LANSDOWNE 2.0

Transportation Impact Assessment

Step 4 – Strategy Report

June 30, 2023 **DRAFT**

Stantec

Lansdowne 2.0

Transportation Impact Assessment

Report

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(DRAFT)

June 30, 2023

Prepared for:

Ottawa Sports and Entertainment Group (OSEG)
on behalf of the City of Ottawa

Prepared by:

Stantec Consulting Ltd.

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1.0 SCREENING

1.1 SUMMARY OF DEVELOPMENT

Municipal Address	1015 Bank Street, Ottawa, K1S 3W7
Description of Location	TD Place at Lansdowne, situated at the southeast quadrant of the intersection of Bank Street and Holmwood Avenue.
Land Use Classification	Mixed-Use Sports & Entertainment District (High-rise residential, retail, office, outdoor stadium, indoor arena, music hall)
Development Size (units)	High-Rise Residential = 1,199 new dwelling units
Development Size (m^2) [sq-ft]	**Office**: 751 m^2 [8,000 sq-ft] (replacing existing office space) **Retail**: 7,356 m^2 [79,176 sq-ft] (net increase of 3,454 m^2 or 39,000 sq-ft) **Indoor Music Hall:** 2,587 m^2 [27,845 sq-ft] (1,500 people) **Indoor Multi-Purpose Event Centre / Arena:** 5,500 seats (6,500 spectators) **New North Stadium Stands:** 11,200 seat (12,000 spectator)
Number of Accesses and Locations	Four existing site access locations: 1. Bank Street and Exhibition Way 2. Bank Street and Marché Way 3. Queen Elizabeth Driveway and Princess Patricia Way 4. Holmwood Parking Garage Ramp (Private, Residents Only Access)
Phase of Development	Phase 1 - Event Center (2026) *Existing Land Use* Phase 2 - North Stadium Stands + Retail Podium (2028/2029) Phase 3 – Residential Towers (2031)
Buildout Year	2032 to 2036

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

1.2 TRIP GENERATION TRIGGER

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

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

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

1.3 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.

1.4 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.

1.5 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?	✓	

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

2.0 SCOPING

2.1 EXISTING AND PLANNED CONDITIONS

2.1.1 Proposed Development

The City of Ottawa is proceeding with a Zoning By-Law Amendment application for its proposed mixed-use re-development located within the TD Place at Lansdowne mixed-use sports and entertainment site. The proposed plan, known as Lansdowne 2.0, seeks to demolish the existing functionally obsolete north stadium stands and arena complex, and build a new world-class event centre within the same site and similar overall building footprint. Lansdown 2.0 includes: new north stadium stands, a new event centre, additional residential housing, and destination-based retail.

The TD Place at Lansdowne site, which was opened in 2014 through the Lansdowne Revitalization project, is located within the Glebe neighbourhood of Ottawa, Ontario. The site is bound by Bank Street to the west, Holmwood Avenue to the north, and Queen Elizabeth Driveway along the Rideau Canal to the east and south. The site location and context is presented in **Figure 1**.

The site currently consists of the Stadium at TD Place: a 24,000 person outdoor stadium that is home to the Canadian Football League's (CFL) Ottawa RedBlacks and Canadian Premier League's (CPL) Ottawa Atlético, the Arena at TD Place: a 9,800 person indoor multipurpose venue and arena (formerly known as the Civic Center) that is home to the Ontario Hockey League's (OHL) Ottawa 67's and the Canadian Elite Basketball League's (CEBL) Ottawa BlackJacks, two condominium towers and townhomes with a total of 280 residential units, approximately 360,000 ft^2 of varied commercial retail and office space, and an 18-acre urban park that includes the historic Aberdeen Pavilion and Horticulture Building. As part of the Lansdowne Revitalization project, the previous ground-level surface parking, which previously supported activities at Lansdowne Park, was replaced with an underground parking garage that provides 1,380 spaces for public and residential use.

The Lansdowne 2.0 plan seeks to replace existing city-owned infrastructure while adding additional density to the site. The proposed plan includes the following elements:

- Replacing the existing functionally obsolete north stadium stands and arena complex with a new 11,200 seat (12,100 spectator) north stand structure for the Stadium at TD Place. This new facility replaces the existing north stadium stands, which currently has a capacity of 14,028 spectators, and would result in a reduction of approximately 2,000 spectator capacity at the Stadium at TD Place. This venue will continue to be the home of the CFL's Ottawa RedBlacks and the CPL's Ottawa Atlético.
- Replace the existing 9,800 seat indoor arena and event space attached to the north stadium stands with a new standalone 5,500 seat (6,500 spectator) multi-purpose event center that will be home to the OHL's Ottawa 67's, the CEBL's Ottawa BlackJacks, and other indoor ticketed events such concerts.
- Construction of three new residential towers with a total of 1,199 dwelling units that include rental, owned and affordable housing.

- Replacing the existing 41,000 ft^2 of commercial retail and box office annex to the Stadium on Exhibition Way with 79,176 ft^2 of new podium-level commercial retail space. This represents a net increase of 39,000 ft^2 of commercial retail space from what is currently provided today.
- As part of the new podium level retail space, a new indoor 27,845 ft^2 music hall with a capacity of 1,500 people.

The Lansdowne 2.0 plan is anticipated to be built-out in three phases with full build-out and occupancy anticipated to occur by 2029:

- *Phase 1* consists of building the new 5,500 seat multipurpose event center which is planned to be completed in mid-2026. This phase of development replaces existing land uses and activities currently provided at Lansdowne. This phase of development is not expected to generate any additional transportation demands.
- *Phase 2* consists of building the new 11,200 seat North Stand Stadium structure and a portion of the podium level retail space. This phase is anticipated to be completed in late-2028 or early 2029 and replaces existing land uses and activities currently provided at Lansdowne. This phase of development is not expected to generate any additional transportation demands.
- *Phase 3* consists of building the three new residential towers with a total of 1,199 new residential units. This phase is anticipated to be completed in phases between 2032 and 2036 and is representative of additional land use density to the site. This phase of development is anticipated to generate additional transportation demands.

Figure 2 provides an overview of the redevelopment plan at ground level.

Figure 3 illustrates a rendering of the redevelopment concept.

Figure 1 – Site Location

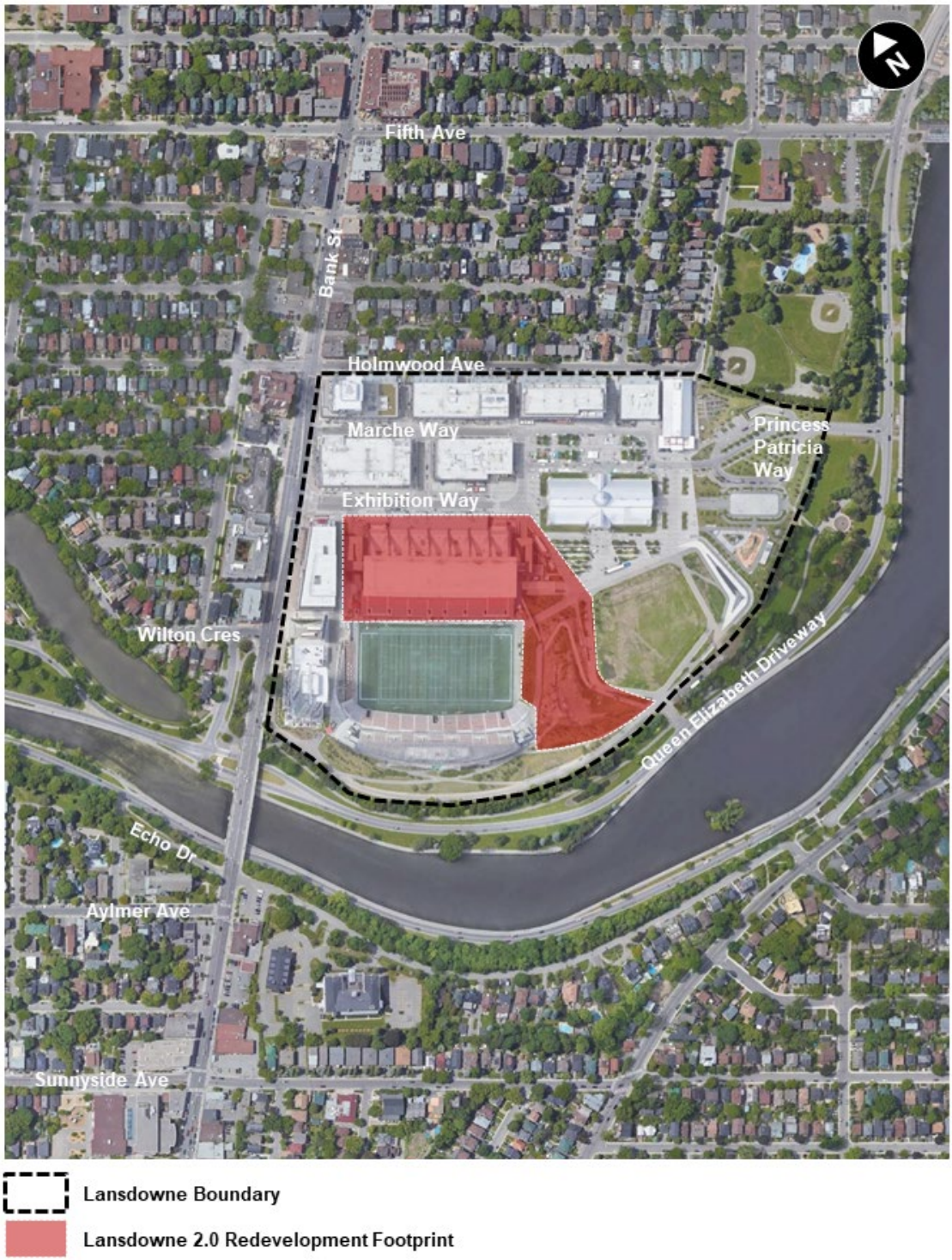


Figure 2 – Lansdowne 2.0 Concept Plan

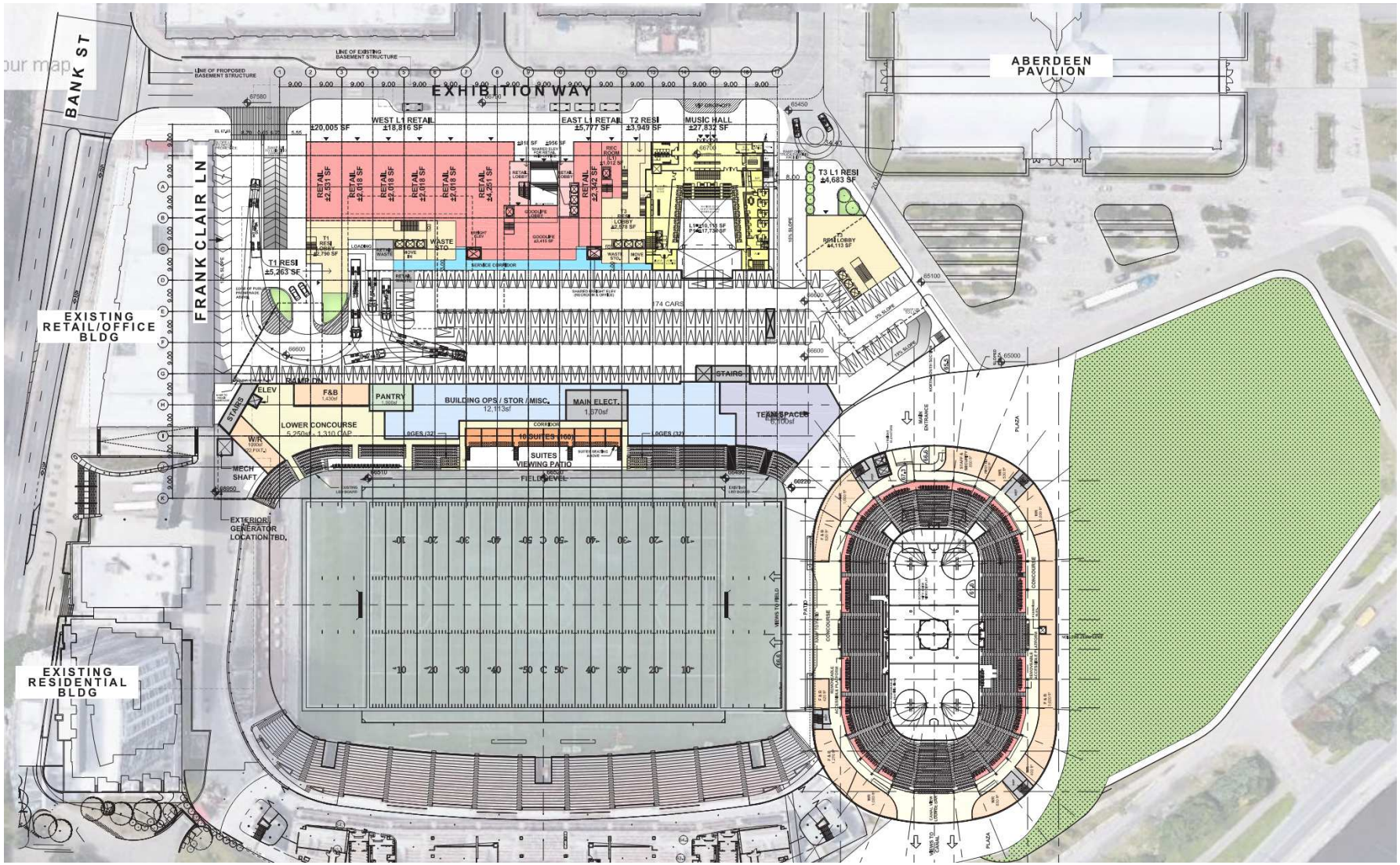


Figure 3 – Lansdowne 2.0 Rendering

As part of the Lansdowne 2.0 development, additional underground parking space will be constructed by extending the existing facility to accommodate an additional 739 parking spaces to service the 1,199 new residential units. This would result in a total of 2,119 underground parking spaces at Lansdowne. Underground parking will continue be accessed at existing access ramps located on Exhibition Way near Bank Street, and Princess Patricia Way near Queen Elizabeth Driveway.

The site currently carries three different zoning designations. The western portion of the proposed site is zoned L2C S258-A S258-B and as outlined in the City of Ottawa's Zoning By-Law, the purpose of the L2 – Major Leisure Facility Zone is to:

- Accommodate major, urban City-wide sports, recreational and cultural facilities addressed under the Major Urban Facilities policies of the Official Plan.
- Permit a broad range and intensity of leisure, recreational, cultural and related uses; and
- Allow a moderate density and scale of development.

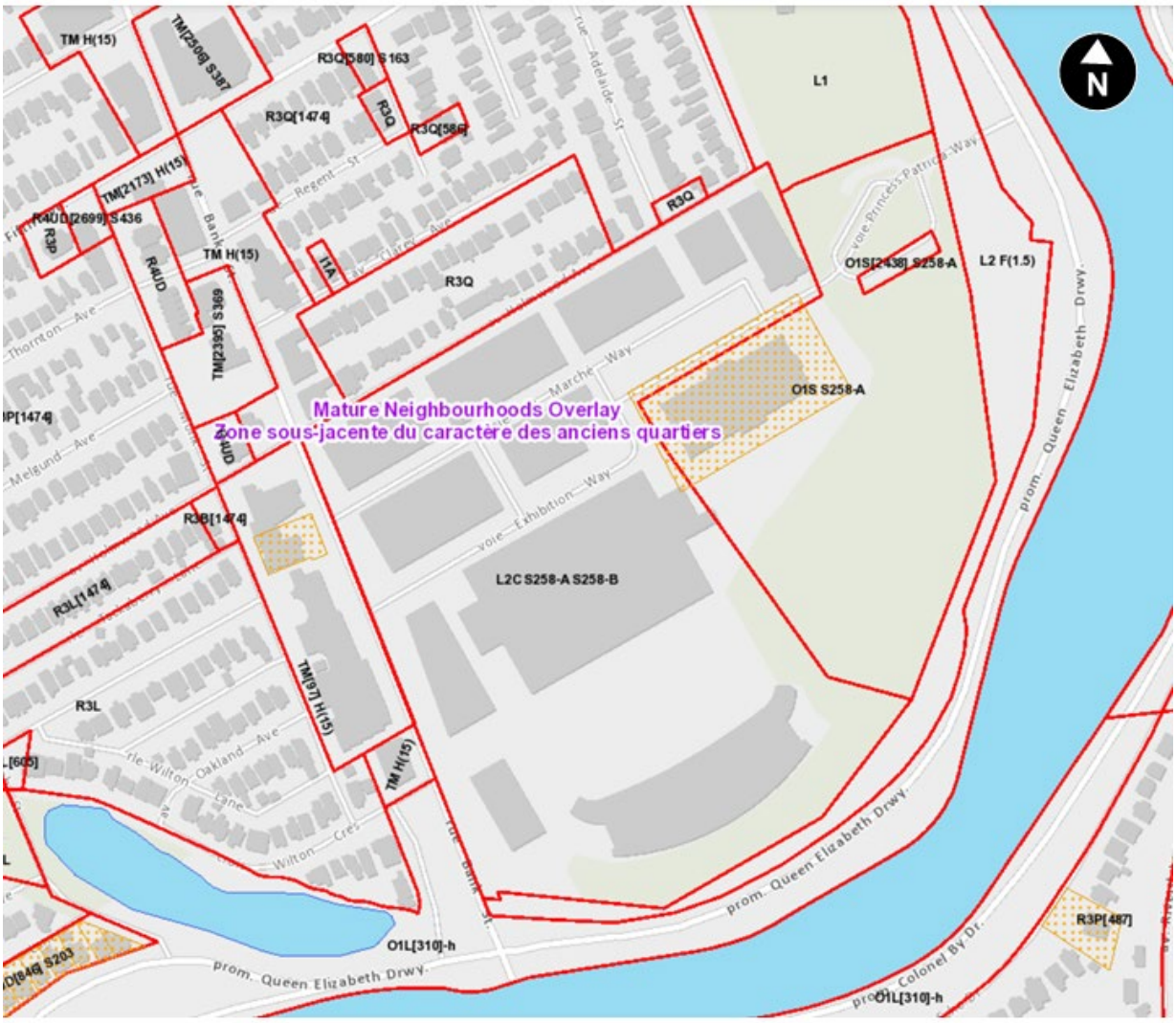
The eastern portion of the proposed site is zoned O1S S258-A and as outlined in the City of Ottawa's Zoning By-Law, the purpose of the O1- Parks and Open Space Zone is to:

- Permit parks, open space and related and compatible uses to locate in areas designated as General Urban Area, General Rural Area, Major Open Space, Mixed Use Centre, Village, Greenbelt Rural and Central Area as well as in Major Recreational Pathway areas and along River Corridors as identified in the Official Plan, and
- Ensure that the range of permitted uses and applicable regulations is in keeping with the low scale, low intensity open space nature of these lands.

