



Transportation Impact Assessment

# PROPOSED CONDOMINIUM BUILDING – BANK AT FIFTH (99 FIFTH AVENUE)

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Prepared for Minto Communities Canada  
by IBI Group  
November 22, 2017

# Table of Contents

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**SECTION A: Certification Form for TIA Project Manager**

**SECTION B: Step 1 – TIA Screening Form**

**SECTION C: Step 2 – Scoping Report**

**SECTION D: Step 3 – Forecasting Report**

**SECTION E: Step 4 – Strategy Report**

# Executive Summary

The following Transportation Impact Assessment (TIA) was prepared on behalf of Minto Communities Canada in support of a Re-Zoning and subsequent Site Plan Control application for a proposed 8-storey condominium development to be located on a portion of 819 Bank Street, in the City of Ottawa. The lot is to be severed and subsequently assigned the municipal address of 99 Fifth Avenue. It is expected that the condominium development will be fully built-out and occupied by 2021.

The format of this document was based on the City of Ottawa's 2017 Transportation Impact Assessment (TIA) Guidelines which follows a multi-step review process that engages City staff throughout the course of the study prior to the final submission. This document provides a comprehensive evaluation of the proposed development with respect to transportation through the completion of the following steps of the TIA process: Screening, Scoping, Forecasting and Strategy. The results of the TIA process determined that there are no off-site road modifications triggered by the proposed development and the anticipated traffic impact is expected to be negligible. As such, no further analysis or reporting is deemed necessary in the submission of this TIA.

The proposed condominium development will be constructed in place of an existing commercial building at 819 Bank Street and will include a total 124 residential suites. The site's existing Bank Street frontage is designated as a heritage property and will be unaffected by the redevelopment of the site. The development will include parking for 122 vehicles on-site which is in excess of City requirements, thereby mitigating the impact to the existing public parking supply in the surrounding community.

At present, the site is primarily accessed via Fourth Avenue. The development proposes a reconfiguration of the site's access by shifting the primary vehicular access to Fifth Avenue. A one-way internal driveway connecting Fourth Avenue with Fifth Avenue will be maintained, providing access to short-term visitor parking on-site, however the flow has been reversed to improve traffic circulation both on-site and on the adjacent road network by directing outbound traffic to Fifth Avenue where turning movements can be better-accommodated through signalized intersections.

The proposed development is expected to generate a total of approximately 30 vehicular trips during each the weekday morning and weekday afternoon peak hours, however due to the existing traffic generation of the site, the net traffic impact on the adjacent road network is expected to be negligible. The existing road network is expected to continue operating with sufficient capacity to accommodate the future traffic demand associated with the proposed development and other known developments in the surrounding area. The design of the site will include measures to manage the transportation demand of the development and promote non-auto modes of transportation. Overall, the multi-modal demand of the proposed development can be safely accommodated on the existing transportation network.

## **TIA Plan Reports - Certification**

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

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

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

### **CERTIFICATION**

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

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

Dated at Ottawa this 22nd day of November, 2017.

Name: David Hook

Professional Title: Project Engineer



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

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Stamp




**STEP 1 - City of Ottawa 2017 TIA Guidelines Screening Form****1. Description of Proposed Development**

Municipal Address	819 Bank Street (99 Fifth Avenue)
Description of Location	Immediately east of Bank Street, between Fourth Avenue and Fifth Avenue
Land Use Classification	Residential
Development Size (units)	124 Units (Condominium)
Development Size (m <sup>2</sup> )	n/a
Number of Accesses and Locations	Fourth Avenue – One (1) one-way access Fifth Avenue – One (1) two-way access/egress Fifth Avenue – One (1) one-way egress
Phase of Development	Single Phase
Buildout Year	2021

**2. Trip Generation Trigger**



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

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

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

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








### 3. Location Triggers

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

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

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

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



## 5. Summary

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

Overall, the subject development has been found to satisfy at least one of the triggers for a Transportation Impact Assessment.

**The TIA process is required to proceed to Step 2 – Scoping.**

Should you have any questions or concerns regarding the above findings, please do not hesitate to contact me at 613-225-1311 (x524).

Sincerely,

David Hook, P.Eng





Transportation Impact Assessment

# PROPOSED CONDOMINIUM BUILDING – BANK AT FIFTH (99 FIFTH AVENUE)

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## Step 2 - Scoping Report



Prepared for Minto Communities Canada  
by IBI Group  
November 22, 2017

<b>1</b>	<b>Introduction .....</b>	<b>3</b>
1.1	Background .....	3
1.2	Methodology .....	3
1.3	Reference Material.....	3
<b>2</b>	<b>Proposed Development.....</b>	<b>4</b>
2.1	Site Location .....	4
2.2	Land Use.....	6
2.3	Site Layout .....	6
2.3.1	Access & Circulation .....	6
2.3.2	Parking .....	8
2.3.3	Loading & Heavy Vehicles .....	8
2.4	Phasing & Occupancy.....	8
<b>3</b>	<b>Existing Conditions .....</b>	<b>9</b>
3.1	Existing Road Network.....	9
3.1.1	Roadways .....	9
3.1.2	Study Area Intersections .....	9
3.1.3	Traffic Management Measures .....	9
3.2	Existing Traffic Volumes .....	9
3.3	Existing Bicycle and Pedestrian Facilities.....	12
3.3.1	Bicycle Facilities.....	12
3.3.2	Pedestrian Facilities .....	12
3.4	Existing Transit Facilities and Service .....	13
3.5	Collision Analysis .....	13
<b>4</b>	<b>Planned Conditions .....</b>	<b>14</b>
4.1	Changes to the Study Area Transportation Network .....	14
4.1.1	Future Road Network Projects.....	14
4.1.2	Future Transit Facilities and Services.....	14
4.1.3	Future Cycling and Pedestrian Facilities .....	14
4.2	Future Adjacent Developments .....	14
4.3	Network Concept Screenline .....	15
<b>5</b>	<b>Study Area &amp; Time Periods.....</b>	<b>16</b>
5.1	Proposed Study Area.....	16
5.2	Time Periods .....	16

5.3	Study Horizon Years .....	16
<b>6</b>	<b>Exemptions Review .....</b>	<b>17</b>
<b>7</b>	<b>Conclusions .....</b>	<b>18</b>
<b>Appendix A – Traffic Count Data</b>		
<b>Appendix B – Collision History</b>		
<b>Appendix C – OC Transpo Maps</b>		

# 1 Introduction

The following Scoping Report was prepared on behalf of Minto Communities Canada in support of a Re-Zoning and subsequent Site Plan Control application for a proposed 8-storey condominium development to be located on a portion of 819 Bank Street, in the City of Ottawa. The lot is to be severed and subsequently assigned the municipal address of 99 Fifth Avenue. The format of this Scoping Report was based on the City of Ottawa's 2017 Transportation Impact Assessment (TIA) Guidelines. The purpose of the Scoping Report is to identify "the range of analyses required to understand how well the development proposal aligns with City of Ottawa policies and objectives and if the transportation network requires modification to offset development impacts."

Following the review and approval of this Scoping Report by City staff, the TIA process will proceed to Step 3 - Forecasting.

## 1.1 Background

IBI Group (IBI) was retained by Minto Communities Canada to evaluate the need for and undertake a Transportation Impact Assessment in support of a proposed condominium development at 819 Bank Street (99 Fifth Avenue) in the City of Ottawa. In accordance with the City of Ottawa TIA Guidelines, the initial Screening (Step 1) was completed and confirmed the need to complete the Traffic Impact Assessment process based on all three triggers: Trip Generation, Location and Safety.

## 1.2 Methodology

The content of the Scoping Report is based on the requirements established by the City of Ottawa TIA Guidelines. As such, the following items are discussed in this report:

- Existing and Planned Conditions
- Key Parameters including: Study Area, Analysis Periods and Study Horizons
- Any Scope Exemptions that would eliminate elements of work not relevant to the development proposal, based on consultation with City staff

## 1.3 Reference Material

The following documents were referenced in the preparation of this report:

- City of Ottawa Transportation Impact Assessment Guidelines (2017)
- City of Ottawa Transportation Master Plan (November 2013)
- City of Ottawa Cycling Plan (2013)
- City of Ottawa Private Approach By-law 2003-447.
- Glebe Neighbourhood Cycling – Tender Drawings (August 2017)

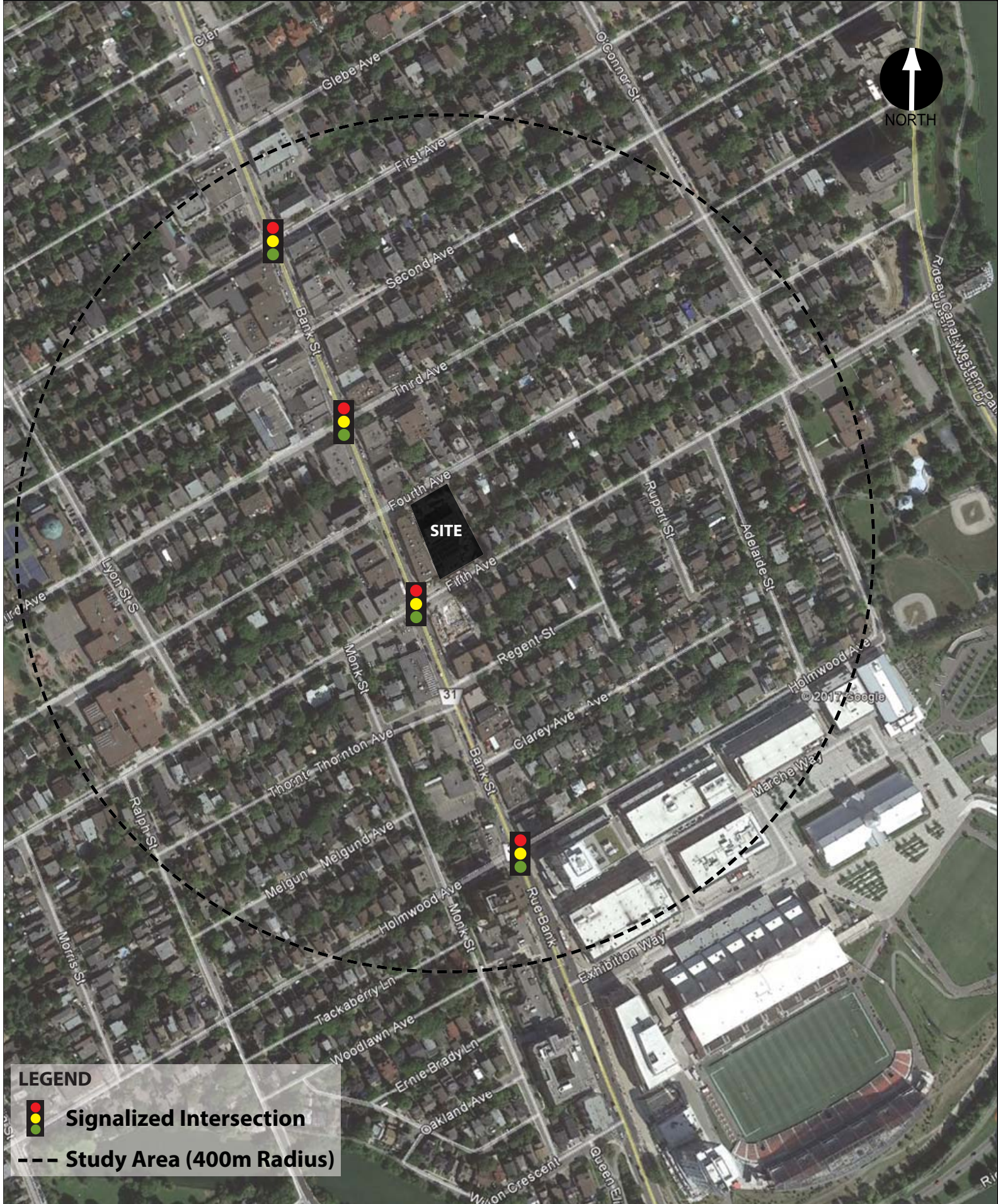
## 2 Proposed Development

### 2.1 Site Location

The proposed development is located at 819 Bank Street in the Glebe district of Ottawa, bounded by Fourth Avenue to the north, Fifth Avenue to the south, an existing 2-story commercial heritage building fronting Bank Street to the west and existing two-story single and multi-family homes to the east. The site will ultimately be severed such that the existing heritage building fronting Bank Street will remain as 819 Bank Street while the eastern portion of the site accommodating the proposed development will become 99 Fifth Avenue. The site is located within a Design Priority Area, located along a Traditional Mainstreet and is fully within the boundaries of the Bank Street Business Improvement Area.

The subject site location and study area for the purposes of project scoping is shown as follows, in **Exhibit 2-1**.





**LEGEND**



**Signalized Intersection**

**--- Study Area (400m Radius)**



99 Fifth Avenue  
Transportation Impact Assessment  
Scoping Report

**EXHIBIT 2-4: Site Location**

PROJECT No. 113459  
DATE: November 2017  
SCALE:  
0m 50m 100m



## 2.2 Land Use

The lot size is approximately 3,697 square meters and is presently zoned as Traditional Mainstreet TM(93)H(15) and is within a Mature Neighbourhood Overlay.

The Draft Plan for the proposed development is illustrated in **Exhibit 2-2**. The development will include 124 Condominium units.

## 2.3 Site Layout

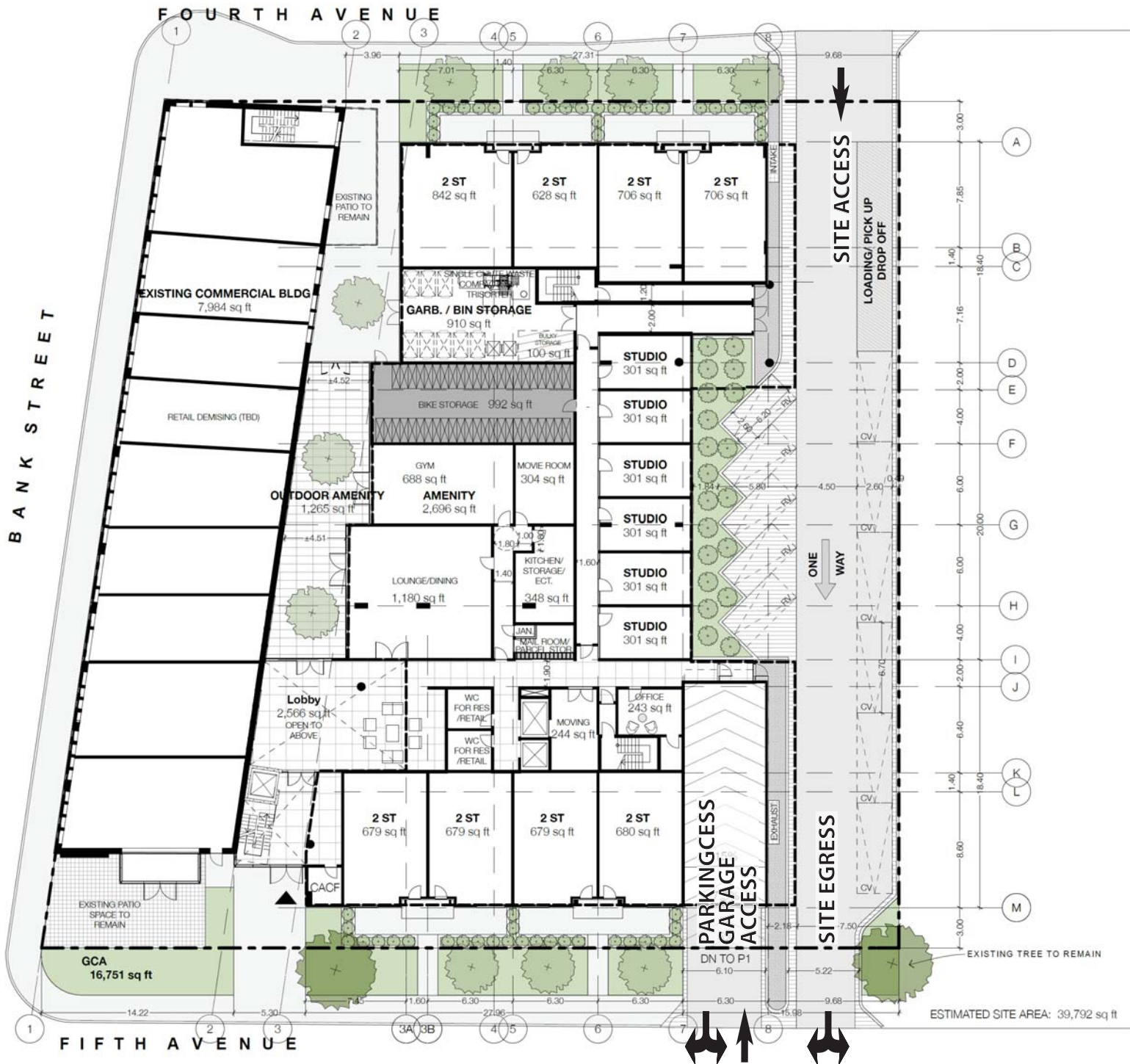
### 2.3.1 Access & Circulation

The proposed Draft Plan includes three vehicular private approach driveways; one on Fourth Avenue and two on Fifth Avenue. The location of the existing Fifth Avenue private approach will remain and be reconfigured as a one-way (outbound) site egress, while the existing private approach on Fourth Avenue will shift to the eastern boundary of the site and be reconfigured as a one-way (inbound) site access. A new two-way private approach will be located on Fifth Avenue and will provide access to the development's below-grade parking facilities.

The circulation of the internal driveway will provide unidirectional flow in the southbound direction from Fourth to Fifth Avenue. Presently, all site-generated traffic must exit via Fourth Avenue, however reversal of the internal site circulation will facilitate turning movements on the adjacent road network due to the presence of traffic signals along Fifth Avenue at Bank Street, Bronson Avenue to the west and Queen Elizabeth Drive to the east.

The Fifth Avenue egress will continue to be located approximately 58m east of Bank Street, while the new two-way parking garage access on Fifth Avenue will be located approximately 50m from Bank Street. The Fourth Avenue access will be located approximately 46 metres east of Bank Street.

Pedestrian access serving the main lobby will be provided by a pedestrian arcade between the proposed building and the existing heritage building, connecting Fourth Avenue and Fifth Avenue. The proposed walk-up units on both Fourth and Fifth Avenue will have direct pedestrian access to the street while visitors using the surface parking will be able to access the development via two auxiliary entrances located at the rear of the building. Dedicated pedestrian connections will be provided between each building entrance and the nearest sidewalk facility.





### **2.3.2 Parking**

The Draft Plan proposes two levels of below-grade parking, accessed via Fifth Avenue. The below-grade parking facility will provide space for 111 vehicles. On the surface, an additional 6 parking spaces will be provided for use by visitors to the condominium development and 5 parking spaces for use by patrons of the existing commercial component of the site.

In total, the site will provide parking for 122 vehicles which is in excess of the 74 spaces required by the City of Ottawa. As the site will provide a sufficient amount of parking to support the proposed development, it is not anticipated that the Transportation Impact Assessment will require any review of off-site parking facilities.

In addition to vehicular parking, a total of 83 bicycle parking spaces will be provided, which is in excess of the 62 spaces required by City By-law based on the number of dwelling units proposed.

### **2.3.3 Loading & Heavy Vehicles**

The internal road connecting Fourth Avenue with Fifth Avenue will be 4.5 metres in width, and thus sufficient for access by heavy vehicles such as waste collection vehicles and medium-sized moving trucks. Waste will be collected via a service corridor located at the mid-point of the internal road, adjacent the parking garage ramp. A space for moving trucks has been reserved adjacent the service corridor at the northeast corner of the building.

## **2.4 Phasing & Occupancy**

The proposed development will be constructed in a single phase. It is anticipated that the development will be constructed and fully-occupied by 2021.

## 3 Existing Conditions

### 3.1 Existing Road Network

#### 3.1.1 Roadways

The proposed development is bounded by the following streets:

**Bank Street** is oriented north-south from Wellington Street to the southern Urban Boundary which at that point, becomes Provincial Highway 31. Within the study area, Bank Street is designated as a 4-lane undivided urban arterial road with a posted speed limit of 40km/h and has a right-of-way 18.5 metres. It is also designated as a Traditional Mainstreet, Transit Priority Corridor and a Design Priority Area. On-street parking is permitted in the curb lanes at various times of the day, however parking is restricted in the direction of peak flow during weekday morning and afternoon peak periods. Bank Street underwent full rehabilitation in 2011 and due to the constrained right-of-way conditions, the inner travel lanes had been narrowed to as low as 3.0 metres in favour of wider pedestrian facilities.

**Fifth Avenue** is oriented east-west from Bronson Avenue to Queen Elizabeth Drive, intersection Bank Street at its midpoint. Within the study area, Fifth Avenue is designated as a 2-lane undivided urban collector road with a posted speed limit of 40km/h and has a right-of-way of 20 metres.

**Fourth Avenue** is oriented east-west from Bronson Avenue to Queen Elizabeth Drive, intersection Bank Street at its midpoint. Within the study area, Fourth Avenue is designated as a 2-lane undivided urban local road with a posted speed limit of 40km/h and has a right-of-way of 18.5 metres.

#### 3.1.2 Study Area Intersections

The following signalized intersections are located within the study area.

- Bank Street & First Avenue
- Bank Street & Third Avenue
- Bank Street & Fifth Avenue
- Bank Street & Holmwood Avenue

#### 3.1.3 Traffic Management Measures

Within the study area, curb extensions are provided on Fifth Avenue at both Lyon Street and Ralph Street to serve as traffic-calming measures and to shorten the pedestrian crossing distance in the vicinity of Muchmor School. Curb extensions are also provided along Fourth Avenue at Lyon Street, Bank Street and Queen Elizabeth Drive.

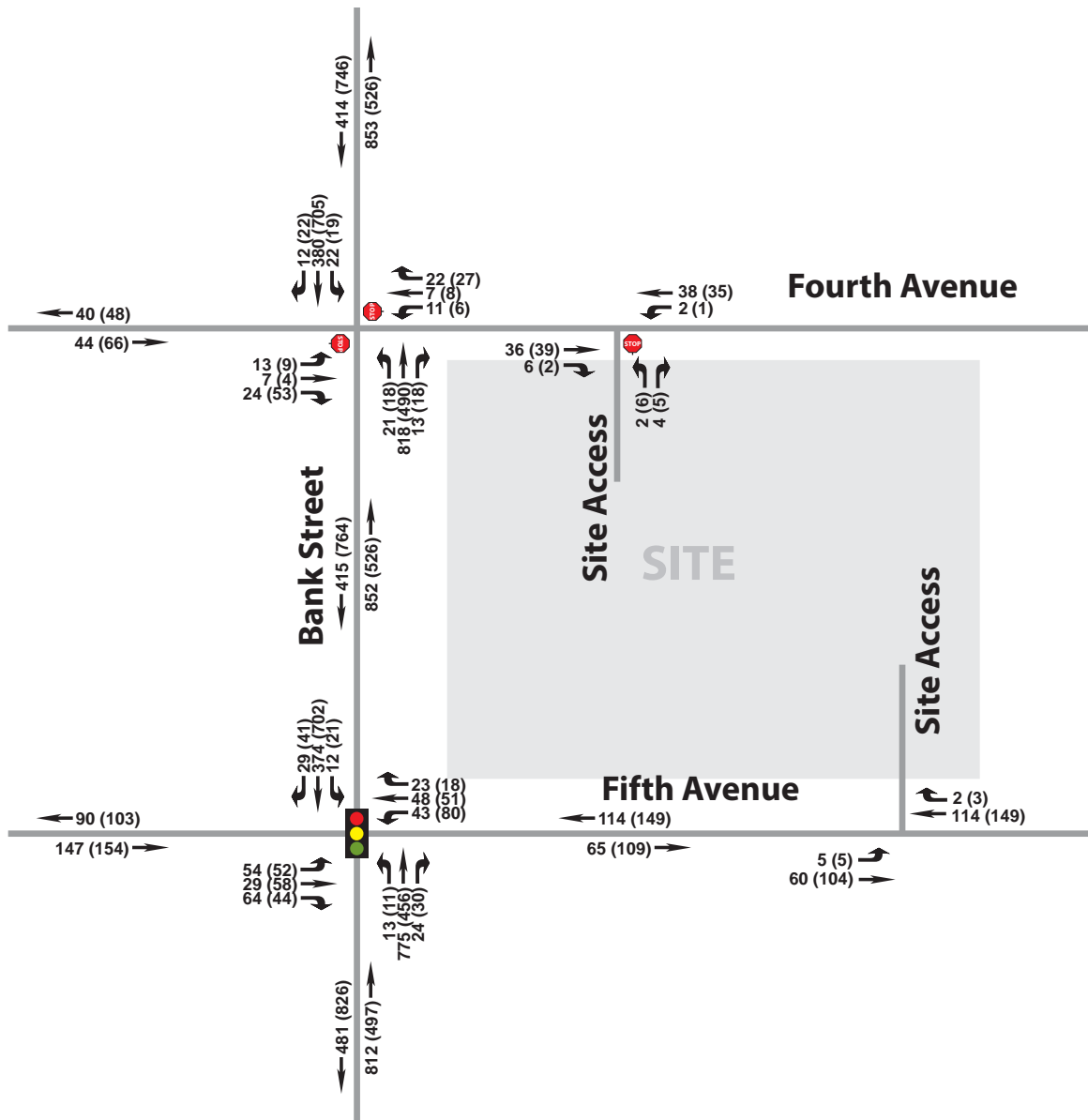
### 3.2 Existing Traffic Volumes

Weekday morning and afternoon peak hour turning movement counts were obtained from the City of Ottawa at the each of the boundary street intersections that will be most impacted by the proposed development:

- Bank Street & Fifth Avenue (City of Ottawa, March 2014)
- Bank Street & Fourth Avenue (City of Ottawa, July 2017)

The application of a growth rate was not necessary for the estimation of existing traffic volumes as sufficient data was available from the City for the present year. Since there are no access driveways on Bank Street between Fourth and Fifth, traffic volumes were balanced though along Bank Street between these two intersections, selecting the highest through-volumes observed. Side street volumes on Fourth Avenue were assumed to be representative of typical conditions as significant background traffic growth would not be expected on this local road.

Peak hour traffic volumes representative of existing conditions are shown in **Exhibit 2-3**. Traffic count data is provided in **Appendix A**.



### 3.3 Existing Bicycle and Pedestrian Facilities

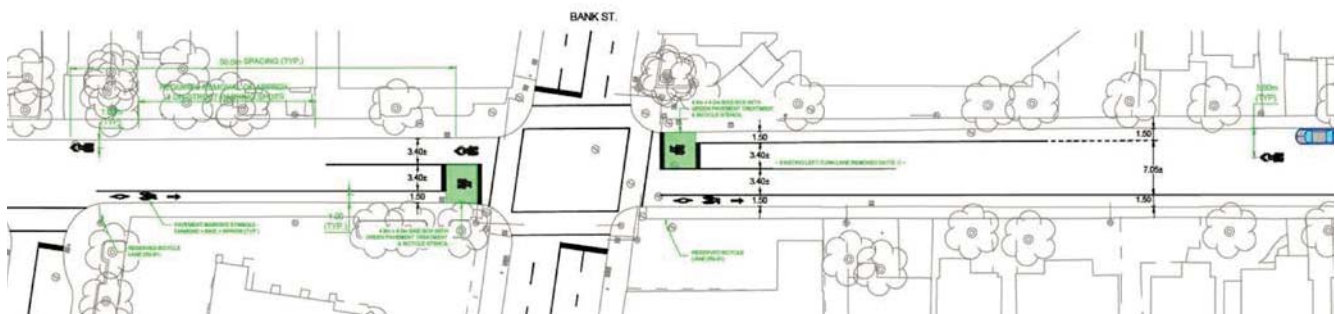
#### 3.3.1 Bicycle Facilities

There are presently no specific bicycle facilities on Bank Street despite its designation in the Ottawa Cycling Plan as a Local Route. Cyclists must share the road with vehicular traffic. O'Connor Street, however, runs parallel with Bank Street and is a designated Spine Cycling Route, serving as the primary north-south corridor for bicycle traffic. Fourth Avenue has no designation within the Ottawa Cycling Plan, therefore no specific cycling facilities are provided. According to the Ottawa Cycling Plan's Ultimate Plan, Fifth Avenue is designated as a Local Cycling Route and a Neighbourhood Bikeway. On Fifth Avenue, there are presently no specific cycling facilities other than on-street bike lanes east of O'Connor Street, however implementation of the Glebe Neighbourhood Cycling project is underway which will see major improvements to cycling facilities in the Glebe by the end of 2017.

Within the study area, the Glebe Neighbourhood Cycling project will improve cycling infrastructure within the community by implementing isolated sections of segregated cycling facilities on Glebe Avenue, as well as other improvements along the neighbourhood collector roads such as lane designations (signage and markings) and traffic calming measures (curb extensions and speed humps).

At the Bank/Fifth intersection, the westbound left-turn lane is planned to be removed by the City with the introduction of 1.5 meter wide bike lanes in both directions on Fifth Avenue along the entire frontage of the site. Bike boxes on the Fifth Avenue approaches to Bank Street will facilitate left turns onto Bank Street by cyclists. East of the site, cyclist connectivity to those existing facilities beyond O'Connor will be provided by a continuous bike lane in the eastbound direction, while westbound cycling facilities will be enhanced by the designation of a shared-use lane.

Figure 2- 1: Glebe Neighbourhood Cycling Project Improvements (Fifth Avenue)



#### 3.3.2 Pedestrian Facilities

Concrete sidewalks are provided on both sides of each street within the study area. Pedestrian crossings are provided on all four legs of the Bank/Fifth intersection, including audible signals for the visually impaired, while only north-south crossings are available at the unsignalized intersection of Bank/Fourth. As Bank Street was reconstructed prior to the implementation of the enhanced accessibility standards required by provincial legislation, there are no Tactile Walking Surface Indicators (TWSI) at any of the controlled pedestrian crossings within the study area, however any modifications constructed as part of the Glebe Neighbourhood Cycling project will involve isolated upgrades to current standards.

### 3.4 Existing Transit Facilities and Service

The 2013 Transportation Master Plan identifies Bank Street as a Transit Priority Corridor with Isolated Measures. OC Transpo operates the following two transit routes on Bank Street providing the only transit service to the study area:

- **Route #6** provides All Day service, 7 days a week between Rockcliffe and Greenboro via Bank Street with direct access to key destinations along the route such as the Rideau Centre, Lansdowne Park and Billings Bridge/Transitway. The route operates on a 10-15 minute frequency during the peak hours and is accessed by bus stops on Bank Street at the northwest and southeast quadrants of the Bank/Fifth intersection.
- **Route #7** provides All Day service, 7 days a week between St. Laurent Mall and Carleton University via Bank Street with direct access to key destinations along the route such as the Rideau Centre and Lansdowne Park. The route operates on a 10-15 minute frequency during the peak hours and is also accessed by bus stops on Bank Street at the northwest and southeast quadrants of the Bank/Fifth intersection.

### 3.5 Collision Analysis

A review of historical collision data has been provided. The City requires 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 2-1** summarizes all reported collisions between January 1, 2011 and January 1, 2016.

Table 2- 1: Summary of Reported Collisions within the Study Area

LOCATION	# OF REPORTED COLLISIONS	RE-OCCURRING EVENTS
Bank & Fourth	16	<ul style="list-style-type: none"> <li>• Northbound/Eastbound Angle Collision: 4 similar events</li> <li>• Southbound/Westbound Angle Collision: 2 similar events</li> </ul>
Bank & Fifth	12	<ul style="list-style-type: none"> <li>• Northbound Sideswipe: 2 similar events</li> </ul>
Bank Street – Fourth to Fifth	11	<ul style="list-style-type: none"> <li>• Northbound Sideswipe: 7 similar events</li> <li>• Southbound Sideswipe: 3 similar events</li> </ul>
Fourth Avenue – Bank to O'Connor	5	<ul style="list-style-type: none"> <li>• Impact to Unattended Vehicle: 3 similar events</li> </ul>
Fifth Avenue – Bank to Howick	6	<ul style="list-style-type: none"> <li>• No re-occurring events</li> </ul>
Fifth Avenue – Monk to Bank	3	<ul style="list-style-type: none"> <li>• Impact to Unattended Vehicle: 2 similar events</li> </ul>

## 4 Planned Conditions

### 4.1 Changes to the Study Area Transportation Network

#### 4.1.1 Future Road Network Projects

The 2013 Transportation Master Plan (TMP) outlines future road network modifications required in the 2031 'Affordable Road Network.' There are no major future road network modifications within the project area that will have any impact on traffic capacity or distribution. Minor modifications relating to improved cycling infrastructure are described below.