Figure 4 illustrates the existing zoning at the site.

As the subject application is for a Zoning By-Law Amendment, detailed information regarding the current concept is not yet known.

Figure 4 – Existing Site Zoning



2.1.2 Existing Conditions

2.1.2.1 Roads and Traffic Control

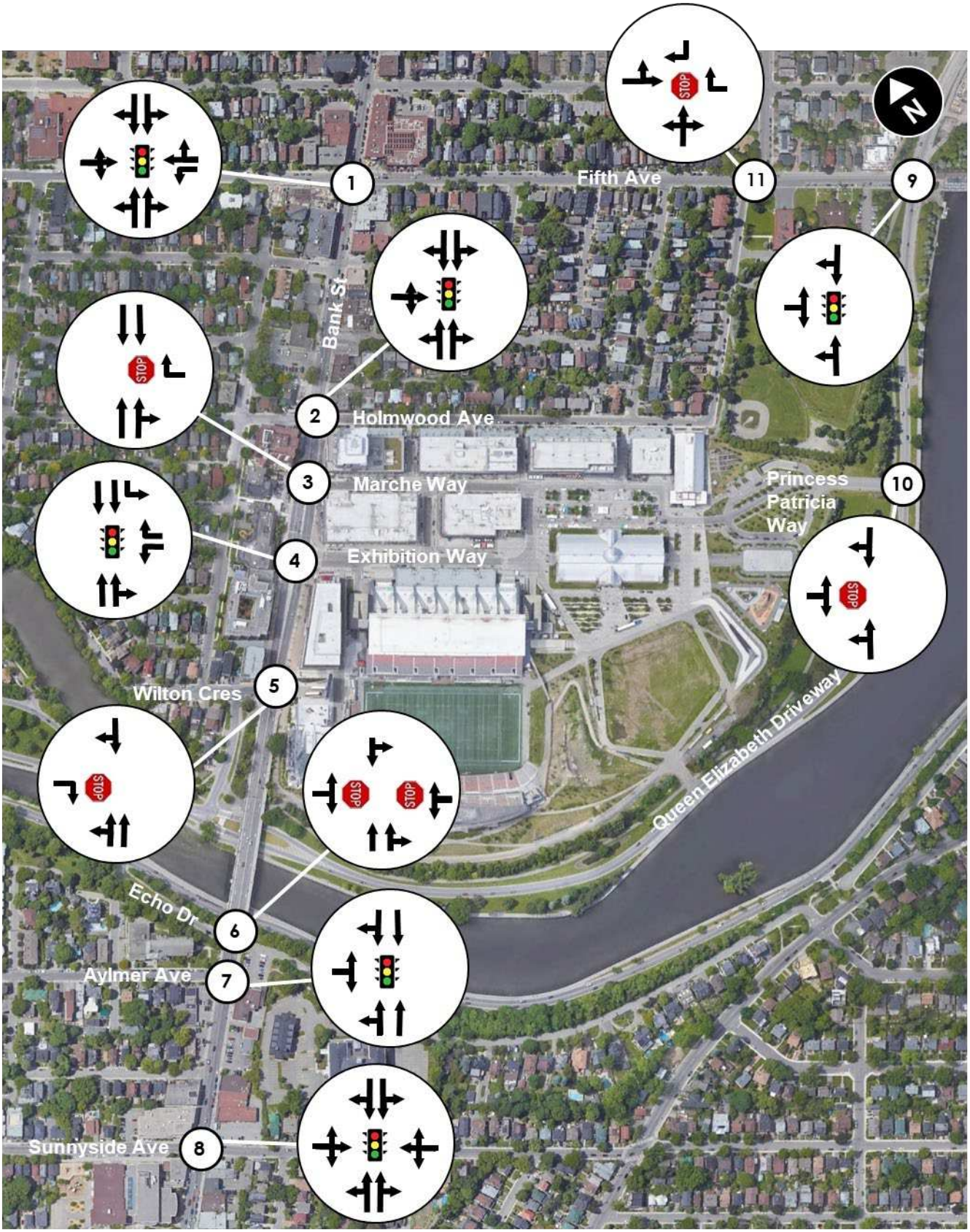
The roadways and intersections under consideration in the study area are described as follows:

Bank Street	Bank Street is a four-lane arterial roadway with a posted speed limit of 40 km/h. The street is under the jurisdiction of the City of Ottawa. Sidewalks are provided along both sides of Bank Street. The roadway is designated as a Local Cycling Route as per the City of Ottawa's Bike Plan and is also designated as a truck route. Bank Street currently provides two access connections to Lansdowne with a signalized, full access movement at Exhibition Way, and an unsignalized right-in/right-out access at Marché Way. On-Street parking is permitted north of Holmwood Avenue. On-street parking on Bank Street across the frontage of the subject site is prohibited at all times. As part of the Bank Street Canal Bridge Rehabilitation Project, 1.5m cycle tracks have been implemented on both sides of the Bank Street Bridge between Exhibition Way and Aylmer Avenue in conjunction with a 3-lane cross-section (2 northbound lanes, 1 southbound lane). Other than the newly installed cycling lanes on the Bank Street Bridge, there is a northbound bike lane on Bank Street across the frontage of the site.
Queen Elizabeth Driveway	Queen Elizabeth Driveway is a two-lane scenic parkway that runs along the Rideau Canal and has a posted speed limit of 40 km/h. The parkway is a federal roadway under the jurisdiction of the National Capital Commission (NCC). In the vicinity of Lansdowne, the parkway features multi-use pathways on both sides. Queen Elizabeth Driveway is designated as a Major Pathway as per the City of Ottawa Bike Plan. The parkway currently provides two access connections to Lansdowne with an unsignalized, full-movements intersection at Princess Patricia Way, as well as a restricted special-use access located on the south side at the Great Lawn. On-street parking on Queen Elizabeth Driveway is prohibited at all times.
Fifth Avenue	Fifth Avenue is a two-lane collector roadway with a posted speed limit of 40 km/h east of Bank Street, and a posted speed limit of 30km/h west of the Bank Street. There are existing sidewalks along both sides of the roadway. The south side of Fifth Avenue features an on-street cycling lane. The roadway is designated as a Local Route per the City of Ottawa Bike Plan. On-street parking on Fifth Avenue in the vicinity of the subject site is permitted on the northside of the roadway.
Holmwood Avenue	Holmwood Avenue is a two-lane local road with a default speed limit of 30 km/h. East of the intersection with Bank Street, Holmwood Avenue is a one-way street providing access in the eastbound direction, and features a cycling lane on the northside of the roadway. West of the Bank Street intersection, Holmwood Avenue is a two-way street. On-street parking on Holmwood Avenue in the vicinity of the subject site is permitted on the southside of the roadway. Holmwood Avenue exists as an occasional, limited exit from the site and parking in its current state.

Exhibition Way	Exhibition Way is a two-way private roadway that functions as the primary access point to Lansdowne and TD Place. The intersection with Bank Street is signalized with an auxiliary left turn lane in the southbound direction. There are existing sidewalks along both sides of the roadway. There are auxiliary left and right turn lanes in the west bound direction. Designated on-street parking spaces are provided with varying time limits.
Marché Way	Marché Way is a two-way private roadway that functions as the secondary access point to Lansdowne and TD Place. The intersection with Bank Street is unsignalized and functions as a right-in/right-out only access connection. There are existing sidewalks along both sides of the roadway. Designated on-street parking spaces are provided with varying time limits.
Wilton Crescent	Wilton Crescent is a two-lane local roadway with a posted speed limit of 30 km/h. Left turn movements from Wilton Crescent to Bank Street are prohibited at all times. The intersection with Bank Street is stop controlled along Wilton Crescent. There are existing sidewalks along both sides of the roadway. Across the frontage of the subject site, Wilton Crescent is designated as a local route as per the City of Ottawa Bike Plan. On-street parking is permitted on the northside of the roadway at specific times.
Echo Drive	Echo Drive is a one-lane local roadway with a default speed limit of 40 km/h. Through and left turns off Echo Drive are prohibited. Echo Drive is a one-way road stop controlled along Echo Drive. The roadway has a sidewalk on the northside. Echo Drive is designated as a local route as per the City of Ottawa's ultimate Cycling Plan.
Aylmer Avenue	Aylmer Avenue is a two-lane local roadway with a posted speed limit of 30 km/h. Sidewalks are provided along both sides of Aylmer Avenue. On-street parking is permitted on the northside of the roadway.
Sunnyside Avenue	Sunnyside Avenue is a two-lane collector roadway with a posted speed limit of 30 km/h. The roadway west of the intersection with Bank Street is designated as local route as per the City of Ottawa Bike Plan. On-street parking is permitted on the southside of the roadway west of the intersection with Bank Street.
O'Connor Street	O'Connor Street is a two-lane local roadway with a posted speed limit of 30 km/h. The roadway is designated as a local route as per the City of Ottawa Bike Plan. South of Fifth Avenue, O'Connor Street is a one-way local road with a dedicated bike lane on the northside, and on-street parking permitted on the southside of the roadway. North of Fifth Avenue, O'Connor Street is a two-way local road with on-street parking permitted on the eastside.

Figure 5 illustrates the existing lane configuration and traffic control.

Figure 5 – Existing Lane Configuration and Traffic Control



2.1.2.2 Walking and Cycling

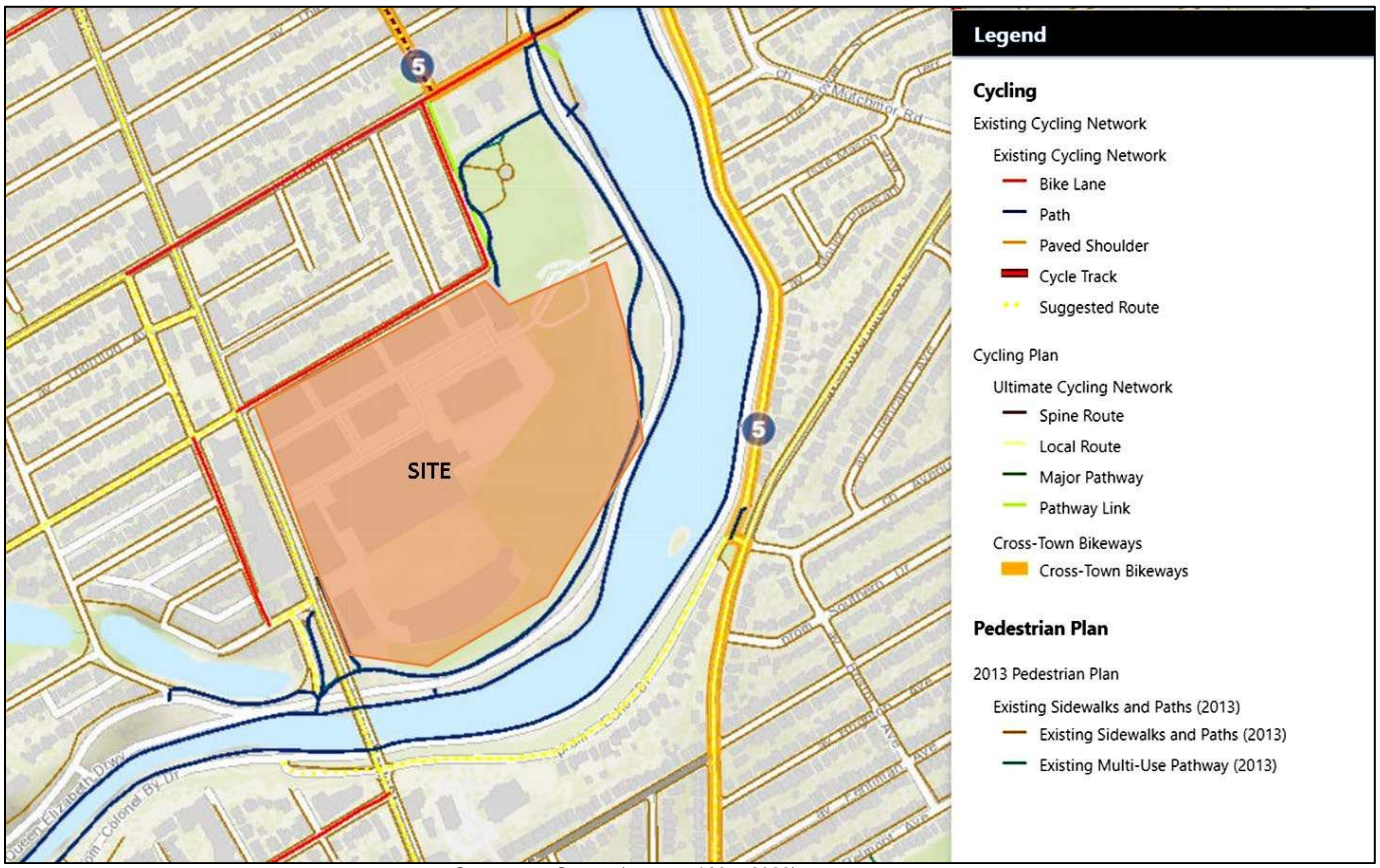
The study area is currently well-serviced by pedestrian facilities with sidewalks along all study area roadways.

All study area corridors are currently designated as Suggested Cycling routes as per the City of Ottawa Bike Plan. Queen Elizabeth Driveway, which is under the jurisdiction of the NCC, features off-street multi-use pathways. There are currently dedicated bike lanes on Fifth Avenue (east of Bank Street), Aylmer Avenue, and Holmwood Avenue (east of the Bank Street) which forms a connection to the O'Connor Street bike lanes and cycle tracks. The Flora Footbridge connection, which was opened in June 2019, provides a cycling and walking connection on both sides of the Rideau Canal at Fifth Avenue / Clegg Street. As previously mentioned, cycle tracks have been implemented on both sides of the Bank Street Bridge between Exhibition Way and Aylmer Avenue.

Under the Ultimate Cycling Network, all study area roadways are envisioned as Local Cycling Routes that form connections to nearby Spine Routes including O'Conner Street and Glebe Avenue, as well as multi-use pathways along Queen Elizabeth Driveway.

Figure 6 illustrates the existing pedestrian and cycling facilities within the vicinity of the subject site.

Figure 6 – Existing Pedestrian and Cycling Network



Source: geoOttawa (accessed May 2022)

2.1.2.3 Transit

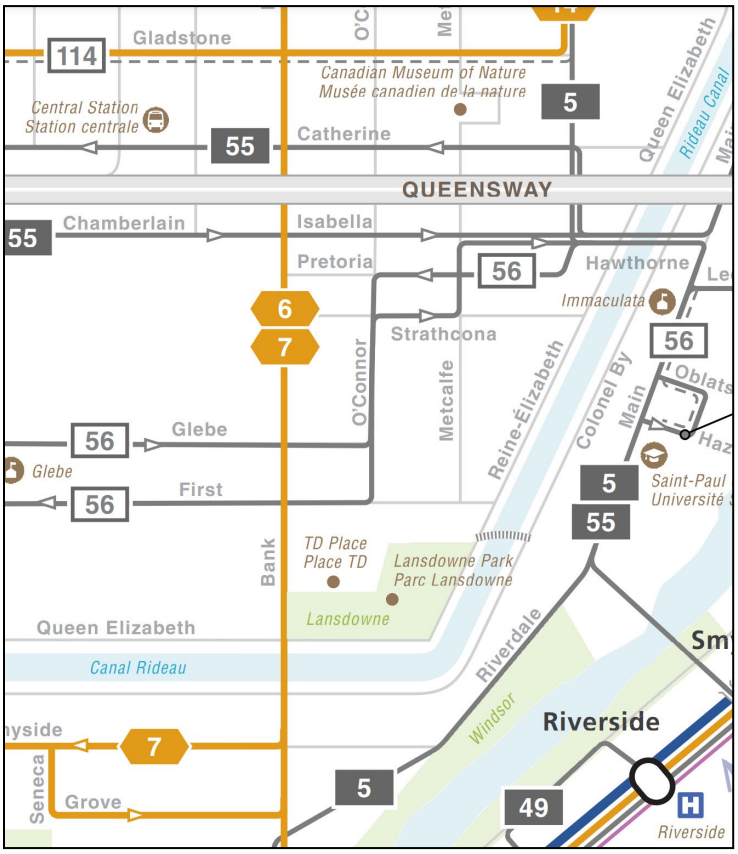
OC Transpo service is currently provided at Lansdowne via routes 6 & 7.

Route 6 is a Frequent Route that runs 7 days per week in all time periods between Greenboro and Rockcliffe. It runs with 15-minute headways or less during the weekday peak periods and 15-minute or less headways during the weekend peak periods.

Route 7 is a Frequent Route that runs 7 days per week in all time periods between Carleton and St. Laurent. It runs with 15-minute headways or less during both peak periods during weekdays and 15-minutes or less headways during the weekend peak.

Figure 7 illustrates the transit routes and stops.