#### 4.1.2 Future Transit Facilities and Services

The 2013 TMP outlines future rapid transit and transit priority (RTTP) network. The 2031 Affordable Rapid Transit and Transit Priority Network identifies Bank Street as a Transit Priority Corridor (with Isolated Measures) between Queen Street (Confederation Line LRT) and the Billings Bridge Transitway station. No specific timing for the implementation of any transit priority measures was available at the time of this study.

#### 4.1.3 Future Cycling and Pedestrian Facilities

The Ottawa Cycling Plan designates Bank Street and Fifth Avenue as Local Routes while O'Connor Street is designated as a "Spine" or "City-wide Cycling Routes," serving the north-south corridor through the community.

As discussed previously, various upgrades to cycling facilities within the study area are planned. Significant to the TIA's analysis of existing and future conditions is the removal of the westbound left-turn lane at the intersection of Bank/Fifth to permit the addition of bicycle lanes along Fifth Avenue including a 'bike box' at the intersection.

East of the study area, a new cyclist/pedestrian connection over the Rideau Canal between Fifth Avenue and Clegg Street has recently begun construction and it is anticipated that it will be open for public use by 2019. This represents a major link in the network and will promote increase active transportation to and from the community.

### 4.2 Future Adjacent Developments

The City of Ottawa Transportation Impact Assessment (TIA) Guidelines specifies all significant developments within the study area which are likely to occur within the horizon years must be identified and taken into consideration in all Traffic Impact Assessment (TIA) reports. Traffic generated by planned adjacent developments are considered in addition to general background traffic growth rates in the estimation of future traffic volumes within the study area.

There are two (2) known significant developments within study area that are either in the development application approval process, have already been approved and in pre-construction, or are currently under construction. Traffic generation estimates for these developments are provided in their respective transportation studies and will be considered in the future traffic analysis conducted in Step 3 of the Transportation Impact Study process - Forecasting.

The adjacent developments have been summarized in **Table 2-2** below:

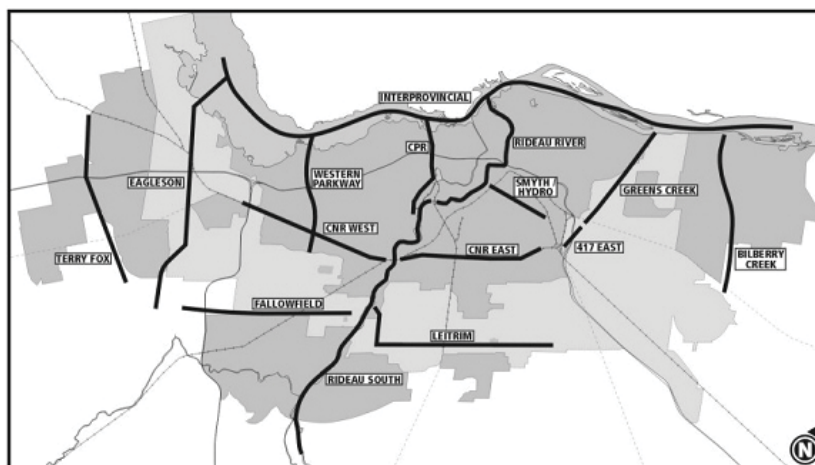
Figure 2- 2 Future Adjacent Developments

LOCATION	DESCRIPTION	AUTHOR/DATE	STATUS
890-900 Bank Street	<ul style="list-style-type: none"> <li>• 160 Room Retirement Residence</li> <li>• 17,000 ft<sup>2</sup> Ground Floor Retail</li> </ul>	Transportation Brief, July 2016 (Parsons)	Zoning Approved - Pending Site Plan Approval
852 Bank Street	<ul style="list-style-type: none"> <li>• 2-Storey Commercial Building (1,260 m<sup>2</sup>) with Ground Floor Retail and Second Storey Restaurant</li> </ul>	Transportation Overview, May 2014 (Delcan)	SPA Approved (February 2017) – Under Construction

### 4.3 Network Concept Screenline

A screenline is an imaginary line made up of a number of stations to count east/west or north/south travel within a particular area. Screenlines are typically located along geographical barriers such as rivers, rail lines or within the greenbelt. The capacity of each road crossing the screenline is monitored such that the combined demand at each crossing does not exceed the combined capacity of the entire screenline. Screenlines established by the City of Ottawa are depicted in **Figure 2-1** below.

Figure 2- 3 City of Ottawa Screenlines



As specified in Module 4.8 of the 2017 TIA Guidelines, the latest Network Concept may be reviewed with to ensure that the nearest strategic planning screenlines to the proposed development are considered in the screenline analysis. The purpose of this review is to assess the volume-to-capacity ratio at each screenline to ensure there is sufficient residual capacity to accommodate the proposed development.

- SL27/28/29 – CPR – This is the nearest screenline west of the study area. It is located along the Trillium Line (O-Train) and extends from the Ottawa River to Heron Road, inclusive.



- SL19/32 – Rideau River Central/Queensway - This is the nearest screenline south and east of the study area. It is located along the Trillium Line (O-Train) and extends from the Ottawa River to Heron Road, inclusive.

## 5 Study Area & Time Periods

### 5.1 Proposed Study Area

Based on the information contained in this Scoping Report, a reduced study area bound by Ralph Street to the west, O'Connor Street to the east, Third Avenue to the north and Regent Street to the south will provide a sufficient assessment of the proposed development's impact on the adjacent transportation network with respect to all modes of transportation provided for in the surrounding area.

The following intersections will be assessed for vehicular capacity as part of this TIA:

- Bank Street & Fourth Avenue
- Bank Street & Fifth Avenue

Multi-Modal Level of Service will be conducted for the intersections described above as well as the site's boundary street segments:

- Bank Street: Fourth Avenue to Fifth Avenue
- Fourth Avenue: Bank Street to O'Connor
- Fifth Avenue: Bank Street to O'Connor Street

As a result of the upcoming changes to the adjacent road network as part of the Glebe Neighbourhood Cycling project, it is proposed that the Transportation Impact Assessment considers existing (2017) conditions pre- and post-modifications. This will establish an existing baseline condition and enable a clear identification of the impacts related to these improvements versus the future impacts by the proposed development or background traffic growth.

### 5.2 Time Periods

Based on the proposed residential land use, traffic generated during the weekday morning and afternoon peak hour is expected to result in the most significant impact to traffic operations on the adjacent network in terms of combined development-generated and background traffic. The two time periods will be considered for operational analysis in the TIA.

### 5.3 Study Horizon Years

Two (2) future horizons are proposed for analysis in the Transportation Impact Analysis (TIA) Report:

- Year 2021 – Full Occupancy
- Year 2026 – 5 years beyond Full Occupancy

## 6 Exemptions Review

The TIA Guidelines provide exemption considerations for both the Design Review and Network Impact components. **Table 2-3** identifies the components of the TIA that are not required.

Figure 2- 4 Exemptions Review

TIA MODULE	ELEMENT	EXEMPTION CONSIDERATIONS	REQUIRED
<b>Design Review Component</b>			
4.1 Development Design	4.1.2 Circulation and Access	<ul style="list-style-type: none"> <li>Only required for site plans</li> </ul>	✓
	4.1.3 New Street Networks	<ul style="list-style-type: none"> <li>Only required for plans of subdivision</li> </ul>	✗
4.2 Parking	4.2.1 Parking Supply	<ul style="list-style-type: none"> <li>Only required for site plans</li> </ul>	✓
	4.2.2 Spillover Parking	<ul style="list-style-type: none"> <li>Only required for site plans where parking supply is 15% below unconstrained demand</li> </ul>	✗
<b>Network Impact Component</b>			
4.5 Transportation Demand Management	All Elements	<ul style="list-style-type: none"> <li>Not required for site plans expected to have fewer than 60 employees and/or students on location at any given time</li> </ul>	✓
4.6 Neighbourhood Traffic Management	4.6.1 Adjacent Neighbourhoods	<ul style="list-style-type: none"> <li>Only required when the development relies on local or collector streets for access and total volumes exceed ATM capacity thresholds</li> </ul>	✓
4.8 Network Concept	n/a	<ul style="list-style-type: none"> <li>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</li> </ul>	✗

## 7 Conclusions

Based on the study parameters and background information established in this Scoping Report, future travel demands can now be prepared in order to analyse pre- and post-development network performance.

**THE TIA PROCESS IS REQUIRED TO PROCEED TO STEP 3 – FORECASTING.**

Should you have any questions or concerns regarding the contents of this Scoping Report, please do not hesitate to contact me at 613-225-1311 (x524).

Sincerely,

A handwritten signature in black ink, appearing to read 'D Hook', with a long horizontal line extending to the right.

David Hook, P.Eng

# Appendix A – Traffic Count Data

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# Transportation Services - Traffic Services

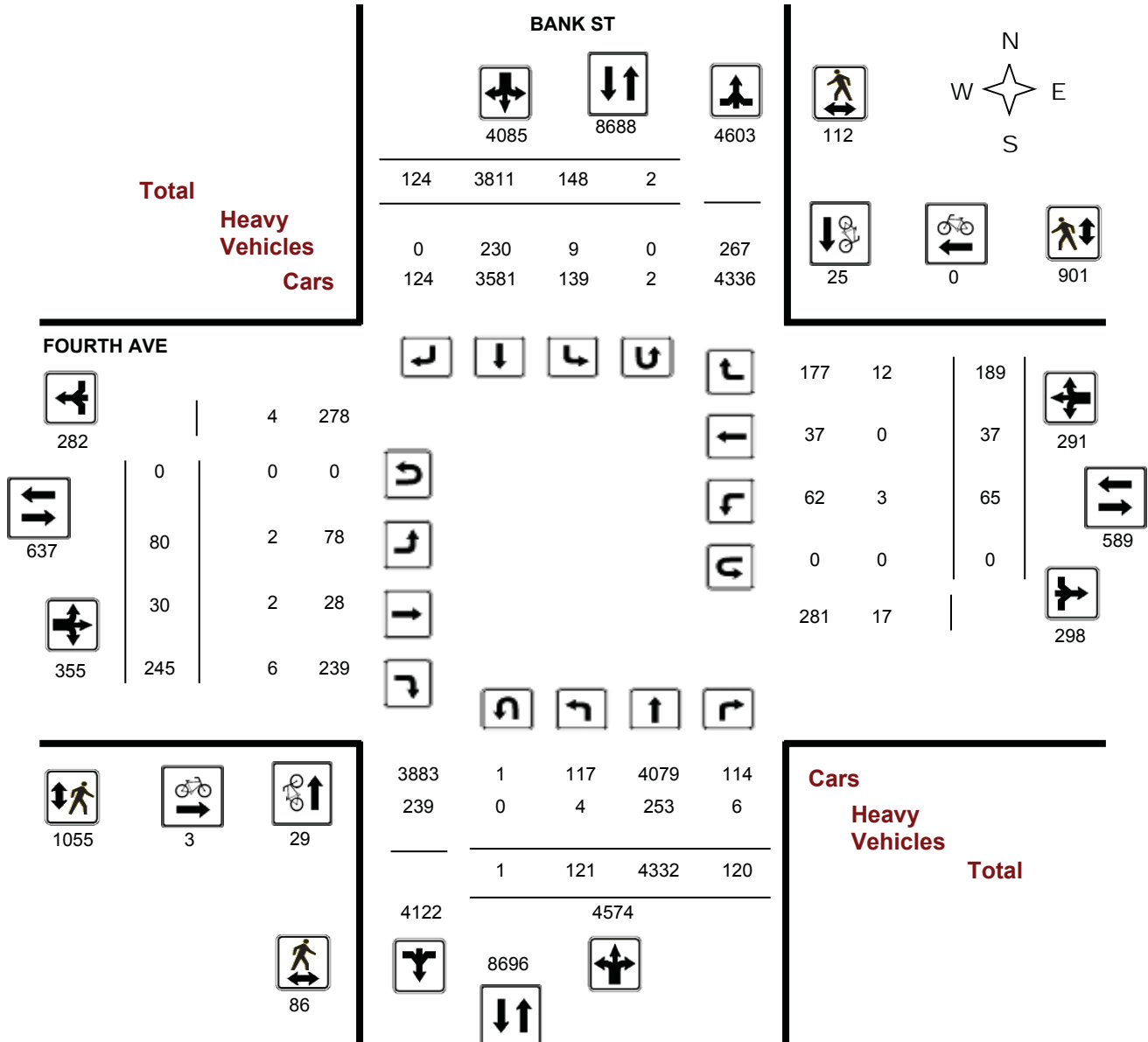
## Turning Movement Count - Full Study Diagram

### BANK ST @ FOURTH AVE

**Survey Date:** Wednesday, March 19, 2014

**WO#:** 29122

**Device:** Miovision





# Transportation Services - Traffic Services

## Turning Movement Count - Full Study Peak Hour Diagram

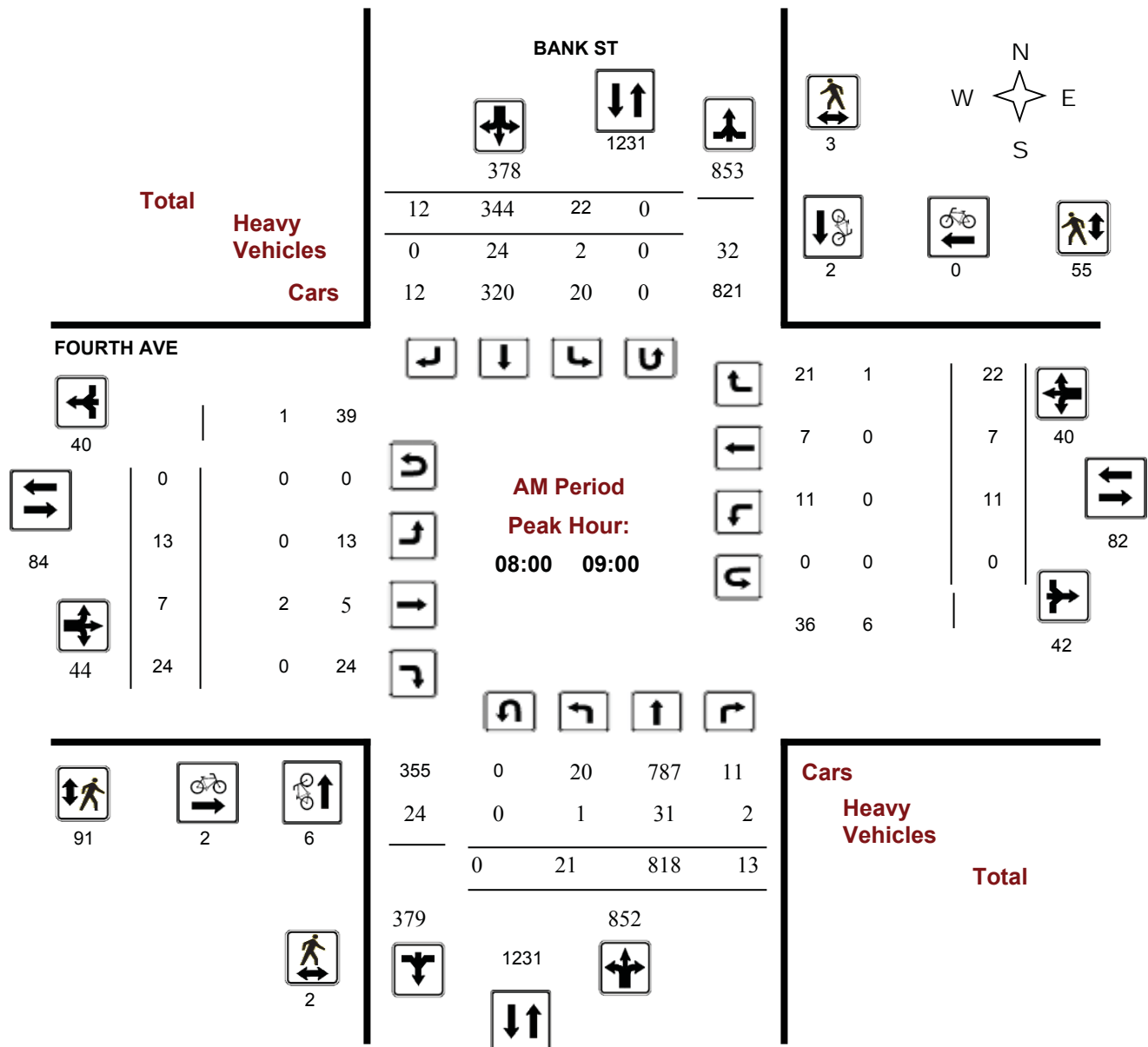
### BANK ST @ FOURTH AVE

**Survey Date:** Wednesday, March 19, 2014

**Start Time:** 07:00

**WO No:** 29122

**Device:** Miovision



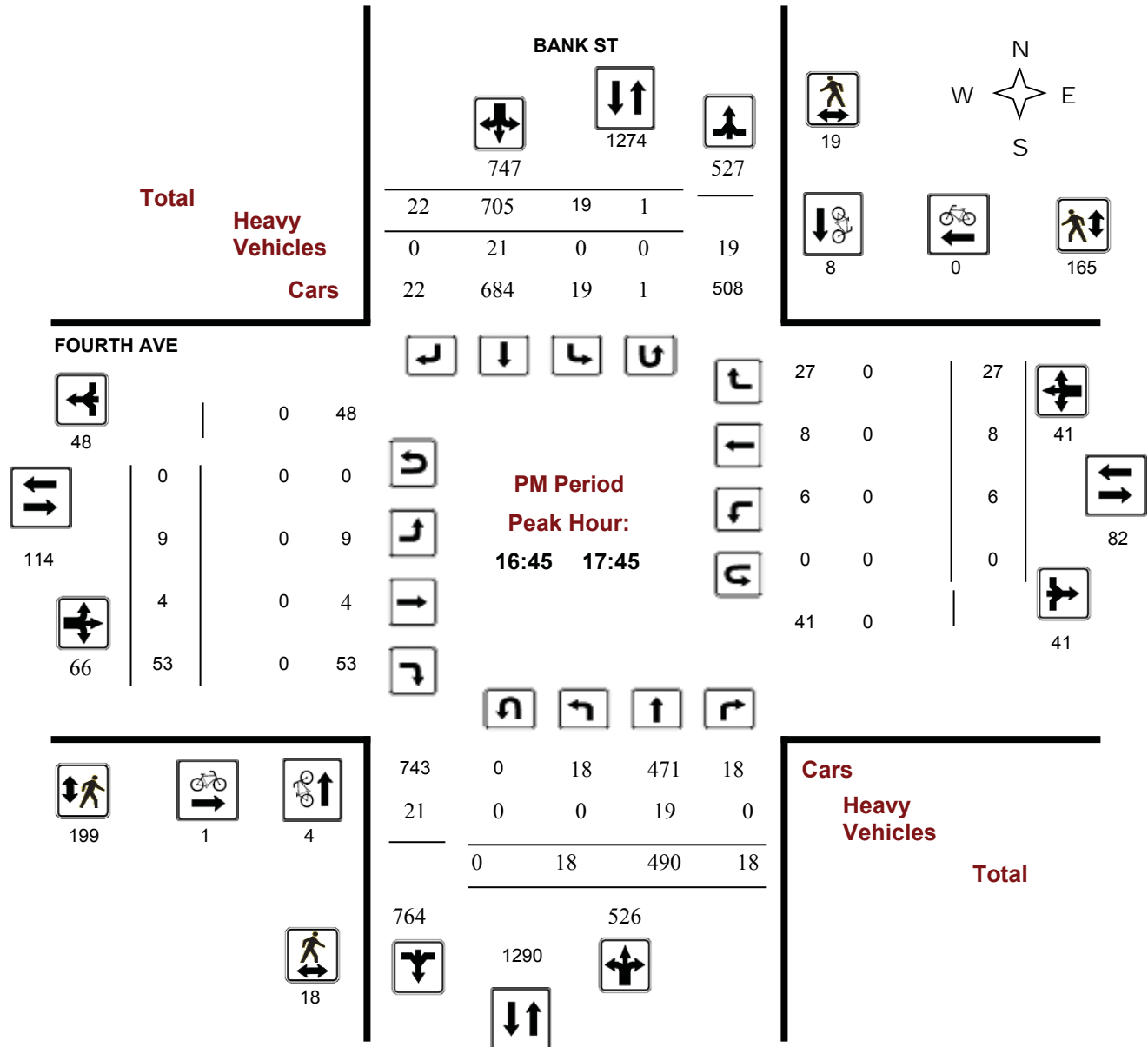
**Comments**

**Survey Date:** Wednesday, March 19, 2014

**Start Time:** 07:00

**WO No:** 29122

**Device:** Miovision



# Transportation Services - Traffic Services

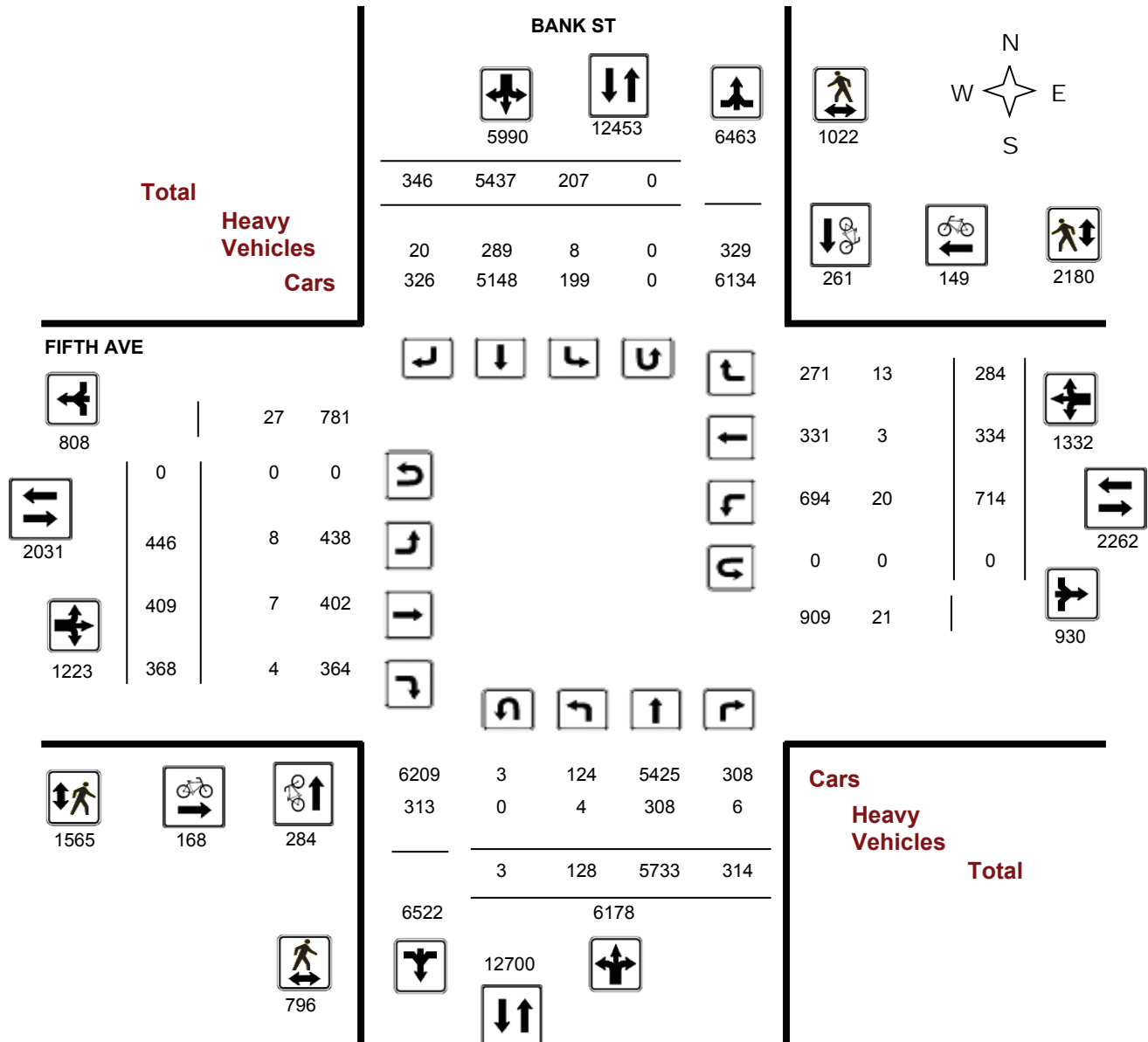
## Turning Movement Count - Full Study Diagram

### BANK ST @ FIFTH AVE

**Survey Date:** Thursday, July 20, 2017

**WO#:** 37227

**Device:** Miovision







# Transportation Services - Traffic Services

## Turning Movement Count - Full Study Peak Hour Diagram

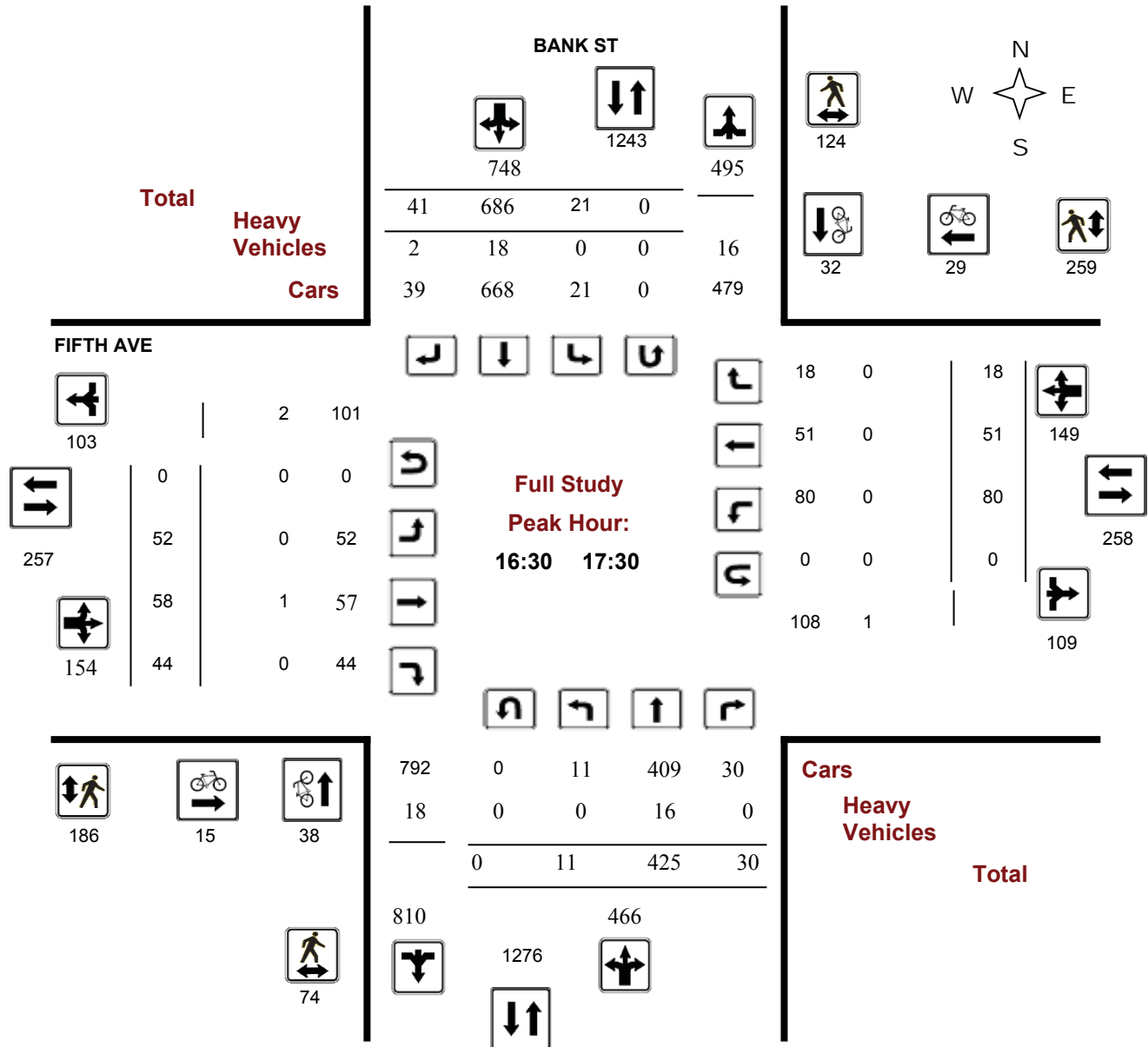
### BANK ST @ FIFTH AVE

**Survey Date:** Thursday, July 20, 2017

**Start Time:** 07:00

**WO No:** 37227

**Device:** Miovision



## Appendix B – Collision History

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# City Operations - Transportation Services

## Collision Details Report - Public Version

**From:** January 1, 2014 **To:** January 1, 2016

**Location:** BANK ST @ FIFTH AVE

**Traffic Control:** Traffic signal

**Total Collisions:** 6

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2014-Apr-17, Thu,18:37	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Pick-up truck	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Feb-06, Fri,17:49	Clear	Sideswipe	P.D. only	Slush	North	Going ahead	Delivery van	Other motor vehicle	
					North	Stopped	Municipal transit bus	Other motor vehicle	
2015-May-26, Tue,18:00	Clear	Angle	P.D. only	Dry	North	Going ahead	Pick-up truck	Other motor vehicle	
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Mar-15, Sun,16:59	Clear	Angle	P.D. only	Dry	South	Going ahead	Passenger van	Other motor vehicle	
					East	Going ahead	Passenger van	Other motor vehicle	
2015-Sep-03, Thu,10:18	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					South	Going ahead	Pick-up truck	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	

2014-Oct-15, Wed,11:48	Clear	Angle	P.D. only	Dry	North	Turning right	Truck - tractor	Other motor vehicle
					West	Turning left	Automobile, station wagon	Other motor vehicle

**Location:** BANK ST @ FIRST AVE

**Traffic Control:** Traffic signal

**Total Collisions:** 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2015-Oct-29, Thu,12:00	Clear	Rear end	P.D. only	Wet	North	Going ahead	Automobile, station wagon	Other motor vehicle	
					North	Stopped	Pick-up truck	Other motor vehicle	

**Location:** BANK ST @ FOURTH AVE

**Traffic Control:** Stop sign

**Total Collisions:** 9

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2014-Jun-14, Sat,09:38	Clear	Turning movement	Non-fatal injury	Dry	South	Turning left	Pick-up truck	Cyclist	
					North	Going ahead	Bicycle	Other motor vehicle	
2014-Jun-02, Mon,20:39	Clear	SMV other	Non-fatal injury	Dry	South	Turning right	Pick-up truck	Pedestrian	1
2015-Jan-16, Fri,08:10	Clear	Angle	P.D. only	Loose snow	West	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-Oct-28, Tue,18:20	Rain	Rear end	Non-fatal injury	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					South	Turning left	Automobile, station wagon	Other motor vehicle	
2015-Jan-24, Sat,20:25	Snow	Angle	P.D. only	Wet	East	Going ahead	Automobile, station wagon	Other motor vehicle	

					North	Going ahead	Automobile, station wagon	Other motor vehicle
2014-Dec-17, Wed,12:50	Clear	Sideswipe	P.D. only	Wet	North	Pulling away from shoulder or curb	Unknown	Other motor vehicle
					North	Stopped	Automobile, station wagon	Other motor vehicle
2015-Jul-25, Sat,19:08	Rain	Angle	P.D. only	Wet	East	Turning left	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle
2015-Jul-31, Fri,20:18	Clear	Angle	P.D. only	Dry	East	Going ahead	Passenger van	Other motor vehicle
					North	Going ahead	Motorcycle	Other motor vehicle
2015-Sep-29, Tue,11:29	Clear	Angle	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle

**Location:** BANK ST @ HOLMWOOD AVE

**Traffic Control:** Traffic signal

**Total Collisions: 2**

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Jul-18, Fri,22:15	Clear	Rear end	P.D. only	Dry	South	Slowing or stopping	Construction equipment	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2015-Jan-05, Mon,19:25	Clear	Rear end	Non-fatal injury	Slush	South	Unknown	Unknown	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	

**Location:** BANK ST @ SECOND AVE

**Traffic Control:** Stop sign

**Total Collisions:** 6

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2014-Sep-04, Thu,17:13	Clear	Turning movement	P.D. only	Dry	South	Turning left	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-Dec-14, Sun,11:22	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	
					South	Stopped	Pick-up truck	Other motor vehicle	
2014-Sep-07, Sun,14:00	Clear	SMV unattended vehicle	P.D. only	Dry	West	Reversing	Pick-up truck	Unattended vehicle	
2015-Apr-26, Sun,11:16	Clear	Angle	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Jun-22, Mon,15:20	Clear	Angle	P.D. only	Dry	West	Going ahead	Pick-up truck	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Oct-02, Fri,10:05	Clear	Angle	P.D. only	Dry	South	Reversing	Pick-up truck	Other motor vehicle	
					West	Going ahead	Pick-up truck	Other motor vehicle	

**Location:** BANK ST @ THIRD AVE

**Traffic Control:** Traffic signal

**Total Collisions:** 3

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2014-Jan-09, Thu,11:44	Clear	Angle	P.D. only	Slush	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					East	Turning right	Pick-up truck	Other motor vehicle	
2015-Jan-31, Sat,16:10	Snow	Rear end	Non-fatal injury	Loose snow	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					South	Stopped	Pick-up truck	Other motor vehicle	
2015-Jan-21, Wed,20:59	Clear	Sideswipe	P.D. only	Dry	North	Going ahead	Municipal transit bus	Other motor vehicle	
					North	Going ahead	Pick-up truck	Other motor vehicle	

**Location:** BANK ST btwn FIFTH AVE & REGENT ST

**Traffic Control:** No control

**Total Collisions:** 2

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2014-Jan-24, Fri,07:00	Clear	Rear end	P.D. only	Ice	North	Going ahead	Automobile, station wagon	Other motor vehicle	
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2015-May-27, Wed,19:32	Clear	SMV unattended vehicle	P.D. only	Dry	Unknown		Unknown	Unattended vehicle	

**Location:** BANK ST btwn FIRST AVE & SECOND AVE

**Traffic Control:** No control

**Total Collisions:** 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2015-Feb-15, Sun,13:46	Clear	Sideswipe	P.D. only	Loose snow	South	Going ahead	Unknown	Other motor vehicle	

South

Stopped

Pick-up truck

Other motor  
vehicle**Location:** BANK ST btwn FOURTH AVE & FIFTH AVE**Traffic Control:** No control**Total Collisions:** 7

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2014-Jul-08, Tue,11:45	Clear	Sideswipe	P.D. only	Dry	North	Pulling away from shoulder or curb	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Passenger van	Other motor vehicle	
2014-Jul-15, Tue,11:02	Clear	Sideswipe	P.D. only	Dry	South	Pulling away from shoulder or curb	Automobile, station wagon	Other motor vehicle	
					South	Going ahead	Truck - open	Other motor vehicle	
2014-Oct-05, Sun,14:50	Clear	Sideswipe	Non-fatal injury	Dry	North	Changing lanes	Automobile, station wagon	Cyclist	
					North	Going ahead	Bicycle	Other motor vehicle	
2015-Feb-28, Sat,12:04	Clear	Sideswipe	P.D. only	Dry	South	Going ahead	Passenger van	Other motor vehicle	
					South	Going ahead	Pick-up truck	Other motor vehicle	
2015-Apr-09, Thu,14:56	Clear	Sideswipe	P.D. only	Dry	North	Going ahead	Pick-up truck	Other motor vehicle	
					North	Changing lanes	Automobile, station wagon	Other motor vehicle	
2015-Oct-16, Fri,14:19	Clear	Sideswipe	Non-fatal injury	Dry	South	Pulling onto shoulder or toward curb	Municipal transit bus	Cyclist	
					South	Going ahead	Bicycle	Other motor vehicle	



2015-Dec-13, Sun,18:10	Clear	Sideswipe	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle

**Location:** BANK ST btwn SECOND AVE & THIRD AVE

**Traffic Control:** No control

**Total Collisions:** 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Jul-21, Tue,14:00	Clear	Angle	P.D. only	Dry	East	Reversing	Delivery van	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	

**Location:** BANK ST btwn THIRD AVE & FOURTH AVE

**Traffic Control:** No control

**Total Collisions:** 2

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Mar-31, Tue,17:45	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Automobile, station wagon	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Jan-12, Mon,11:19	Snow	Sideswipe	P.D. only	Loose snow	North	Changing lanes	Pick-up truck	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	



# City Operations - Transportation Services

## Collision Details Report - Public Version

**From:** January 1, 2014 **To:** January 1, 2016

**Location:** BANK ST @ FIFTH AVE

**Traffic Control:** Traffic signal

**Total Collisions:** 6

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2014-Apr-17, Thu,18:37	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Pick-up truck	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Feb-06, Fri,17:49	Clear	Sideswipe	P.D. only	Slush	North	Going ahead	Delivery van	Other motor vehicle	
					North	Stopped	Municipal transit bus	Other motor vehicle	
2015-May-26, Tue,18:00	Clear	Angle	P.D. only	Dry	North	Going ahead	Pick-up truck	Other motor vehicle	
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Mar-15, Sun,16:59	Clear	Angle	P.D. only	Dry	South	Going ahead	Passenger van	Other motor vehicle	
					East	Going ahead	Passenger van	Other motor vehicle	
2015-Sep-03, Thu,10:18	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					South	Going ahead	Pick-up truck	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	

2014-Oct-15, Wed,11:48	Clear	Angle	P.D. only	Dry	North	Turning right	Truck - tractor	Other motor vehicle
					West	Turning left	Automobile, station wagon	Other motor vehicle

**Location:** FIFTH AVE @ MONK ST

**Traffic Control:** Stop sign

**Total Collisions:** 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Jan-09, Thu,08:45	Clear	Rear end	P.D. only	Ice	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					North	Stopped	Automobile, station wagon	Other motor vehicle	

**Location:** FIFTH AVE @ QUEEN ELIZABETH DRWY

**Traffic Control:** Traffic signal

**Total Collisions:** 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Nov-07, Fri,11:40	Clear	Turning movement	P.D. only	Dry	North	Turning left	Pick-up truck	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	

**Location:** FIFTH AVE btwn BANK ST & HOWICK PL

**Traffic Control:** No control

**Total Collisions:** 5

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Apr-23, Wed,14:52	Clear	Turning movement	Non-fatal injury	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle	
					East	Going ahead	Passenger van	Other motor vehicle	
2014-Sep-01, Mon,11:19	Clear	Angle	P.D. only	Dry	South	Reversing	Automobile, station wagon	Other motor vehicle	
					West	Stopped	Automobile, station wagon	Other motor vehicle	

2015-Mar-07, Sat,11:34	Clear	SMV unattended vehicle	P.D. only	Dry	Unknown	Unknown	Unknown	Unattended vehicle
2015-Jul-22, Wed,22:26	Clear	Angle	P.D. only	Dry	North	Reversing	Pick-up truck	Other motor vehicle
					East	Stopped	Automobile, station wagon	Other motor vehicle
2014-Dec-23, Tue,17:17	Rain	SMV unattended vehicle	P.D. only	Wet	West	Going ahead	Automobile, station wagon	Unattended vehicle

**Location:** FIFTH AVE btwn HOWICK PL & RUPERT ST

**Traffic Control:** No control

**Total Collisions:** 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Feb-28, Sat,11:50	Clear	Sideswipe	P.D. only	Dry	West	Stopped	Automobile, station wagon	Other motor vehicle	
					West	Going ahead	Pick-up truck	Other motor vehicle	

**Location:** FIFTH AVE btwn MONK ST & BANK ST

**Traffic Control:** No control

**Total Collisions:** 2

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Sep-10, Wed,00:00	Clear	SMV unattended vehicle	P.D. only	Wet	West	Unknown	Unknown	Unattended vehicle	
2015-Jan-09, Fri,14:56	Clear	Approaching	P.D. only	Loose snow	East	Going ahead	Pick-up truck	Other motor vehicle	
					West	Stopped	Automobile, station wagon	Other motor vehicle	

**Location:** FIFTH AVE btwn O'CONNOR ST & QUEEN ELIZABETH DRWY

**Traffic Control:** No control

**Total Collisions:** 2

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
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2015-Jan-18, Sun,14:49	Clear	SMV unattended vehicle	P.D. only	Slush	West	Reversing	Pick-up truck	Unattended vehicle
2015-Mar-09, Mon,17:35	Clear	SMV unattended vehicle	P.D. only	Dry	East	Unknown	Unknown	Unattended vehicle

**Location:** FIFTH AVE btwn RALPH ST & MONK ST

**Traffic Control:** No control

**Total Collisions:** 2

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Sep-03, Thu,18:44	Clear	Other	P.D. only	Dry	West	Reversing	Automobile, station wagon	Other motor vehicle	
					East	Going ahead	Pick-up truck	Other motor vehicle	
2015-Oct-13, Tue,00:43	Clear	SMV unattended vehicle	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Unattended vehicle	



# City Operations - Transportation Services

## Collision Details Report - Public Version

**From:** January 1, 2014 **To:** January 1, 2016

**Location:** BANK ST @ FOURTH AVE

**Traffic Control:** Stop sign

**Total Collisions:** 9

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2014-Jun-14, Sat,09:38	Clear	Turning movement	Non-fatal injury	Dry	South	Turning left	Pick-up truck	Cyclist	
					North	Going ahead	Bicycle	Other motor vehicle	
2014-Jun-02, Mon,20:39	Clear	SMV other	Non-fatal injury	Dry	South	Turning right	Pick-up truck	Pedestrian	1
2015-Jan-16, Fri,08:10	Clear	Angle	P.D. only	Loose snow	West	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-Oct-28, Tue,18:20	Rain	Rear end	Non-fatal injury	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					South	Turning left	Automobile, station wagon	Other motor vehicle	
2015-Jan-24, Sat,20:25	Snow	Angle	P.D. only	Wet	East	Going ahead	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-Dec-17, Wed,12:50	Clear	Sideswipe	P.D. only	Wet	North	Pulling away from shoulder or curb	Unknown	Other motor vehicle	
					North	Stopped	Automobile, station wagon	Other motor vehicle	

2015-Jul-25, Sat,19:08	Rain	Angle	P.D. only	Wet	East	Turning left	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle
2015-Jul-31, Fri,20:18	Clear	Angle	P.D. only	Dry	East	Going ahead	Passenger van	Other motor vehicle
					North	Going ahead	Motorcycle	Other motor vehicle
2015-Sep-29, Tue,11:29	Clear	Angle	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle

**Location:** FOURTH AVE btwn BANK ST & O'CONNOR ST

**Traffic Control:** No control

**Total Collisions: 4**

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Apr-30, Wed,12:35	Rain	Sideswipe	P.D. only	Wet	East	Pulling away from shoulder or curb	Automobile, station wagon	Other motor vehicle	
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-May-28, Wed,12:00	Clear	SMV unattended vehicle	P.D. only	Dry	North	Turning right	Automobile, station wagon	Unattended vehicle	
2014-Nov-22, Sat,21:00	Rain	SMV unattended vehicle	P.D. only	Wet	East	Reversing	Pick-up truck	Unattended vehicle	
2015-Jan-09, Fri,13:00	Snow	SMV unattended vehicle	P.D. only	Packed snow	East	Going ahead	Automobile, station wagon	Unattended vehicle	

**Location:** FOURTH AVE btwn LYON ST S & BANK ST

**Traffic Control:** No control

**Total Collisions:** 3

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Feb-09, Mon,11:55	Snow	Angle	P.D. only	Loose snow	North	Reversing	Truck - closed	Other motor vehicle	
					West	Stopped	Automobile, station wagon	Other motor vehicle	
2015-May-22, Fri,16:10	Clear	Angle	P.D. only	Dry	North	Reversing	Automobile, station wagon	Other motor vehicle	
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Sep-26, Sat,00:00	Clear	SMV unattended vehicle	P.D. only	Dry	Unknown	Unknown	Unknown	Unattended vehicle	



# Collision Main Detail Summary

OnTRAC Reporting System

FROM: 2011-01-01 TO: 2014-01-01

## BANK ST & CLAREY AVE

Former Municipality: Ottawa

Traffic Control: Stop sign

Number of Collisions: 2

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
1	2011-01-29	Sat	18:50	Snow	Dark	Angle	P.D. only	V1 N V2 W	Slush Slush	Going ahead Turning right	Automobile, station Automobile, station	Other motor vehicle Other motor vehicle	0
2	2011-03-09	We	09:04	Clear	Daylight	Turning	P.D. only	V1 S V2 N	Wet Wet	Turning left Going ahead	Pick-up truck Automobile, station	Other motor vehicle Other motor vehicle	0

## BANK ST, CLAREY AVE to THORNTON AVE

Former Municipality: Ottawa

Traffic Control: No control

Number of Collisions: 4

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
3	2011-04-07	Thu	14:44	Clear	Daylight	Single vehicle	P.D. only	V1 N	Dry	Making U-Turn	Passenger van	Unattended vehicle	0
4	2011-05-01	Sun	14:00	Clear	Daylight	Turning	Non-fatal	V1 S V2 N	Dry Dry	Going ahead Making U-Turn	Automobile, station Automobile, station	Other motor vehicle Other motor vehicle	0
5	2013-02-09	Sat	18:50	Clear	Dark	Sideswipe	P.D. only	V1 N V2 N	Wet Wet	Pulling away Stopped	Automobile, station Automobile, station	Other motor vehicle Other motor vehicle	0
6	2013-07-21	Sun	15:31	Clear	Daylight	Sideswipe	Non-fatal	V1 S V2 S	Dry Dry	Changing lanes Going ahead	Automobile, station Bicycle	Cyclist Other motor vehicle	0

## BANK ST, CLAREY AVE to HOLMWOOD AVE

Former Municipality: Ottawa

Traffic Control: No control

Number of Collisions: 3

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
7	2011-03-31	Thu	17:06	Clear	Daylight	Single vehicle	Non-fatal	V1 E	Dry	Going ahead	Automobile, station	Pedestrian	1
8	2013-03-26	Tue	17:45	Clear	Daylight	Turning	P.D. only	V1 N V2 S	Dry Dry	Turning left Going ahead	Automobile, station Automobile, station	Other motor vehicle Other motor vehicle	0
9	2013-06-25	Tue	10:33	Clear	Daylight	Single vehicle	P.D. only	V1 W	Dry	Unknown	Automobile, station	Curb	0

(Note: Time of Day = "00:00" represents unknown collision time)

Friday, September 29, 2017

Page 1 of 10

# Collision Main Detail Summary

OnTRAC Reporting System

FROM: 2011-01-01 TO: 2014-01-01

## BANK ST & FIFTH AVE

Former Municipality: Ottawa

Traffic Control: Traffic signal

Number of Collisions: 6

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
10	2011-05-15	Sun	14:07	Clear	Daylight	Rear end	P.D. only	V1 N V2 N	Dry Dry	Slowing or Slowing or	Automobile, station Passenger van	Other motor vehicle Other motor vehicle	0
11	2012-11-09	Fri	10:00	Clear	Daylight	Sideswipe	P.D. only	V1 N V2 N	Dry Dry	Overtaking Going ahead	Unknown Automobile, station	Other motor vehicle Other motor vehicle	0
12	2013-03-24	Sun	13:00	Clear	Daylight	Turning	P.D. only	V1 E V2 W	Dry Dry	Turning right Turning left	Automobile, station Automobile, station	Other motor vehicle Other motor vehicle	0
13	2013-10-19	Sat	12:00	Rain	Daylight	Sideswipe	P.D. only	V1 N V2 N	Wet Wet	Changing lanes Going ahead	Automobile, station Automobile, station	Other motor vehicle Other motor vehicle	0
14	2013-11-28	Thu	14:50	Clear	Daylight	Single vehicle	Non-fatal	V1 W	Wet	Turning left	Automobile, station	Pedestrian	1
15	2013-12-23	Mo	15:49	Clear	Daylight	Sideswipe	P.D. only	V1 S V2 S	Slush Slush	Overtaking Stopped	Unknown Municipal transit bus	Other motor vehicle Other motor vehicle	0

## BANK ST, FIFTH AVE to FOURTH AVE

Former Municipality: Ottawa

Traffic Control: No control

Number of Collisions: 5

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED	
16	2011-01-15	Sat	17:30	Snow	Dusk	Sideswipe	P.D. only	V1 N V2 N	Slush Slush	Going ahead Pulling away	Automobile, station Passenger van	Other motor vehicle Other motor vehicle	0	
17	2011-02-28	Mo	12:00	Snow	Daylight	Sideswipe	P.D. only	V1 N V2 N	Loose snow Loose snow	Going ahead Pulling away	Truck and trailer Automobile, station	Other motor vehicle Other motor vehicle	0	
COMMENTS: EXACT LOCATION UNKNOWN														
18	110302291	2011-10-06	Thu	11:30	Clear	Daylight	Other	P.D. only	V1 U V2 U	Dry Dry	Reversing Stopped	Unknown Automobile, station	Other motor vehicle Other motor vehicle	0
COMMENTS: EXACT LOCATION UNKNOWN														
19	2012-12-22	Sat	22:41	Clear	Dark	Rear end	P.D. only	V1 N V2 N	Dry Dry	Going ahead Stopped	Automobile, station Pick-up truck	Other motor vehicle Other motor vehicle	0	
20	2013-12-22	Sun	12:49	Freezin	Daylight	Approaching	P.D. only	V1 S V2 N	Loose snow Loose snow	Going ahead Going ahead	Delivery van Municipal transit bus	Other motor vehicle Other motor vehicle	0	

(Note: Time of Day = "00:00" represents unknown collision time)

Friday, September 29, 2017

Page 2 of 10

# Collision Main Detail Summary

OnTRAC Reporting System

FROM: 2011-01-01 TO: 2014-01-01

## BANK ST, FIFTH AVE to REGENT ST

Former Municipality: Ottawa

Traffic Control: No control

Number of Collisions: 2

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
21	2012-11-26	Mo	14:00	Clear	Daylight	Sideswipe	P.D. only	V1 S V2 S	Wet Wet	Going ahead Going ahead	Truck - other Truck - other	Other motor vehicle Other motor vehicle	0
22	2013-02-26	Tue	19:44	Clear	Dark	Single vehicle	P.D. only	V1 N	Wet	Pulling onto	Municipal transit bus	Unattended vehicle	0

## BANK ST & FIRST AVE

Former Municipality: Ottawa

Traffic Control: Traffic signal

Number of Collisions: 3

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
23	2011-01-23	Sun	12:00	Snow	Daylight	Rear end	P.D. only	V1 N V2 N	Loose snow Slush	Slowing or Stopped	Automobile, station Automobile, station	Skidding/Sliding Other motor vehicle	0
24	2011-03-23	We	13:15	Clear	Daylight	Rear end	Non-fatal	V1 S V2 S	Dry Dry	Going ahead Stopped	Automobile, station Passenger van	Other motor vehicle Other motor vehicle	0
25	2011-03-28	Mo	14:29	Clear	Daylight	Angle	P.D. only	V1 N V2 W	Dry Dry	Going ahead Going ahead	Automobile, station School van	Other motor vehicle Other motor vehicle	0

## BANK ST, FIRST AVE to SECOND AVE

Former Municipality: Ottawa

Traffic Control: No control

Number of Collisions: 5

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
26	2011-01-25	Tue	14:46	Clear	Daylight	Turning	P.D. only	V1 S V2 N	Wet Wet	Going ahead Making U-Turn	Pick-up truck Automobile, station	Other motor vehicle Other motor vehicle	0
27	2011-02-02	We	17:31	Clear	Dark	Approaching	P.D. only	V1 S V2 N	Loose snow Loose snow	Going ahead Slowing or	Pick-up truck Automobile, station	Other motor vehicle Other motor vehicle	0
28	2011-12-15	Thu	19:10	Clear	Dark	Sideswipe	P.D. only	V1 N V2 N	Wet Wet	Stopped Going ahead	Automobile, station Automobile, station	Other motor vehicle Other motor vehicle	0
29	2012-01-20	Fri	17:25	Clear	Dusk	Sideswipe	P.D. only	V1 S V2 S	Wet Wet	Changing lanes Going ahead	Automobile, station Automobile, station	Other motor vehicle Other motor vehicle	0

(Note: Time of Day = "00:00" represents unknown collision time)

Friday, September 29, 2017

# Collision Main Detail Summary

OnTRAC Reporting System

FROM: 2011-01-01 TO: 2014-01-01

30 2013-03-29 Fri 13:05 Clear Daylight Single vehicle P.D. only V1 N Dry Pulling onto Unknown Unattended vehicle 0

## BANK ST & FOURTH AVE

Former Municipality: Ottawa

Traffic Control: Stop sign

Number of Collisions: 7

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
31	2011-01-31	Mo	14:52	Clear	Daylight	Rear end	Non-fatal	V1 N V2 N V3 N	Dry Dry Dry	Going ahead Stopped Stopped	Automobile, station Automobile, station Automobile, station	Other motor vehicle Other motor vehicle Other motor vehicle	0
32	2011-05-03	Tue	15:20	Rain	Daylight	Angle	P.D. only	V1 N V2 W	Wet Wet	Going ahead Turning right	Municipal transit bus Passenger van	Other motor vehicle Other motor vehicle	0
33	2012-04-25	We	08:24	Clear	Daylight	Other	P.D. only	V1 W V2 E	Dry Dry	Going ahead Reversing	Automobile, station Truck - dump	Other motor vehicle Other motor vehicle	0
34	2012-04-27	Fri	13:51	Clear	Daylight	Angle	P.D. only	V1 E V2 N	Dry Dry	Going ahead Going ahead	Automobile, station Automobile, station	Other motor vehicle Other motor vehicle	0
35	2012-09-07	Fri	20:40	Clear	Dark	Rear end	P.D. only	V1 S V2 S	Dry Dry	Going ahead Stopped	Pick-up truck Automobile, station	Other motor vehicle Other motor vehicle	0
36	2012-10-06	Sat	16:50	Clear	Daylight	Angle	P.D. only	V1 W V2 S	Dry Dry	Going ahead Going ahead	Automobile, station Automobile, station	Other motor vehicle Other motor vehicle	0
37	2012-12-12	We	08:20	Clear	Daylight	Angle	P.D. only	V1 E V2 N V3 W	Dry Dry Dry	Going ahead Going ahead Stopped	Passenger van Automobile, station Pick-up truck	Other motor vehicle Other motor vehicle Other motor vehicle	0

## BANK ST, FOURTH AVE to THIRD AVE

Former Municipality: Ottawa

Traffic Control: No control

Number of Collisions: 3

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
38	2011-11-20	Sun	17:16	Clear	Dark	Rear end	P.D. only	V1 S V2 S V3 N	Dry Dry Dry	Going ahead Going ahead Going ahead	Automobile, station Passenger van Automobile, station	Other motor vehicle Other motor vehicle Other motor vehicle	0

(Note: Time of Day = "00:00" represents unknown collision time)

Friday, September 29, 2017

## Collision Main Detail Summary

OnTRAC Reporting System

FROM: 2011-01-01 TO: 2014-01-01

39	2012-08-11	Sat	19:44	Clear	Daylight	Single vehicle	P.D. only	V1 S	Dry	Reversing	Unknown	Unattended vehicle	0
40	2013-12-24	Tue	12:21	Clear	Daylight	Sideswipe	Non	V1 N V2 N	Dry Dry	Going ahead Slowing or	Police vehicle Automobile, station	Other motor vehicle Other motor vehicle	0

### BANK ST & HOLMWOOD AVE

Former Municipality: Ottawa

Traffic Control: Traffic signal

Number of Collisions: 8

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
41	2011-01-18	Tue	17:35	Snow	Dusk	Rear end	P.D. only	V1 N V2 N	Wet Wet	Slowing or Stopped	Automobile, station Automobile, station	Other motor vehicle Other motor vehicle	0
42	2011-07-03	Sun	14:55	Clear	Daylight	Single vehicle	Non-fatal	V1 N	Loose sand or	Going ahead	Automobile, station	Ran off road	0
43	2012-04-15	Sun	20:56	Clear	Dark	Rear end	Non-fatal	V1 S V2 S	Dry Dry	Going ahead Stopped	Automobile, station Automobile, station	Other motor vehicle Other motor vehicle	0
44	2012-12-28	Fri	12:45	Clear	Daylight	Sideswipe	P.D. only	V1 S V2 S	Packed snow Packed snow	Changing lanes Going ahead	Automobile, station Pick-up truck	Other motor vehicle Other motor vehicle	0
45	2013-01-28	Mo	18:28	Snow	Dark	Rear end	P.D. only	V1 N V2 N	Loose snow Loose snow	Slowing or Stopped	Automobile, station Automobile, station	Other motor vehicle Other motor vehicle	0
46	2013-06-22	Sat	15:57	Clear	Daylight	Other	P.D. only	V1 N V2 N V3 N	Dry Dry Dry	Going ahead Going ahead Going ahead	Truck - dump Automobile, station Automobile, station	Other Events Debris falling off Debris falling off	0
47	2013-08-13	Tue	08:14	Clear	Daylight	Single vehicle	P.D. only	V1 N	Dry	Going ahead	Automobile, station	Curb	0
48	2013-11-27	We	14:56	Clear	Daylight	Sideswipe	Non	V1 N V2 N	Dry Dry	Going ahead Stopped	Pick-up truck Municipal transit bus	Other motor vehicle Other motor vehicle	0

### BANK ST & SECOND AVE

Former Municipality: Ottawa

Traffic Control: Stop sign

Number of Collisions: 5

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
49	2011-11-21	Mo	10:04	Clear	Daylight	Angle	Non-fatal	V1 E V2 N	Dry Dry	Turning left Going ahead	Automobile, station Automobile, station	Other motor vehicle Other motor vehicle	0
50	2012-02-14	Tue	08:48	Clear	Daylight	Angle	P.D. only	V1 E V2 N	Wet Wet	Going ahead Going ahead	Automobile, station Automobile, station	Other motor vehicle Other motor vehicle	0

(Note: Time of Day = "00:00" represents unknown collision time)

Friday, September 29, 2017

## Collision Main Detail Summary

OnTRAC Reporting System

FROM: 2011-01-01 TO: 2014-01-01

51	2012-04-30	Mo	15:09	Clear	Daylight	Other	P.D. only	V1 W	Dry	Reversing	Automobile, station	Other motor vehicle	0
								V2 E	Dry	Stopped	Automobile, station	Other motor vehicle	
52	2013-02-08	Fri	13:49	Snow	Daylight	Angle	P.D. only	V1 W	Ice	Going ahead	Automobile, station	Other motor vehicle	0
								V2 S	Ice	Going ahead	Automobile, station	Other motor vehicle	
53	2013-07-12	Fri	16:12	Clear	Daylight	Single vehicle	Non-fatal	V1 N	Dry	Going ahead	Motorcycle	Skidding/Sliding	0

### BANK ST, SECOND AVE to THIRD AVE

Former Municipality: Ottawa

Traffic Control: No control

Number of Collisions: 6

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
54	2012-06-25	Mo	11:01	Clear	Daylight	Sideswipe	Non-fatal	V1 N	Dry	Going ahead	Municipal transit bus	Cyclist	0
								V2 N	Dry	Going ahead	Bicycle	Other motor vehicle	
55	2012-09-15	Sat	20:00	Clear	Dark	Other	P.D. only	V1 N	Dry	Reversing	Automobile, station	Other motor vehicle	0
								V2 S	Dry	Stopped	Automobile, station	Other motor vehicle	
56	2013-05-14	Tue	17:30	Clear	Daylight	Single vehicle	P.D. only	V1 U	Dry	Unknown	Unknown	Unattended vehicle	0
57	2013-05-18	Sat	20:30	Clear	Dusk	Single vehicle	P.D. only	V1 U	Dry	Reversing	Unknown	Unattended vehicle	0
58	2013-07-04	Thu	14:41	Clear	Daylight	Sideswipe	P.D. only	V1 N	Dry	Going ahead	Pick-up truck	Other motor vehicle	0
								V2 N	Dry	Changing lanes	Automobile, station	Other motor vehicle	
59	2013-07-12	Fri	17:30	Clear	Daylight	Single vehicle	P.D. only	V1 N	Dry	Pulling away	Automobile, station	Unattended vehicle	0

### BANK ST & THIRD AVE

Former Municipality: Ottawa

Traffic Control: Traffic signal

Number of Collisions: 13

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
60	2011-09-07	We	14:00	Clear	Daylight	Sideswipe	P.D. only	V1 E	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2 E	Dry	Going ahead	Automobile, station	Other motor vehicle	
61	2012-07-14	Sat	22:46	Clear	Dark	Rear end	P.D. only	V1 N	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2 N	Dry	Stopped	Pick-up truck	Other motor vehicle	
62	2012-08-02	Thu	12:40	Clear	Daylight	Single vehicle	P.D. only	V1 S	Dry	Going ahead	Automobile, station	Unattended vehicle	0

(Note: Time of Day = "00:00" represents unknown collision time)

Friday, September 29, 2017

Page 6 of 10

## Collision Main Detail Summary

OnTRAC Reporting System

FROM: 2011-01-01 TO: 2014-01-01

63	2012-09-04	Tue	14:30	Clear	Daylight	Rear end	P.D. only	V1 N	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2 N	Dry	Stopped	Automobile, station	Other motor vehicle	
64	2012-09-26	We	17:27	Clear	Daylight	Turning	P.D. only	V1 S	Dry	Turning right	Pick-up truck	Other motor vehicle	0
								V2 S	Dry	Going ahead	Automobile, station	Other motor vehicle	
65	2012-11-23	Fri	23:45	Clear	Dark	Rear end	Non-fatal	V1 S	Wet	Going ahead	Automobile, station	Other motor vehicle	0
								V2 S	Wet	Stopped	Automobile, station	Other motor vehicle	
66	2012-12-05	We	17:45	Clear	Dark	Rear end	P.D. only	V1 S	Dry	Slowing or	Automobile, station	Other motor vehicle	0
								V2 S	Dry	Stopped	Automobile, station	Other motor vehicle	
67	2013-01-10	Thu	12:15	Clear	Daylight	Single vehicle	Non-fatal	V1 W	Dry	Turning left	Automobile, station	Pedestrian	1
68	2013-01-17	Thu	12:54	Clear	Daylight	Single vehicle	Non-fatal	V1 W	Wet	Turning left	Automobile, station	Pedestrian	1
69	2013-03-22	Fri	16:16	Clear	Daylight	Sideswipe	P.D. only	V1 N	Dry	Changing lanes	Passenger van	Other motor vehicle	0
								V2 N	Dry	Going ahead	Pick-up truck	Other motor vehicle	
70	2013-05-25	Sat	12:55	Clear	Daylight	Sideswipe	Non-fatal	V1 N	Dry	Turning right	Automobile, station	Cyclist	0
								V2 N	Dry	Going ahead	Bicycle	Other motor vehicle	
71	2013-06-19	We	13:55	Clear	Daylight	Sideswipe	P.D. only	V1 N	Dry	Pulling away	Automobile, station	Other motor vehicle	0
								V2 N	Dry	Going ahead	Passenger van	Other motor vehicle	
72	2013-09-20	Fri	08:17	Clear	Daylight	Turning	P.D. only	V1 N	Dry	Turning right	Pick-up truck	Other motor vehicle	0
								V2 N	Dry	Going ahead	Automobile, station	Other motor vehicle	

### FIFTH AVE, BANK ST to HOWICK PL

Former Municipality: Ottawa

Traffic Control: No control

Number of Collisions: 1

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
73	2011-08-05	Fri	15:25	Clear	Daylight	Single vehicle	P.D. only	V1 W	Dry	Overtaking	Municipal transit bus	Unattended vehicle	0