Figure 7 – Study Area Transit Routes and Stops



Source: OC Transpo System Map (Accessed on June 2022)

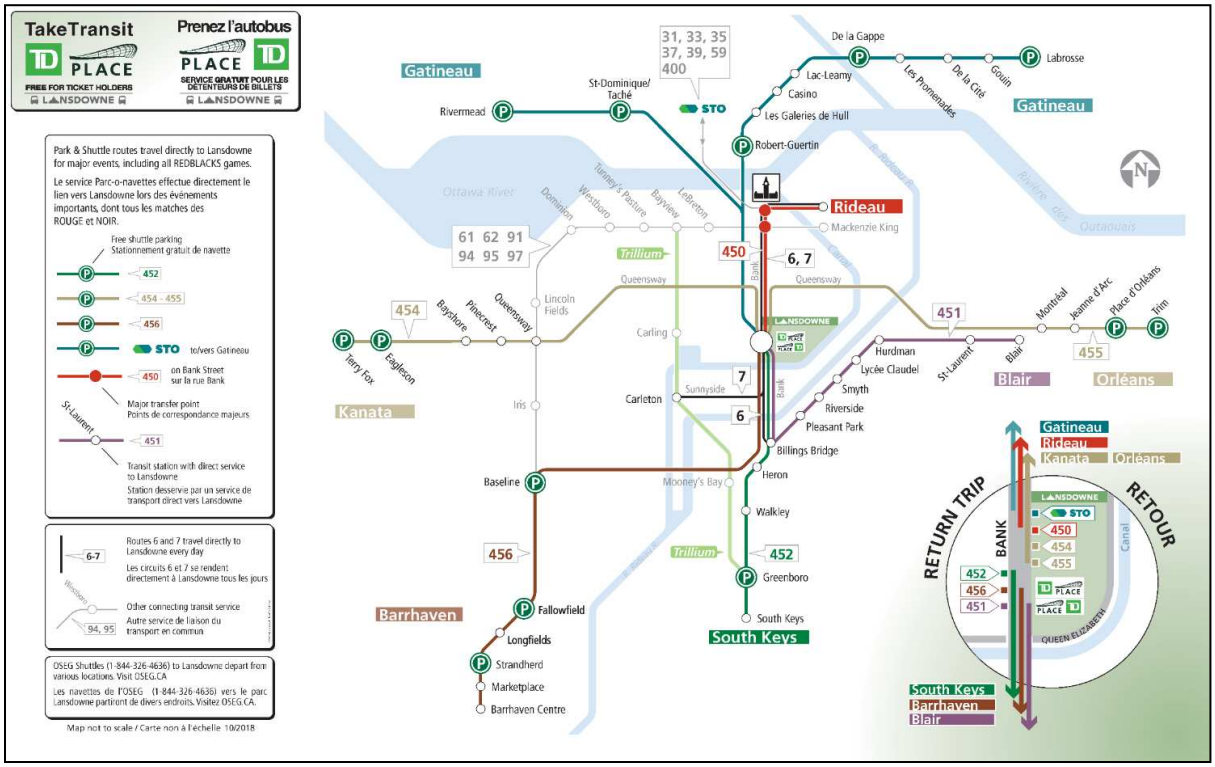
As part of the Lansdowne Revitalization project, enhanced transit services are provided to support special events at Lansdowne and TD Place. This includes the provision of free transit to ticketholders for all events held at Lansdowne through an innovative program that is the first of its kind for large venues. The cost of transit service is free of charge for event goers and is bourn by OSEG for any service enhancements provided for events with 5,000 or more attendees.

Transit service for special events includes providing supplemental trips on routes 6 and 7 for minor events with attendance levels of 10,000 or less.

For major events, which include events with 10,000 or more attendees, dedicated Park & Shuttle services is provided with event day services provided from OC Transpo Park & Ride locations, as well as privately run shuttles operated by OSEG. Major event transit service typically starts two hours prior to the start of a ticketed evet for ingress service, and two hours after the end of a ticketed event for egress service.

Figure 8 illustrates special event transit and shuttle services to TD Place.

Figure 8 – Enhanced Transit and Shuttle Service to TD Place



2.1.2.4 Traffic Management Measures

Traffic management measures are deployed at Lansdowne during special events. These measures include the deployment of traffic control devices and police point duty along Bank Street and Queen Elizabeth Driveway to help manage traffic flow and accommodate safe pedestrian crossings. Vehicle access to the site is restricted during large events, such as football games, to minimize pedestrian and vehicle conflicts. In addition, on-street parking on Bank Street is temporarily prohibited during large events in order to support special event enhanced transit and shuttle service operations to TD Place. While access to Lansdowne is restricted during major events, existing retail patrons and residents continue to access the underground parking facility at Lansdowne from Queen Elizabeth Driveway, which will remain an important arterial road in the city's transportation network. In addition, residents are able to access underground parking through a residents-only underground garage ramp on Holmwood Avenue.

2.1.2.5 Traffic Volumes

Updated traffic volume data at the study area intersections was collected as part of this study. This included traffic data captured for regular weekdays (AM and PM peak periods), the Saturday mid-day peak which is representative of weekend commercial retail traffic, and during a special event at the Arena at TD Place. Updated traffic data was collected during the following periods:

- Tuesday, May 3rd, 2022 / Wednesday, May 11th, 2022 (Weekday AM and PM)
- Saturday, May 7th, 2022 (Saturday Mid-Day)
- Monday, May 9th, 2022 (Special Event Concert at the Arena at TD Place. Start time of 7:30 pm, End time of 10:30 pm.
- Friday, October 14th, 2022 (REDBLACKS Football Game at TD Place. Start time of 7:30pm, End time of approximately 10:30pm.

Figure 9 illustrated Existing Weekday AM and PM peak hour demands.

Figure 10 illustrated Existing Weekday Mid-Day peak hour demands.

Figure 11 illustrates special event ingress and egress special event traffic for a concert at TD Place. Start time of 7:30 pm, End time of approximately 10:00 pm.

Figure 12 illustrates a major event ingress and egress traffic for a football game at TD Place. Start time of 7:30pm. End time of approximately 10:30 pm.

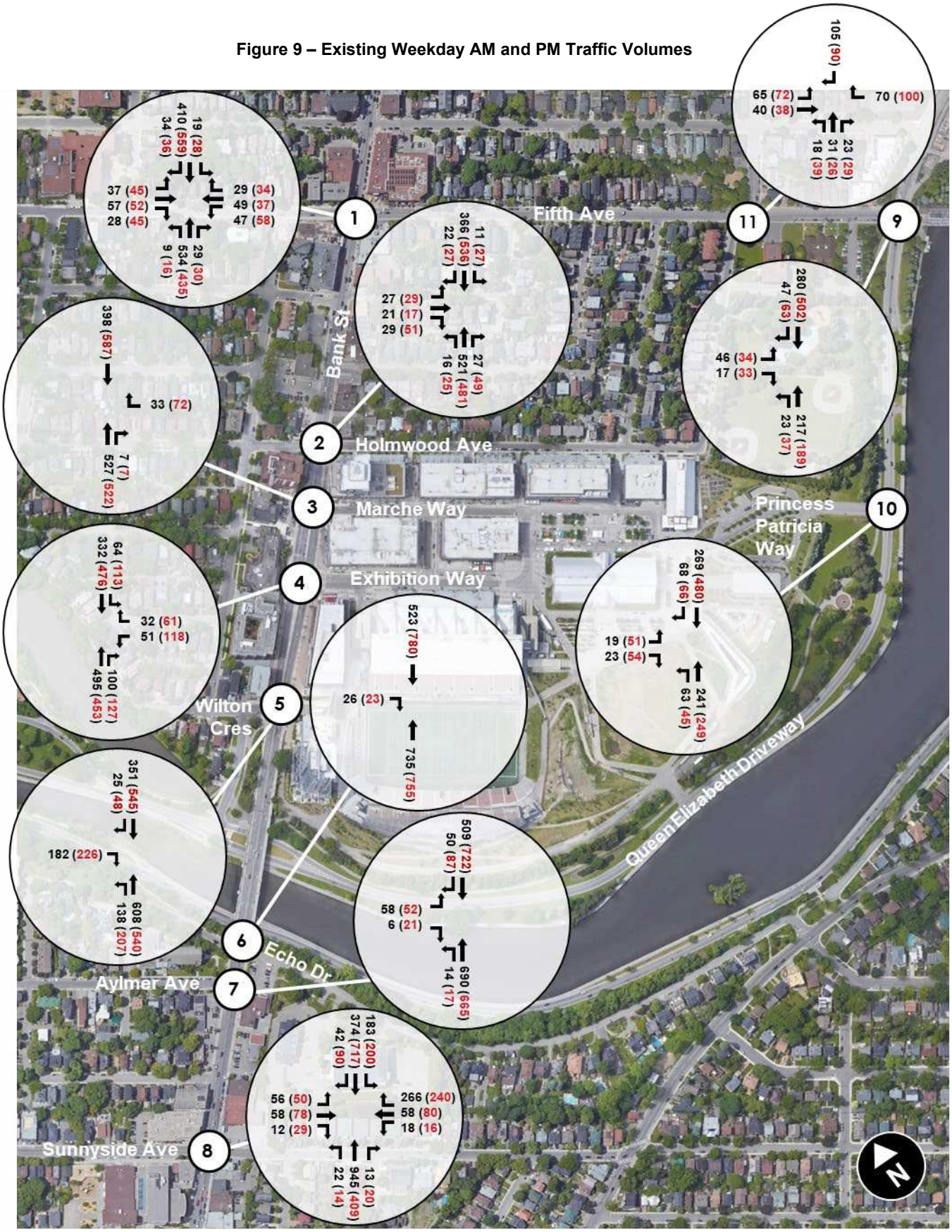
Pedestrian and cycling volumes were summarized at key study area intersections.

Pedestrian count data, where available for study peak periods, are summarized in **Figure 13** to **Figure 15**.

Cycling count data, where available for study peak periods, are summarized in **Figure 16** to **Figure 18**.

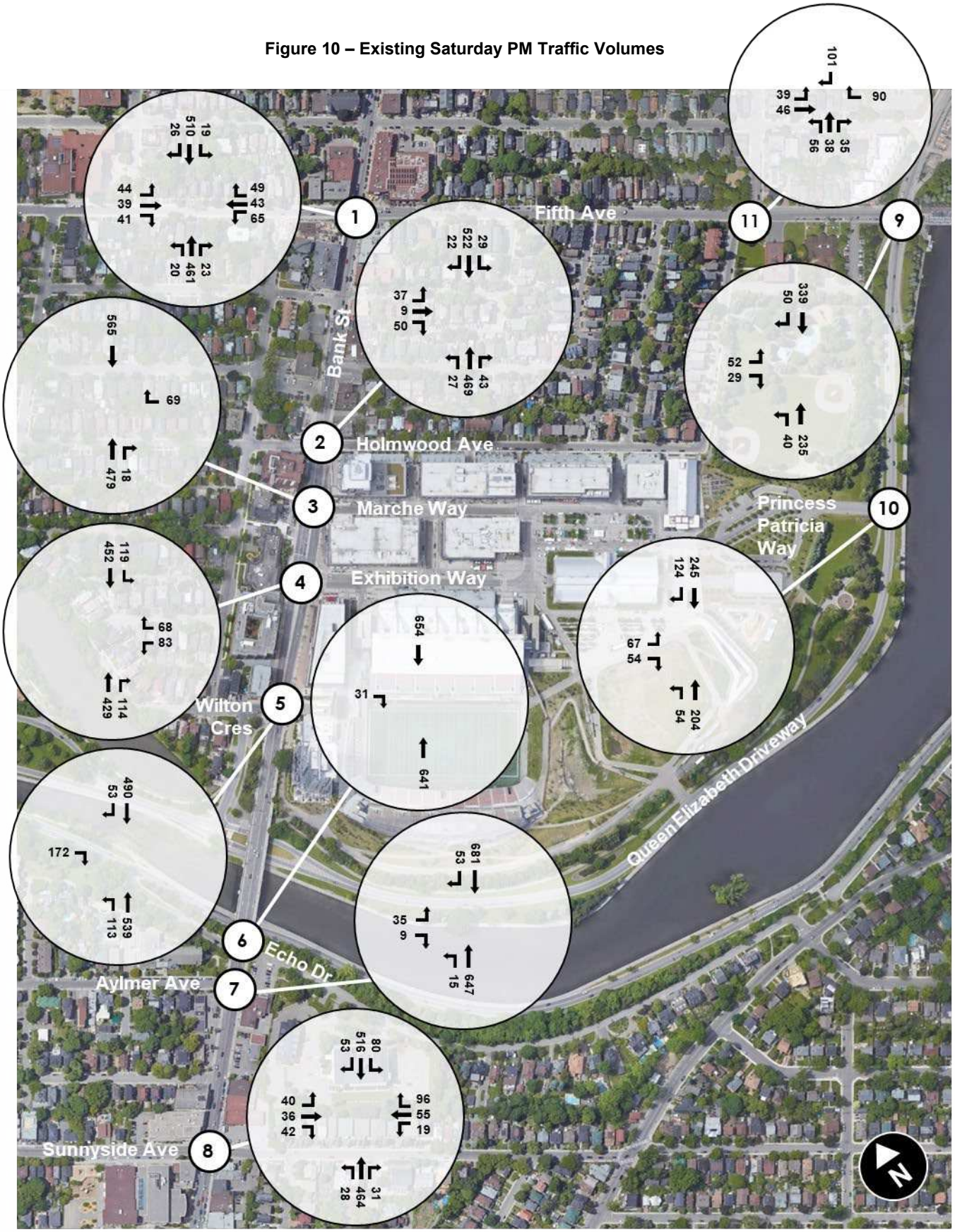
Turning Movement Count Data is documented in **Appendix A**.

Figure 9 – Existing Weekday AM and PM Traffic Volumes



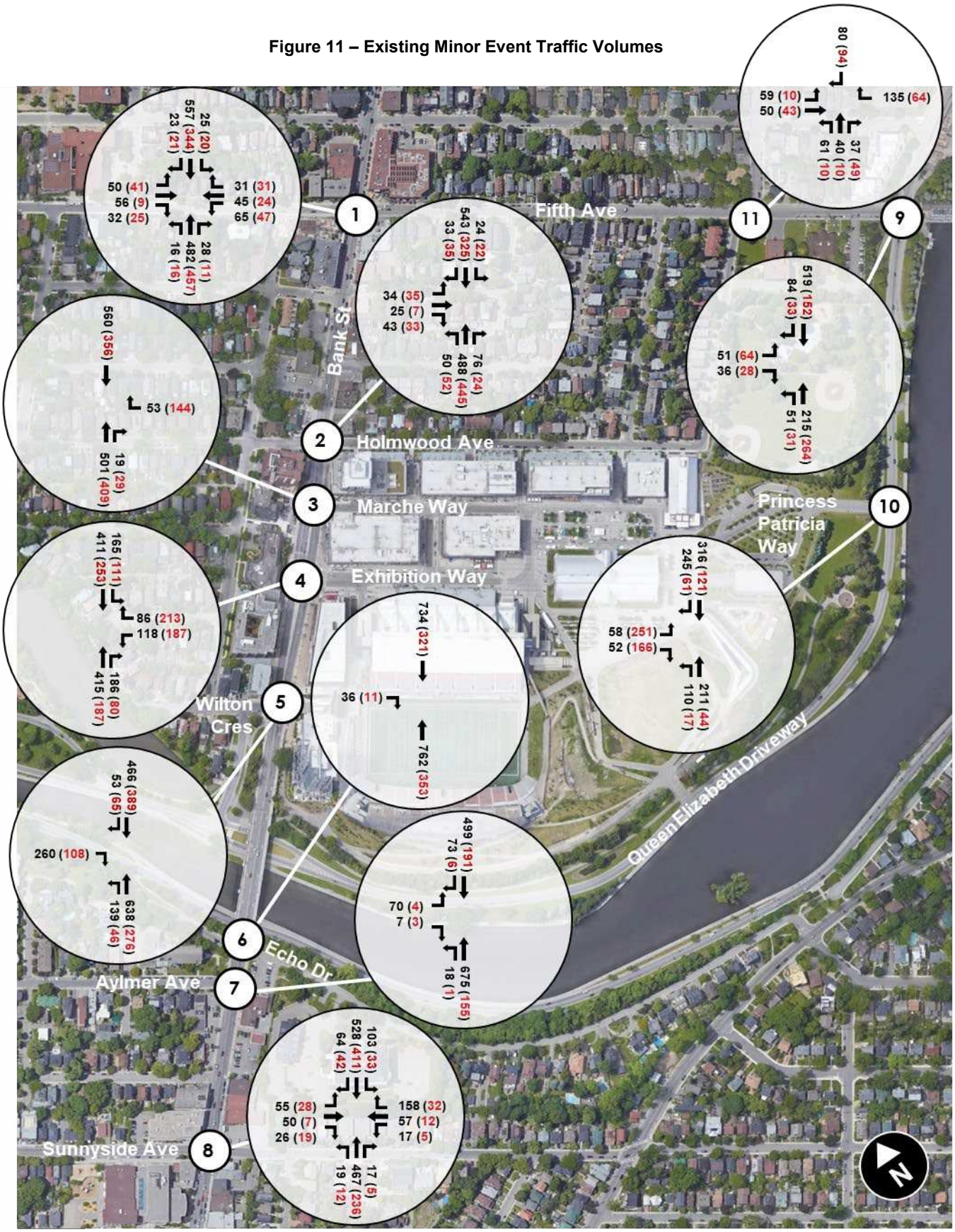
Existing Weekday AM and PM Peak Hour Volumes
AM Peak Hour (PM Peak Hour)