### FIFTH AVE, BANK ST to MONK ST

Former Municipality: Ottawa

Traffic Control: No control

Number of Collisions: 1

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
74	2011-06-16	Thu	21:50	Clear	Dark	Single vehicle	P.D. only	V1 E	Dry	Reversing	Automobile, station	Unattended vehicle	0

(Note: Time of Day = "00:00" represents unknown collision time)

Friday, September 29, 2017

Page 7 of 10

## Collision Main Detail Summary

OnTRAC Reporting System

FROM: 2011-01-01 TO: 2014-01-01

### FIFTH AVE, HOWICK PL to RUPERT ST

Former Municipality: Ottawa

Traffic Control: No control

Number of Collisions: 1

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
75	2011-04-20	We	19:00	Rain	Dusk	Single vehicle	P.D. only	V1 U	Wet	Unknown	Unknown	Unattended vehicle	0

### FIFTH AVE, LYON ST to RALPH ST

Former Municipality: Ottawa

Traffic Control: No control

Number of Collisions: 5

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
76	2011-10-11	Tue	12:00	Clear	Daylight	Sideswipe	P.D. only	V1 S V2 S	Dry Dry	Turning left Overtaking	Pick-up truck Passenger van	Other motor vehicle Other motor vehicle	0
77	2012-01-09	Mo	20:30	Clear	Dark	Single vehicle	P.D. only	V1 W	Packed snow	Going ahead	Pick-up truck	Skidding/Sliding	0
78	2012-01-16	Mo	14:30	Clear	Daylight	Single vehicle	P.D. only	V1 W	Packed snow	Going ahead	Unknown	Unattended vehicle	0
79	2013-12-16	Mo	17:15	Snow	Dark	Approaching	P.D. only	V1 W V2 E	Packed snow Packed snow	Going ahead Going ahead	Automobile, station Automobile, station	Other motor vehicle Other motor vehicle	0
80	2013-12-20	Fri	15:00	Snow	Daylight	Single vehicle	P.D. only	V1 W	Loose snow	Going ahead	Pick-up truck	Unattended vehicle	0

### FIFTH AVE & MONK ST

Former Municipality: Ottawa

Traffic Control: Stop sign

Number of Collisions: 1

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
81	2012-02-04	Sat	16:20	Clear	Daylight	Angle	P.D. only	V1 N V2 W	Dry Dry	Turning left Going ahead	Automobile, station Automobile, station	Other motor vehicle Other motor vehicle	0

### FIFTH AVE & O'CONNOR ST

Former Municipality: Ottawa

Traffic Control: Stop sign

Number of Collisions: 1

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
82	2011-08-28	Sun	00:40	Clear	Dark	Single vehicle	Non-fatal	V1 E	Dry	Turning left	Pick-up truck	Pedestrian	1

(Note: Time of Day = "00:00" represents unknown collision time)

Friday, September 29, 2017



## Collision Main Detail Summary

OnTRAC Reporting System

FROM: 2011-01-01 TO: 2014-01-01

### FIFTH AVE, O'CONNOR ST to QUEEN ELIZABETH DRWY

Former Municipality: **Ottawa**

Traffic Control: **No control**

Number of Collisions: **2**

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
83	2011-01-24	Mo	08:53	Clear	Daylight	Angle	P.D. only	V1 N V2 E	Dry Dry	Turning left Going ahead	Automobile, station Automobile, station	Other motor vehicle Other motor vehicle	0
84	2013-12-18	We	14:00	Clear	Daylight	Approaching	P.D. only	V1 E V2 W	Dry Unknown	Going ahead Stopped	Unknown Pick-up truck	Other motor vehicle Other motor vehicle	0

### FIFTH AVE & QUEEN ELIZABETH DRWY

Former Municipality: **Ottawa**

Traffic Control: **Stop sign**

Number of Collisions: **2**

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
85	2011-02-03	Thu	20:02	Clear	Dark	Angle	P.D. only	V1 E V2 S	Dry Dry	Going ahead Going ahead	Automobile, station Automobile, station	Other motor vehicle Other motor vehicle	0
86	2011-10-20	Thu	17:05	Clear	Daylight	Angle	P.D. only	V1 E V2 S	Wet Wet	Turning left Going ahead	Automobile, station Automobile, station	Other motor vehicle Other motor vehicle	0

### FIFTH AVE & RUPERT ST

Former Municipality: **Ottawa**

Traffic Control: **Stop sign**

Number of Collisions: **1**

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
87	2013-01-03	Thu	16:22	Snow	Daylight	Angle	P.D. only	V1 N V2 E	Ice Ice	Turning right Going ahead	Automobile, station Automobile, station	Other motor vehicle Other motor vehicle	0

### FOURTH AVE, BANK ST to O'CONNOR ST

Former Municipality: **Ottawa**

Traffic Control: **No control**

Number of Collisions: **1**

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
88	2011-10-14	Fri	08:31	Rain	Daylight	Single vehicle	P.D. only	V1 N	Wet	Reversing	Truck - closed	Pole (utility, tower)	0

(Note: Time of Day = "00:00" represents unknown collision time)

Friday, September 29, 2017

## Collision Main Detail Summary

OnTRAC Reporting System

FROM: 2011-01-01 TO: 2014-01-01

### FOURTH AVE, BANK ST to LYON ST

Former Municipality: **Ottawa**

Traffic Control: **No control**

Number of Collisions: **3**

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
89	2011-05-28	Sat	12:00	Clear	Daylight	Single vehicle	P.D. only	V1 U	Dry	Unknown	Unknown	Unattended vehicle	0
90	2012-04-23	Mo	21:30	Rain	Dark	Single vehicle	P.D. only	V1 W	Wet	Going ahead	Automobile, station	Unattended vehicle	0
91	2013-11-25	Mo	13:00	Clear	Daylight	Other	P.D. only	V1 E V2 W	Dry Unknown	Going ahead Reversing	Passenger van Automobile, station	Other motor vehicle Other motor vehicle	0

### FOURTH AVE & LYON ST

Former Municipality: **Ottawa**

Traffic Control: **Stop sign**

Number of Collisions: **1**

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
92	2013-05-25	Sat	09:30	Clear	Daylight	Sideswipe	P.D. only	V1 W V2 W	Dry Dry	Going ahead Stopped	Automobile, station Pick-up truck	Other motor vehicle Other motor vehicle	0

### FOURTH AVE & QUEEN ELIZABETH DRWY

Former Municipality: **Ottawa**

Traffic Control: **Stop sign**

Number of Collisions: **1**

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
93	2011-06-24	Fri	21:12	Rain	Dusk	Angle	P.D. only	V1 N V2 E	Wet Wet	Going ahead Stopped	Automobile, station Automobile, station	Other motor vehicle Other motor vehicle	0

(Note: Time of Day = "00:00" represents unknown collision time)

Friday, September 29, 2017

Page 10 of 10

## Appendix C – OC Transpo Maps

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FORMER / ANCIEN 1

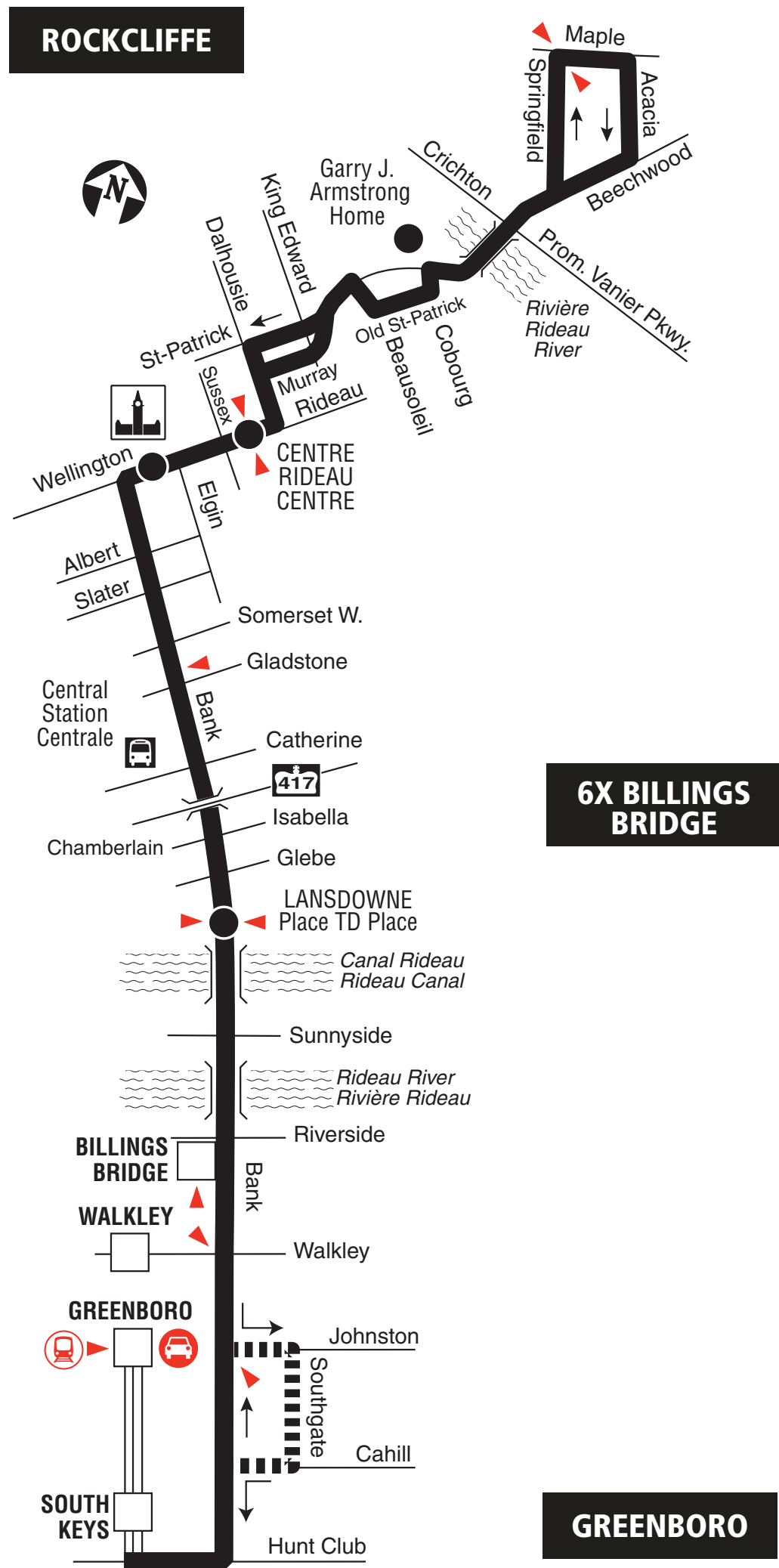
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ROCKCLIFFE  
GREENBORO

Fréquent

7 days a week / 7 jours par semaine

All day service  
Service toute la journée



Legend • Légende

- Transitway & Station / Station et Transitway
- No early morning service / Aucun service matinal
- Line 2 – O-Train Trillium Line  
Ligne 2 - O-Train Ligne Trillium
- Park & Ride / Parc-o-Bus
- Timepoint / Heures de passage

2017.06



Schedule / Horaire.....613-560-1000

Text / Texto .....560560

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

Customer Relations

Service à la clientèle ..... 613-842-3600

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

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

Effective June 25, 2017

En vigueur 25 juin 2017



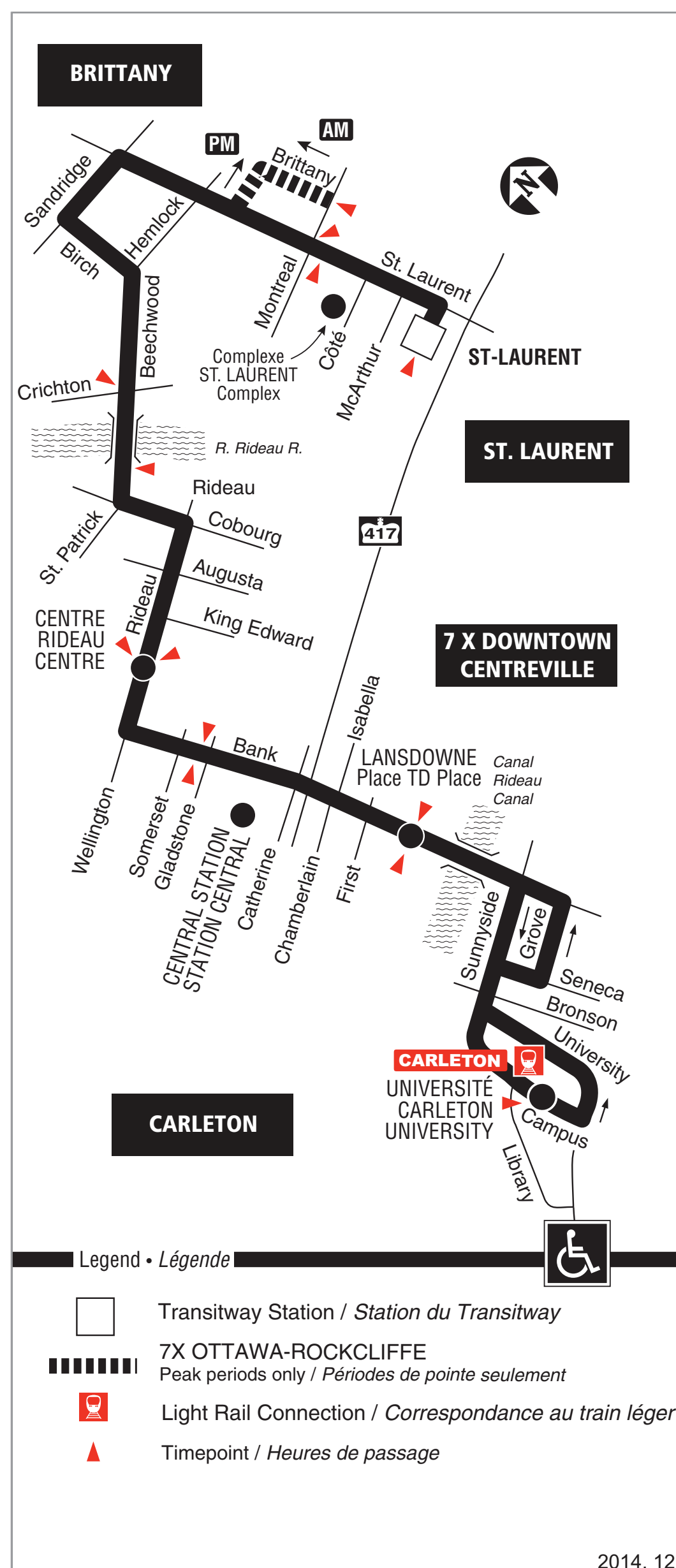
INFO 613-741-4390  
octranspo.com

# 7

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

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Schedule / Horaire.....**613-560-1000**

Text / Texto .....**560560**

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

**Effective / En vigueur Sept 5 sept 2004**

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



Transportation Impact Assessment

# PROPOSED CONDOMINIUM BUILDING – BANK AT FIFTH (99 FIFTH AVENUE)

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## Step 3 - Forecasting Report



Prepared for Minto Communities Canada  
by IBI Group  
November 22, 2017

<b>1</b>	<b>Introduction .....</b>	<b>2</b>
1.1	Background .....	2
1.2	Methodology .....	2
1.3	Reference Material.....	2
<b>2</b>	<b>Development-Generated Traffic .....</b>	<b>3</b>
2.1	Base Trip Generation Rates .....	3
2.2	Total Development-Generated Person-Trips.....	3
2.3	Mode Share .....	3
2.3.1	Existing Mode Share .....	3
2.3.2	Future Mode Share .....	4
2.4	Trip Reduction Factors.....	4
2.4.1	Existing Site Traffic .....	4
2.5	Net Trip Generation .....	4
2.6	Trip Distribution & Assignment .....	5
<b>3</b>	<b>Background Network Traffic.....</b>	<b>8</b>
3.1	Transportation Network Plans .....	8
3.2	Background Growth .....	8
3.3	Other Developments .....	8
<b>4</b>	<b>Demand Rationalization .....</b>	<b>9</b>
4.1	Future Traffic Volumes.....	9
4.1.1	Future Background Traffic .....	9
4.1.2	Future Total Traffic.....	9
4.2	Description of Capacity Issues .....	12
4.3	Adjustment to Development-Generated Demands.....	12
4.3.1	Transit Modal Share .....	12
4.4	Adjustments to Background Network Demands .....	12
4.4.1	Growth Rate Reductions .....	12
<b>5</b>	<b>Conclusions .....</b>	<b>13</b>
<b>Appendix A – Trip Generation Data</b>		

# 1 Introduction

The following Forecasting Report was prepared on behalf of Minto Communities Canada in support of a Re-Zoning and subsequent Site Plan Control application for a proposed 8-storey condominium development to be located on a portion of 819 Bank Street, in the City of Ottawa. The lot is to be severed and subsequently assigned the municipal address of 99 Fifth Avenue.

The format of this Forecasting Report was based on the City of Ottawa's 2017 Transportation Impact Assessment (TIA) Guidelines. The purpose of the report is to estimate the appropriate trip generation values associated with the proposed development in order to analyze pre and post-development network performance and determine if network modifications are required to offset any potential impacts of the development.

Following the review and approval of this Forecasting Report by City staff, the TIA process will proceed to Step 4 – Analysis, the results of which will be summarized in a Strategy Report.

## 1.1 Background

IBI Group (IBI) was retained by Minto Communities Canada to evaluate the need for and undertake a Transportation Impact Assessment in support of a proposed condominium development at 819 Bank Street (99 Fifth Avenue) in the City of Ottawa. In accordance with the City of Ottawa TIA Guidelines, the initial Screening and Scoping (Steps 1 & 2) were completed which established the basic study parameters for the Traffic Impact Assessment process.

## 1.2 Methodology

The content of the Forecasting Report is based on the requirements established by the City of Ottawa TIA Guidelines. As such, the following items are discussed in this report:

- Development-Generated Travel Demand
- Background Network Travel Demand
- Demand Rationalization

## 1.3 Reference Material

The following documents were referenced in the preparation of this report:

- City of Ottawa Transportation Impact Assessment Guidelines (2017)
- City of Ottawa Transportation Master Plan (November 2013)
- Institute of Transportation Engineers (ITE) Trip Generation Manual, 9<sup>th</sup> Edition
- 2011 NCR Household Origin-Destination Survey (TRANS, February 2013)



## 2 Development-Generated Traffic

### 2.1 Base Trip Generation Rates

Trip generation rates published by the Institute of Transportation Engineers' (ITE) Trip Generation Manual are listed in **Table 3-1** below, as applied to the land use details of the proposed development.

Table 3 - 1: Base Trip Generation

ITE LAND USE	UNITS	AM PEAK			PM PEAK		
		IN	OUT	TOTAL	IN	OUT	TOTAL
230 – Residential Townhouse/ Condominium	124	10	51	<b>61</b>	48	24	<b>72</b>

The relevant extracts from the Trip Generation Manual are provided in **Appendix A**.

### 2.2 Total Development-Generated Person-Trips

The City's TIA Guidelines require trip generation to be expressed in terms of 'person-trips' rather than automobile trips in order to clearly identify the multi-modal demands of a development on the adjacent transportation network. Trip generation rates published by ITE are typically based on historical data from suburban areas with little to no access to public transit. The City of Ottawa TIA Guidelines suggest the use of a 1.28 conversion factor to obtain the equivalent number of person-trips from this ITE data. This conversion factor is calculated under the assumption that a 1.15 auto occupancy rate is inherent to these rates and that roughly 10% of trips are by non-auto modes and thus not captured in the data.

### 2.3 Mode Share

#### 2.3.1 Existing Mode Share

The 2011 TRANS Origin-Destination Survey for the Ottawa Inner Area provides approximations of the existing modal share within the study area. The mode share often varies significantly between travel within and outside the district and also between peak periods. The following represents a weighted average modal share for the study area as compared to the City's 2031 target:

Table 3 - 2: Existing Mode Share

MODE	EXISTING MODE SHARE	2031 CITY-WIDE TARGET* (AM PEAK)
Auto Driver	36%	50%
Auto Passenger	9%	9%
Transit	25%	26%
Bicycle	6%	5%
Walk	22%	10%
Other	2%	n/a

\* Source: *Transportation Master Plan (November 2013)*

### 2.3.2 Future Mode Share

As noted above, the Transportation Master Plan identifies city-wide mode share targets for the City's 2031 planning horizon. Within the study area, the existing mode share noted above has been found to meet or exceed this target. Based on current and planned improvements to sustainable transportation infrastructure within the study area such as future transit priority measures on Bank Street, improvements to cycling infrastructure on Fifth Avenue and a new bicycle/pedestrian bridge crossing the Rideau Canal between Fifth Avenue and Clegg, a continued decline in automobile use over time is realistic. However, due to the relatively small scale of the proposed development, slight adjustments to the future mode share will have an insignificant effect of the trip generation values presented in this study. Existing mode share values have been retained for the analysis of future conditions, and provides a conservative approach with respect to vehicular traffic generation.

## 2.4 Trip Reduction Factors

### 2.4.1 Existing Site Traffic

The site is presently occupied by a two-storey, 38,171 square foot commercial centre hosting a variety of specialty shops, restaurants and professional services. The existing heritage building along Bank Street will remain, however traffic associated with the portion of the site to be demolished and replaced with the proposed condominium building will reduce the net traffic volumes generated by the site in the future. Field observations indicate that the site presently generates approximately 21 and 22 two-way vehicular trips during the weekday morning and weekday afternoon peak hours, respectively. It has been assumed that, based on the relative proportion of retail gross floor area, the existing heritage building accounts for approximately 25% of the traffic generated by the site. This has therefore been considered in the development of future site-generated traffic volumes.

## 2.5 Net Trip Generation

**Table 3-3** summarizes the net number of person-trips the proposed development is expected to generate, separated by mode.

Table 3 - 3: Net Trip Generation

MODE	AM PEAK			PM PEAK		
	IN	OUT	TOTAL	IN	OUT	TOTAL
Total Person-Trips	13	65	<b>78</b>	61	30	<b>92</b>
Auto Driver <sup>1</sup>	5-15= -10	23-6= 17	28-21= 7	22-11 =11	11-11 =0	33-22 =11
Auto Passenger	1	6	<b>7</b>	6	3	<b>8</b>
Transit	3	16	<b>20</b>	15	8	<b>23</b>
Walk	3	14	<b>17</b>	14	7	<b>20</b>
Bicycle	1	4	<b>5</b>	4	2	<b>6</b>
Other	0	1	<b>2</b>	1	1	<b>2</b>
Retail Auto Driver Trips	6	6	<b>12</b>	6	6	<b>12</b>
<b>TOTAL NET AUTO TRIPS</b>	<b>-4</b>	<b>23</b>	<b>19</b>	<b>17</b>	<b>6</b>	<b>23</b>

*Note 1 – ‘Auto Driver’ values were reduced by the observed number of vehicular trips entering and exiting the site during the weekday peak hours.*

As indicated in Table 3-3 above, the site is expected contribute approximately only a nominal amount of additional vehicular trips to the adjacent road network during the weekday morning and weekday afternoon peak hours.

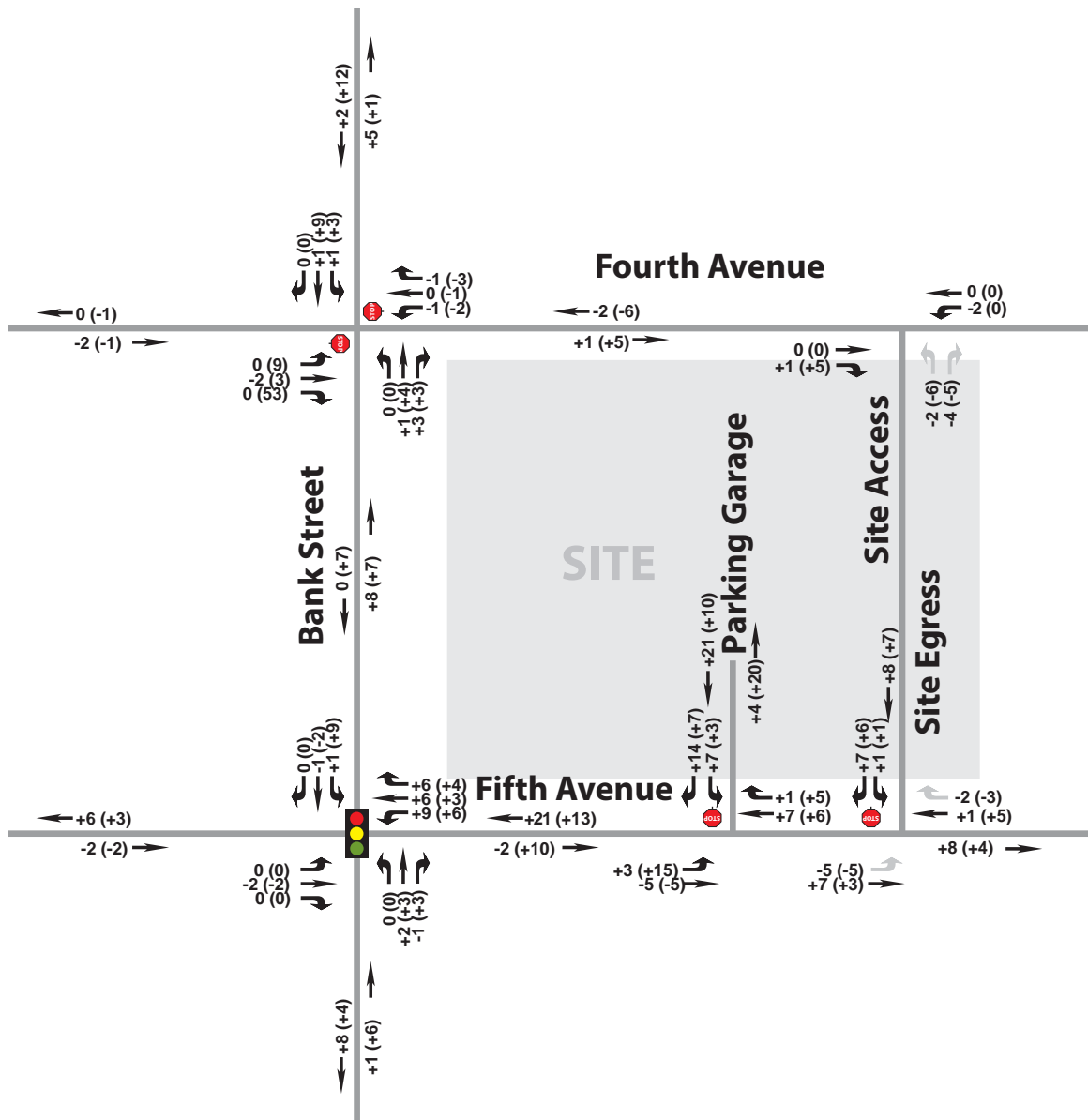
## 2.6 Trip Distribution & Assignment

With consideration that the land use of the proposed development will be residential, the anticipated distribution of site-generated traffic in each of the four cardinal directions will be consistent with the AM Peak commuter flow based on the 2011 O-D Survey data. Assignment of site-generated traffic along logical routes for each direction has been assumed as follows and is consistent with transportation impact assessment studies for nearby adjacent developments:

- 40% to/from the North
  - 50% via Bank Street
  - 25% via O'Connor
  - 25% via Queen Elizabeth Drive
- 40% to/from the South
  - 60% via Bank Street
  - 40% via Bronson Avenue
- 10% to from the East
  - 100% via Fifth Avenue

- 10% to/from the West
  - 100% via Fifth Avenue

**Exhibit 3-1** presents the net change in site-generated traffic as a result of the proposed development. These volumes were derived by redistributing the existing site-generated volumes in accordance with the proposed site access circulation (i.e. one-way southbound) and then subtracted from the gross vehicular trip generation of the proposed development.



## 3 Background Network Traffic

### 3.1 Transportation Network Plans

To properly assess future traffic conditions, planned modifications to the transportation network that may impact travel patterns or demand within the study area must be considered. The Scoping Report reviewed the anticipated network modifications within the study area and determined that there are no major road network modifications planned within the study area. Although Bank Street is designated as a Transit Priority Route in the TMP, there are no known modifications to transit services that will be implemented within the timeframe of this study.

The imminent implementation of exclusive bicycle facilities on Fifth Avenue, however, will result in the removal of the westbound left-turn lane at the intersection of Bank/Fifth, thereby reducing vehicular capacity in favour of improving conditions for cyclists at the intersection. The analysis to be conducted in Step 4 of the TIA process will therefore consider existing traffic conditions with and without this modification to determine its impact and establish as baseline condition prior to the application of site-generated traffic from the proposed development.

### 3.2 Background Growth

The rate of background traffic growth within the study area is expected to be insignificant within the timeframe of this study. On established urban arterial mainstreets such as this, it is not uncommon for traffic volumes experience very little growth, and in some cases, volumes may even decline over time. A high degree of commuter friction caused by frequent signalized intersections and high volumes of pedestrian traffic often results in commuter/through-traffic selecting alternative routes. Within the timeframe of this study, it is conceivable that background traffic growth will be limited to the anticipated traffic generation of the adjacent development applications proposed within the study area, therefore a 0% general growth rate is proposed for the calculation of future background traffic estimates. This methodology is consistent with the Transportation Brief for 890-900 Bank Street development, completed by Parsons in 2016, and has been confirmed by an analysis of the TRANS Regional Model (updated July 2017) which compares AM Peak direction auto volumes between 2011 and 2031.

### 3.3 Other Developments

As described in the Scoping Report, there are two (2) known significant developments within study area that are either in the development application approval process, have already been approved and in pre-construction, or are currently under construction. Based on their respective studies, traffic generation associated with these developments are included in the future background traffic volumes presented in this study.

Table 3- 4: Adjacent Development Traffic

DEVELOPMENT NAME	DESCRIPTION	NEW TWO-WAY AUTO TRIPS		APPROVAL STATUS	BUILD-OUT YEAR
		AM Peak	PM Peak		
890-900 Bank Street	<ul style="list-style-type: none"> <li>160 Room Retirement Residence</li> <li>17,000 ft<sup>2</sup> Ground Floor Retail</li> </ul>	18	41	Zoning Approved - Pending Site Plan Approval	n/a
852 Bank Street	<ul style="list-style-type: none"> <li>2-Storey Commercial Building (1,260 m<sup>2</sup>) with Ground Floor Retail and Second Storey Restaurant</li> </ul>	20	40	Under Construction	2018 (Assumed)

As the studies referenced above do not indicate future build-out or horizon years, it has been assumed that both developments will be in place by the date of full-occupancy of the subject development at 99 Fifth Avenue.

## 4 Demand Rationalization

The purpose of this section is to rationalize future travel demands within the study area to account for potential capacity limitations in the transportation network and its ability to effectively absorb the additional demand generated by a new development.