Figure 10 – Existing Saturday PM Traffic Volumes



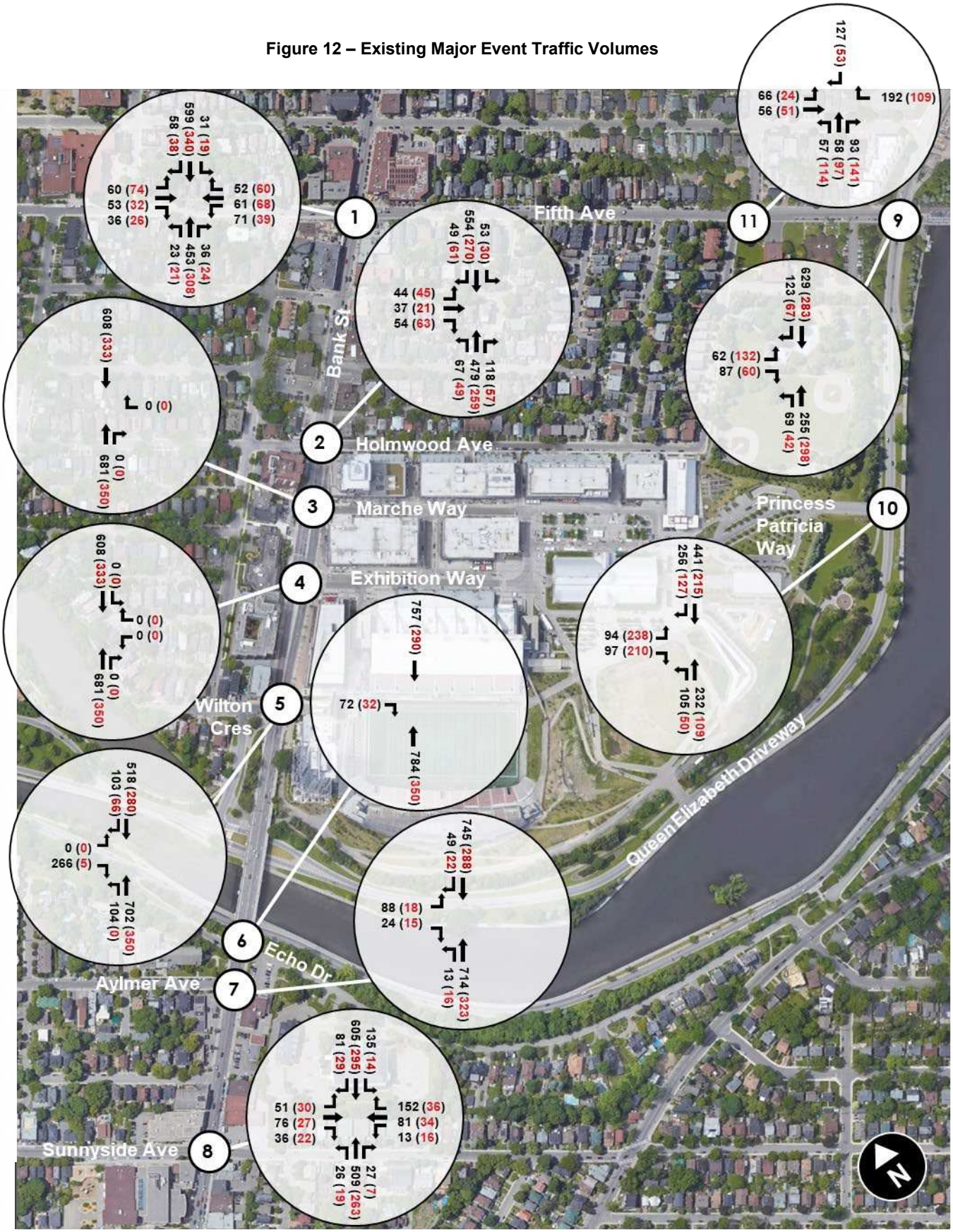
Existing Saturday Peak Hour Volumes

Figure 11 – Existing Minor Event Traffic Volumes



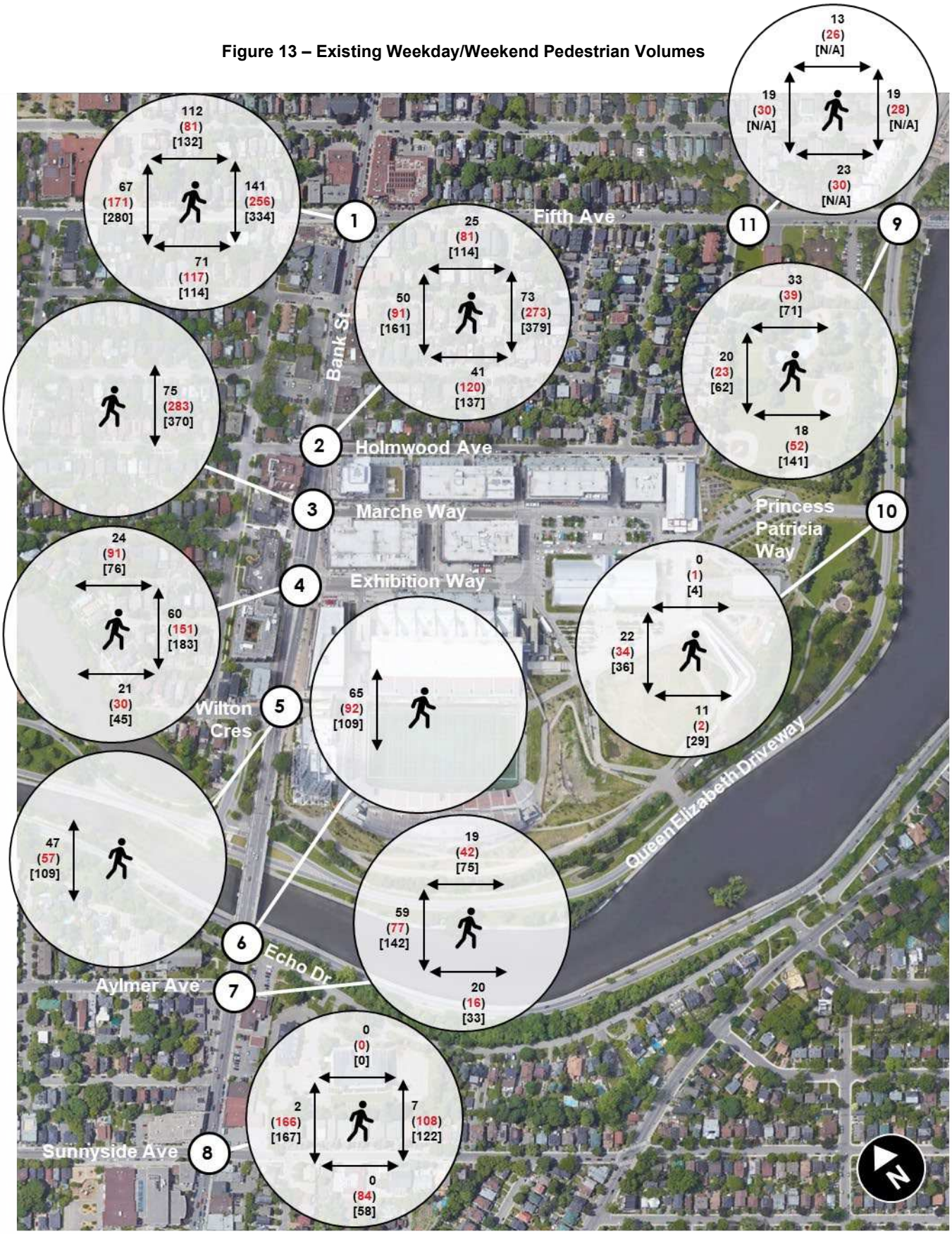
Existing Minor Event (Arena at TD Place) Traffic Volumes
Ingress Peak Hour (Egress Peak Hour)
Weekday Evening Concert (Monday, May 9 2022)

Figure 12 – Existing Major Event Traffic Volumes



Existing Major Event (Stadium at TD Place) Traffic Volumes
Ingress Peak Hour (Egress Peak Hour)
Weekday Evening Football Game (Friday, October 14, 2022)

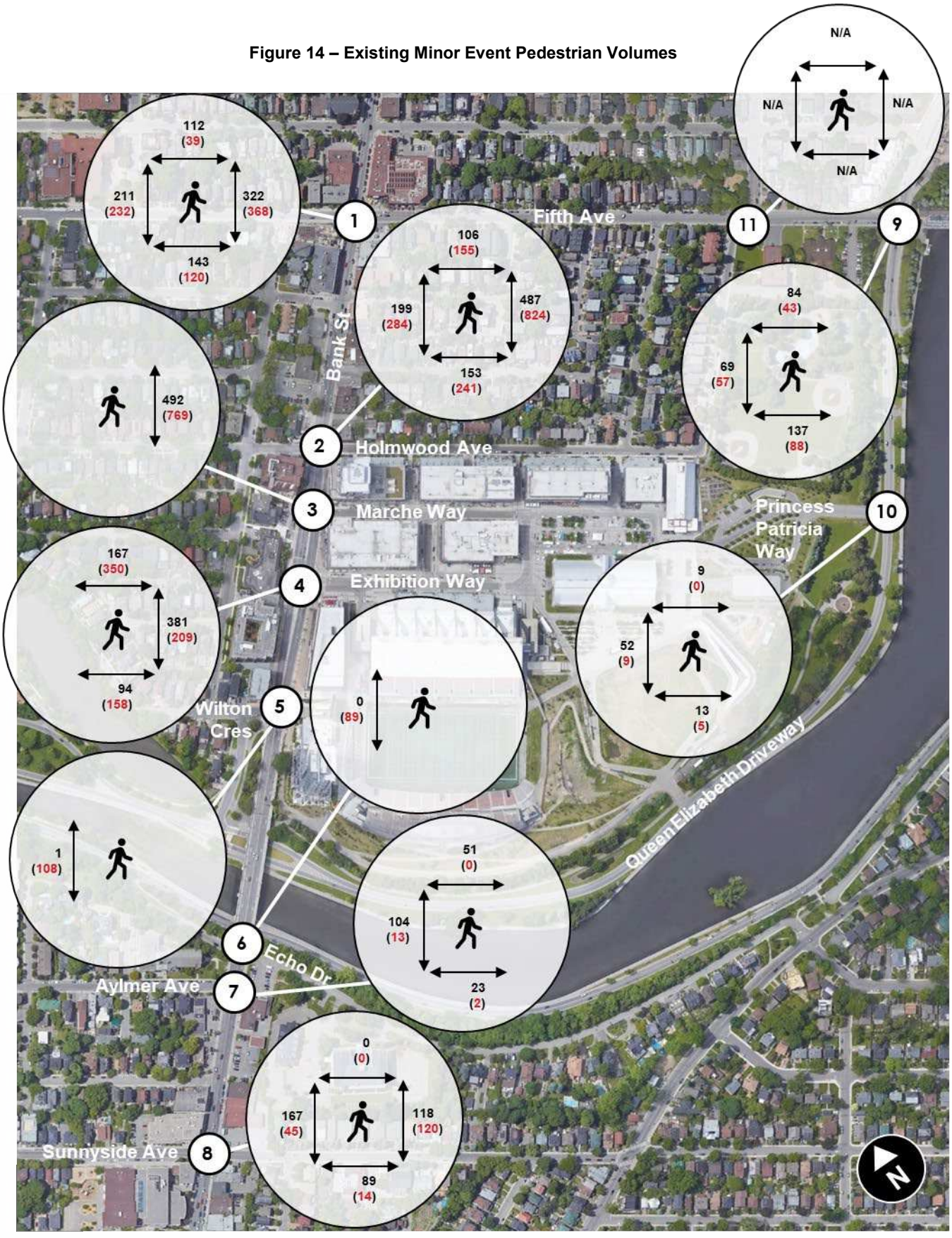
Figure 13 – Existing Weekday/Weekend Pedestrian Volumes



Existing Pedestrian Volumes
AM Peak Hour (PM Peak Hour) [Saturday Peak Hour]

Note: *Saturday counts not available for Intersection #11*

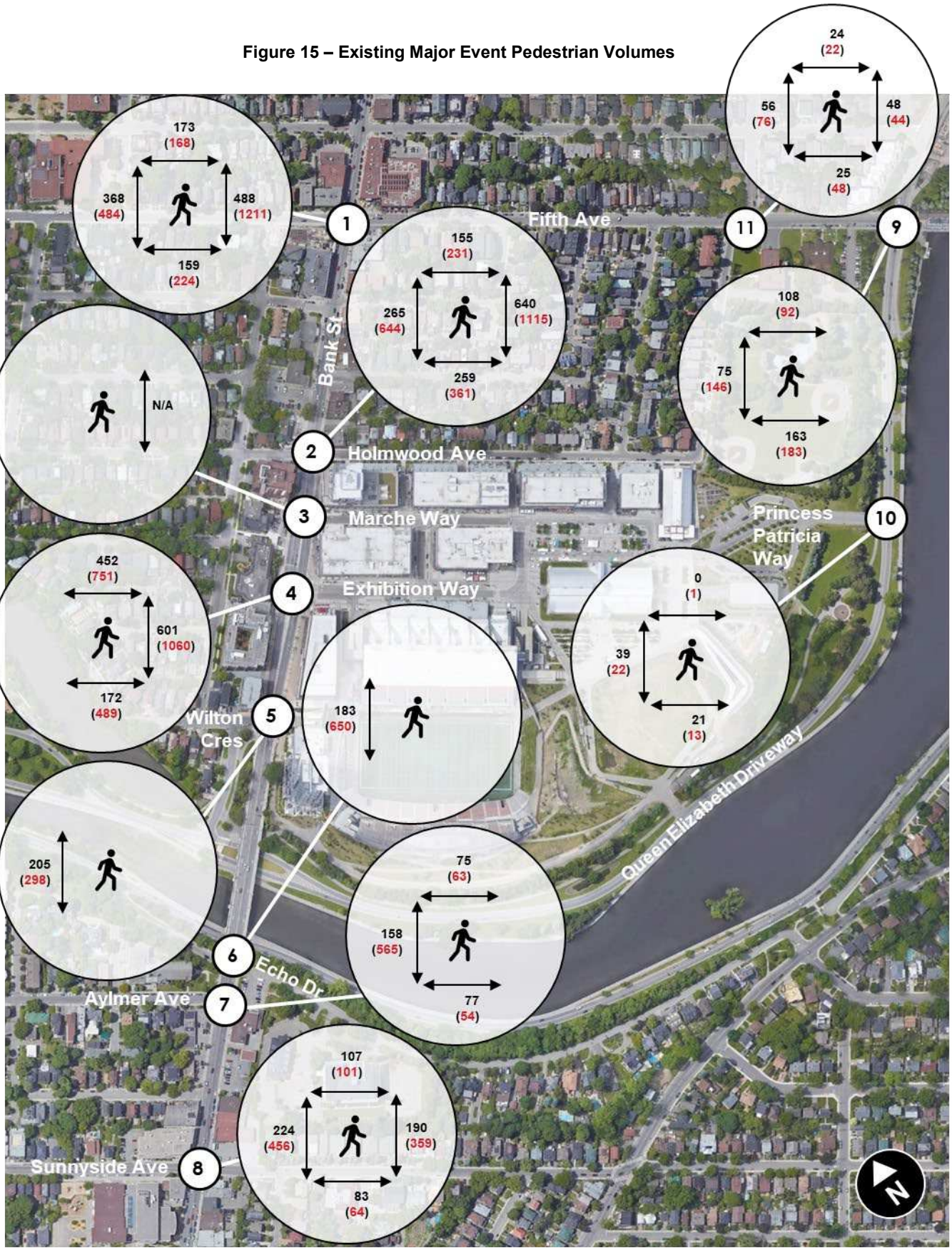
Figure 14 – Existing Minor Event Pedestrian Volumes



Existing Minor Event (Arena at TD Place) Pedestrian Volumes
Ingress Peak Hour (Egress Peak Hour)
Weekday Evening Concert (Monday, May 9 2022)

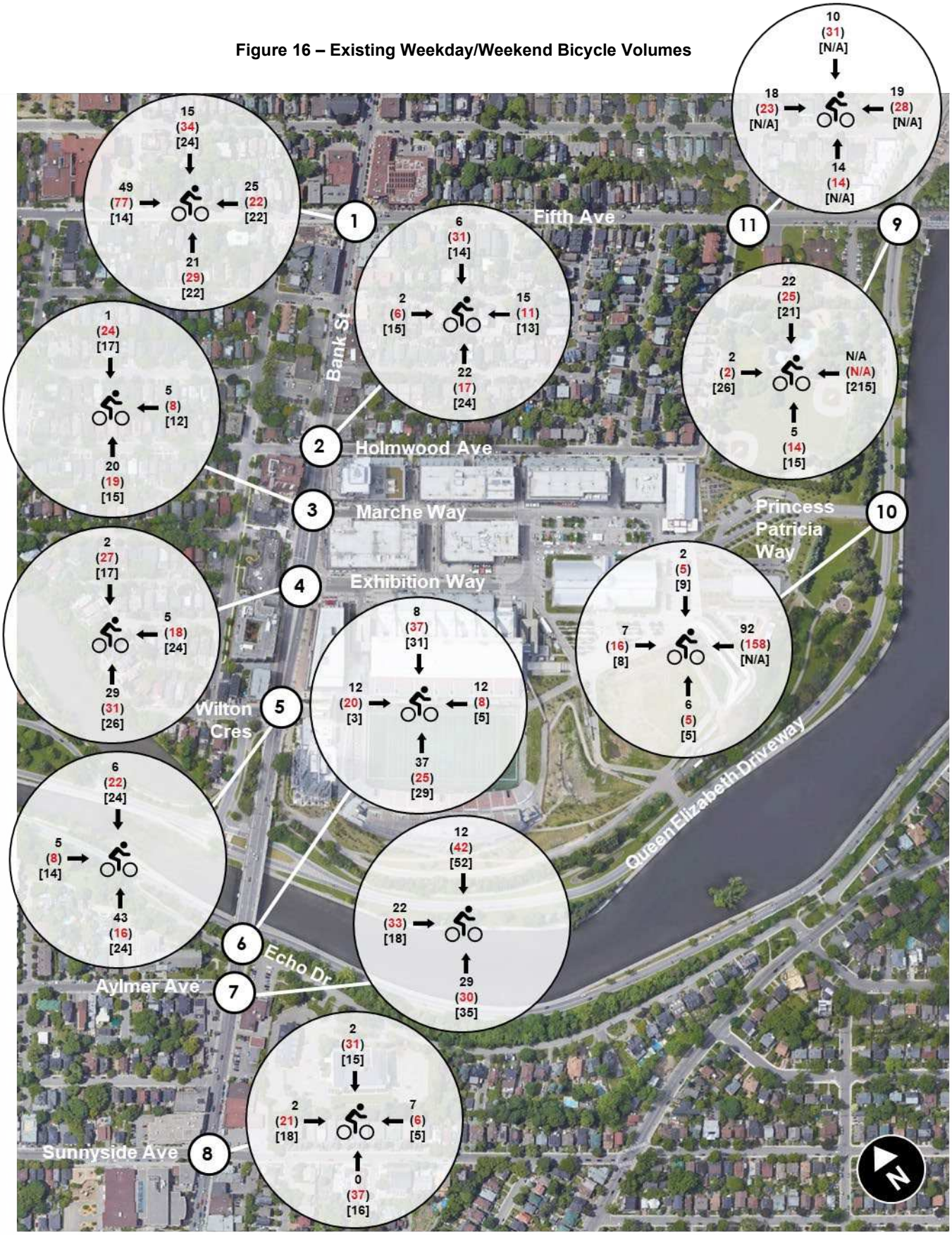
Note: *Counts not available for Intersection #11*

Figure 15 – Existing Major Event Pedestrian Volumes



Existing Major Event (Stadium at TD Place) Pedestrian Volumes
Ingress Peak Hour (Egress Peak Hour)
Weekday Evening Football Game (Friday, October 14, 2022)
Note: *Counts not available for Intersection #3*

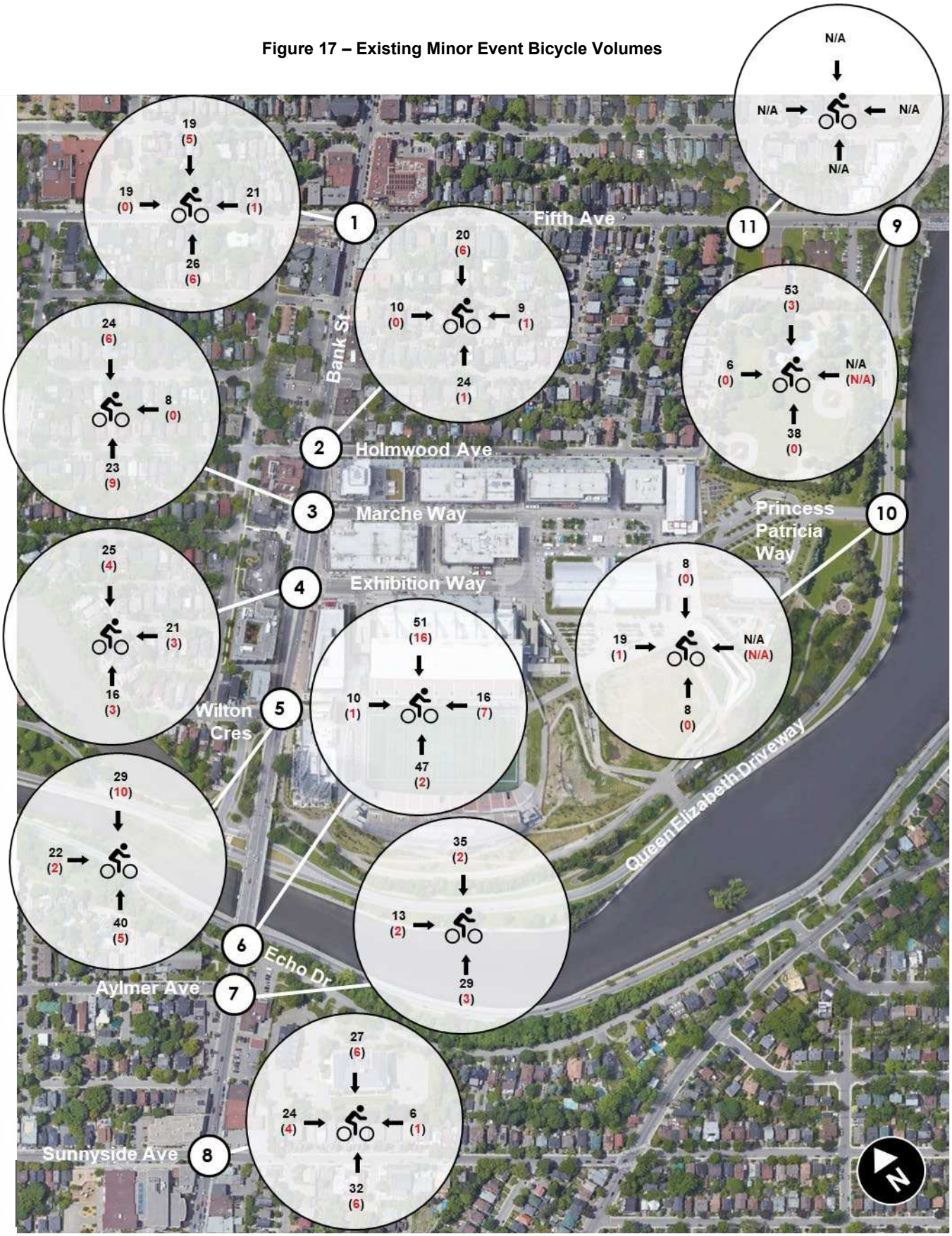
Figure 16 – Existing Weekday/Weekend Bicycle Volumes



Existing Cycling Volumes
AM Peak Hour (PM Peak Hour) [Saturday Peak Hour]

Note: *Saturday counts not available for Intersection #11. Approach data missing for #9 and #10*

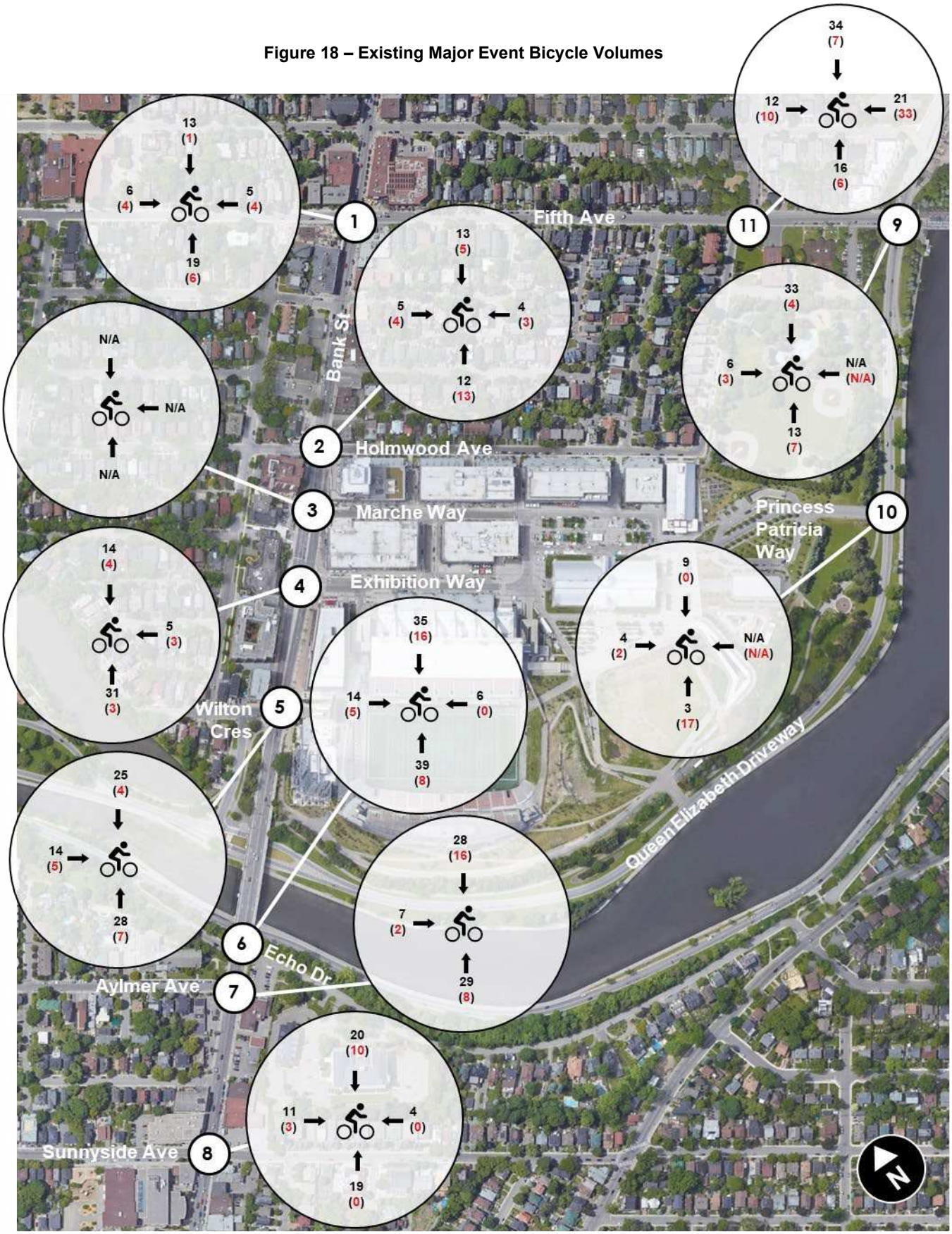
Figure 17 – Existing Minor Event Bicycle Volumes



Existing Minor Event (Arena at TD Place) Cycling Volumes
Ingress Peak Hour (Egress Peak Hour)
Weekday Evening Concert (Monday, May 9 2022)

Note: *Saturday counts not available for Intersection #11. Approach data missing for #9 and #10*

Figure 18 – Existing Major Event Bicycle Volumes



Existing Major Event (Stadium at TD Place) Cycling Volumes
Ingress Peak Hour (Egress Peak Hour)
Weekday Evening Football Game (Friday, October 14, 2022)

Note: *Counts not available for Intersection #3. Approach data missing for #9 and #10*

2.1.2.6 Collision History

Collision data was provided by the City of Ottawa for the period January 2017 to December 2021 in the vicinity of the subject site. The data was reviewed to determine if any intersections or road segments exhibited an identifiable collision pattern during the five (5) year period.

Table 1 summarizes the collision class and impact types for each road segment and intersection in the study area.

Table 1 – Collision Summary

LOCATION	CLASS	IMPACT TYPE				
		Sideswipe	Angle / Turning	Rear End	Single Vehicle	Other
Bank Street at Exhibition Way	Property Damage	1		4	1	
	Non-Fatal Injury					
Bank St at Marche Way	Property Damage			1		
	Non-Fatal Injury				1	
Bank St at Fifth Ave	Property Damage	3	2	3	1	
	Non-Fatal Injury		3	1	2	
Bank St at Holmwood Ave	Property Damage	3	6	2		
	Non-Fatal Injury		1			
Bank St at Wilton Cres	Property Damage	2	3	3	1	
	Non-Fatal Injury	1	3	1		
Bank St at Echo Dr	Property Damage	1	2			1
	Non-Fatal Injury					
Bank St at Aylmer Ave	Property Damage	4	2	4		
	Non-Fatal Injury			1	1	
Bank St at Sunnyside Ave	Property Damage	7	5	1		
	Non-Fatal Injury		3	1	3	
Queen Elizabeth Dr at Fifth Ave	Property Damage			3		
	Non-Fatal Injury					
Queen Elizabeth Dr at Princess Patricia Way	Property Damage	1	2	1		
	Non-Fatal Injury		2			1
Fifth Avenue at O'Connor Street	Property Damage					2
	Non-Fatal Injury					
Total	**Property Damage**	**22**	**22**	**22**	**3**	**3**
	Non-Fatal Injury	**1**	**12**	**4**	**7**	**1**

Based on the collision data summarized in **Table 1** above, it was found that the majority of the collisions resulted in property damage only (74%), which suggests that the majority of collisions occurred at low enough speeds to not cause injury. The Bank St at Sunnyside Ave intersection experienced the highest number of collisions (21%) with the majority of them classified as Angle / Turning collisions (40%). Collision summary data can be found in **Appendix B**.

2.1.3 Planned Conditions

2.1.3.1 Road Network Modifications

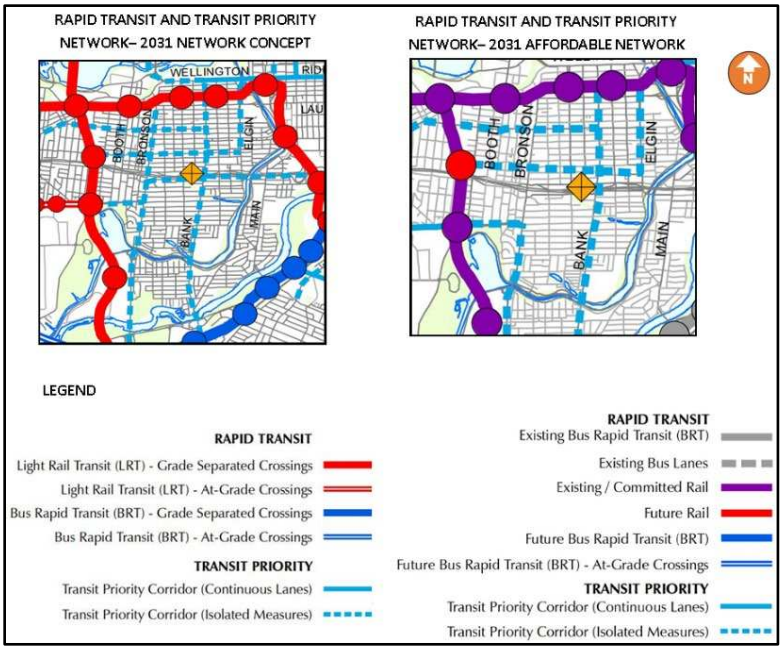
Table 2 identifies the City of Ottawa's Transportation Master Plan (TMP) projects located in the vicinity of the subject site, as well as projects that are anticipated to influence modal share characteristics in the future.

Figure 19 illustrates planned network modifications near the proposed development.

Table 2 – City of Ottawa Transportation Master Plan Projects

Project	Description	TMP Phase
Bank Street	Transit signal priority between Wellington Street and Highway 417. May also include parking lane conversion in the immediate vicinity of selected intersections Transit signal priority between Highway 417 and Billings Bridge Station, including limited installation of queue jump lanes (in one direction only) at selected intersections	Affordable Network

Figure 19 – Planned Network Modifications



Source: City of Ottawa TMP, accessed April 2022

2.1.3.2 Future Background Developments

Several new developments are proposed in the vicinity of Lansdowne. The location of background developments are illustrated in **Figure 20** and described in **Table 3**.

Figure 20 – Background Developments Key Plan

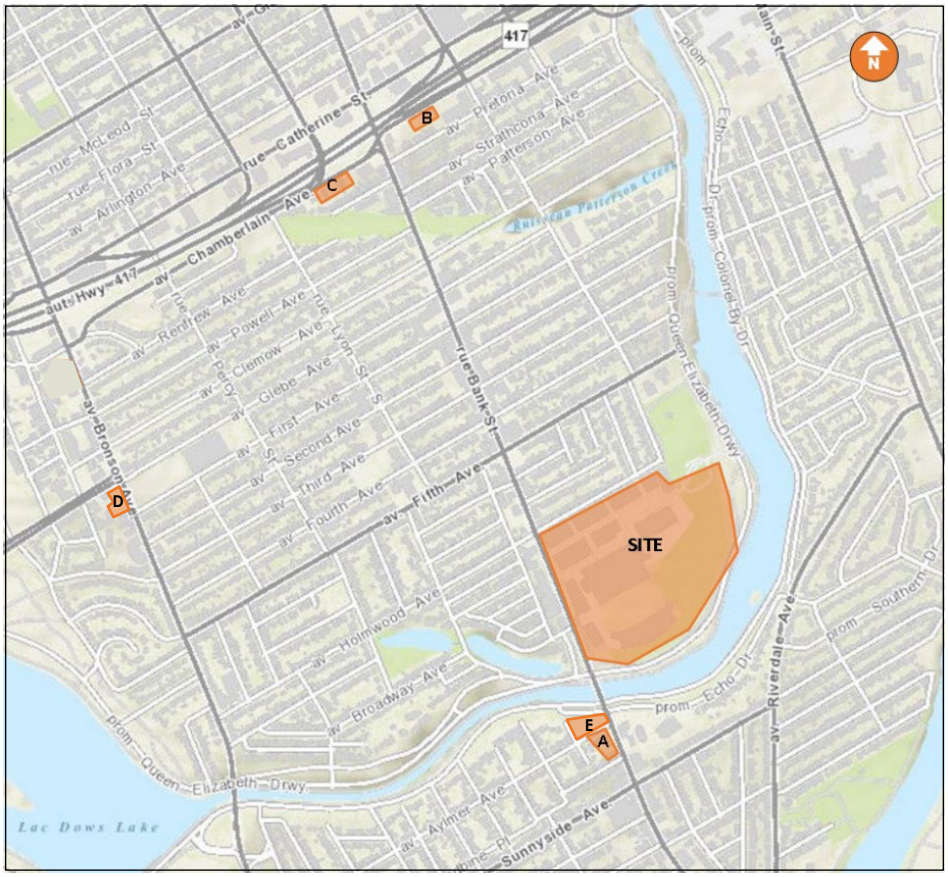


Table 3 – Background Developments

Key Plan Reference	Development	Location	Description
A	1050 – 1060 Bank Street	West side of Bank Street between Aylmer and Euclid Avenue in the south portion of Ottawa	6 storey residential apartment (44) units and 825m^2 retail space (Buildout – 2024)
B	178 – 200 Isabella Street	South of Highway 417 between Bank Street and O'Connor Street	16 storey mixed-use building with 251 dwellings units and approximately 355 m^2 of ground floor commercial space (Buildout – 2025)
C	30-48 Chamberlain Avenue	South of Chamberlain Avenue, west of Bank Street	150 apartment units and approximately 400 m^2 of ground floor retail space (Buildout – 2024)
D	770 – 774 Bronson Avenue	Southwest corner of Bronson Avenue and Carling Avenue intersection	257 apartment dwelling unit and 71 student housing dwelling units (Buildout-2025)
E	1040 Bank Street	Northwest corner of Bank Street and Aylmer Avenue intersection	Redevelopment of the Southminister United Church including a six-storey condominium building adjacent to the church

2.2 STUDY AREA AND TIME PERIODS

2.2.1 Study Area

The following study area intersections are proposed for analysis:

1. Bank Street at Fifth Avenue
2. Bank Street at Holmwood Avenue
3. Bank Street at Exhibition Way
4. Bank Street at Wilton Crescent
5. Bank Street at Echo Drive
6. Bank Street at Aylmer Avenue
7. Bank Street at Sunnyside Avenue
8. Queen Elizabeth Driveway at Princess Patricia Way
9. Queen Elizabeth Driveway at Fifth Avenue
10. Bank Street at Marché Way
11. Fifth Avenue at O'Connor Street

2.2.2 Time Periods

The proposed scope of the transportation assessment includes the following analysis time periods:

- Weekday AM Peak Hour of roadway
- Weekday PM Peak Hour of roadway
- Saturday Mid-Day Peak Hour of roadway
- Weekday Minor and Major Events: Ingress and Egress Peak Hour

2.2.3 Horizon Years

The proposed scope of the transportation assessment includes the following horizon years:

- 2023 Existing Conditions;
- 2031 Future Background Conditions;
- 2031 Total Future conditions (site build-out); and
- 2036 Total Future conditions (5 years beyond build-out).