### 4.1 Future Traffic Volumes

#### 4.1.1 Future Background Traffic

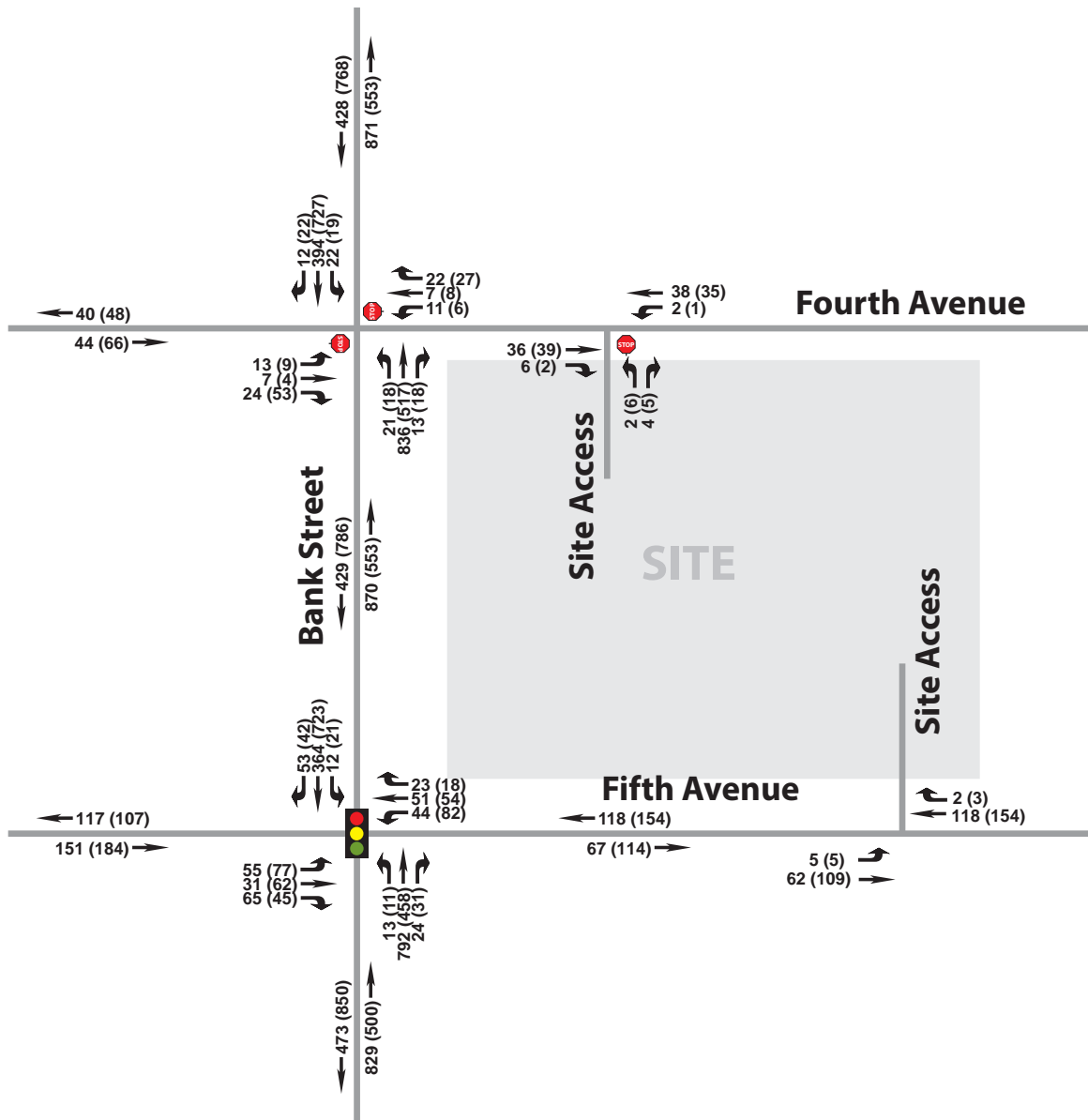
It is assumed that the two active development applications within the study area (listed above) will be constructed and fully-occupied by the time the subject development at 99 Fifth Avenue is built-out. As a 0% background traffic growth rate has been assumed for the purposes of this study, there will be no difference in future background traffic volumes between the 2021 and 2026 horizon years and therefore **only a single future condition has been evaluated**.

**Exhibit 3-2** presents the future background traffic volumes anticipated within the timeframe of this study.

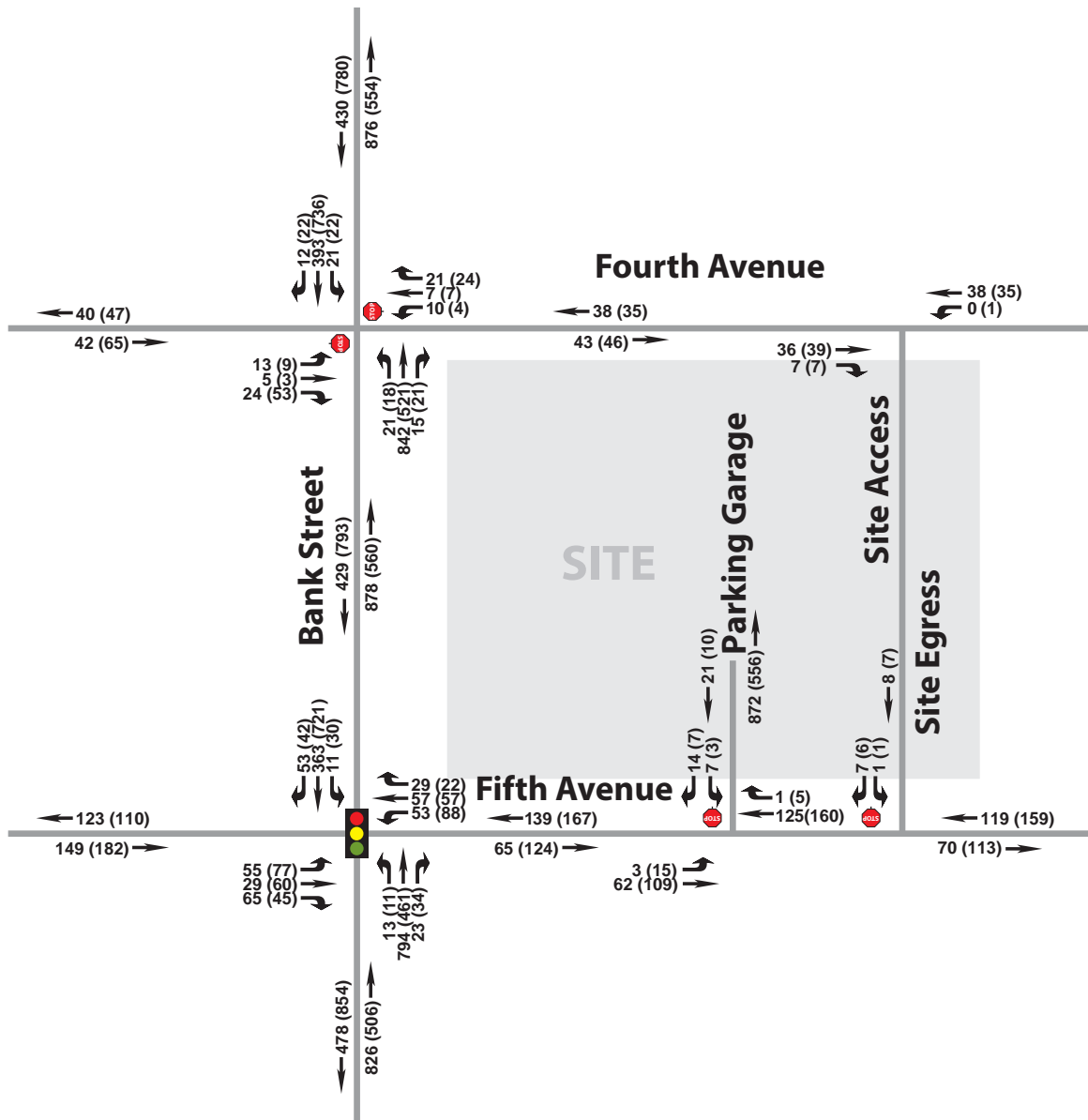
#### 4.1.2 Future Total Traffic

Future total traffic volumes have been derived by combining the net site-generated traffic volumes presented in Exhibit 3-1 with the future background traffic volumes in Exhibit 3-2.

**Exhibit 3-3** presents the future total traffic volumes anticipated within the timeframe of this study.







## 4.2 Description of Capacity Issues

Based on the existing (2017) traffic volumes presented in the Scoping Report, weekday morning and afternoon peak hour traffic volumes on Bank Street are in the order of 800 vehicles per hour, which is well below capacity for the two lanes provided in the peak direction. Side-street volumes on Fifth Avenue are in the order of 100-150 vehicles per hour per lane during the peak periods which is also well below the lane capacity for a collector road.

As indicated by the traffic volumes presented in Exhibits 3-1, 3-2 and 3-3, neither background traffic growth nor traffic generated by the proposed development is expected to trigger any traffic capacity issues on roads within the study area. The detailed analysis to be undertaken in Step 4 of the Transportation Impact Analysis process, however, will identify if there are any localized capacity issues at any of the intersections within the study area under both background and total traffic conditions.

## 4.3 Adjustment to Development-Generated Demands

### 4.3.1 Transit Modal Share

The breakdown of site generated trips by mode presented in Table 3-3 above indicates that the proposed development will generate approximately 20 additional transit users during both the weekday morning and weekday afternoon peak hours. This additional volume of transit users will have a negligible effect on the capacity of the two existing transit routes that operate within the study area and therefore no adjustment to mode share is deemed necessary.

## 4.4 Adjustments to Background Network Demands

### 4.4.1 Growth Rate Reductions

According to the TRANS Regional Model provided by the City, there is not expected to be any significant background traffic growth in the study area within the 2031 planning horizon of the Transportation Master Plan, based on the City's projected population and employment indices. For the purposes of this study, no further reduction to the assumed growth rate is recommended.

## 5 Conclusions

Based on the future traffic volumes established in this Forecasting Report, all necessary information has been prepared in order to undertake a Strategy Report, which includes the Design Review and Network Impact Analysis components of the Transportation Impact Assessment.

**THE TIA PROCESS IS REQUIRED TO PROCEED TO STEP 4 – ANALYSIS.**

Should you have any questions or concerns regarding the contents of this Forecasting Report, please do not hesitate to contact me at 613-225-1311 (x524).

Sincerely,

A handwritten signature in black ink, appearing to read 'D Hook', with a long horizontal line extending to the right.

David Hook, P.Eng

# Appendix A – Trip Generation Data

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# Residential Condominium/Townhouse (230)

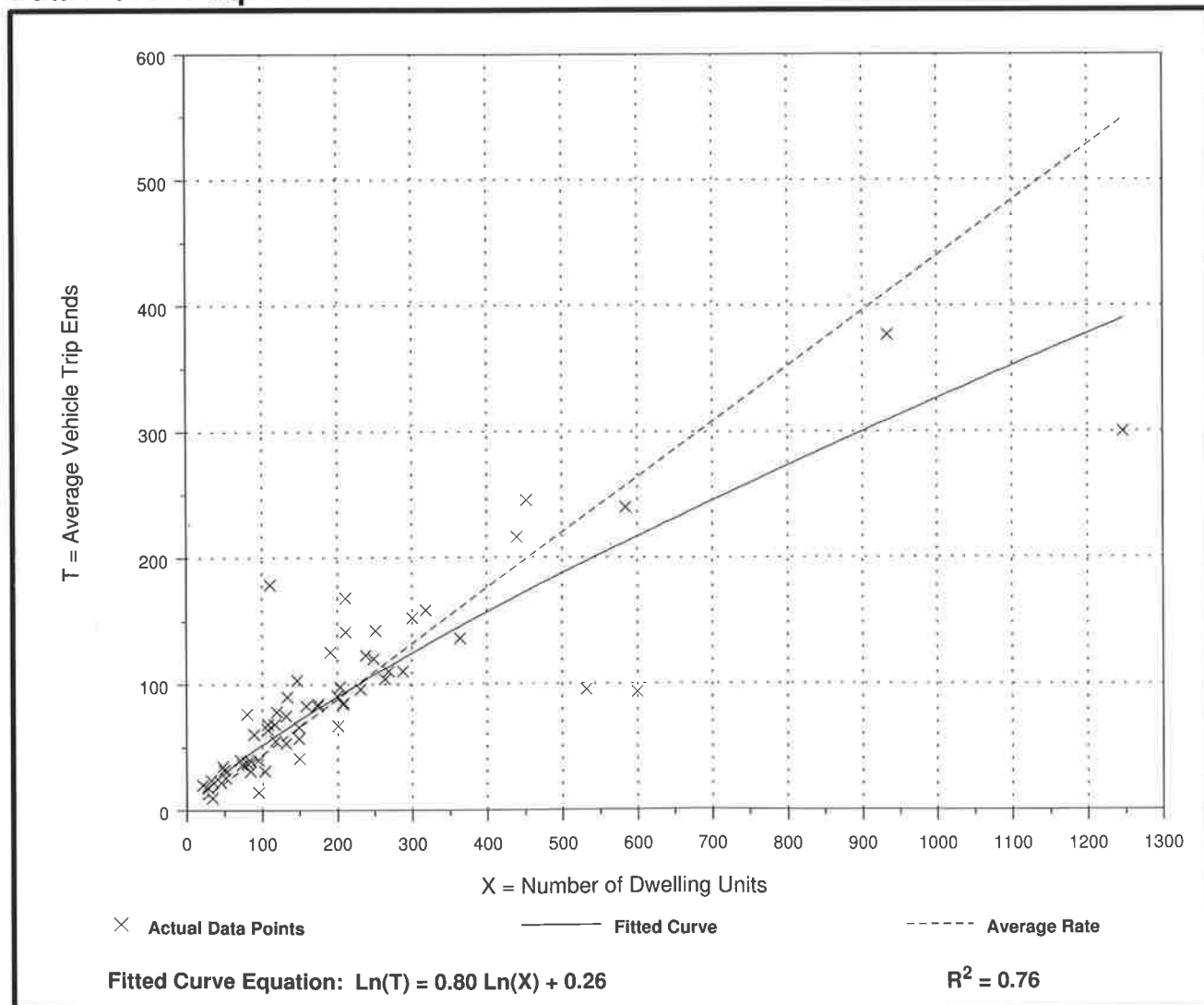
Average Vehicle Trip Ends vs: Dwelling Units  
On a: Weekday,  
Peak Hour of Adjacent Street Traffic,  
One Hour Between 7 and 9 a.m.

Number of Studies: 59  
Avg. Number of Dwelling Units: 213  
Directional Distribution: 17% entering, 83% exiting

## Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.44	0.15 - 1.61	0.69

## Data Plot and Equation



# Residential Condominium/Townhouse (230)

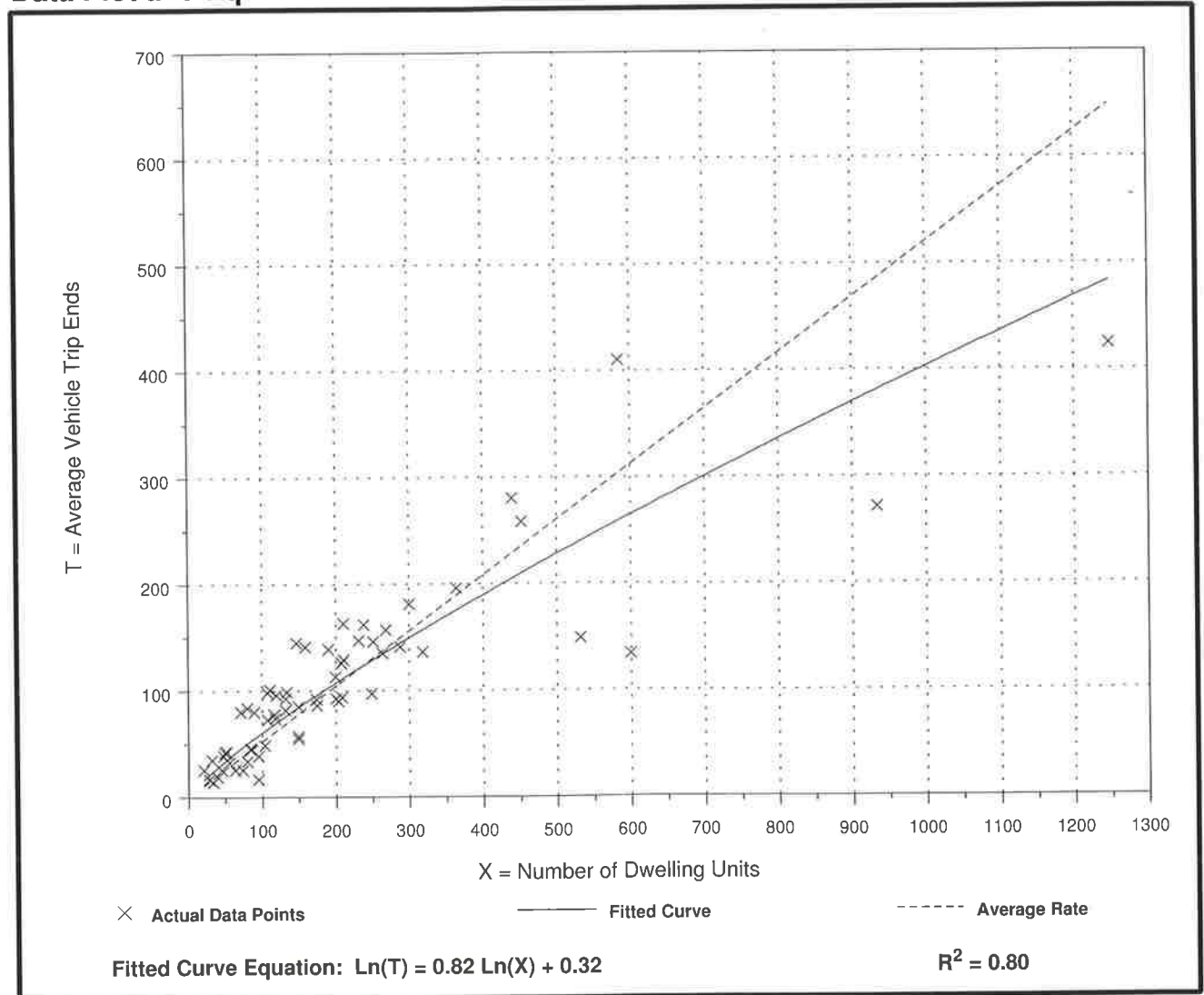
**Average Vehicle Trip Ends vs: Dwelling Units**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 4 and 6 p.m.**

Number of Studies: 62  
 Avg. Number of Dwelling Units: 205  
 Directional Distribution: 67% entering, 33% exiting

## Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.52	0.18 - 1.24	0.75

## Data Plot and Equation





Transportation Impact Assessment

# PROPOSED CONDOMINIUM BUILDING – BANK AT FIFTH (99 FIFTH AVENUE)

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## Step 4 – Strategy Report



Prepared for Minto Communities Canada  
by IBI Group  
November 22, 2017

<b>1</b>	<b>Introduction .....</b>	<b>3</b>
1.1	Background .....	3
1.2	Methodology .....	3
1.3	Reference Material .....	3
<b>2</b>	<b>Design Review .....</b>	<b>4</b>
2.1	Development Design .....	4
2.1.1	Design for Sustainable Modes .....	4
2.1.2	Circulation and Access .....	4
2.2	Parking .....	5
2.3	Boundary Streets .....	5
2.3.1	Mobility .....	5
2.3.2	Road Safety .....	5
2.4	Access Intersections .....	6
2.4.1	Location and Design of Access .....	6
2.4.2	Intersection Control .....	7
2.4.3	Intersection Design .....	7
<b>3</b>	<b>Network Impact .....</b>	<b>7</b>
3.1	Transportation Demand Management .....	7
3.1.1	Context .....	8
3.1.2	Need and Opportunity .....	8
3.1.3	TDM Program Measures .....	8
3.2	Neighbourhood Traffic Management .....	8
3.3	Transit .....	9
3.3.1	Route Capacity .....	9
3.3.2	Transit Priority .....	9
3.4	Network Concept Review .....	9
<b>4</b>	<b>Network Performance Analysis .....</b>	<b>9</b>
4.1	Intersection Capacity Analyses .....	9
4.1.1	Analysis Criteria .....	9
4.1.2	Existing (2017) Traffic .....	11
4.1.3	Future Background Traffic .....	12
4.1.4	Future Total Traffic .....	12
4.1.1	Intersection Capacity Analysis Summary .....	12



4.2	Multi-Modal Level of Service (MMLOS) Analyses .....	13
4.2.1	Analysis Criteria .....	13
4.2.1	Existing (2017) Conditions .....	14
<b>5</b>	<b>Summary of Improvements .....</b>	<b>15</b>
<b>6</b>	<b>Conclusions .....</b>	<b>16</b>
<b>Appendix A – TDM-Supportive Development Design and Infrastructure Checklist</b>		
<b>Appendix B – TDM Measures Checklist</b>		
<b>Appendix C – Synchro Analysis</b>		
<b>Appendix D – MMLOS Analysis</b>		

# 1 Introduction

The following Strategy Report was prepared on behalf of Minto Communities Canada in support of a Re-Zoning and subsequent Site Plan Control application for a proposed 8-storey condominium development to be located on a portion of 819 Bank Street, in the City of Ottawa. The lot is to be severed and subsequently assigned the municipal address of 99 Fifth Avenue.

The format of this Strategy Report was based on the City of Ottawa's 2017 Transportation Impact Assessment (TIA) Guidelines. The purpose of the report is to evaluate pre and post-development network performance and determine if network modifications are required to offset any potential impacts of the development. It also provides an opportunity to review the details of the proposed plan to ensure that is in conformance with the City's geometric requirements and is supportive of transportation demand management principles.

Following the review and approval of this Strategy Report by City staff, the TIA process will proceed to Step 5 – Transportation Impact Assessment submission. Should the conclusions of this report indicate that no further work is necessary for the comprehensive evaluation of the proposed development, this report shall complete the TIA requirements.

## 1.1 Background

IBI Group (IBI) was retained by Minto Communities Canada to evaluate the need for and undertake a Transportation Impact Assessment in support of a proposed condominium development at 819 Bank Street (99 Fifth Avenue) in the City of Ottawa. In accordance with the City of Ottawa TIA Guidelines, the Screening Form, Scoping Report and Forecasting Report (Steps 1 to 3) were completed to establish the basic study parameters and content for analysis which will all become components of the final Transportation Impact Assessment submission.

## 1.2 Methodology

The content of the Strategy Report is based on the requirements established by the City of Ottawa TIA Guidelines. As such, the following items are discussed in this report:

- Design Review Component, which will consider the following topics:
  - Development Design
  - Parking
  - Boundary Streets
  - Access Intersections
- Network Impact Component, which will consider the following topics:
  - Transportation Demand Management
  - Neighbourhood Traffic Management
  - Transit
  - Network Concept Review
  - Network Intersections Design

## 1.3 Reference Material

The following documents were referenced in the preparation of this report:

- City of Ottawa Transportation Impact Assessment Guidelines (2017)
- City of Ottawa Transportation Master Plan (November 2013)
- City of Ottawa TDM Checklist (June 2017)
- City of Ottawa Private Approach By-law 2003-447

## 2 Design Review

### 2.1 Development Design

#### 2.1.1 Design for Sustainable Modes

For consistency with the City of Ottawa's Urban Design Guidelines and transportation policies, new developments shall provide safe and efficient access for all users while creating an environment that encourages walking, cycling and transit use.

The site integrates well with the adjacent transportation network by providing convenient access to active transportation facilities. The site is located close to Bank Street, an arterial mainstreet with an abundance of shops and services within close walking distance. It also has direct access to bicycle infrastructure and all units proposed are within the minimum-prescribed distance of 400 meters to public transportation.

The TDM-Supportive Development Design and Infrastructure Checklist was completed and is provided in **Appendix A**. This checklist identifies anticipated measures that are being considered in association with the proposed development to offset the vehicular impact on the adjacent road network.

#### 2.1.2 Circulation and Access

The proposed site access and circulation is similar to the existing configuration, except with the following changes:

- Location of Site Access: The site access on Fourth Avenue will be relocated to the eastern edge of the property line to align with the existing access on Fifth Avenue. Access for automobiles and trucks has been positioned at the back of the building, thereby reducing vehicular conflict with areas of higher pedestrian activity. A new two-way access to the below-grade parking facilities is proposed along the Fifth Avenue frontage. This will provide direct access to the arterial road network for the majority of the site-generated traffic thereby mitigating any potential impacts to Fourth Avenue which is classified by the City of Ottawa as a Local Road.
- Circulation: The internal circulation of site traffic has been reversed. All vehicular traffic is proposed to enter from Fourth Avenue and exit via Fifth Avenue. This configuration was chosen to improve traffic circulation on the adjacent road network by redirecting outbound traffic to the signalized intersection at Bank/Fifth rather than the unsignalized intersection at Bank/Fourth while more-efficiently accommodating on-site parking and loading/unloading manoeuvres. Access to and egress from the below-grade parking facilities will be entirely from Fifth Avenue, independent from the rear laneway connecting Fourth Avenue with Fifth Avenue.
- Pedestrian Access: The primary pedestrian entrance to the proposed development is located nearest the Bank/Fifth intersection. Ground level units will have direct private pedestrian access from both Fourth Avenue and Fifth Avenue. Two separate pedestrian

entries to the building will be provided at the rear of the building, each with direct concrete sidewalks connecting to the City's pedestrian network.

- **Bicycle Access:** Secure bicycle parking spaces are provided below-grade on parking level P1 at the base of the vehicle entry ramp. Access to the bicycle parking facilities is also available via the elevator lobby at the main pedestrian entrance.

## 2.2 Parking

On-street parking on Fourth Avenue will require local reconfiguration to accommodate the relocation of the site access, however no loss of on-street parking is anticipated as the proposed access is of similar width (8.5 metres) as compared to the existing two-way access (7.0 metres).

The proposed development will include 122 on-site parking spaces. This equates to 48 spaces in excess of the minimum parking requirement per City by-law. As the proposed supply of on-site parking is greater than the demand, no further review of parking is required beyond what has been described in the Scoping Document.

## 2.3 Boundary Streets

### 2.3.1 Mobility

The proposed development provides direct connections to both Fourth Avenue and Fifth Avenue.

Fourth Avenue is a local road and, although has no designation as a cycling route, it is in essence a Complete Street as it provides balanced facilities for all modes of travel. A low posted speed limit (40km/h) and relatively low traffic volumes permit the paved surface to operate both as a vehicular and bicycle facility while on-street parking provides a buffer between vehicles and pedestrians.

Fifth Avenue on the other hand, is a collector road and carries a significantly-higher volumes of traffic. The planned cycling link across the Rideau River between Fifth Avenue and Clegg Street will encourage cycling along the corridor and therefore, in its present state, cycling infrastructure is under-provided for along Fifth Avenue, west of O'Connor. Planned bicycle infrastructure to be constructed in the near future (exclusive/shared bike lanes along Fifth Avenue with a designated 'bike box' on the eastbound and westbound approaches to the Bank/Fifth intersection) will fill a gap in the cycling network and result in a more 'complete' street, for which the proposed development will benefit. The Bicycle Level of Service impact of these changes are discussed below in **Section 4.0 – Network Performance Analysis**.

### 2.3.2 Road Safety

A summary of all reported collisions within the study period over the past five years was presented in the Scoping Report. The City requires a safety review if at least six collisions for any one movement or of a discernible pattern, over a five year period have occurred. Based on a review of the re-occurring events identified in the Scoping Report, the following locations warrant further review:

- **Bank Street – Fourth Avenue to Fifth Avenue**
  - In the past five years, there have been 7 Sideswipe collisions in the northbound direction on this short 85m long section of road. Details of these collisions were reviewed to determine if there is any probable cause for these repeated collisions:
    - Surface Conditions: Slush/Snow (2 of 7)
    - Daylight Conditions: Dark (2 of 7)

- Vehicle Manoeuvre: Pulling Away From Curb (3 of 7)
- Time of Day: Peak Hour (2 of 7)
- Based on the above, there is no evident pattern or specific cause for collisions at this location and can each be considered random occurrences.

## 2.4 Access Intersections

### 2.4.1 Location and Design of Access

As discussed in the Scoping Report, the proposed plan is within conformance with the City of Ottawa Zoning By-law 2003-447, with particular confirmation of the following items:

- Width: Must be 2.4 to 7.5 metres in width for one-way private approaches and up to 9.0 metres for two-way private approaches.
  - The proposed one-way private approach on Fourth Avenue will be 8.5 metres wide. Although this is in excess of the maximum width requirement, it is necessary to accommodate the turning radii of a waste collection vehicle and should therefore be permitted under this circumstance.
  - The proposed one-way private approach on Fifth Avenue will be 5.2 metres wide and is in conformance with the By-law.
  - The proposed two-way private approach on Fifth Avenue will be 6.1 metres wide. This private approach will provide access to a below-grade parking facility whose minimum internal drive aisle width is 6.0 metres and therefore the width of the access at street level is appropriate in this circumstance.
- Distance from Intersecting Road: For a residential development with 100-199 parking spaces, the proposed private approach must be at least 30 metres from the nearest intersecting street line.
  - None of the private approaches are within 30 metres of the nearest intersecting street line at Bank Street.
- Quantity and Spacing of Private Approaches: For sites with frontage between 46 and 150 metres, one (1) two-way and two (2) one-way private approaches are permitted. Any two private approaches must be separated by at least 9.0m and can be reduced to 2.0m in the case of two one-way driveways.
  - The Fifth Avenue frontage is approximately 62 meters and therefore the proposed quantity of private approaches is compliant with the By-law.
  - The proposed two-way private approach and the proposed one-way (outbound) private approach on Fifth Avenue are planned to be 1.71 meters apart. Although this is not compliant with the By-law, turning movement conflicts between these two driveways are not expected to be significant as traffic exiting the one-way egress will be relatively infrequent (see **Exhibit 3-3** of the Forecasting Report for future traffic volume projections at each of the site's private approaches). Further to this, the required separation cannot be practicably achieved while satisfying the minimum distance from the intersection road as described previously. As visibility between these two private approaches is unobstructed and turning movement conflicts are expected to be infrequent, it is recommended that a relaxation of this bylaw requirement be considered such that the proposed site access configuration may be approved.

- Distance from Property Line: Private approaches must be at least 3.0m from the abutting property line, however this requirement can be reduced to 0.3m provided that the access is a safe distance from the access serving the adjacent property, sight lines are adequate and that it does not create a traffic hazard.
  - The proposed private approach on Fourth Avenue will be located immediately at the property line. A residential driveway exists at the abutting property line on Fourth Avenue, therefore the 3.0m offset requirement is not met. Since the private approach on Fourth Avenue will be restricted to inbound vehicles only, there is reduced hazard to the adjacent driveway and therefore the proposed offset should be considered sufficient. Further to this, as on-site parallel parking will be provided along the eastern property line, the vehicular drive aisle will be located 3.1m west of the property line. As indicated previously, the additional width of this private approach is to accommodate the turning radii of waste collection vehicles into the site.
  - The proposed one-way private approach on Fifth Avenue will be located approximately 3.0 metres from the abutting property line. A residential pathway is located near the property line on Fifth Avenue. Visibility requirements have been reviewed at the Fifth Avenue site egress, and while on-street parking is currently provided along the north side of Fifth Avenue, there are no visibility concerns with respect to traffic approaching from the east.

#### 2.4.2 Intersection Control

The proposed private approach driveways on Fifth Avenue will be stop-controlled. Vehicular Level of Service results at this private approach are presented in **Section 4 – Network Performance Analysis**.

#### 2.4.3 Intersection Design

Vehicle turning templates confirm that the proposed width and curb radii at both one-way private approach driveways can accommodate large heavy vehicles for waste collection and moving trucks. As the proposed development provides frontage on three City roads, the internal access driveway between Fourth Avenue and Fifth Avenue is not intended to function as a fire route.

### 3 Network Impact

#### 3.1 Transportation Demand Management

The City of Ottawa is committed to implementing Transportation Demand Management (TDM) measures on a city-wide basis in an effort to reduce automobile dependence for residents of Ottawa, particularly during the weekday peak travel periods. TDM initiatives are aimed at encouraging individuals to use non-auto modes of travel during peak periods.

As described in Forecasting Report associated with this Transportation Impact Assessment study, mode shares used to estimate future development traffic were based on the 2011 TRANS Origin-Destination Survey for the Traffic Assessment Zone (TAZ) in which the proposed development is located. Active transportation presently accounts for a significant proportion of the mode share within the TAZ and meets or exceeds the City's 2031 city-wide target. A conservative approach was taken in that future mode shares were assumed to remain unchanged within the timeframe of this study as the relative impact of any reasonable adjustments would be insignificant across all modes.

### 3.1.1 Context

The proposed development is within the Bank Street Design Priority Area and will provide high-density townhouse and condominium suites ranging in size from 450 to 1450 square feet of living space. The planned unit breakdown is as follows: 2% Studio, 42% One-Bedroom, 23% One-Bedroom + Den, 33% Two-Bedroom.

### 3.1.2 Need and Opportunity

As illustrated in **Exhibit 3-1** of the Forecasting Report, the projected net-increase in site-generated traffic associated with the proposed development is expected to be relatively low. The intersection capacity analysis described in **Section 4.0** (Network Performance Analysis) of this report identifies sufficient residual capacity at the study area intersections to accommodate significant variances in the development's projected future traffic demand. It is therefore unlikely that higher than expected site-generated traffic volumes would have any significant impact on the Level of Service at intersections within the study area.

### 3.1.3 TDM Program Measures

The proposed development conforms to the City's TDM principles by providing convenient and direct connections to adjacent pedestrian, cycling and transit facilities. The City of Ottawa's TDM Measures Checklist provided in **Appendix B** provides a list of measures that will be considered for implementation to ensure that the proposed development's vehicular impact on the transportation network is minimized.

## 3.2 Neighbourhood Traffic Management

As noted previously, the access and circulation configuration has been converted to unidirectional flow (southbound) from Fourth Avenue to Fifth Avenue with the intention of reducing off-site vehicular delays at unsignalized intersections while directing outbound traffic to a collector road rather than a local road as exists currently. The majority of traffic generated by the site will enter and exit via the parking garage access on Fifth Avenue.

**Table 4-1** identifies the existing (2017) peak hour traffic volumes on the boundary streets adjacent the proposed development and provides comparison to their theoretical hourly capacities based roadway classification.

Table 4- 1: Boundary Street Capacity

BOUNDARY STREET	CLASSIFICATION	CAPACITY (PER LANE)	EXISTING TWO-WAY VOLUME
Fourth Avenue	Local Road	120 Vehicles/Hour (1,000 Vehicles/Day)	82 Vehicles/Hour (AM Peak) 77 Vehicles/Hour (PM Peak)
Fifth Avenue	Collector Road	300 Vehicles/Hour (2,500 Vehicles/Day)	179 Vehicles/Hour (AM Peak) 258 Vehicles/Hour (PM Peak)

The proposed development is expected to contribute up to 10 additional vehicular trips to Fourth Avenue and up to 15 vehicular trips to Fifth Avenue during the peak hours, which is well within the theoretical capacities of each road. A Neighbourhood Traffic Management (NTM) Plan is therefore not required based on these findings.



### 3.3 Transit

#### 3.3.1 Route Capacity

The estimated transit passenger demand generated by the proposed development was determined in the Forecasting Report. It is anticipated that the proposed development will generate approximately 20 transit trips during the peak hours. This projected volume of additional transit users is not expected to have a significant impact on the capacity of the two OC Transpo transit routes that operate along Bank Street at frequent intervals during the weekday peak hours.

#### 3.3.2 Transit Priority

The 2013 Transportation Master Plan designates Bank Street as a Transit Priority corridor. The expected increase in transit users as a result of the proposed development is not likely to trigger the need for any isolated measures along Bank Street for improvements to existing service and offset any existing delays.

### 3.4 Network Concept Review

The proposed development is expected to generate less than 100 person trips during the weekday morning or afternoon peak hours. As indicated in the Scoping Report, the impact of the development will be localized and minor, therefore there is no requirement to undertake a review of the Network Concept.

## 4 Network Performance Analysis

### 4.1 Intersection Capacity Analyses

The following sections summarize the methodology and results of the intersection capacity analysis conducted for intersections within the study area with consideration of vehicular traffic only. Details of the analysis are provided in **Appendix C**.

*Note: The analysis of other modes is discussed in Section 4.2 – Multi-Modal Level of Service Analyses.*

#### 4.1.1 Analysis Criteria

##### Signalized Intersections

In qualitative terms, Level of Service (LOS) describes a user's perceived operational conditions of a transportation facility. For vehicular LOS, these conditions are generally defined in terms of delay, speed and travel time, freedom to manoeuvre, traffic interruptions, safety, comfort and convenience. LOS can also be related to the ratio of the volume to capacity (v/c) which is simply the relationship of the traffic volume (either measured or forecast) to the capability of the intersection or road section to accommodate a given traffic volume. This capability varies depending on the factors described above. LOS is given 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.



Table 4- 2: LOS Thresholds (Signalized)

LEVEL OF SERVICE	VOLUME TO CAPACITY (V/C) RATIO
A	0 to 0.60
B	0.61 to 0.70
C	0.71 to 0.80
D	0.81 to 0.90
E	0.90 to 1.00
F	> 1.00

The City of Ottawa has developed a set of thresholds as part of the Transportation Impact Assessment Guidelines which directly relate the volume to capacity (v/c) ratio of a signalized intersection to a LOS designation, as indicated in **Table 4-2**.

The intersection capacity analysis technique provides an indication of the LOS for each movement at the intersection under consideration and for the intersection as a whole. The overall v/c ratio for an intersection is defined as the sum of equivalent volumes for all critical movements at the intersection divided by the sum of capacities for all critical movements.

#### Unsignalized Intersections

The capacity of an unsignalized intersection can also be expressed in terms of the Level of Service it provides. For an unsignalized intersection, the LOS is described in terms of the average movement delays at the intersection. Delay is defined as the total elapsed time from when a vehicle stops at the end of the queue until the vehicle departs from the stop line; this includes the time required for a vehicle to travel from the last-in-queue position to the first-in-queue position. The average delay for any particular minor movement at an unsignalized intersection is a function of the capacity of the approach and the degree of saturation. The overall intersection LOS is representative of the approach with the highest degree of delay.

The Highway Capacity Manual 2010 (HCM), prepared by the Transportation Research Board, includes the following Levels of Service criteria for unsignalized intersections, related to average movement delays at the intersection, as indicated in **Table 4-3**.

Table 4- 3: LOS Thresholds (Unsignalized)

LEVEL OF SERVICE	DELAY (SECONDS / VEHICLE)
A	<10
B	>10 and <15
C	>15 and <25
D	>25 and <35
E	>35 and <50
F	>50

The unsignalized intersection capacity analysis technique included in the HCM and used in the current study provides an indication of the Level of Service for each movement of the intersection under consideration. By this technique, the performance of the unsignalized intersection can be compared under varying traffic conditions, using the Level of Service concept in a qualitative sense. One unsignalized intersection can be compared with another unsignalized intersection using this concept. Level of Service 'E' represents the capacity of the movement under consideration and generally, in large urban areas, Level of Service 'D' is considered to represent an acceptable operating condition (Level of Service 'E' is considered an

acceptable operating condition for planning purposes for intersections located within Ottawa's Urban Core, Transit-Oriented Development Zones or Traditional Mainstreet/Design Priority Areas). Level of Service 'F' indicates that the movement is operating beyond its design capacity.

#### 4.1.2 Existing (2017) Traffic

An intersection capacity analysis has been undertaken using the Existing (2017) Traffic volumes presented in **Exhibit 2-3** of the Scoping Report, yielding the following results:

Table 4- 4: Existing (2017) Traffic

INTERSECTION	TRAFFIC CONTROL	AM PEAK HOUR		PM PEAK HOUR	
		OVERALL LOS (V/C OR DELAY)	CRITICAL MOVEMENTS (V/C OR DELAY)	OVERALL LOS (V/C OR DELAY)	CRITICAL MOVEMENTS (V/C OR DELAY)
Bank & Fifth	Signalized	<b>A</b> (0.52)	EBT (0.62)	<b>A</b> (0.58)	EBT (0.61)
> Bank & Fifth <sup>1</sup>	Signalized	<b>A</b> (0.52)	EBT (0.63)	<b>A</b> (0.60)	WBT (0.66)
Bank & Fourth	Unsignalized	<b>D</b> (31.3s)	WB (31.3s)	<b>D</b> (29.2s)	EB (29.2s)
Site Access & Fourth	Unsignalized	<b>A</b> (8.7s)	NB (8.7s)	<b>A</b> (8.8s)	NB (8.8s)

*Note 1: Analysis considers removal of westbound left-turn lane resulting from the planned bicycle facilities on Fifth Avenue to be implemented in the near future.*

### 4.1.3 Future Background Traffic

An intersection capacity analysis has been undertaken using the Future Background Traffic volumes presented in **Exhibit 3-2** of the Forecasting Report, yielding the following results:

Table 4- 5: Future Background Traffic

INTERSECTION	TRAFFIC CONTROL	AM PEAK HOUR		PM PEAK HOUR	
		OVERALL LOS (V/C OR DELAY)	CRITICAL MOVEMENTS (V/C OR DELAY)	OVERALL LOS (V/C OR DELAY)	CRITICAL MOVEMENTS (V/C OR DELAY)
Bank & Fifth	Signalized	<b>A</b> (0.49)	EBT (0.60)	<b>A</b> (0.57)	EBT (0.65)
Bank & Fourth	Unsignalized	<b>D</b> (24.6s)	WB (24.6s)	<b>D</b> (25.0s)	EB (25.0s)
Existing Site Access & Fourth	Unsignalized	<b>A</b> (8.7s)	NB (8.7s)	<b>A</b> (8.8s)	NB (8.8s)

### 4.1.4 Future Total Traffic

An intersection capacity analysis has been undertaken using the Future Total Traffic volumes presented in **Exhibit 3-3** of the Forecasting Report, yielding the following results:

Table 4- 6: Future Total Traffic

INTERSECTION	TRAFFIC CONTROL	AM PEAK HOUR		PM PEAK HOUR	
		OVERALL LOS (V/C OR DELAY)	CRITICAL MOVEMENTS (V/C OR DELAY)	OVERALL LOS (V/C OR DELAY)	CRITICAL MOVEMENTS (V/C OR DELAY)
Bank & Fifth	Signalized	<b>A</b> (0.49)	EBT (0.61)	<b>A</b> (0.57)	WBT (0.66)
Bank & Fourth	Unsignalized	<b>D</b> (26.0s)	WB (26.0s)	<b>C</b> (24.6s)	EB (24.6s)
Fifth & Parking Garage Access	Unsignalized	<b>A</b> (8.9s)	SB (8.9s)	<b>A</b> (9.5s)	SB (9.5s)
Fifth & Site Egress	Unsignalized	<b>A</b> (9.0s)	SB (9.0s)	<b>A</b> (9.2s)	SB (9.2s)

### 4.1.1 Intersection Capacity Analysis Summary

The results presented in tables 4-4, 4-5 and 4-6 above indicate that there are no existing capacity issues at any of the analysed intersections within the study area, nor are any capacity issues expected in future conditions with or without the proposed development. It shall be noted that future conditions the intersection of Bank/Fifth are shown to improve slightly over existing conditions. Future conditions were analysed using a Peak Hour Factor (PHF) of 1.0 per the requirements of the TIA Guidelines. The PHF is the ratio of hourly volumes to the calculated Flow Rate (i.e. highest 15 minute interval multiplied by four). Existing conditions are conservatively-estimated by analysing the Flow Rate, rather than the hourly volumes. The analysis of future conditions assumes that additional demand will spread within the hour such that the Flow Rate

will eventually approach the hourly volume – or in other words, the PHF will approach a value of 1.0.

Overall, the volume of traffic associated with the proposed development is expected to have a negligible impact on the intersection within the study area. There is sufficient capacity available on the adjacent road network to accommodate the net increase in traffic generated by the development for the foreseeable future.

## 4.2 Multi-Modal Level of Service (MMLOS) Analyses

Analysis of existing conditions for each travel mode has been conducted based on the methodology prescribed in the City of Ottawa Multi-Modal Level of Service (MMLOS) Guidelines (approved by City Council in October 2015 and amended in October 2016). The Level of Service (LOS) for each mode has been calculated for each signalized intersection and for each segment of roadway between intersections. The results of the analysis for each mode are summarized below. Details of the analysis are provided in **Appendix D**.

### 4.2.1 Analysis Criteria

Analysis criteria for each of the four non-auto modes are briefly described as follows:

#### **Intersection Pedestrian Level of Service (PLOS)**

The Pedestrian Level of Service (PLOS) at intersections is based on factors including the number of traffic lanes that pedestrians must cross, corner radii, and whether the crossing allows for permissive or protective right or left turns, among others. The City of Ottawa target for PLOS is C.

#### **Intersection Bicycle Level of Service (BLOS)**

The Bicycle Level of Service (BLOS) at intersections is dependent on the number of lanes that the cyclist is required to cross to make a left-turn or on the presence of a dedicated right-turn lane on the approach, as well as the operating speed of each approach. The City target for BLOS is 'C'.

#### **Intersection Transit Level of Service (TLOS)**

Intersection Transit Level of Service (TLOS) is based on the average signal delay experienced by transit vehicles at each intersection. The City target for BLOS is 'D'.

#### **Intersection Truck Level of Service (TkLOS)**

The Truck LOS (TkLOS) is based on the right-turn radii, as well as the number of receiving lanes for vehicles making a right-turn from the traffic lane being analyzed. The City of Ottawa target for TkLOS is 'D'.

#### 4.2.1 Existing (2017) Conditions

A desktop review of existing conditions within the study area was undertaken utilizing the methodology prescribed by the City's MMLOS Guidelines. **Table 4-7** describes the existing LOS for Pedestrian, Bicycle, Transit and Trucks.

Table 4- 7: Existing (2017) MMLOS Results

LOCATION	LEVEL OF SERVICE BY MODE			
	PEDESTRIAN (PLOS)	BICYCLE (BLOS)	TRANSIT (TLOS)	TRUCK (TkLOS)
	TARGET 'C'	TARGET 'C'	TARGET 'D'	TARGET 'D'
<b>INTERSECTIONS</b>				
Bank & Fifth	<b>D</b>	<b>C</b>	<b>D</b>	<b>F</b>
> Bank & Fifth <sup>1</sup>	-	<b>C</b>	-	-
Bank & Fourth	n/a	<b>C</b>	<b>D</b>	<b>F</b>
<b>SEGMENTS</b>				
Bank Street – Third to Fourth	<b>C</b>	<b>D</b>	<b>D</b>	<b>E</b>
Bank Street – Fourth to Fifth	<b>C</b>	<b>D</b>	<b>D</b>	<b>E</b>
Bank Street – Fifth to Regent	<b>C</b>	<b>D</b>	<b>D</b>	<b>E</b>
Fourth Avenue – Lyon to Bank	<b>E</b>	<b>A</b>	n/a	<b>B</b>
Fourth Avenue - Bank to O'Connor	<b>E</b>	<b>A</b>	n/a	<b>B</b>
Fifth Avenue - Monk to Bank	<b>D</b>	<b>D</b>	n/a	<b>B</b>
>Fifth Avenue - Monk to Bank <sup>1</sup>	-	<b>D</b>	-	-
Fifth Avenue - Bank to Howick	<b>E</b>	<b>D</b>	n/a	<b>B</b>
>Fifth Avenue - Bank to Howick <sup>1</sup>	-	<b>B</b>	-	-

*Note 1: Planned bicycle facilities on Fifth Avenue to be implemented in the near future as part of the Glebe Neighbourhood Cycling project include: A bike lane and bike box (EB) and sharrows (WB) west of Bank Street, and bike lanes and a bike box east of Bank Street. From O'Connor to Howick, sharrows are provided in the westbound direction, while a continuous bike lane is provided for eastbound cyclists.*

The improvements to bicycle infrastructure on Fifth Avenue have been found to have no impact on the overall BLOS at the intersection of Bank/Fifth as the intersection LOS is governed by the lowest-performing approach, Bank Street.

A similar conclusion can be drawn for Fifth Avenue, west of Bank Street. Although a bicycle lane will be added on the eastbound approach to the Bank/Fifth intersection, the westbound lanes will

remain as mixed traffic thereby governing the overall Bicycle LOS of the segment. East of Bank Street, the Bicycle Level of Service is improved to BLOS 'B' with the introduction of continuous bike lanes in both directions.

## 5 Summary of Improvements

Based on the MMLOS results summarized in **Table 4-7** above, the following measures could improve conditions for each mode:

### Pedestrians

- The intersection of Bank/Fifth performs beyond minimum LOS standards. The combined implementation of painted ladder-style crossings, in conjunction with a leading pedestrian interval on the east-west crossing and an increase in Walk time from 7 to 10 seconds will sufficiently-improve the PLOS to an acceptable operating standard (BLOS 'C').
- Both Fourth Avenue and Fifth Avenue have sections of substandard-width sidewalks. Upgrading the sidewalks to a minimum 1.8m width will permit the PLOS to improve to an acceptable operating standard (PLOS 'C').

### Cyclists

- Bank Street operates below acceptable standards, however there are no reasonable measures that can be undertaken to improve the BLOS from 'D' to 'C' due to constrained right-of-way.
- The BLOS on Fifth Avenue west of Bank Street could be improved by the removal of on-street parking and introduction of a westbound bike lane.

### Transit

- All intersections and segments are operating at acceptable Levels of Service within the study area, based on existing traffic signal delay at Bank/Fifth.

### Truck

- All intersections and segments operate beyond minimum TkLOS standards. In urban constrained conditions, it is not expected that TkLOS will meet acceptable standards. There are no reasonable measures that can be undertaken to improve Truck Level of Service as it is based on geometric criteria such as curb radii, number of lanes and lane widths.

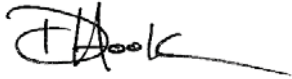
## 6 Conclusions

Based on the results of this Strategy Report, all necessary information has been prepared in order to deem complete the Transportation Impact Assessment. The proposed development does not trigger any road modifications, therefore there are no drawings that shall accompany the TIA package. A Monitoring Plan is not considered a necessary component of the TIA submission as the proposed development is projected to have a negligible impact on the adjacent transportation network.

**THE TIA PROCESS IS NOW COMPLETE**

Should you have any questions or concerns regarding the contents of this Strategy Report, please do not hesitate to contact me at 613-225-1311 (x524).

Sincerely,

A handwritten signature in black ink, appearing to read 'D Hook', with a long horizontal line extending to the right.

David Hook, P.Eng

# Appendix A – TDM-Supportive Development Design and Infrastructure Checklist

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

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

TDM-supportive design & infrastructure measures: <i>Residential developments</i>		Check if completed & add descriptions, explanations or plan/drawing references
<b>1. WALKING &amp; CYCLING: ROUTES</b>		
<b>1.1 Building location &amp; access points</b>		
<b>BASIC</b>	1.1.1 Locate building close to the street, and do not locate parking areas between the street and building entrances	<input checked="" type="checkbox"/> A1.2 & A2.3
<b>BASIC</b>	1.1.2 Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations	<input checked="" type="checkbox"/> A1.2 & A2.3
<b>BASIC</b>	1.1.3 Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort	<input checked="" type="checkbox"/> A2.3-10
<b>1.2 Facilities for walking &amp; cycling</b>		
<b>REQUIRED</b>	1.2.1 Provide convenient, direct access to stations or major stops along rapid transit routes within 600 metres; minimize walking distances from buildings to rapid transit; provide pedestrian-friendly, weather-protected (where possible) environment between rapid transit accesses and building entrances; ensure quality linkages from sidewalks through building entrances to integrated stops/stations ( <i>see Official Plan policy 4.3.3</i> )	<input checked="" type="checkbox"/> A1.2 & A2.3 Main entrance into building lobby is located at the same intersection as near by bus stops. Access to cross walk.
<b>REQUIRED</b>	1.2.2 Provide safe, direct and attractive pedestrian access from public sidewalks to building entrances through such measures as: reducing distances between public sidewalks and major building entrances; providing walkways from public streets to major building entrances; within a site, providing walkways along the front of adjoining buildings, between adjacent buildings, and connecting areas where people may congregate, such as courtyards and transit stops; and providing weather protection through canopies, colonnades, and other design elements wherever possible ( <i>see Official Plan policy 4.3.12</i> )	<input checked="" type="checkbox"/> A1.2 & A2.3 Main entrance into building located as close to major pedestrian walkways/transit stops as possible.

<b>TDM-supportive design &amp; infrastructure measures:</b> <i>Residential developments</i>		<b>Check if completed &amp; add descriptions, explanations or plan/drawing references</b>
<b>REQUIRED</b>	1.2.3 Provide sidewalks of smooth, well-drained walking surfaces of contrasting materials or treatments to differentiate pedestrian areas from vehicle areas, and provide marked pedestrian crosswalks at intersection sidewalks ( <i>see Official Plan policy 4.3.10</i> )	<input checked="" type="checkbox"/> A1.2 & A2.3
<b>REQUIRED</b>	1.2.4 Make sidewalks and open space areas easily accessible through features such as gradual grade transition, depressed curbs at street corners and convenient access to extra-wide parking spaces and ramps ( <i>see Official Plan policy 4.3.10</i> )	<input checked="" type="checkbox"/> A1.2 & A2.3
<b>REQUIRED</b>	1.2.5 Include adequately spaced inter-block/street cycling and pedestrian connections to facilitate travel by active transportation. Provide links to the existing or planned network of public sidewalks, multi-use pathways and on-road cycle routes. Where public sidewalks and multi-use pathways intersect with roads, consider providing traffic control devices to give priority to cyclists and pedestrians ( <i>see Official Plan policy 4.3.11</i> )	<input checked="" type="checkbox"/> A1.2 & A2.3
<b>BASIC</b>	1.2.6 Provide safe, direct and attractive walking routes from building entrances to nearby transit stops	<input checked="" type="checkbox"/> A1.2 & A2.3
<b>BASIC</b>	1.2.7 Ensure that walking routes to transit stops are secure, visible, lighted, shaded and wind-protected wherever possible	<input checked="" type="checkbox"/> A1.2 & A2.3
<b>BASIC</b>	1.2.8 Design roads used for access or circulation by cyclists using a target operating speed of no more than 30 km/h, or provide a separated cycling facility	<input type="checkbox"/>
<b>1.3 Amenities for walking &amp; cycling</b>		
<b>BASIC</b>	1.3.1 Provide lighting, landscaping and benches along walking and cycling routes between building entrances and streets, sidewalks and trails	<input checked="" type="checkbox"/> A1.2 & A2.3
<b>BASIC</b>	1.3.2 Provide wayfinding signage for site access (where required, e.g. when multiple buildings or entrances exist) and egress (where warranted, such as when directions to reach transit stops/stations, trails or other common destinations are not obvious)	<input type="checkbox"/>

<b>TDM-supportive design &amp; infrastructure measures:</b> <i>Residential developments</i>		<b>Check if completed &amp; add descriptions, explanations or plan/drawing references</b>
<b>2. WALKING &amp; CYCLING: END-OF-TRIP FACILITIES</b>		
<b>2.1 Bicycle parking</b>		
<b>REQUIRED</b>	2.1.1 Provide bicycle parking in highly visible and lighted areas, sheltered from the weather wherever possible ( <i>see Official Plan policy 4.3.6</i> )	<input checked="" type="checkbox"/>
<b>REQUIRED</b>	2.1.2 Provide the number of bicycle parking spaces specified for various land uses in different parts of Ottawa; provide convenient access to main entrances or well-used areas ( <i>see Zoning By-law Section 111</i> )	<input checked="" type="checkbox"/> A2.1-3 All bike parking for residential portion of site is provided below grade with access to lobby/building
<b>REQUIRED</b>	2.1.3 Ensure that bicycle parking spaces and access aisles meet minimum dimensions; that no more than 50% of spaces are vertical spaces; and that parking racks are securely anchored ( <i>see Zoning By-law Section 111</i> )	<input checked="" type="checkbox"/> through elevator. Bike racks for existing retail to remain located on Bank (no change proposed)
<b>BASIC</b>	2.1.4 Provide bicycle parking spaces equivalent to the expected number of resident-owned bicycles, plus the expected peak number of visitor cyclists	<input checked="" type="checkbox"/>
<b>2.2 Secure bicycle parking</b>		
<b>REQUIRED</b>	2.2.1 Where more than 50 bicycle parking spaces are provided for a single residential building, locate at least 25% of spaces within a building/structure, a secure area (e.g. supervised parking lot or enclosure) or bicycle lockers ( <i>see Zoning By-law Section 111</i> )	<input checked="" type="checkbox"/> A2.2-3 100% of bike parking/locker space provided in secure area within the building
<b>BETTER</b>	2.2.2 Provide secure bicycle parking spaces equivalent to at least the number of units at condominiums or multi-family residential developments	<input checked="" type="checkbox"/> A2.2-3 bicycle parking/storage lockers provided at 1 to 1.
<b>2.3 Bicycle repair station</b>		
<b>BETTER</b>	2.3.1 Provide a permanent bike repair station, with commonly used tools and an air pump, adjacent to the main bicycle parking area (or secure bicycle parking area, if provided)	<input type="checkbox"/>
<b>3. TRANSIT</b>		
<b>3.1 Customer amenities</b>		
<b>BASIC</b>	3.1.1 Provide shelters, lighting and benches at any on-site transit stops	<input type="checkbox"/>
<b>BASIC</b>	3.1.2 Where the site abuts an off-site transit stop and insufficient space exists for a transit shelter in the public right-of-way, protect land for a shelter and/or install a shelter	<input type="checkbox"/>
<b>BETTER</b>	3.1.3 Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	<input type="checkbox"/>

TDM-supportive design & infrastructure measures: <i>Residential developments</i>		Check if completed & add descriptions, explanations or plan/drawing references
<b>4. RIDESHARING</b>		
<b>4.1 Pick-up &amp; drop-off facilities</b>		
<b>BASIC</b>	4.1.1 Provide a designated area for carpool drivers (plus taxis and ride-hailing services) to drop off or pick up passengers without using fire lanes or other no-stopping zones	<input checked="" type="checkbox"/> A1.2 & A2.3
<b>5. CARSHARING &amp; BIKESHARING</b>		
<b>5.1 Carshare parking spaces</b>		
<b>BETTER</b>	5.1.1 Provide up to three carshare parking spaces in an R3, R4 or R5 Zone for specified residential uses ( <i>see Zoning By-law Section 94</i> )	<input type="checkbox"/>
<b>5.2 Bikeshare station location</b>		
<b>BETTER</b>	5.2.1 Provide a designated bikeshare station area near a major building entrance, preferably lighted and sheltered with a direct walkway connection	<input type="checkbox"/>
<b>6. PARKING</b>		
<b>6.1 Number of parking spaces</b>		
<b>REQUIRED</b>	6.1.1 Do not provide more parking than permitted by zoning, nor less than required by zoning, unless a variance is being applied for	<input checked="" type="checkbox"/> A2.1-3 Providing close to 1 parking space per unit
<b>BASIC</b>	6.1.2 Provide parking for long-term and short-term users that is consistent with mode share targets, considering the potential for visitors to use off-site public parking	<input checked="" type="checkbox"/> A2.1-3 Visitor parking provided at grade w/ resident and remaining visitor parking U/G
<b>BASIC</b>	6.1.3 Where a site features more than one use, provide shared parking and reduce the cumulative number of parking spaces accordingly ( <i>see Zoning By-law Section 104</i> )	<input type="checkbox"/>
<b>BETTER</b>	6.1.4 Reduce the minimum number of parking spaces required by zoning by one space for each 13 square metres of gross floor area provided as shower rooms, change rooms, locker rooms and other facilities for cyclists in conjunction with bicycle parking ( <i>see Zoning By-law Section 111</i> )	<input type="checkbox"/>
<b>6.2 Separate long-term &amp; short-term parking areas</b>		
<b>BETTER</b>	6.2.1 Provide separate areas for short-term and long-term parking (using signage or physical barriers) to permit access controls and simplify enforcement (i.e. to discourage residents from parking in visitor spaces, and vice versa)	<input checked="" type="checkbox"/> A2.2

# Appendix B – TDM Measures Checklist

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**TDM Measures Checklist:**

*Residential Developments (multi-family, condominium or subdivision)*

**Legend**

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

TDM measures: <i>Residential developments</i>		Check if proposed & add descriptions
<b>1. TDM PROGRAM MANAGEMENT</b>		
<b>1.1 Program coordinator</b>		
<b>BASIC</b>	★ 1.1.1 Designate an internal coordinator, or contract with an external coordinator	<input type="checkbox"/>
<b>1.2 Travel surveys</b>		
<b>BETTER</b>	1.2.1 Conduct periodic surveys to identify travel-related behaviours, attitudes, challenges and solutions, and to track progress	<input type="checkbox"/>
<b>2. WALKING AND CYCLING</b>		
<b>2.1 Information on walking/cycling routes &amp; destinations</b>		
<b>BASIC</b>	2.1.1 Display local area maps with walking/cycling access routes and key destinations at major entrances ( <i>multi-family, condominium</i> )	<input checked="" type="checkbox"/> TO BE INTEGRATED WITH TRANSIT SCREEN 3.1
<b>2.2 Bicycle skills training</b>		
<b>BETTER</b>	2.2.1 Offer on-site cycling courses for residents, or subsidize off-site courses	<input type="checkbox"/>



TDM measures: Residential developments		Check if proposed & add descriptions
<b>3. TRANSIT</b>		
<b>3.1 Transit information</b>		
BASIC	3.1.1 Display relevant transit schedules and route maps at entrances ( <i>multi-family, condominium</i> )	<input checked="" type="checkbox"/>
BETTER	3.1.2 Provide real-time arrival information display at entrances ( <i>multi-family, condominium</i> )	<input checked="" type="checkbox"/>
<b>3.2 Transit fare incentives</b>		
BASIC ★	3.2.1 Offer PRESTO cards preloaded with one monthly transit pass on residence purchase/move-in, to encourage residents to use transit	<input type="checkbox"/>
BETTER	3.2.2 Offer at least one year of free monthly transit passes on residence purchase/move-in	<input type="checkbox"/>
<b>3.3 Enhanced public transit service</b>		
BETTER ★	3.3.1 Contract with OC Transpo to provide early transit services until regular services are warranted by occupancy levels ( <i>subdivision</i> )	<input type="checkbox"/>
<b>3.4 Private transit service</b>		
BETTER	3.4.1 Provide shuttle service for seniors homes or lifestyle communities (e.g. scheduled mall or supermarket runs)	<input type="checkbox"/>
<b>4. CARSHARING &amp; BIKESHARING</b>		
<b>4.1 Bikeshare stations &amp; memberships</b>		
BETTER	4.1.1 Contract with provider to install on-site bikeshare station ( <i>multi-family</i> )	<input type="checkbox"/>
BETTER	4.1.2 Provide residents with bikeshare memberships, either free or subsidized ( <i>multi-family</i> )	<input type="checkbox"/>
<b>4.2 Carshare vehicles &amp; memberships</b>		
BETTER	4.2.1 Contract with provider to install on-site carshare vehicles and promote their use by residents	<input checked="" type="checkbox"/> 1 CAR SHARE SPACE TO BE PROVIDED
BETTER	4.2.2 Provide residents with carshare memberships, either free or subsidized	<input type="checkbox"/>
<b>5. PARKING</b>		
<b>5.1 Priced parking</b>		
BASIC ★	5.1.1 Unbundle parking cost from purchase price ( <i>condominium</i> )	<input checked="" type="checkbox"/> PARKING IS NOT PART OF PURCHASE PRICE
BASIC ★	5.1.2 Unbundle parking cost from monthly rent ( <i>multi-family</i> )	<input type="checkbox"/>

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




















# Appendix C – Synchro Analysis

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2: Bank Street & Fifth Avenue  
99 Fifth Avenue

Existing (2017) Traffic

AM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NET	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	29	64	43	48	23	13	775	24	12	374	29
Future Volume (vph)	54	29	64	43	48	23	13	775	24	12	374	29
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	35.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor		0.91			0.99			1.00			1.00	
Frt		0.941			0.952			0.996			0.991	
Flt Protected		0.982		0.950				0.999			0.999	
Satd. Flow (prot)	0	1500	0	1616	1714	0	0	3227	0	0	1393	0
Flt Permitted		0.847		0.616				0.947			0.972	
Satd. Flow (perm)	0	1277	0	1048	1714	0	0	3059	0	0	1355	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		49			25			7			9	
Link Speed (k/h)		40			40			40			40	
Link Distance (m)		135.1			66.9			157.3			84.6	
Travel Time (s)		12.2			6.0			14.2			7.6	
Confl. Peds. (#/hr)	29		64									
Confl. Bikes (#/hr)			18			26			34			40
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	6%	7%	0%	7%	0%	0%	0%	5%	0%	8%	6%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	8	0	0	8	0
Parking (#/hr)											10	
Adj. Flow (vph)	59	32	70	47	53	25	14	852	26	13	411	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	161	0	47	78	0	0	892	0	0	456	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	25.5	25.5		25.5	25.5		26.5	26.5		26.5	26.5	
Total Split (s)	25.5	25.5		25.5	25.5		51.0	51.0		51.0	51.0	
Total Split (%)	33.3%	33.3%		33.3%	33.3%		66.7%	66.7%		66.7%	66.7%	
Maximum Green (s)	20.0	20.0		20.0	20.0		45.5	45.5		45.5	45.5	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)		5.5		5.5	5.5			5.5			5.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	9.0	9.0		9.0	9.0		10.0	10.0		10.0	10.0	
Flash Dont Walk (s)	9.0	9.0		9.0	9.0		10.0	10.0		10.0	10.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	