2.3 EXEMPTIONS REVIEW

Table 4 summarizes the Exemptions Review table from the City of Ottawa's *2017 Transportation Impact Assessment Guidelines*.

As the subject TIA is in support of a Zoning By-Law Amendment application, Modules 4.1 to 4.4 have been omitted from the study.

Table 4 – Exemptions Review

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

3.0 FORECASTING

3.1 DEVELOPMENT GENERATED TRAVEL DEMAND

3.1.1 Existing Trip Generation

Lansdowne is currently an active site featuring a variety of land uses including the Stadium at TD Place, the Arena at TD Place, 280 residential townhome and condo units, an 18-acre urban park, and approximately 360,000 ft^2 of varied commercial retail and office space.

The current vehicular trip generation characteristics of the site are captured through updated Turning Movement Count (TMC) data captured in the Summer and Fall of 2022. Existing peak hour traffic volumes under Weekday AM, Weekday PM, and Weekend Saturday peak hour conditions are summarized in Section 2.1.2.5.

3.1.2 Future Trip Generation and Mode Shares

The *Institute of Transportation (ITE) Trip Generation Manual (11th Edition)* was used to forecast the auto trip generation for the multifamily housing and shopping center land uses and the *TRANS Trip Generation Manual* was used to forecast the auto trip generation for the residential land use. Land use codes 222 – Multi-Unit High Rise Building, and 820 – Shopping Center were thought to be the most representative of the proposed land uses.

Table 5 outlines the assumed land uses and the trip generation rates (ITE) for each land use.

Table 5 – Future Land Uses and Trip Generation Rates

LUC	Land Use	Trip Type ITE Manual	Units / GFA (1000 sq-ft)	Weekday AM Peak Hour			Weekday PM Peak Hour			Weekend (Saturday) Peak Hour		
				In	Out	Rate	In	Out	Total	In	Out	Rate
222	Multi-unit Residential (High-Rise)	Person Trips	1,199 units	16%	84%	**0.76 / unit**	64%	36%	**0.58 / unit**	56%	44%	**0.74 / unit**
820	Shopping Center	Vehicle Trips	66 ksf	62%	38%	**0.84 / ksf**	48%	52%	**3.4 / ksf**	52%	48%	**4.40 / ksf**
710	General Office	Person Trips	8 ksf	*Existing Land Use at Lansdowne. Net Zero Increase.* *No Additional / New Trips are forecasted for these Land Uses.*								
N/A	CFL Football Stadium	Person Trips	25,000 Seats									
N/A	Indoor Arena	Person Trips	5,000 Seats									

3.1.2.1 Trip Internalization

Trip Internalization refers to trips that are shared between two or more uses within the same site. This behaviour is typical for mixed-use developments that feature a variety of land uses that complement each other. When trip internalization occurs, a portion of the generated trips for each individual land use are drawn from adjacent land uses, as opposed to new trips that are drawn externally.

For the new land uses proposed as part of the Lansdowne 2.0 development, trip Internalization factors were applied to account for new site trips that are expected to be generated from within the site, or external trips that visit more than one land use within the subject development. Since these trips are contained within Lansdowne, accounting for each trip separately on the roadway network would result in "double-counting". For this reason, land uses that may have associated internal capture trips between one another ultimately had their net new trips adjusted consistent with typical industry standards.

For Lansdowne, a portion of the additional retail land-uses are assumed to feature trip internalization with other land-uses and activities within the site include existing and future residential, office , and the existing retail land-uses.

Table 6 outlines the trip internalization rates assumed for the additional retail land uses assumed as part of the Lansdowne 2.0 development.

Trip internalization rates were developed based on the methodologies outlined in TRANS Trip Generation Manual and NCHRP Report 684 (Enhancing Internal Trip Capture Estimation for Mixed-Use Developments).

The spreadsheet used for the Internal Capture rates is included in **Appendix G**.

Table 6 – Internal Capture Trips

LUC	Land Use	Trip Conversion	Weekday AM Peak			Weekday PM Peak			Weekend Peak Hour		
			In	Out	Total	In	Out	Total	In	Out	Total
820	Commercial Retail	Internal Capture	15%			30%			15%		

3.1.2.2 Additional Person Trips Generated by Lansdowne 2.0

Table 7 outlines additional development-generated person trips for each land use. Forecasted person trips for the proposed multi-unit residential towers were derived using the TRANS Trip Generation Manual. Trips forecasted for the commercial retail component were derived using the ITE Trip Generation Manual.

The trip internalization factors outlined in **Table 6** were applied to the shopping/retail land use to capture internal trips. The TRANS Trip Generation Manual Peak Period to Peak Hour factor was applied to the multi-unit residential component to convert the number of person trips from peak period to peak hour. As the ITE Trip Generation Manual is passed on Auto Trips, person trips were derived by applying an Auto Occupancy factor of 1.28.

Table 7 – Future Person Trips Generated by Land Use

LUC	Land Use	Trip Conversion	Weekday AM Peak			Weekday PM Peak			Weekend Peak Hour		
			In	Out	Total	In	Out	Total	In	Out	Total
222	Multi-Unit Residential (High-Rise)	Person Trips *(Peak Period)*	146	765	911	445	250	695	497	390	887
		Peak Period to Peak Hour Factor (TRANS)	0.80			0.90			1.00		
		Person Trips (Peak Hour)	**117**	**612**	**729**	**401**	**225**	**626**	**497**	**390**	**887**
820	Commercial Retail	Auto Trips (Peak Hour)	34	21	55	106	115	221	149	137	286
		Person Trip Factor	1.28								
		Person Trips (Peak Hour)	**43**	**27**	**70**	**136**	**147**	**283**	**190**	**176**	**366**
		Internal Reduction Factor	15%			30%			15%		
		Internal Reduction	-6	-4	-10	-41	-44	-85	-29	-26	-55
		Net Person Trips (Peak Period)	**37**	**23**	**60**	**95**	**103**	**198**	**161**	**150**	**311**
Lansdowne 2.0 Additional Development New Total Person Trips (Peak Hour)			154	635	**789**	495	328	**824**	658	540	**1,198**

The total new person trips forecasted as part of the Lansdowne 2.0 development are outlined above. It is estimated that the Lansdowne 2.0 development is projected to result in a net increase of 789 person trips in the AM Peak Hour, 824 person trips in the PM Peak Hour, and 1,198 trips during the Saturday Weekend Peak Hour.

To reflect local travel characteristics, forecasted person trips were assigned and distributed to various travel modes (i.e., auto, passenger, transit, cycling and walking). Modal share percentages were adopted from the TRANS Trip Generation Manual.

The TRANS Trip Generation Manual provides trip generation and modal share rates for 26 geographic regions within Ottawa-Gatineau. For Lansdowne, the modal shares for the *Ottawa Inner Area (050)* were adopted for the High-Rise Multifamily Housing and Commercial land-uses.

The Lansdowne 2.0 assumed modal shares are summarized below in **Table 8.**

Table 8 – Mode Share by Land Use

Mode	222 - Multiuse Family			820 - Commercial Retail		
	AM	PM	Average	AM	PM	Average
Auto	26%	25%	**26%**	39%	22%	**31%**
Passenger	7%	9%	**8%**	2%	4%	**3%**
Transit	28%	21%	**25%**	16%	12%	**14%**
Cycling	5%	6%	**6%**	3%	4%	**4%**
Walking	34%	39%	**37%**	40%	58%	**49%**

Residential Trips – Mode Shares

Section 4.2 (Table 8) of the *TRANS Trip Generation Manual (October 2020)* was utilized to determine the residential mode share for high rise multi-family housing for the Ottawa Inner Area district. The mode shares for the district, which is based on blended AM and PM peak period rates, include a 26% auto mode share, a 25% transit mode share, and a combined 43% modal share for walking and cycling.

Commercial Trips – Mode Shares

Section 6.3 (Table 13) of the *TRANS Trip Generation Summary Manual (October 2020)* was utilized to determine the commercial retail mode share for the Ottawa Inner Area district. The mode shares for the district, which is based on blended AM and PM peak period rates, include a 31% auto mode share, a 14% transit mode share, and a combined 53% modal share for walking and cycling.

Table 9 outlines the adjusted future trip generation estimate for Lansdowne 2.0 by travel mode.

Table 9 – Future Trip Generation by Travel Mode

LUC	Land Use	Modal Share %		Weekday AM Peak Hour			Weekday PM Peak Hour			Weekend Saturday Peak Hour		
				In	Out	Total	In	Out	Total	In	Out	Total
222	Multi – Unit (High-Rise)	Auto Driver	26%	30	156	186	102	57	160	127	100	226
		Auto Passenger	8%	9	49	58	32	18	50	40	31	71
		Transit	25%	29	150	179	98	55	153	122	96	217
		Cycling	6%	6	34	40	22	12	34	27	21	49
		Walking	37%	43	224	266	146	82	228	181	142	324
820	Shopping Center	Auto Driver	31%	11	7	18	29	31	60	49	46	95
		Auto Passenger	3%	1	1	2	3	3	6	5	4	9
		Transit	14%	5	3	8	13	14	28	23	21	44
		Cycling	4%	1	1	2	3	4	7	6	5	11
		Walking	49%	18	11	29	46	51	97	79	73	152
Lansdowne 2.0 Additional Development Trips		**Auto Driver**		**41**	**163**	**204**	**131**	**89**	**220**	**176**	**145**	**321**
		Auto Passenger		**10**	**50**	**60**	**35**	**21**	**56**	**45**	**36**	**80**
		Transit		**34**	**153**	**187**	**111**	**70**	**181**	**144**	**117**	**261**
		Cycling		**8**	**34**	**42**	**25**	**16**	**41**	**33**	**27**	**60**
		Walking		**61**	**235**	**295**	**193**	**133**	**325**	**260**	**216**	**476**
		Total Person Trips		**154**	**635**	**789**	**495**	**328**	**824**	**658**	**540**	**1,198**

The total additional number of trips generated by the Lansdowne 2.0 development are outlined above by mode, with a total of 789, 824, and 1198 person trips forecasted for the Weekday AM, Weekday PM, and Weekend Saturday peak hours, respectively.

Out of the total trips forecasted, the additional auto trips forecasted as part of the Lansdowne 2.0 development are estimated to be 204, 220, and 321 vehicle trips in the Weekday AM, Weekday PM, and Weekend Saturday peak hours.

3.1.3 Trip Distribution

The distribution of traffic to / from Lansdowne was developed based on the 2011 TRANS Origin-Destination Survey for the Ottawa Inner Area region. Based on the origin-destination data outlined in the survey, trip distributions were estimated based on cardinal directions to the north, east, south and west. The data indicates that up to 32% of trips surveyed within the Ottawa Inner Area started and ended within the same district, and upwards of 10% of trips have an origin/destination to the Ottawa Centre region north of the district (i.e. downtown Ottawa). The remaining trips were found to be distributed to other regions in Ottawa-Gatineau.

Table 10 outlines the trip distribution assumptions to/from Lansdowne based on the 2011 TRANS Origin-Destination Survey.

Table 10 – Site Trip Directional Distribution

Direction	Trip Distribution
North	35%
East	21%
South	32%
West	13%
Total	**100%**

As Lansdowne is bound by two north-south corridors (i.e. Bank Street to the west, and Queen Elizabeth Driveway to the east), Site Trip Distribution assumptions were further refined in the north-south direction, representing localized trip distribution on Bank Street and Queen Elizabeth Driveway.

Table 11 outlines the assumed directional trip distributions based on access to nearby key regional corridors such as Highway 417 to the north, Bronson Avenue to the west, and Riverside Drive and Heron Road to the south.

Table 11 – Refined Directional Trip Distribution Assumptions

Direction	Refined Trip Distribution
North	50%
South	50%

3.1.4 Trip Assignment

Lansdowne 2.0 new site generated trips were assigned to the study area road network based on the trip distribution assumptions outlined in Section 3.1.3. In addition, a review of existing traffic data was performed to estimate the traffic volume split between Bank Street, Holmwood Avenue, and Queen Elizabeth Driveway.

Currently, 65% of Lansdowne specific public traffic utilizes Bank Street for access to/from Lansdowne, with the remaining 35% utilizing QED.

Based on access gate data provided by OSEG for the private residential Holmwood garage ramp, it is estimated that there are approximately 90 residential vehicles utilizing the Holmwood residential garage access per day (a total of 180 access gate openings per day).

It is assumed that the new residential tenants will also have access to the Holmwood garage ramp. As a result, a proportion of the residential based trips were assumed to utilize the Holmwood garage ramp for access. The following site access assumptions were adopted:

- **55%** of new site generated trips are assumed to utilize Lansdowne accesses on Bank Street
- **30%** of new site generated trips are assumed to utilize the Lansdowne access at Queen Elizabeth Driveway
- **15%** of new site generated trips, specifically a proportion of new residential trips, are assumed to utilize the private garage access on Holmwood Avenue

Table 12 below illustrates the new Lansdowne 2.0 site generated trips and their respective assignment to Bank Street and QED for the Weekday AM, Weekday PM, and Weekend Saturday peak hours.

Table 12 – Trip Assignment for Newly Generated Trips

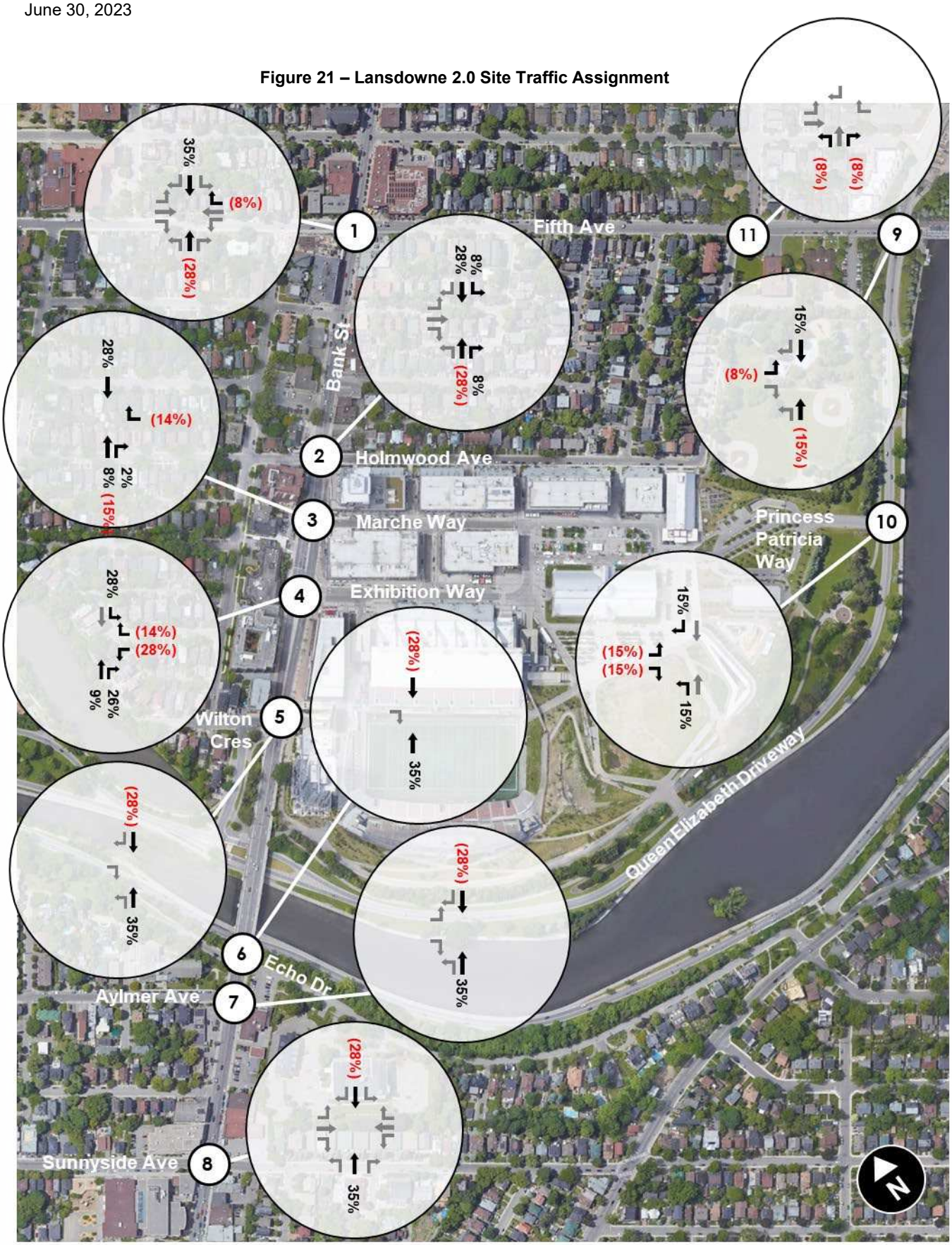
Access	Weekday AM Peak Hour		Weekday PM Peak Hour		Weekend Peak Hour	
	In	Out	In	Out	In	Out
Bank Street	23	90	72	49	97	80
Queen Elizabeth Driveway	12	49	39	27	53	44
Holmwood Private Garage Access	6	24	20	13	26	22
Total	**41**	**163**	**131**	**89**	**176**	**145**

Figure 21 documents the new site trip assignment assumptions.

Figure 22 illustrates the site generated trips for the Weekday AM and PM peak hours.