2: Bank Street & Fifth Avenue  
99 Fifth Avenue

Existing (2017) Traffic  
AM Peak

	↗	→	↘	↙	←	↖	↗	↑	↘	↙	↓	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)		13.1		13.1	13.1			52.4			52.4	
Actuated g/C Ratio		0.17		0.17	0.17			0.68			0.68	
v/c Ratio		0.62		0.26	0.25			0.42			0.49	
Control Delay		30.6		29.9	21.0			6.5			8.5	
Queue Delay		0.0		0.0	0.0			0.0			0.0	
Total Delay		30.6		29.9	21.0			6.5			8.5	
LOS		C		C	C			A			A	
Approach Delay		30.6			24.3			6.5			8.5	
Approach LOS		C			C			A			A	
Queue Length 50th (m)		14.0		5.6	6.2			21.6			22.2	
Queue Length 95th (m)		28.3		12.7	14.8			41.3			52.5	
Internal Link Dist (m)		111.1			42.9			133.3			60.6	
Turn Bay Length (m)				35.0								
Base Capacity (vph)		370		273	466			2099			931	
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		0.44		0.17	0.17			0.42			0.49	

Intersection Summary

Area Type: Other

Cycle Length: 76.5

Actuated Cycle Length: 76.5

Offset: 33 (43%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.62

Intersection Signal Delay: 10.8

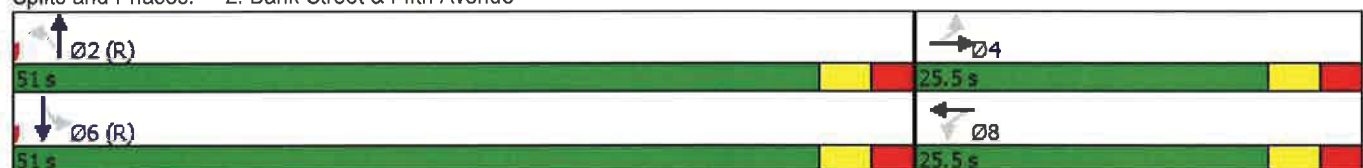
Intersection LOS: B

Intersection Capacity Utilization 59.7%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 2: Bank Street & Fifth Avenue





















2: Bank Street & Fifth Avenue  
99 Fifth Avenue

Existing (2017) Traffic - With Modifications

AM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SEL	SET	SBR
Lane Configurations												
Traffic Volume (vph)	54	29	64	43	48	23	13	775	24	12	374	29
Future Volume (vph)	54	29	64	43	48	23	13	775	24	12	374	29
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	35.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor		0.91			0.99			1.00			1.00	
Frt		0.941			0.973			0.996			0.991	
Flt Protected		0.982			0.982			0.999			0.999	
Satd. Flow (prot)	0	1500	0	0	1683	0	0	3227	0	0	1393	0
Flt Permitted		0.840			0.793			0.947			0.972	
Satd. Flow (perm)	0	1267	0	0	1359	0	0	3059	0	0	1355	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		49			16			7			9	
Link Speed (k/h)		40			40			40			40	
Link Distance (m)		135.1			66.9			157.3			84.6	
Travel Time (s)		12.2			6.0			14.2			7.6	
Confl. Peds. (#/hr)	29		64									
Confl. Bikes (#/hr)			18			26			34			40
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	6%	7%	0%	7%	0%	0%	0%	5%	0%	8%	6%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	8	0	0	8	0
Parking (#/hr)											10	
Adj. Flow (vph)	59	32	70	47	53	25	14	852	26	13	411	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	161	0	0	125	0	0	892	0	0	456	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	25.5	25.5		25.5	25.5		26.5	26.5		26.5	26.5	
Total Split (s)	25.5	25.5		25.5	25.5		51.0	51.0		51.0	51.0	
Total Split (%)	33.3%	33.3%		33.3%	33.3%		66.7%	66.7%		66.7%	66.7%	
Maximum Green (s)	20.0	20.0		20.0	20.0		45.5	45.5		45.5	45.5	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.5			5.5			5.5			5.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	9.0	9.0		9.0	9.0		10.0	10.0		10.0	10.0	
Flash Dont Walk (s)	9.0	9.0		9.0	9.0		10.0	10.0		10.0	10.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	

2: Bank Street & Fifth Avenue  
99 Fifth Avenue

Existing (2017) Traffic - With Modifications

AM Peak

	↗	→	↘	↙	←	↖	↗	↑	↘	↙	↓	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NER	SBL	SBT	SBR
Act Effct Green (s)		13.1			13.1			52.4			52.4	
Actuated g/C Ratio		0.17			0.17			0.68			0.68	
v/c Ratio		0.63			0.51			0.42			0.49	
Control Delay		30.8			31.7			6.5			8.5	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		30.8			31.7			6.5			8.5	
LOS		C			C			A			A	
Approach Delay		30.8			31.7			6.5			8.5	
Approach LOS		C			C			A			A	
Queue Length 50th (m)		14.0			13.5			21.6			22.2	
Queue Length 95th (m)		28.3			25.3			41.3			52.5	
Internal Link Dist (m)		111.1			42.9			133.3			60.6	
Turn Bay Length (m)												
Base Capacity (vph)		367			367			2099			931	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.44			0.34			0.42			0.49	

Intersection Summary

Area Type: Other

Cycle Length: 76.5

Actuated Cycle Length: 76.5

Offset: 33 (43%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.63

Intersection Signal Delay: 11.4

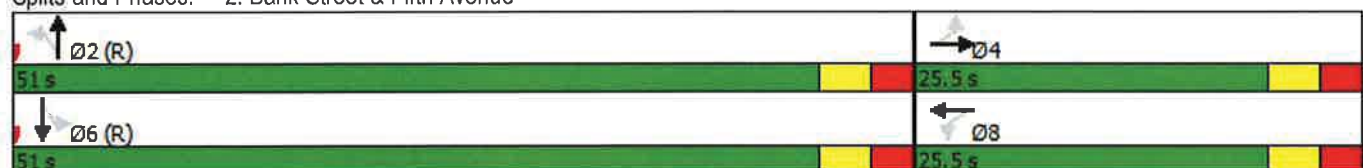
Intersection LOS: B

Intersection Capacity Utilization 56.9%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 2: Bank Street & Fifth Avenue



3: Bank Street & Fourth Avenue  
99 Fifth Avenue

Existing (2017) Traffic  
AM Peak

Intersection												
Int Delay, s/veh	2.1											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕			↕	
Traffic Vol, veh/h	13	7	24	11	7	22	21	818	13	22	380	12
Future Vol, veh/h	13	7	24	11	7	22	21	818	13	22	380	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	0	29	0	0	0	5	5	4	15	0	7	10
Mvmt Flow	14	8	26	12	8	24	23	899	14	24	418	13

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	972	1432	424	1442	1431	457	431	0	0	913	0	0
Stage 1	473	473	-	952	952	-	-	-	-	-	-	-
Stage 2	499	959	-	490	479	-	-	-	-	-	-	-
Critical Hdwy	7.3	6.935	6.2	7.3	6.5	6.975	4.175	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.935	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.935	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.2755	3.3	3.5	4.3	3.475	2.2475	-	-	2.2	-	-
Pot Cap-1 Maneuver	222	111	634	103	136	545	1108	-	-	755	-	-
Stage 1	576	505	-	283	341	-	-	-	-	-	-	-
Stage 2	527	290	-	564	558	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	190	102	634	87	125	545	1108	-	-	755	-	-
Mov Cap-2 Maneuver	190	102	-	87	125	-	-	-	-	-	-	-
Stage 1	552	484	-	271	327	-	-	-	-	-	-	-
Stage 2	471	278	-	510	535	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	22.6	31.3	0.4	0.5
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1108	-	-	252	180	755	-	-
HCM Lane V/C Ratio	0.021	-	-	0.192	0.244	0.032	-	-
HCM Control Delay (s)	8.3	0.2	-	22.6	31.3	9.9	0	-
HCM Lane LOS	A	A	-	C	D	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.7	0.9	0.1	-	-



Intersection

Int Delay, s/veh 0.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	1			1	1	
Traffic Vol, veh/h	36	6	2	38	2	4
Future Vol, veh/h	36	6	2	38	2	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	38	6	2	40	2	4


















Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	44	0	85	41
Stage 1	-	-	-	-	41	-
Stage 2	-	-	-	-	44	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1564	-	916	1030
Stage 1	-	-	-	-	981	-
Stage 2	-	-	-	-	978	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1564	-	915	1030
Mov Cap-2 Maneuver	-	-	-	-	915	-
Stage 1	-	-	-	-	981	-
Stage 2	-	-	-	-	977	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	8.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	989	-	-	1564	-
HCM Lane V/C Ratio	0.006	-	-	0.001	-
HCM Control Delay (s)	8.7	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

2: Bank Street & Fifth Avenue  
99 Fifth Avenue

Existing (2017) Traffic  
PM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	52	58	44	80	51	18	11	456	30	21	702	41
Future Volume (vph)	52	58	44	80	51	18	11	456	30	21	702	41
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	35.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor		0.99		1.00	0.98			0.99			0.99	
Frt		0.962			0.961			0.992			0.992	
Flt Protected		0.983		0.950				0.999			0.999	
Satd. Flow (prot)	0	1694	0	1729	1720	0	0	1419	0	0	3236	0
Flt Permitted		0.858		0.597				0.980			0.934	
Satd. Flow (perm)	0	1475	0	1085	1720	0	0	1391	0	0	3022	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		25			20			7			13	
Link Speed (k/h)		40			40			40			40	
Link Distance (m)		135.1			66.9			157.3			84.6	
Travel Time (s)		12.2			6.0			14.2			7.6	
Confl. Peds. (#/hr)	3		2	2		3	91		55	55		91
Confl. Bikes (#/hr)			18			26			34			40
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	2%	0%	0%	0%	0%	0%	4%	0%	0%	3%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	8	0	0	8	0
Parking (#/hr)								10				
Adj. Flow (vph)	57	64	48	88	56	20	12	501	33	23	771	45
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	169	0	88	76	0	0	546	0	0	839	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	25.5	25.5		25.5	25.5		26.5	26.5		26.5	26.5	
Total Split (s)	25.5	25.5		25.5	25.5		51.0	51.0		51.0	51.0	
Total Split (%)	33.3%	33.3%		33.3%	33.3%		66.7%	66.7%		66.7%	66.7%	
Maximum Green (s)	20.0	20.0		20.0	20.0		45.5	45.5		45.5	45.5	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)		5.5		5.5	5.5			5.5			5.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	9.0	9.0		9.0	9.0		10.0	10.0		10.0	10.0	
Flash Dont Walk (s)	9.0	9.0		9.0	9.0		10.0	10.0		10.0	10.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	



2: Bank Street & Fifth Avenue  
99 Fifth Avenue

Existing (2017) Traffic  
PM Peak

	↖	→	↘	↙	←	↖	↘	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NET	NBR	SBL	SBT	SBR
Act Effct Green (s)		13.3		13.3	13.3			52.2			52.2	
Actuated g/C Ratio		0.17		0.17	0.17			0.68			0.68	
v/c Ratio		0.61		0.47	0.24			0.57			0.41	
Control Delay		34.0		35.9	22.1			10.0			6.4	
Queue Delay		0.0		0.0	0.0			0.0			0.0	
Total Delay		34.0		35.9	22.1			10.0			6.4	
LOS		C		D	C			B			A	
Approach Delay		34.0			29.5			10.0			6.4	
Approach LOS		C			C			B			A	
Queue Length 50th (m)		17.9		10.8	6.5			30.5			20.5	
Queue Length 95th (m)		32.2		21.2	15.1			68.7			37.7	
Internal Link Dist (m)		111.1			42.9			133.3			60.6	
Turn Bay Length (m)				35.0								
Base Capacity (vph)		404		283	464			952			2067	
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		0.42		0.31	0.16			0.57			0.41	

Intersection Summary

Area Type: Other

Cycle Length: 76.5

Actuated Cycle Length: 76.5

Offset: 33 (43%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.61

Intersection Signal Delay: 12.5





Intersection LOS: B

Intersection Capacity Utilization 61.9%

ICU Level of Service B

Analysis Period (min) 15

















Splits and Phases: 2: Bank Street & Fifth Avenue

 Ø2 (R)  Ø6 (R)	 Ø4  Ø8
51 s	25.5 s

2: Bank Street & Fifth Avenue  
99 Fifth Avenue

Existing (2017) Traffic - With Modifications













PM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SEB	SEB	SBR
Lane Configurations												
Traffic Volume (vph)	52	58	44	80	51	18	11	456	30	21	702	41
Future Volume (vph)	52	58	44	80	51	18	11	456	30	21	702	41
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	35.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor		0.99			0.99			0.99			0.99	
Frt		0.962			0.984			0.992			0.992	
Flt Protected		0.983			0.974			0.999			0.999	
Satd. Flow (prot)	0	1694	0	0	1731	0	0	1419	0	0	3236	0
Flt Permitted		0.829			0.719			0.980			0.934	
Satd. Flow (perm)	0	1426	0	0	1277	0	0	1391	0	0	3022	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		25			9			7			13	
Link Speed (k/h)		40			40			40			40	
Link Distance (m)		135.1			66.9			157.3			84.6	
Travel Time (s)		12.2			6.0			14.2			7.6	
Confl. Peds. (#/hr)	3		2	2		3	91		55	55		91
Confl. Bikes (#/hr)			18			26			34			40
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	2%	0%	0%	0%	0%	0%	4%	0%	0%	3%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	8	0	0	8	0
Parking (#/hr)								10				
Adj. Flow (vph)	57	64	48	88	56	20	12	501	33	23	771	45
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	169	0	0	164	0	0	546	0	0	839	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	25.5	25.5		25.5	25.5		26.5	26.5		26.5	26.5	
Total Split (s)	25.5	25.5		25.5	25.5		51.0	51.0		51.0	51.0	
Total Split (%)	33.3%	33.3%		33.3%	33.3%		66.7%	66.7%		66.7%	66.7%	
Maximum Green (s)	20.0	20.0		20.0	20.0		45.5	45.5		45.5	45.5	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.5			5.5			5.5			5.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	9.0	9.0		9.0	9.0		10.0	10.0		10.0	10.0	
Flash Dont Walk (s)	9.0	9.0		9.0	9.0		10.0	10.0		10.0	10.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	

2: Bank Street & Fifth Avenue  
99 Fifth Avenue

Existing (2017) Traffic - With Modifications

PM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)		14.5			14.5			51.0			51.0	
Actuated g/C Ratio		0.19			0.19			0.67			0.67	
v/c Ratio		0.58			0.66			0.59			0.42	
Control Delay		31.4			39.2			11.1			7.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		31.4			39.2			11.1			7.1	
LOS		C			D			B			A	
Approach Delay		31.4			39.2			11.1			7.1	
Approach LOS		C			D			B			A	
Queue Length 50th (m)		17.6			19.3			33.1			22.3	
Queue Length 95th (m)		31.4			33.7			73.8			40.5	
Internal Link Dist (m)		111.1			42.9			133.3			60.6	
Turn Bay Length (m)												
Base Capacity (vph)		391			340			929			2018	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.43			0.48			0.59			0.42	

Intersection Summary

Area Type: Other

Cycle Length: 76.5

Actuated Cycle Length: 76.5

Offset: 33 (43%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 13.9

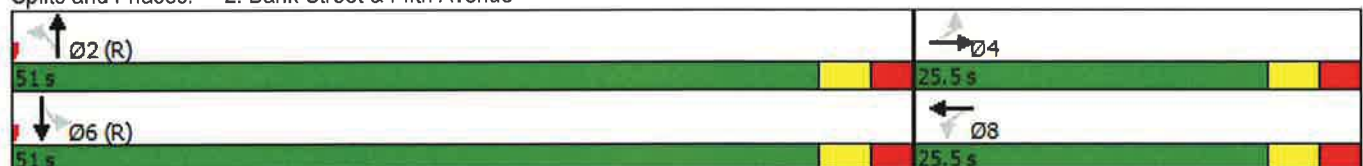
Intersection LOS: B

Intersection Capacity Utilization 60.3%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 2: Bank Street & Fifth Avenue





Intersection												
Int Delay, s/veh	2.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↕			↕		
Traffic Vol, veh/h	9	4	53	6	8	27	18	490	18	19	705	22
Future Vol, veh/h	9	4	53	6	8	27	18	490	18	19	705	22
Conflicting Peds, #/hr	3	0	2	2	0	3	91	0	55	55	0	91
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	6	7	0	0	7	0	0	5	0	8	6	7
Mvmt Flow	10	4	58	7	9	30	20	538	20	21	775	24

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1530	1573	492	1076	1575	606	890	0	0	613	0	0
Stage 1	920	920	-	643	643	-	-	-	-	-	-	-
Stage 2	610	653	-	433	932	-	-	-	-	-	-	-
Critical Hdwy	7.39	6.605	6.9	7.3	6.605	6.2	4.1	-	-	4.22	-	-
Critical Hdwy Stg 1	6.59	5.605	-	6.1	5.605	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.19	5.605	-	6.5	5.605	-	-	-	-	-	-	-
Follow-up Hdwy	3.557	4.0665	3.3	3.5	4.0665	3.3	2.2	-	-	2.276	-	-
Pot Cap-1 Maneuver	85	106	528	187	105	501	770	-	-	930	-	-
Stage 1	286	340	-	465	458	-	-	-	-	-	-	-
Stage 2	472	453	-	577	335	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	63	85	483	141	84	474	769	-	-	927	-	-
Mov Cap-2 Maneuver	63	85	-	141	84	-	-	-	-	-	-	-
Stage 1	252	299	-	425	418	-	-	-	-	-	-	-
Stage 2	416	414	-	479	294	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	29.2	26.6	0.3	0.4
HCM LOS	D	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	769	-	-	220	211	927	-	-
HCM Lane V/C Ratio	0.026	-	-	0.33	0.214	0.023	-	-
HCM Control Delay (s)	9.8	0	-	29.2	26.6	9	0.2	-
HCM Lane LOS	A	A	-	D	D	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	1.4	0.8	0.1	-	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↓	Y	
Traffic Vol, veh/h	39	2	1	35	6	5
Future Vol, veh/h	39	2	1	35	6	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	41	2	1	37	6	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	43	0	81	42
Stage 1	-	-	-	-	42	-
Stage 2	-	-	-	-	39	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1566	-	921	1029
Stage 1	-	-	-	-	980	-
Stage 2	-	-	-	-	983	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1566	-	920	1029
Mov Cap-2 Maneuver	-	-	-	-	920	-
Stage 1	-	-	-	-	980	-
Stage 2	-	-	-	-	982	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	8.8
HCM LOS			A

















Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	967	-	-	1566	-
HCM Lane V/C Ratio	0.012	-	-	0.001	-
HCM Control Delay (s)	8.8	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-



2: Bank Street & Fifth Avenue  
99 Fifth Avenue













Future Background Traffic

AM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	31	65	44	51	23	13	792	24	12	364	53
Future Volume (vph)	55	31	65	44	51	23	13	792	24	12	364	53
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	35.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor		0.91			0.99			1.00			0.99	
Frt		0.942			0.974			0.996			0.983	
Flt Protected		0.982			0.982			0.999			0.999	
Satd. Flow (prot)	0	1502	0	0	1685	0	0	3227	0	0	1377	0
Flt Permitted		0.849			0.804			0.948			0.975	
Satd. Flow (perm)	0	1282	0	0	1380	0	0	3063	0	0	1344	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		48			15			7			16	
Link Speed (k/h)		40			40			40			40	
Link Distance (m)		135.1			66.9			157.3			84.6	
Travel Time (s)		12.2			6.0			14.2			7.6	
Confl. Peds. (#/hr)	29		64									
Confl. Bikes (#/hr)			18			26			34			40
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 (%)	6%	7%	0%	7%	0%	0%	0%	5%	0%	8%	6%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	8	0	0	8	0
Parking (#/hr)											10	
Adj. Flow (vph)	55	31	65	44	51	23	13	792	24	12	364	53
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	151	0	0	118	0	0	829	0	0	429	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	25.5	25.5		25.5	25.5		26.5	26.5		26.5	26.5	
Total Split (s)	25.5	25.5		25.5	25.5		51.0	51.0		51.0	51.0	
Total Split (%)	33.3%	33.3%		33.3%	33.3%		66.7%	66.7%		66.7%	66.7%	
Maximum Green (s)	20.0	20.0		20.0	20.0		45.5	45.5		45.5	45.5	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.5			5.5			5.5			5.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	9.0	9.0		9.0	9.0		10.0	10.0		10.0	10.0	
Flash Dont Walk (s)	9.0	9.0		9.0	9.0		10.0	10.0		10.0	10.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	

2: Bank Street & Fifth Avenue  
99 Fifth Avenue

Future Background Traffic  
AM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)		12.6			12.6			52.9			52.9	
Actuated g/C Ratio		0.16			0.16			0.69			0.69	
v/c Ratio		0.60			0.49			0.39			0.46	
Control Delay		29.9			31.7			6.0			7.7	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		29.9			31.7			6.0			7.7	
LOS		C			C			A			A	
Approach Delay		29.9			31.7			6.0			7.7	
Approach LOS		C			C			A			A	
Queue Length 50th (m)		12.9			12.8			19.0			19.2	
Queue Length 95th (m)		26.8			24.4			36.2			45.8	
Internal Link Dist (m)		111.1			42.9			133.3			60.6	
Turn Bay Length (m)												
Base Capacity (vph)		370			371			2118			933	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.41			0.32			0.39			0.46	

Intersection Summary

Area Type: Other

Cycle Length: 76.5

Actuated Cycle Length: 76.5

Offset: 33 (43%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.60

Intersection Signal Delay: 10.8





Intersection LOS: B

Intersection Capacity Utilization 58.0%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 2: Bank Street & Fifth Avenue

 Ø2 (R)	 Ø4
51 s	25.5 s
 Ø6 (R)	 Ø8
51 s	25.5 s

Intersection												
Int Delay, s/veh	1.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SEL	SBT	SBR
Lane Configurations	↕			↕			↕			↕		
Traffic Vol, veh/h	13	7	24	11	7	22	21	836	13	22	394	12
Future Vol, veh/h	13	7	24	11	7	22	21	836	13	22	394	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	29	0	0	0	5	5	4	15	0	7	10
Mvmt Flow	13	7	24	11	7	22	21	836	13	22	394	12

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	908	1335	400	1345	1335	425	406	0	0	849	0	0
Stage 1	444	444	-	885	885	-	-	-	-	-	-	-
Stage 2	464	891	-	460	450	-	-	-	-	-	-	-
Critical Hdwy	7.3	6.935	6.2	7.3	6.5	6.975	4.175	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.935	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.935	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.2755	3.3	3.5	4.3	3.475	2.2475	-	-	2.2	-	-
Pot Cap-1 Maneuver	246	128	654	121	155	571	1132	-	-	798	-	-
Stage 1	597	521	-	310	366	-	-	-	-	-	-	-
Stage 2	553	314	-	585	575	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	216	119	654	105	144	571	1132	-	-	798	-	-
Mov Cap-2 Maneuver	216	119	-	105	144	-	-	-	-	-	-	-
Stage 1	576	502	-	299	353	-	-	-	-	-	-	-
Stage 2	503	303	-	536	554	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	20	26.4	0.3	0.5
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1132	-	-	283	208	798	-
HCM Lane V/C Ratio	0.019	-	-	0.155	0.192	0.028	-
HCM Control Delay (s)	8.2	0.1	-	20	26.4	9.6	0
HCM Lane LOS	A	A	-	C	D	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.5	0.7	0.1	-



Intersection

Int Delay, s/veh 0.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	↱	
Traffic Vol, veh/h	36	6	2	38	2	4
Future Vol, veh/h	36	6	2	38	2	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	36	6	2	38	2	4

















Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	42	0	81	39
Stage 1	-	-	-	-	39	-
Stage 2	-	-	-	-	42	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1567	-	921	1033
Stage 1	-	-	-	-	983	-
Stage 2	-	-	-	-	980	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1567	-	920	1033
Mov Cap-2 Maneuver	-	-	-	-	920	-
Stage 1	-	-	-	-	983	-
Stage 2	-	-	-	-	979	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	8.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	992	-	-	1567	-
HCM Lane V/C Ratio	0.006	-	-	0.001	-
HCM Control Delay (s)	8.7	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-













2: Bank Street & Fifth Avenue  
99 Fifth Avenue

Future Background Traffic  
PM Peak

												
Lane Group	EBL	EBT	EBR	WEL	WBT	WER	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	62	45	82	54	18	11	458	30	21	723	72
Future Volume (vph)	77	62	45	82	54	18	11	458	30	21	723	72
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	35.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor		0.99			0.99			0.99			0.98	
Frt		0.967			0.984			0.992			0.987	
Flt Protected		0.980			0.974			0.999			0.999	
Satd. Flow (prot)	0	1701	0	0	1732	0	0	1419	0	0	3194	0
Flt Permitted		0.803			0.715			0.981			0.938	
Satd. Flow (perm)	0	1391	0	0	1270	0	0	1392	0	0	2995	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		21			8			7			23	
Link Speed (k/h)		40			40			40			40	
Link Distance (m)		135.1			66.9			157.3			84.6	
Travel Time (s)		12.2			6.0			14.2			7.6	
Confl. Peds. (#/hr)	3		2	2		3	91		55	55		91
Confl. Bikes (#/hr)			18			26			34			40
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%	0%	0%	0%	0%	4%	0%	0%	3%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	8	0	0	8	0
Parking (#/hr)								10				
Adj. Flow (vph)	77	62	45	82	54	18	11	458	30	21	723	72
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	184	0	0	154	0	0	499	0	0	816	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	25.5	25.5		25.5	25.5		26.5	26.5		26.5	26.5	
Total Split (s)	25.5	25.5		25.5	25.5		51.0	51.0		51.0	51.0	
Total Split (%)	33.3%	33.3%		33.3%	33.3%		66.7%	66.7%		66.7%	66.7%	
Maximum Green (s)	20.0	20.0		20.0	20.0		45.5	45.5		45.5	45.5	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.5			5.5			5.5			5.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	9.0	9.0		9.0	9.0		10.0	10.0		10.0	10.0	
Flash Dont Walk (s)	9.0	9.0		9.0	9.0		10.0	10.0		10.0	10.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	

2: Bank Street & Fifth Avenue  
99 Fifth Avenue

Future Background Traffic  
PM Peak

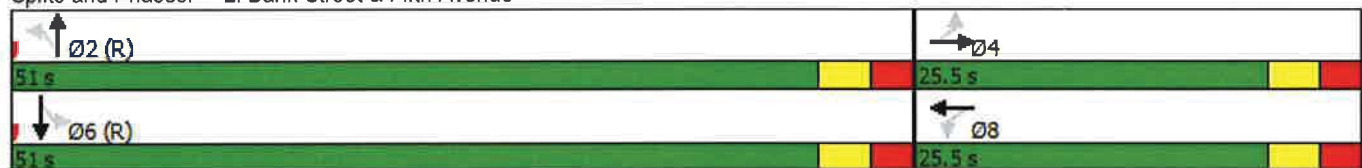
												
Lane Group	EBL	EBT	EBR	WBL	WBT	WER	NBL	NBT	NBR	SEL	SET	SEB
Act Effct Green (s)		14.5			14.5			51.0			51.0	
Actuated g/C Ratio		0.19			0.19			0.67			0.67	
v/c Ratio		0.65			0.62			0.54			0.41	
Control Delay		36.0			37.6			10.1			7.0	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		36.0			37.6			10.1			7.0	
LOS		D			D			B			A	
Approach Delay		36.0			37.6			10.1			7.0	
Approach LOS		D			D			B			A	
Queue Length 50th (m)		20.3			18.1			28.5			21.2	
Queue Length 95th (m)		35.1			31.8			63.1			38.7	
Internal Link Dist (m)		111.1			42.9			133.3			60.6	
Turn Bay Length (m)												
Base Capacity (vph)		379			337			929			2003	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.49			0.46			0.54			0.41	

Intersection Summary

Area Type: Other  
 Cycle Length: 76.5  
 Actuated Cycle Length: 76.5  
 Offset: 33 (43%), 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: 14.0  
 Intersection Capacity Utilization 59.2%  
 Analysis Period (min) 15

Intersection LOS: B  
 ICU Level of Service B

Splits and Phases: 2: Bank Street & Fifth Avenue





Intersection

Int Delay, s/veh 2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SEL	SET	SEB
Lane Configurations	↕			↕			↕			↕		
Traffic Vol, veh/h	9	4	53	6	8	27	18	517	18	19	727	22
Future Vol, veh/h	9	4	53	6	8	27	18	517	18	19	727	22
Conflicting Peds, #/hr	3	0	2	2	0	3	91	0	55	55	0	91
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	6	7	0	0	7	0	0	5	0	8	6	7
Mvmt Flow	9	4	53	6	8	27	18	517	18	19	727	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1450	1493	468	1023	1495	584	840	0	0	590	0	0
Stage 1	867	867	-	617	617	-	-	-	-	-	-	-
Stage 2	583	626	-	406	878	-	-	-	-	-	-	-
Critical Hdwy	7.39	6.605	6.9	7.3	6.605	6.2	4.1	-	-	4.22	-	-
Critical Hdwy Stg 1	6.59	5.605	-	6.1	5.605	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.19	5.605	-	6.5	5.605	-	-	-	-	-	-	-
Follow-up Hdwy	3.557	4.0665	3.3	3.5	4.0665	3.3	2.2	-	-	2.276	-	-
Pot Cap-1 Maneuver	97	118	547	204	118	515	804	-	-	949	-	-
Stage 1	308	360	-	481	470	-	-	-	-	-	-	-
Stage 2	489	466	-	598	356	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	74	96	500	159	96	487	803	-	-	946	-	-
Mov Cap-2 Maneuver	74	96	-	159	96	-	-	-	-	-	-	-
Stage 1	273	318	-	442	432	-	-	-	-	-	-	-
Stage 2	438	428	-	508	315	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	25	23.8	0.3	0.3
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SEL	SET	SBR
Capacity (veh/h)	803	-	-	245	232	946	-	-
HCM Lane V/C Ratio	0.022	-	-	0.269	0.177	0.02	-	-
HCM Control Delay (s)	9.6	0	-	25	23.8	8.9	0.1	-
HCM Lane LOS	A	A	-	D	C	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	1.1	0.6	0.1	-	-

Intersection						
Int Delay, s/veh	1.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	Y	
Traffic Vol, veh/h	39	2	1	35	6	5
Future Vol, veh/h	39	2	1	35	6	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	39	2	1	35	6	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	41	0	77	40
Stage 1	-	-	-	-	40	-
Stage 2	-	-	-	-	37	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1568	-	926	1031
Stage 1	-	-	-	-	982	-
Stage 2	-	-	-	-	985	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1568	-	925	1031
Mov Cap-2 Maneuver	-	-	-	-	925	-
Stage 1	-	-	-	-	982	-
Stage 2	-	-	-	-	984	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	8.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	970	-	-	1568	-
HCM Lane V/C Ratio	0.011	-	-	0.001	-
HCM Control Delay (s)	8.8	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection							
Int Delay, s/veh	2.3						
Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		↱	↱		↱	↱	
Traffic Vol, veh/h	3	62	0	1	7	14	
Future Vol, veh/h	3	62	0	1	7	14	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Free	Free	Free	Free	Stop	Stop	
RT Channelized	-	None	-	None	-	None	
Storage Length	-	-	-	-	0	0	
Veh in Median Storage, #	-	0	0	-	0	-	
Grade, %	-	0	0	-	0	-	
Peak Hour Factor	100	100	100	100	100	100	
Heavy Vehicles, %	2	2	2	2	2	2	
Mvmt Flow	3	62	0	1	7	14	