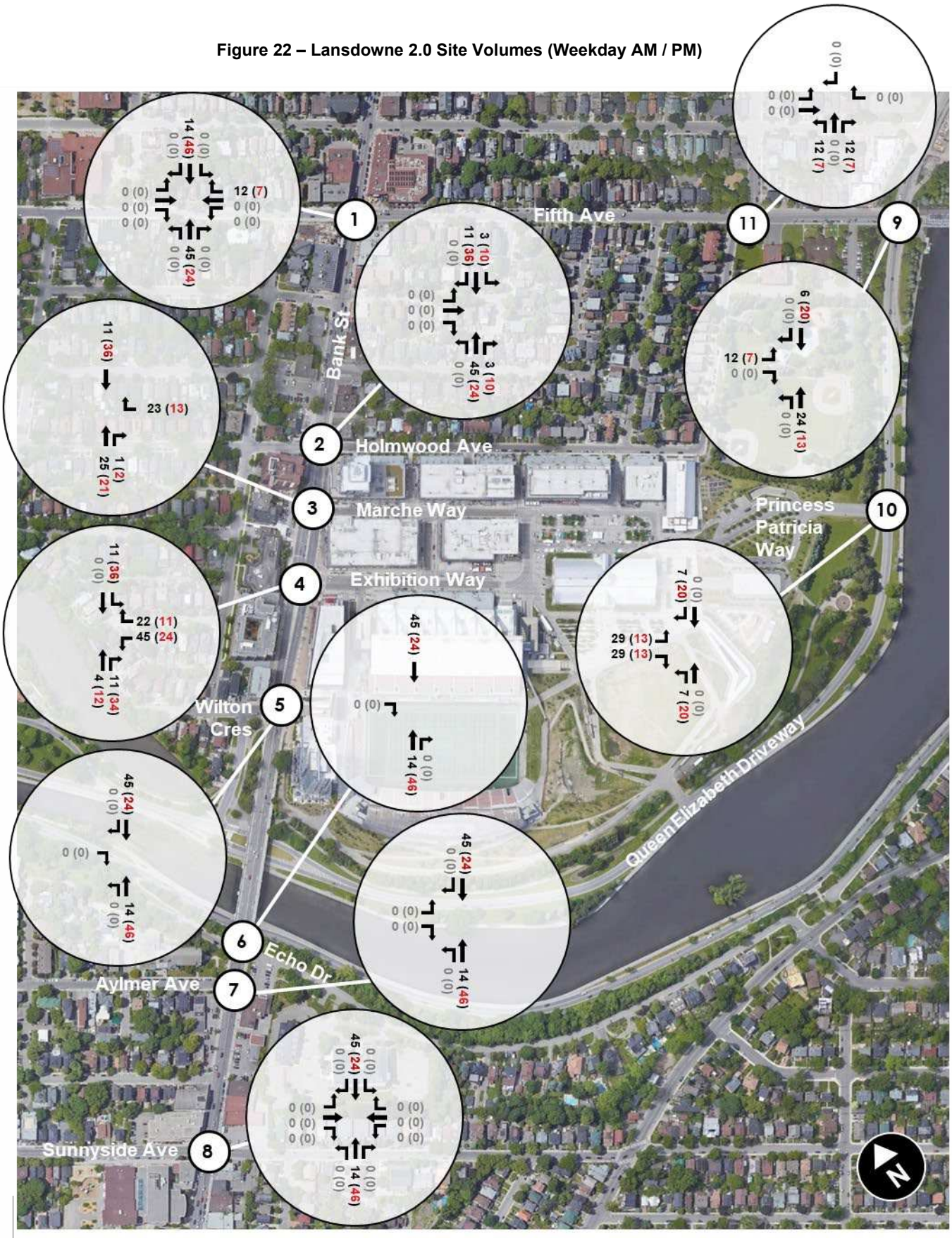
Figure 23 illustrates the site generated trips for the Weekday Saturday peak hour.

Figure 21 – Lansdowne 2.0 Site Traffic Assignment



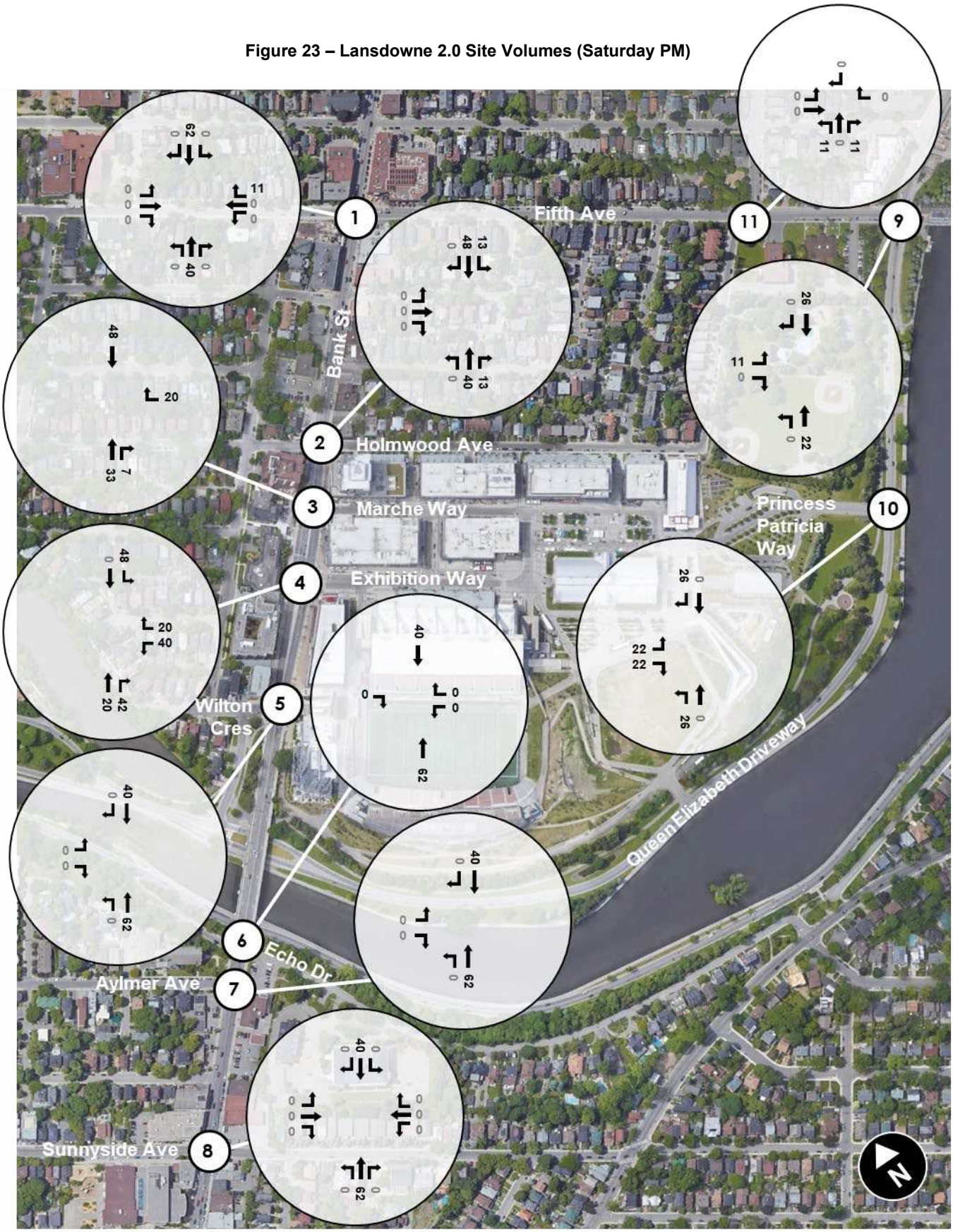
Lansdowne 2.0 Site Traffic Assignment
Inbound % (Outbound %)

Figure 22 – Lansdowne 2.0 Site Volumes (Weekday AM / PM)



Lansdowne 2.0 Site Volumes (Weekday AM and PM Peak Hours)
AM Peak Hour (PM Peak Hour)

Figure 23 – Lansdowne 2.0 Site Volumes (Saturday PM)



Lansdowne 2.0 Site Volumes (Saturday Peak Hour)

3.2 BACKGROUND NETWORK TRAVEL DEMAND

3.2.1 Transportation Network Plans

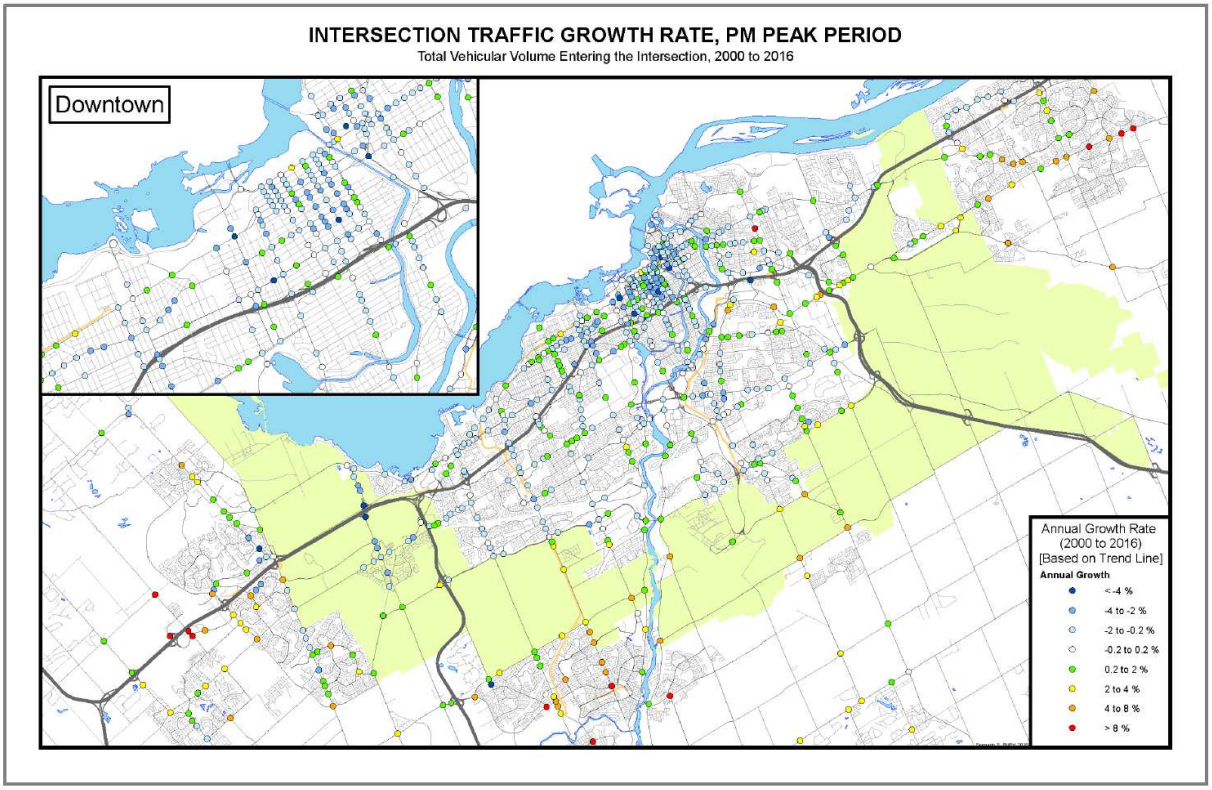
Table 2 includes the transportation network plans in the vicinity of the subject site. The only road infrastructure project that is included in the TMP within the vicinity of Lansdowne is the proposed Transit Priority Corridor improvements on Bank Street. In May 2022, City of Ottawa Transportation Committee directed staff to undertake an Active Transportation and Transit Operations Feasibility Study project of Bank Street between the Rideau Canal to Highway 417.

The Transit Operations and Feasibility Study project will examine options to improve transit service efficiency and reliability along Bank Street, between the Rideau Canal and Highway 417, and identify opportunities to improve the travel environment for active transportation.

3.2.2 Background Growth

Figure 24 below, which was developed by the City of Ottawa, outlines the average annual growth rates based on trend lines between the years 2000 and 2016. As illustrated below, the average annual growth in the vicinity of Lansdowne is between -2% to +0.2, indicating a general reduction or very little growth in automobile traffic volume growth on Bank Street. To be conservative, a 0.5% annual background growth rate was applied to forecast 2031 future background volumes.

Figure 24 – City of Ottawa Traffic Growth Rate Trends



3.2.3 Other Developments

As outlined in **Table 3** in **Section 2.1.3.2**, there are numerous developments in the study area that are scheduled to be constructed within the horizons of the subject study. The traffic volumes from these developments were obtained from their respective traffic studies, where available, and added to the transportation network as part of background traffic growth.

3.3 DEMAND RATIONALIZATION

The current peak hour traffic volumes along Bank Street are in the range of 500 – 800 vehicles per hour per direction. Similar volumes are exhibited on QED with peak hour volumes in the range of 250 – 550 vehicles per hour per direction.

The traffic volumes forecasted under the Future 2031 and Future 2036 horizon years are projected to be in the range of 600 – 900 vehicles per hour per direction for Bank Street, and 300 – 600 vehicles per hour per direction for QED. As the projected volumes fall within a similar range to existing conditions and are likely to be supported by the transportation network, no demand rationalization was undertaken. This methodology was applied to intersection operational analyses, even if the operations at intersections were found to be poor.

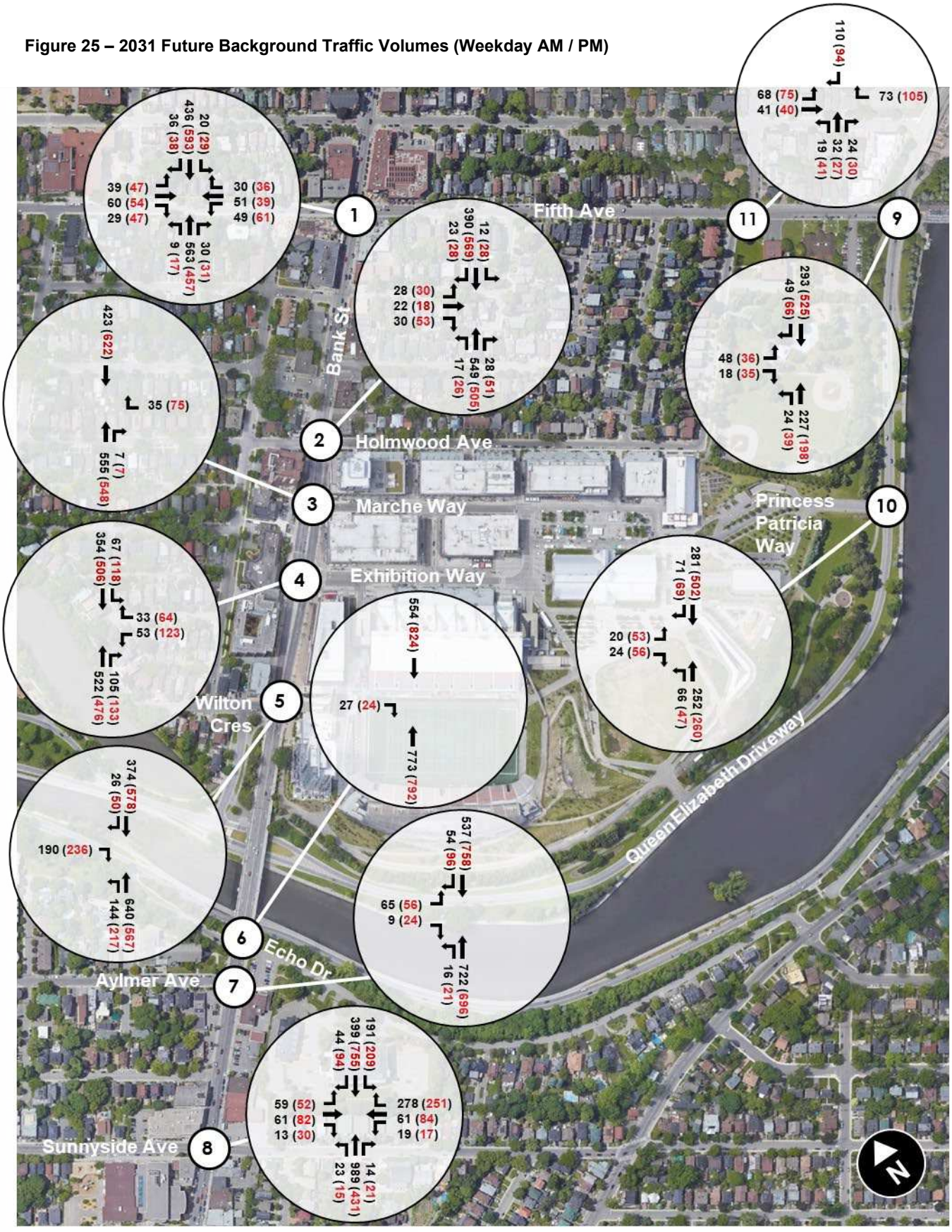
3.3.1 2031 Future Background Traffic Volumes

2031 Future Background traffic volumes were developed by applying a 0.5% background growth rate. In addition, background volumes from nearby developments were explicitly added as well.

Figure 25 illustrates 2031 Future Background traffic volumes for the Weekday AM and Weekday PM peak hours.

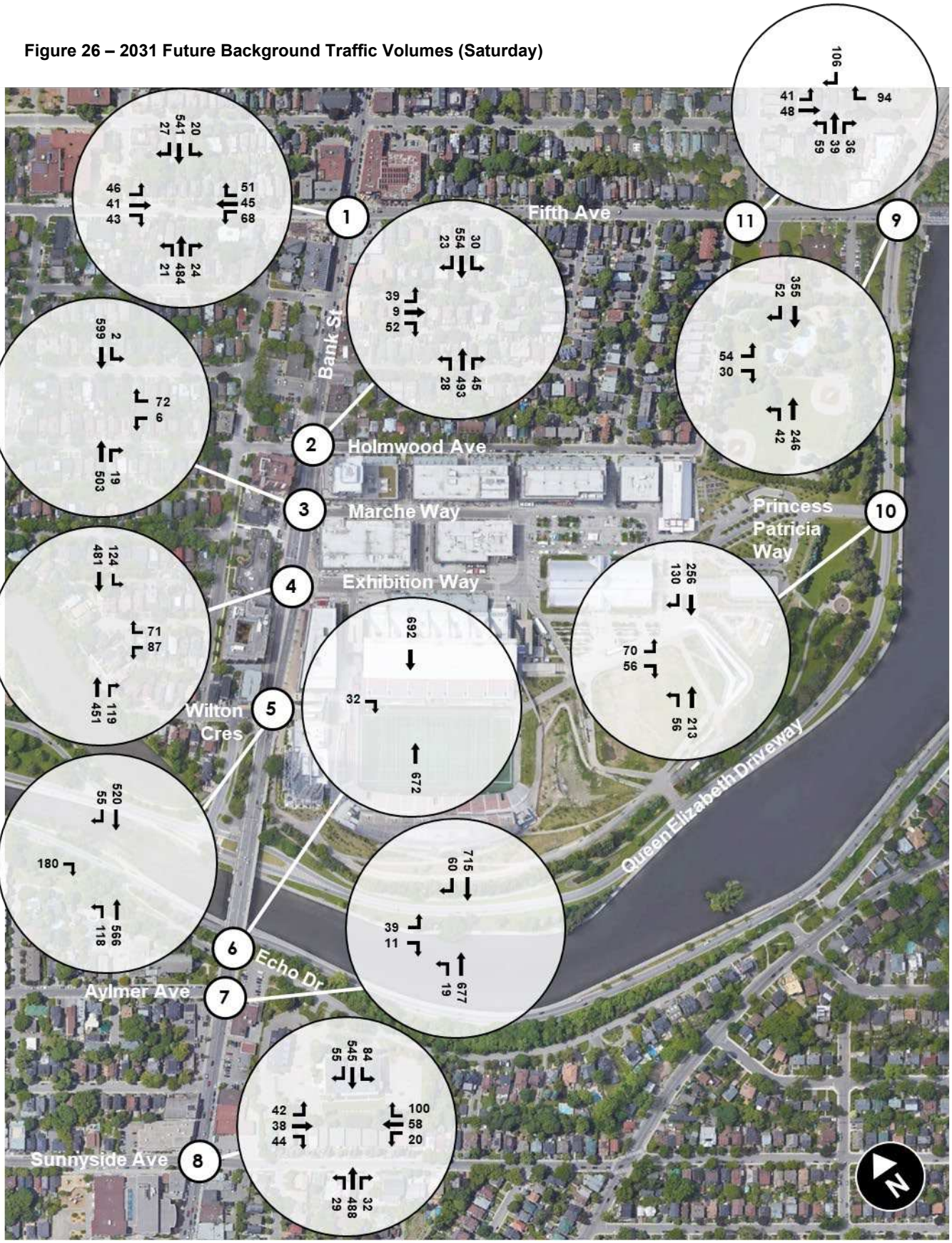
Figure 26 illustrates 2031 Future Background traffic volumes for the Weekend Saturday peak hour.