Major/Minor	Major1		Major2		Minor2		
Conflicting Flow All	1	0	-	0	69	1	
Stage 1	-	-	-	-	1	-	
Stage 2	-	-	-	-	68	-	
Critical Hdwy	4.12	-	-	-	6.42	6.22	
Critical Hdwy Stg 1	-	-	-	-	5.42	-	
Critical Hdwy Stg 2	-	-	-	-	5.42	-	
Follow-up Hdwy	2.218	-	-	-	3.518	3.318	
Pot Cap-1 Maneuver	1622	-	-	-	936	1084	
Stage 1	-	-	-	-	1022	-	
Stage 2	-	-	-	-	955	-	
Platoon blocked, %		-	-	-			
Mov Cap-1 Maneuver	1622	-	-	-	934	1084	
Mov Cap-2 Maneuver	-	-	-	-	934	-	
Stage 1	-	-	-	-	1022	-	
Stage 2	-	-	-	-	953	-	

Approach	EB	WB	SB	
HCM Control Delay, s	0.3	0	8.6	
HCM LOS			A	

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2	
Capacity (veh/h)	1622	-	-	-	934	1084	
HCM Lane V/C Ratio	0.002	-	-	-	0.007	0.013	
HCM Control Delay (s)	7.2	0	-	-	8.9	8.4	
HCM Lane LOS	A	A	-	-	A	A	
HCM 95th %tile Q(veh)	0	-	-	-	0	0	



3: Bank Street & Fourth Avenue  
99 Fifth Avenue

Future Total Traffic  
AM Peak

Intersection												
Int Delay, s/veh	1.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↕			↕		
Traffic Vol, veh/h	13	5	24	10	7	21	21	842	15	23	395	12
Future Vol, veh/h	13	5	24	10	7	21	21	842	15	23	395	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	29	0	0	0	5	5	4	15	0	7	10
Mvmt Flow	13	5	24	10	7	21	21	842	15	23	395	12

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	914	1346	401	1354	1345	429	407	0	0	857	0	0
Stage 1	447	447	-	892	892	-	-	-	-	-	-	-
Stage 2	467	899	-	462	453	-	-	-	-	-	-	-
Critical Hdwy	7.3	6.935	6.2	7.3	6.5	6.975	4.175	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.935	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.935	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.2755	3.3	3.5	4.3	3.475	2.2475	-	-	2.2	-	-
Pot Cap-1 Maneuver	243	126	653	119	153	568	1131	-	-	792	-	-
Stage 1	595	519	-	307	363	-	-	-	-	-	-	-
Stage 2	551	311	-	584	573	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	213	117	653	105	142	568	1131	-	-	792	-	-
Mov Cap-2 Maneuver	213	117	-	105	142	-	-	-	-	-	-	-
Stage 1	574	499	-	296	350	-	-	-	-	-	-	-
Stage 2	501	300	-	536	551	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	19	26	0.3	0.5
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1131	-	-	299	209	792	-	-
HCM Lane V/C Ratio	0.019	-	-	0.14	0.182	0.029	-	-
HCM Control Delay (s)	8.2	0.1	-	19	26	9.7	0	-
HCM Lane LOS	A	A	-	C	D	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.5	0.6	0.1	-	-

Intersection

Int Delay, s/veh 0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↑	↑
Traffic Vol, veh/h	0	69	118	0	1	7
Future Vol, veh/h	0	69	118	0	1	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	69	118	0	1	7

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	187	118
Stage 1	-	-	-	-	118	-
Stage 2	-	-	-	-	69	-
Critical Hdwy	-	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	0	-	-	0	802	934
Stage 1	0	-	-	0	907	-
Stage 2	0	-	-	0	954	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	802	934
Mov Cap-2 Maneuver	-	-	-	-	802	-
Stage 1	-	-	-	-	907	-
Stage 2	-	-	-	-	954	-

















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

Minor Lane/Major Mvmt	EBT	WBT	SBLn1
Capacity (veh/h)	-	-	915
HCM Lane V/C Ratio	-	-	0.009
HCM Control Delay (s)	-	-	9
HCM Lane LOS	-	-	A
HCM 95th %tile Q(veh)	-	-	0















2: Bank Street & Fifth Avenue  
99 Fifth Avenue

Future Total Traffic  
AM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	29	65	53	57	29	13	794	23	13	363	53
Future Volume (vph)	55	29	65	53	57	29	13	794	23	13	363	53
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	35.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor		0.91			0.99			1.00			0.99	
Frt		0.941			0.972			0.996			0.983	
Flt Protected		0.982			0.981			0.999			0.998	
Satd. Flow (prot)	0	1500	0	0	1678	0	0	3227	0	0	1376	0
Flt Permitted		0.822			0.803			0.948			0.972	
Satd. Flow (perm)	0	1239	0	0	1374	0	0	3063	0	0	1340	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		49			17			6			16	
Link Speed (k/h)		40			40			40			40	
Link Distance (m)		135.1			53.3			157.3			84.6	
Travel Time (s)		12.2			4.8			14.2			7.6	
Confl. Peds. (#/hr)	29		64									
Confl. Bikes (#/hr)			18			26			34			40
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 (%)	6%	7%	0%	7%	0%	0%	0%	5%	0%	8%	6%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	8	0	0	8	0
Parking (#/hr)											10	
Adj. Flow (vph)	55	29	65	53	57	29	13	794	23	13	363	53
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	149	0	0	139	0	0	830	0	0	429	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	25.5	25.5		25.5	25.5		26.5	26.5		26.5	26.5	
Total Split (s)	25.5	25.5		25.5	25.5		51.0	51.0		51.0	51.0	
Total Split (%)	33.3%	33.3%		33.3%	33.3%		66.7%	66.7%		66.7%	66.7%	
Maximum Green (s)	20.0	20.0		20.0	20.0		45.5	45.5		45.5	45.5	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.5			5.5			5.5			5.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	9.0	9.0		9.0	9.0		10.0	10.0		10.0	10.0	
Flash Dont Walk (s)	9.0	9.0		9.0	9.0		10.0	10.0		10.0	10.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	

2: Bank Street & Fifth Avenue  
99 Fifth Avenue

Future Total Traffic  
AM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)		12.7			12.7			52.8			52.8	
Actuated g/C Ratio		0.17			0.17			0.69			0.69	
v/c Ratio		0.61			0.58			0.39			0.46	
Control Delay		30.2			34.9			6.0			7.7	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		30.2			34.9			6.0			7.7	
LOS		C			C			A			A	
Approach Delay		30.2			34.9			6.0			7.7	
Approach LOS		C			C			A			A	
Queue Length 50th (m)		12.4			15.3			19.4			19.6	
Queue Length 95th (m)		26.4			28.3			36.1			45.7	
Internal Link Dist (m)		111.1			29.3			133.3			60.6	
Turn Bay Length (m)												
Base Capacity (vph)		360			371			2117			930	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.41			0.37			0.39			0.46	

Intersection Summary

Area Type: Other

Cycle Length: 76.5

Actuated Cycle Length: 76.5

Offset: 33 (43%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.61

Intersection Signal Delay: 11.4





Intersection LOS: B

Intersection Capacity Utilization 58.8%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 2: Bank Street & Fifth Avenue

 Ø2 (R)	 Ø4
51 s	25.5 s
 Ø6 (R)	 Ø8
51 s	25.5 s

1: Fifth Avenue & Parking Garage  
99 Fifth Avenue

Future Background Traffic  
PM Peak

Intersection							
Int Delay, s/veh	0.7						
Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		↰	↰		↰	↰	
Traffic Vol, veh/h	15	109	154	5	3	7	
Future Vol, veh/h	15	109	154	5	3	7	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Free	Free	Free	Free	Stop	Stop	
RT Channelized	-	None	-	None	-	None	
Storage Length	-	-	-	-	0	0	
Veh in Median Storage, #	-	0	0	-	0	-	
Grade, %	-	0	0	-	0	-	
Peak Hour Factor	100	100	100	100	100	100	
Heavy Vehicles, %	2	2	2	2	2	2	
Mvmt Flow	15	109	154	5	3	7	

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	159	0	-	0	296	157
Stage 1	-	-	-	-	157	-
Stage 2	-	-	-	-	139	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1420	-	-	-	695	889
Stage 1	-	-	-	-	871	-
Stage 2	-	-	-	-	888	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1420	-	-	-	687	889
Mov Cap-2 Maneuver	-	-	-	-	687	-
Stage 1	-	-	-	-	871	-
Stage 2	-	-	-	-	878	-

Approach	EB	WB	SB
HCM Control Delay, s	0.9	0	9.5
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1420	-	-	-	687	889
HCM Lane V/C Ratio	0.011	-	-	-	0.004	0.008
HCM Control Delay (s)	7.6	0	-	-	10.3	9.1
HCM Lane LOS	A	A	-	-	B	A
HCM 95th %tile Q(veh)	0	-	-	-	0	0



3: Bank Street & Fourth Avenue  
99 Fifth Avenue

Future Background Traffic  
PM Peak

Intersection												
Int Delay, s/veh	2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Vol, veh/h	9	3	53	4	7	24	18	521	21	22	736	22
Future Vol, veh/h	9	3	53	4	7	24	18	521	21	22	736	22
Conflicting Peds, #/hr	3	0	2	2	0	3	91	0	55	55	0	91
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	6	7	0	0	7	0	0	5	0	8	6	7
Mvmt Flow	9	3	53	4	7	24	18	521	21	22	736	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1468	1515	472	1039	1516	590	849	0	0	597	0	0
Stage 1	882	882	-	623	623	-	-	-	-	-	-	-
Stage 2	586	633	-	416	893	-	-	-	-	-	-	-
Critical Hdwy	7.39	6.605	6.9	7.3	6.605	6.2	4.1	-	-	4.22	-	-
Critical Hdwy Stg 1	6.59	5.605	-	6.1	5.605	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.19	5.605	-	6.5	5.605	-	-	-	-	-	-	-
Follow-up Hdwy	3.557	4.0665	3.3	3.5	4.0665	3.3	2.2	-	-	2.276	-	-
Pot Cap-1 Maneuver	94	115	544	199	115	511	798	-	-	943	-	-
Stage 1	302	354	-	477	467	-	-	-	-	-	-	-
Stage 2	487	463	-	590	350	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	73	93	497	155	93	484	797	-	-	940	-	-
Mov Cap-2 Maneuver	73	93	-	155	93	-	-	-	-	-	-	-
Stage 1	268	311	-	438	429	-	-	-	-	-	-	-
Stage 2	440	425	-	500	307	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	24.6	23.3	0.3	0.4
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	797	-	-	248	232	940	-	-
HCM Lane V/C Ratio	0.023	-	-	0.262	0.151	0.023	-	-
HCM Control Delay (s)	9.6	0	-	24.6	23.3	8.9	0.2	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	1	0.5	0.1	-	-

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↑	
Traffic Vol, veh/h	0	112	159	0	1	6
Future Vol, veh/h	0	112	159	0	1	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	112	159	0	1	6

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	271	159
Stage 1	-	-	-	-	159	-
Stage 2	-	-	-	-	112	-
Critical Hdwy	-	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	0	-	-	0	718	886
Stage 1	0	-	-	0	870	-
Stage 2	0	-	-	0	913	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	718	886
Mov Cap-2 Maneuver	-	-	-	-	718	-
Stage 1	-	-	-	-	870	-
Stage 2	-	-	-	-	913	-

















Approach	EB	WB	SB
HCM Control Delay, s	0	0	9.2
HCM LOS			A

Minor Lane/Major Mvmt	EBT	WBT	SBLn1
Capacity (veh/h)	-	-	857
HCM Lane V/C Ratio	-	-	0.008
HCM Control Delay (s)	-	-	9.2
HCM Lane LOS	-	-	A
HCM 95th %tile Q(veh)	-	-	0















2: Bank Street & Fifth Avenue  
99 Fifth Avenue

Future Background Traffic  
PM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NSR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	60	45	88	57	22	11	461	34	30	721	42
Future Volume (vph)	77	60	45	88	57	22	11	461	34	30	721	42
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	35.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor		0.99			0.99			0.99			0.99	
Frt		0.967			0.982			0.991			0.992	
Flt Protected		0.979			0.974			0.999			0.998	
Satd. Flow (prot)	0	1699	0	0	1726	0	0	1417	0	0	3234	0
Flt Permitted		0.791			0.721			0.982			0.925	
Satd. Flow (perm)	0	1369	0	0	1277	0	0	1391	0	0	2993	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		21			10			8			13	
Link Speed (k/h)		40			40			40			40	
Link Distance (m)		135.1			55.3			157.3			84.6	
Travel Time (s)		12.2			5.0			14.2			7.6	
Confl. Peds. (#/hr)	3		2	2		3	91		55	55		91
Confl. Bikes (#/hr)			18			26			34			40
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%	0%	0%	0%	0%	4%	0%	0%	3%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	8	0	0	8	0
Parking (#/hr)								10				
Adj. Flow (vph)	77	60	45	88	57	22	11	461	34	30	721	42
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	182	0	0	167	0	0	506	0	0	793	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	25.5	25.5		25.5	25.5		26.5	26.5		26.5	26.5	
Total Split (s)	25.5	25.5		25.5	25.5		51.0	51.0		51.0	51.0	
Total Split (%)	33.3%	33.3%		33.3%	33.3%		66.7%	66.7%		66.7%	66.7%	
Maximum Green (s)	20.0	20.0		20.0	20.0		45.5	45.5		45.5	45.5	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.5			5.5			5.5			5.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	9.0	9.0		9.0	9.0		10.0	10.0		10.0	10.0	
Flash Dont Walk (s)	9.0	9.0		9.0	9.0		10.0	10.0		10.0	10.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	

2: Bank Street & Fifth Avenue  
99 Fifth Avenue

Future Background Traffic  
PM Peak

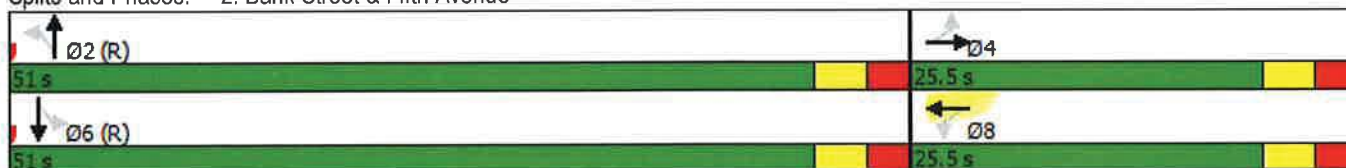
												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SEB
Act Effct Green (s)		14.6			14.6			50.9			50.9	
Actuated g/C Ratio		0.19			0.19			0.67			0.67	
v/c Ratio		0.65			0.66			0.55			0.40	
Control Delay		35.9			39.1			10.3			7.0	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		35.9			39.1			10.3			7.0	
LOS		D			D			B			A	
Approach Delay		35.9			39.1			10.3			7.0	
Approach LOS		D			D			B			A	
Queue Length 50th (m)		20.0			19.6			29.4			21.0	
Queue Length 95th (m)		34.9			34.1			64.6			37.7	
Internal Link Dist (m)		111.1			31.3			133.3			60.6	
Turn Bay Length (m)												
Base Capacity (vph)		373			341			927			1994	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.49			0.49			0.55			0.40	

Intersection Summary

Area Type: Other  
 Cycle Length: 76.5  
 Actuated Cycle Length: 76.5  
 Offset: 33 (43%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green  
 Natural Cycle: 60  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.66  
 Intersection Signal Delay: 14.5  
 Intersection Capacity Utilization 60.5%  
 Analysis Period (min) 15

Intersection LOS: B  
 ICU Level of Service B

Splits and Phases: 2: Bank Street & Fifth Avenue



## Appendix D – MMLoS Analysis

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INTERSECTIONS		Bank & Fourth (unsignalized)				Bank & Fifth (signalized)			
Pedestrian	Lanes (do NOT include lanes protected by bulb-outs)	NORTH leg	SOUTH leg	EAST leg	WEST leg	NORTH leg	SOUTH leg	EAST leg	WEST leg
	Median					4 No Median	4 No Median	3 No Median	2 No Median
	Island Refuge								
	Conflicting Left Turns (from street to right)					Permissive	Permissive	Permissive	Permissive
	Conflicting Right Turns (from street to left)					Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	RTOR? (from street to left)					RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Leading Interval? (on cross street)					No	No	No	No
	Corner Radius					> 3m to 5m	> 3m to 5m	> 3m to 5m	> 3m to 5m
	Right Turn Channel					No right turn channel	No right turn channel	No right turn channel	No right turn channel
	Crosswalk Type					Standard transverse markings	Standard transverse markings	Standard transverse markings	Standard transverse markings
LOS (PETS)		#N/A	#N/A	#N/A	#N/A	55 D	55 D	72 C	87 B
Cycle Length (sec)						75	75	75	75
Pedestrian Walk Time (solid white symbol) (sec)						7	7	7	7
LOS (Delay,seconds)		#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	31.9 D	31.9 D	31.9 D	31.9 D
Overall Level of Service		#N/A				D			
Cyclist	Type of Bikeway	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Turning Speed (based on corner radius & angle)	Slow	Slow	Slow	Slow	Slow	Slow	Slow	Slow
	Right Turn Storage Length	≤ 50m	≤ 50m	≤ 50m	≤ 50m	> 50m	≤ 50m	≤ 50m	≤ 50m
	Dual Right Turn?	No	No	No	No	No	No	No	No
	Shared Through-Right?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Bike Box?	No	No	No	No	No	No	Yes	No
	Number of Lanes Crossed for Left Turns	1 Lane Crossed	1 Lane Crossed	No Lanes Crossed	No Lanes Crossed	1 Lane Crossed	1 Lane Crossed	No Lanes Crossed	No Lanes Crossed
	Operating Speed on Approach	50km/h	50km/h	50km/h	50km/h	50km/h	50km/h	50km/h	50km/h
	Dual Left Turn Lanes?	No	No	No	No	No	No	Yes	No
	Level of Service	C	C	B	B	C	C	B	B
Transit	Average Signal Delay	≤30 sec	≤30 sec			≤30 sec	≤30 sec		
	Level of Service	D	D		A	D	D		
Truck	Turning Radius (Right Turn)	< 10m	< 10m	< 10m	< 10m	< 10m	< 10m	< 10m	< 10m
	Number of Receiving Lanes	1	1	2+	2+	1	1	2+	2+
	Level of Service	F	F	D	D	F	F	D	D
Auto	Level of Service	(See Synchro Results)				(See Synchro Results)			

SEGMENTS		Bank Street – Third to Fourth			Bank Street – Fourth to Fifth			Bank Street – Fifth to Regent			Fourth Avenue – Lyon to Bank			Fourth Avenue – Bank to O'Connor			Fifth Avenue – Monk to Bank			Fifth Avenue – Bank to Howick														
Pedestrian	Sidewalk Width	2.0 or more			2.0 or more			2.0 or more			2.0 or more			1.5			1.5			1.5			1.8			1.5			1.8					
	Boulevard Width	0			0			0			0			0			0			0			0			0			0					
	AADT	> 3000			> 3000			> 3000			> 3000			> 3000			> 3000			> 3000			> 3000			> 3000								
	On-Street Parking	Yes			No			Yes			No			Yes			No			Yes			No			Yes			No					
	Operating Speed	31 to 50 km/h			31 to 50 km/h			31 to 50 km/h			31 to 50 km/h			31 to 50 km/h			31 to 50 km/h			31 to 50 km/h			31 to 50 km/h			31 to 50 km/h			31 to 50 km/h					
Level of Service		B			C			B			C			B			C			E			E			D			E			C		
Cyclist	Type of Bikeway	Mixed Traffic			Mixed Traffic			Mixed Traffic			Mixed Traffic			Mixed Traffic			Mixed Traffic			Mixed Traffic			Mixed Traffic			Mixed Traffic			Mixed Traffic					
	Number of Travel Lanes (per direction)	1 Travel Lane Per Direction			1 Travel Lane Per Direction			1 Travel Lane Per Direction			1 Travel Lane Per Direction			1 Travel Lane Per Direction			1 Travel Lane Per Direction			1 Travel Lane Per Direction			1 Travel Lane Per Direction			1 Travel Lane Per Direction			1 Travel Lane Per Direction					
	Raised Median?	No			No			No			No			No			No			No			No			No			No					
	Bike Lane Width	N/A			N/A			N/A			N/A			N/A			N/A			N/A			N/A			N/A			N/A					
	Operating Speed	50 km/h			50 km/h			50 km/h			50 km/h			≤ 40 km/h			≤ 40 km/h			≤ 40 km/h			50 km/h			50 km/h			50 km/h					
	Bike Lane Blockages (Commercial Areas)	Frequent			Frequent			Frequent			Frequent			Rare			Rare			Rare			Frequent			Frequent			Frequent					
	Median Refuge	No Median Refuge			No Median Refuge			No Median Refuge			No Median Refuge			No Median Refuge			No Median Refuge			No Median Refuge			No Median Refuge			No Median Refuge			No Median Refuge					
	Number of Travel Lanes on Sidestreet	2 Lanes Crossed			2 Lanes Crossed			2 Lanes Crossed			2 Lanes Crossed			4 Lanes Crossed			4 Lanes Crossed			4 Lanes Crossed			4 Lanes Crossed			4 Lanes Crossed			4 Lanes Crossed					
Sidestreet Operating Speed	≤ 40 km/h			≤ 40 km/h			≤ 40 km/h			≤ 40 km/h			50 km/h			50 km/h			50 km/h			50 km/h			50 km/h			50 km/h						
Level of Service		D			D			D			D			A			A			A			D			D			D					
Transit	Facility Type	Mixed Traffic			Mixed Traffic			Mixed Traffic			Mixed Traffic			Mixed Traffic			Mixed Traffic			Mixed Traffic			Mixed Traffic			Mixed Traffic			Mixed Traffic					
	Friction	Limited parking/driveway friction			Limited parking/driveway friction			Limited parking/driveway friction			Limited parking/driveway friction			Limited parking/driveway friction			Limited parking/driveway friction			Limited parking/driveway friction			Limited parking/driveway friction			Limited parking/driveway friction			Limited parking/driveway friction					
Level of Service		D			D			D			D			#N/A			#N/A			#N/A			#N/A			#N/A			#N/A					
Truck	Curb Lane Width	≤3.3			≤3			≤3.3			≤3			≤3.3			≤3			≤3.3			≤3			≤3.3			≤3					
	Number of Travel Lanes	2			3+			2			3+			2			3+			2			3			2			3					
		D			E			D			E			D			E			B			B			B			B					



INTERSECTIONS		Bank & Fourth (unsignalized)				Bank & Fifth (signalized)			
Pedestrian	Lanes (do NOT include lanes protected by bulb-outs)	NORTH leg	SOUTH leg	EAST leg	WEST leg	NORTH leg	SOUTH leg	EAST leg	WEST leg
	Median					4	4	2	2
	Island Refuge					No Median	No Median	No Median	No Median
	Conflicting Left Turns (from street to right)					Permissive	Permissive	Permissive	Permissive
	Conflicting Right Turns (from street to left)					Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	RTOR? (from street to left)					RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Leading Interval? (on cross street)					No	No	No	No
	Corner Radius					> 3m to 5m	> 3m to 5m	> 3m to 5m	> 3m to 5m
	Right Turn Channel					No right turn channel	No right turn channel	No right turn channel	No right turn channel
	Crosswalk Type					Standard transverse markings	Standard transverse markings	Standard transverse markings	Standard transverse markings
	LOS (PETS)	#N/A	#N/A	#N/A	#N/A	55	55	87	87
	Cycle Length (sec)	#N/A	#N/A	#N/A	#N/A	D	D	B	B
Cyclist	LOS (Delay,seconds)	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	75	75	75	75
	Pedestrian Walk Time (solid white symbol) (sec)	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	7	7	7	7
	Overall Level of Service	#N/A				D			
	Level of Service	C				C			
Transit	Average Signal Delay	≤30 sec				≤30 sec			
	Level of Service	D				D			
	Turning Radius (Right Turn)	< 10m	< 10m	< 10m	< 10m	< 10m	< 10m	< 10m	< 10m
	Number of Receiving Lanes	1	1	2+	2+	1	1	2+	2+
Auto	Level of Service	(See Synchro Results)				(See Synchro Results)			

SEGMENTS		Bank Street – Third to Fourth	Section			Bank Street – Fourth to Fifth	Section			Bank Street – Fifth to Regent	Section			Fourth Avenue – Lyon to Bank	Section			Fourth Avenue – Bank to O'Connor	Section			Fifth Avenue – Monk to Bank	Section			Fifth Avenue – Bank to Howick	Section		
Pedestrian	Sidewalk Width		1	2	3		1	2	3		1	2	3		1	2	3		1	2	3		1	2	3		1	2	3
	Boulevard Width		2.0 or more	2.0 or more			2.0 or more	2.0 or more			2.0 or more	2.0 or more			1.5	1.5			1.5				1.8				1.5	1.8	
	AADT		0	0			0	0			0	0			0	0			0				0				0	0	
	On-Street Parking		> 3000	> 3000			> 3000	> 3000			> 3000	> 3000			< 3000	< 3000			< 3000				> 3000				> 3000	> 3000	
Cyclist	Operating Speed		Yes	No			Yes	No			Yes	No			Yes	No			Yes				No				No	Yes	
	Level of Service		31 to 50 km/h	31 to 50 km/h			31 to 50 km/h	31 to 50 km/h			31 to 50 km/h	31 to 50 km/h			31 to 50 km/h	31 to 50 km/h			31 to 50 km/h				31 to 50 km/h				31 to 50 km/h	31 to 50 km/h	
	Level of Service		B	C			B	C			B	C			E	E			E				D				E	C	
	Level of Service		D				D				D				A				A				D				B		
Transit	Facility Type		Mixed Traffic				Mixed Traffic				Mixed Traffic				Mixed Traffic				Mixed Traffic				Mixed Traffic				Mixed Traffic		
	Friction		Limited parking/driveway friction				Limited parking/driveway friction				Limited parking/driveway friction				Limited parking/driveway friction				Limited parking/driveway friction				Limited parking/driveway friction				Limited parking/driveway friction		
	Level of Service		D				D				D				#N/A				#N/A				#N/A				#N/A		
	Level of Service		D				D				D				#N/A				#N/A				#N/A				#N/A		
Truck	Curb Lane Width		≤3.3	≤3			≤3.3	≤3			≤3.3	≤3			>3.7				>3.7				>3.7				>3.7		
	Number of Travel Lanes		2	3+			2	3+			2	3+			2				2				2				2		
	Level of Service		D	E			D	E			D	E			B				B				B				B		
	Level of Service		E				E				E				B				B				B				B		



INTERSECTIONS		Bank & Fourth (unsignalized)				Bank & Fifth (signalized)			
Pedestrian	Lanes (do NOT include lanes protected by bulb-outs)	NORTH leg	SOUTH leg	EAST leg	WEST leg	NORTH leg	SOUTH leg	EAST leg	WEST leg
	Median					4	4	2	2
	Island Refuge					No Median	No Median	No Median	No Median
	Conflicting Left Turns (from street to right)					Permissive	Permissive	Permissive	Permissive
	Conflicting Right Turns (from street to left)					Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	RTOR? (from street to left)					RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Leading Interval? (on cross street)					Yes	Yes	No	No
	Corner Radius					> 3m to 5m	> 3m to 5m	> 3m to 5m	> 3m to 5m
	Right Turn Channel					No right turn channel	No right turn channel	No right turn channel	No right turn channel
	Crosswalk Type					Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings
Cyclist	LOS (PETS)	#N/A	#N/A	#N/A	#N/A	60	60	90	90
	Cycle Length (sec)					C	C	A	A
	Pedestrian Walk Time (solid white symbol) (sec)					75	75	75	75
	LOS (Delay,seconds)	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	10	10	10	10
	Overall Level of Service					29.6	29.6	29.6	29.6
Transit						C	C	C	C
	Type of Bikeway	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Bike Lanes/Cycle Track	Bike Lanes/Cycle Track
	Turning Speed (based on corner radius & angle)	Slow	Slow	Slow	Slow	Slow	Slow	Slow	Slow
	Right Turn Storage Length	≤ 50m	≤ 50m	≤ 50m	≤ 50m	≤ 50m	≤ 50m	≤ 50m	≤ 50m
	Dual Right Turn?	No	No	No	No	No	No	No	No
	Shared Through-Right?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Bike Box?	No	No	No	No	No	No	Yes	Yes
	Number of Lanes Crossed for Left Turns	1 Lane Crossed	1 Lane Crossed	No Lanes Crossed	No Lanes Crossed	1 Lane Crossed	1 Lane Crossed	No Lanes Crossed	No Lanes Crossed
	Operating Speed on Approach	50km/h	50km/h	50km/h	50km/h	50km/h	50km/h	50km/h	50km/h
	Dual Left Turn Lanes?	No	No	No	No	No	No	No	No
Truck	Level of Service								
Auto									
	Level of Service								

SEGMENTS		Bank Street – Third to Fourth	Section			Bank Street – Fourth to Fifth	Section			Bank Street – Fifth to Regent	Section			Fourth Avenue – Lyon to Bank	Section			Fourth Avenue – Bank to O'Connor	Section			Fifth Avenue – Monk to Bank	Section			Fifth Avenue – Bank to Howick	Section		
Pedestrian	Sidewalk Width		2.0 or more	2.0 or more			2.0 or more	2.0 or more			2.0 or more	2.0 or more			1.8	1.8			1.8				1.8			1.8			
	Boulevard Width		0	0			0	0			0	0			0	0			0				0.5 to 2			0	0		
	AADT		> 3000	> 3000			> 3000	> 3000			> 3000	> 3000			< 3000	< 3000			< 3000				> 3000			> 3000	> 3000		
	On-Street Parking		Yes	No			Yes	No			Yes	No			Yes	No			Yes				No			No	Yes		
	Operating Speed		31 to 50 km/h	31 to 50 km/h			31 to 50 km/h	31 to 50 km/h			31 to 50 km/h	31 to 50 km/h			31 to 50 km/h	31 to 50 km/h			31 to 50 km/h				31 to 50 km/h			31 to 50 km/h	31 to 50 km/h		
Cyclist	Level of Service		B	C			B	C			B	C			B	C			B				C			C	C		
	Type of Bikeway		Mixed Traffic				Mixed Traffic				Mixed Traffic				Mixed Traffic				Mixed Traffic				Bike Lanes Not Adjacent Parking Lane				Bike Lanes Not Adjacent Parking Lane		
	Number of Travel Lanes (per direction)		1 Travel Lane Per Direction				1 Travel Lane Per Direction				1 Travel Lane Per Direction				1 Travel Lane Per Direction				1 Travel Lane Per Direction				1 Travel Lane Per Direction				1 Travel Lane Per Direction		
	Raised Median?		No				No				No				No				No				No				No		
	Bike Lane Width		N/A				N/A				N/A				N/A				N/A				N/A				≥1.5 m to <1.8 m wide bike lane		
	Operating Speed		50 km/h				50 km/h				50 km/h				≤ 40 km/h				≤ 40 km/h				50 km/h				50 km/h		
	Bike Lane Blockages (Commercial Areas)		Frequent				Frequent				Frequent				Rare				Rare				Frequent				Frequent		
	Median Refuge		No Median Refuge				No Median Refuge				No Median Refuge				No Median Refuge				No Median Refuge				No Median Refuge				No Median Refuge		
	Number of Travel Lanes on Sidestreet		2 Lanes Crossed				2 Lanes Crossed				2 Lanes Crossed				4 Lanes Crossed				4 Lanes Crossed				4 Lanes Crossed				4 Lanes Crossed		
	Sidestreet Operating Speed		≤ 40 km/h				≤ 40 km/h				≤ 40 km/h				50 km/h				50 km/h				50 km/h				50 km/h		
Transit	Level of Service		D				D				D				A				A				A				B		
	Facility Type		Mixed Traffic				Mixed Traffic				Mixed Traffic																		
	Friction		Limited parking/driveway friction				Limited parking/driveway friction				Limited parking/driveway friction																		
Truck	Level of Service		D				D				D				#N/A				#N/A				#N/A				#N/A		
	Curb Lane Width		≤3.3	≤3			≤3.3	≤3			≤3.3	≤3			>3.7				>3.7				>3.7			>3.7			
	Number of Travel Lanes		2	3+			2	3+			2	3+			2				2				2			2			
Auto			D	E			D	E			D	E			B				B				B			B			
	Level of Service		E				E				E				B				B				B				B		