Figure 25 – 2031 Future Background Traffic Volumes (Weekday AM / PM)



2031 Future Background Traffic Volumes (Weekday AM and PM Peak Hour)
AM Peak Hour (PM Peak Hour)

Figure 26 – 2031 Future Background Traffic Volumes (Saturday)



2031 Future Background Traffic Volumes (Weekend Saturday Peak Hour)

3.3.2 2031 Total Future Traffic Volumes

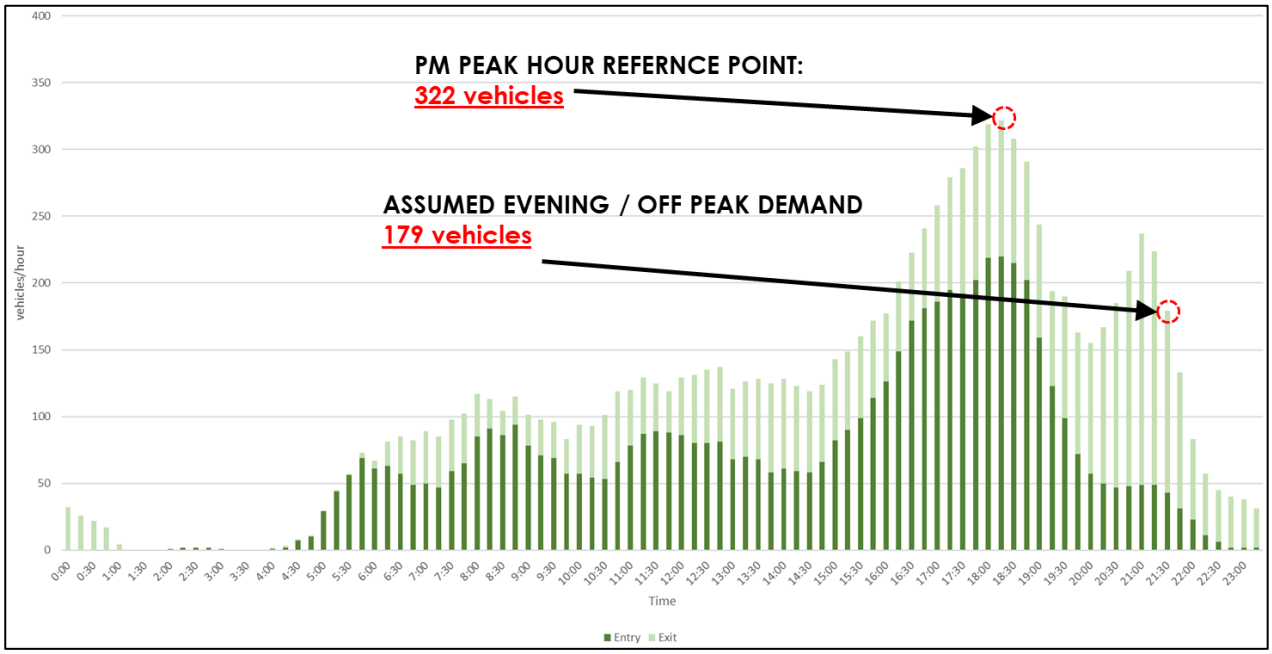
2031 Total Future traffic volumes represent the future transportation demands on the roadway network under the full build-out of Lansdowne 2.0. Total Future traffic conditions were derived by adding 2031 Future Background volumes to Lansdowne 2.0 site generated trips.

2031 Total Future traffic volumes were also developed for the Minor Event and Major Event scenarios at Lansdowne. As both events occurred on a Weekday, the Lansdowne 2.0 Weekday PM peak hour site generated traffic volumes were added to the Minor and Major Event traffic volumes. As event Ingress (i.e. arrival to Lansdowne prior to the start of the event) occurs in the late afternoon, the Lansdowne 2.0 site generated traffic volumes for the PM peak hour were added with no adjustments.

As event Egress (i.e. departure from Lansdowne after the conclusion of the event) occurs later in the evening, a portion of the Lansdowne 2.0 Weekday PM peak hour site generated traffic volumes were added to forecast Egress demands in the future as part of the Lansdowne 2.0 site. To estimate Lansdowne 2.0 site generated traffic demands in the evening, existing parking data for the underground parking facility at Lansdowne was obtained for May 3, 2022. The parking data was analyzed to determine the proportion of site trips that occurs later in the evening.

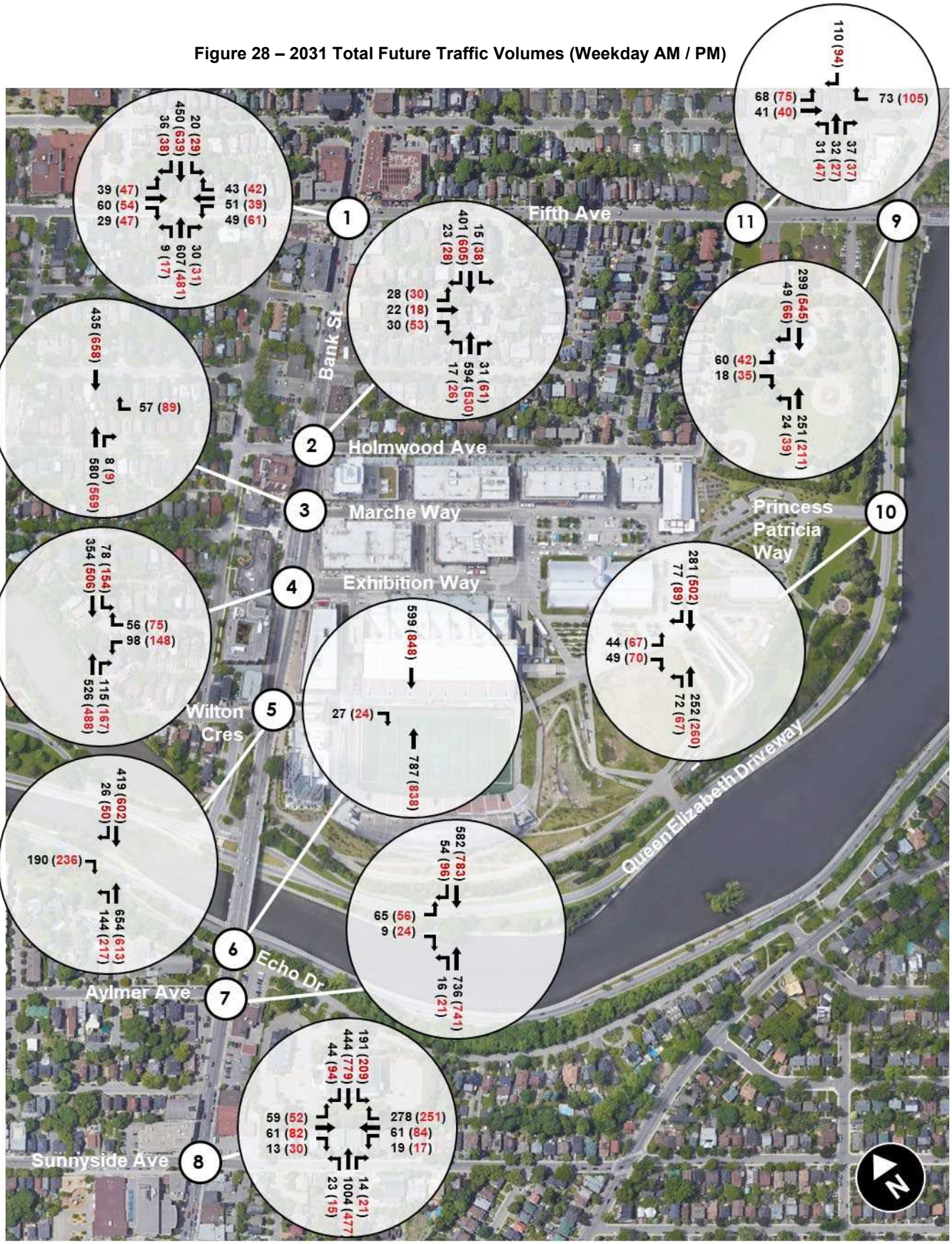
As illustrated in **Figure 27**, the day-to-day site activity at Lansdowne later in the evening (i.e. 9:30 PM to 10:30 PM) is approximately 55% of peak activity that occurs during the PM peal hour. Based on this, 55% of the Lansdowne 2.0 Weekday PM peak hour site generated traffic volumes were added to the Minor and Major Event Egress volumes.

Figure 27 – Lansdowne Weekday Parking Activity (May 3, 2022)



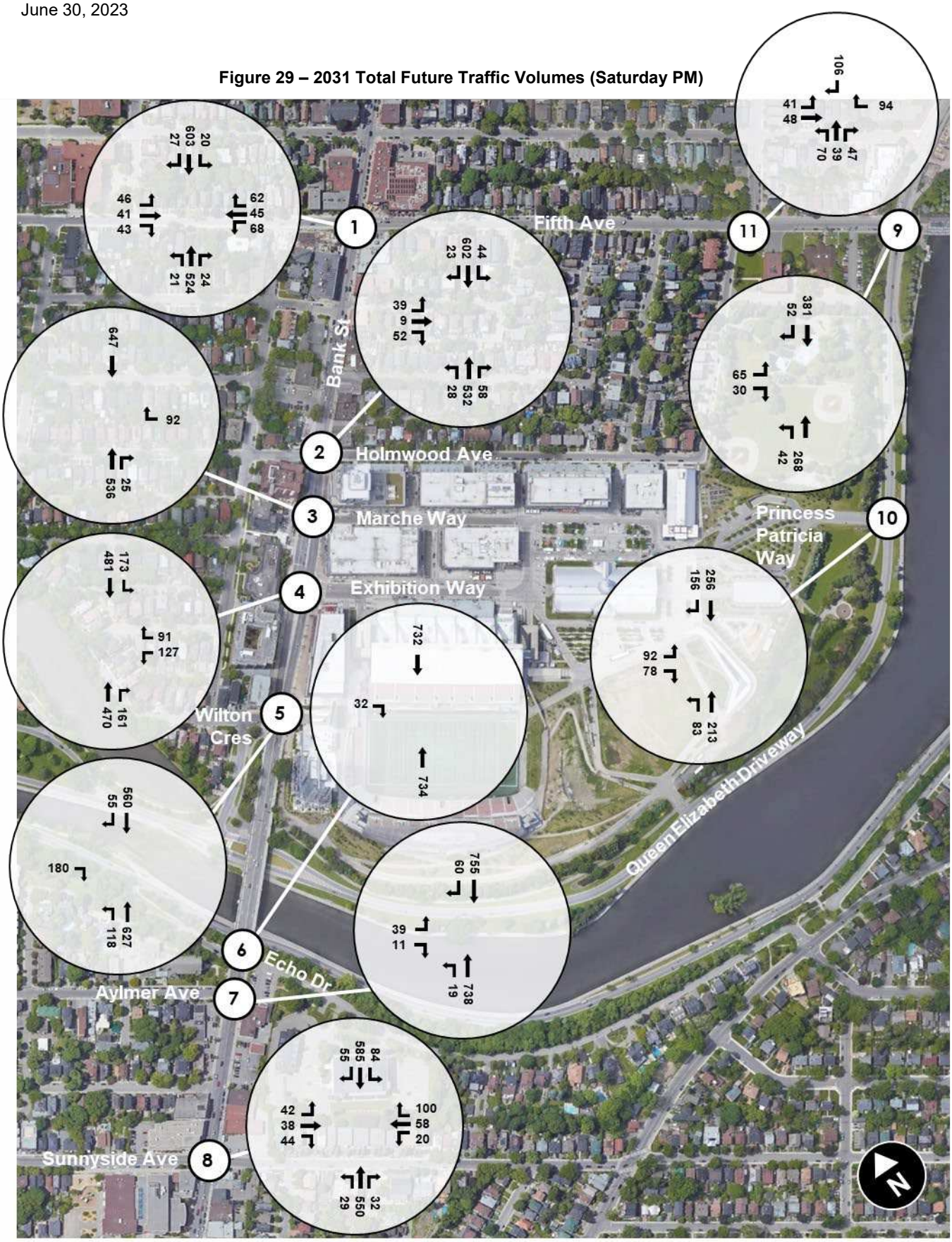
2031 Total Future traffic volumes under Weekday AM, Weekday PM, Weekend Saturday, as well as for both Minor and Major events are summarized in **Figure 28** through **Figure 31**.

Figure 28 – 2031 Total Future Traffic Volumes (Weekday AM / PM)



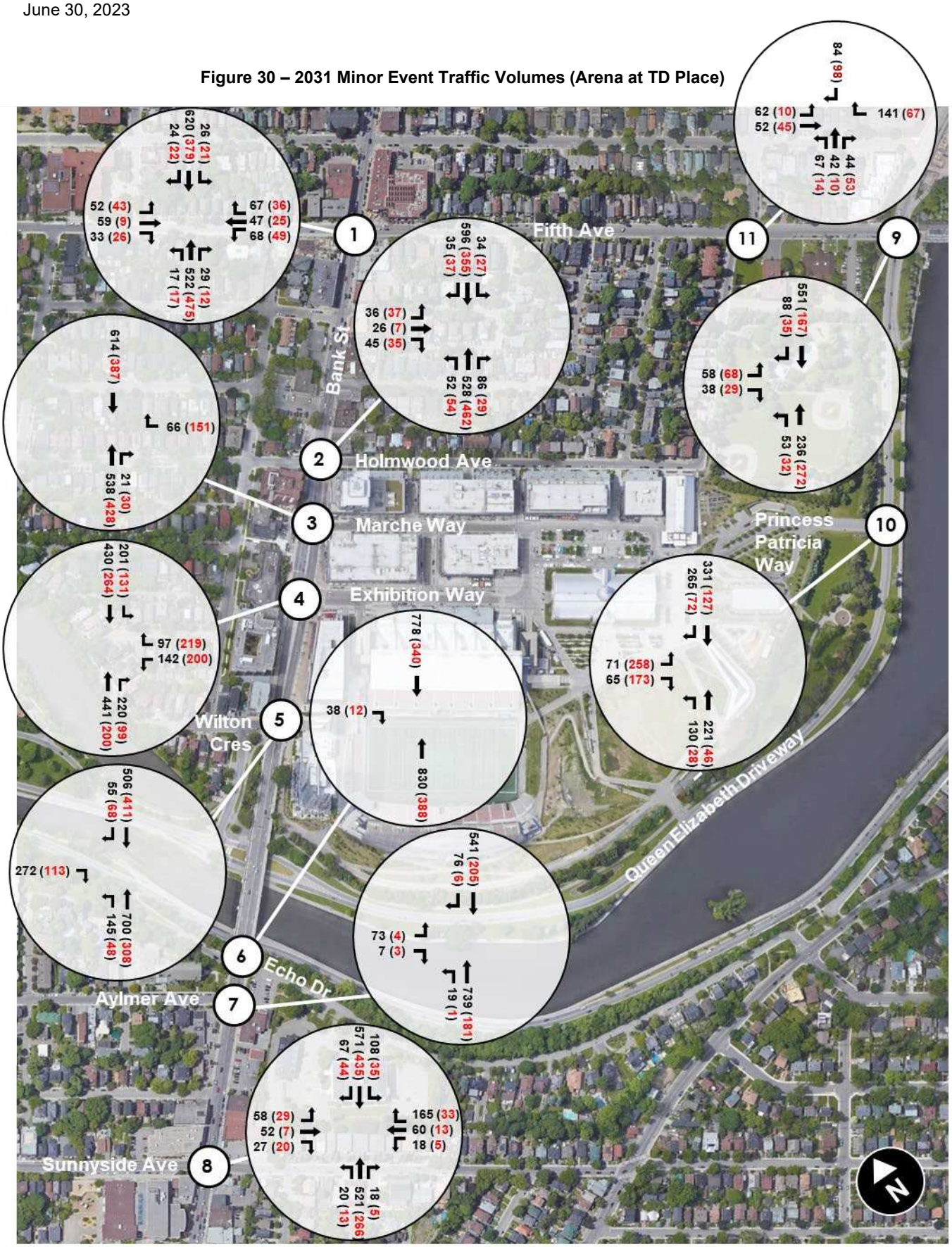
2031 Total Future Traffic Volumes (Weekday AM and PM Peak Hour)
AM Peak Hour (PM Peak Hour)

Figure 29 – 2031 Total Future Traffic Volumes (Saturday PM)



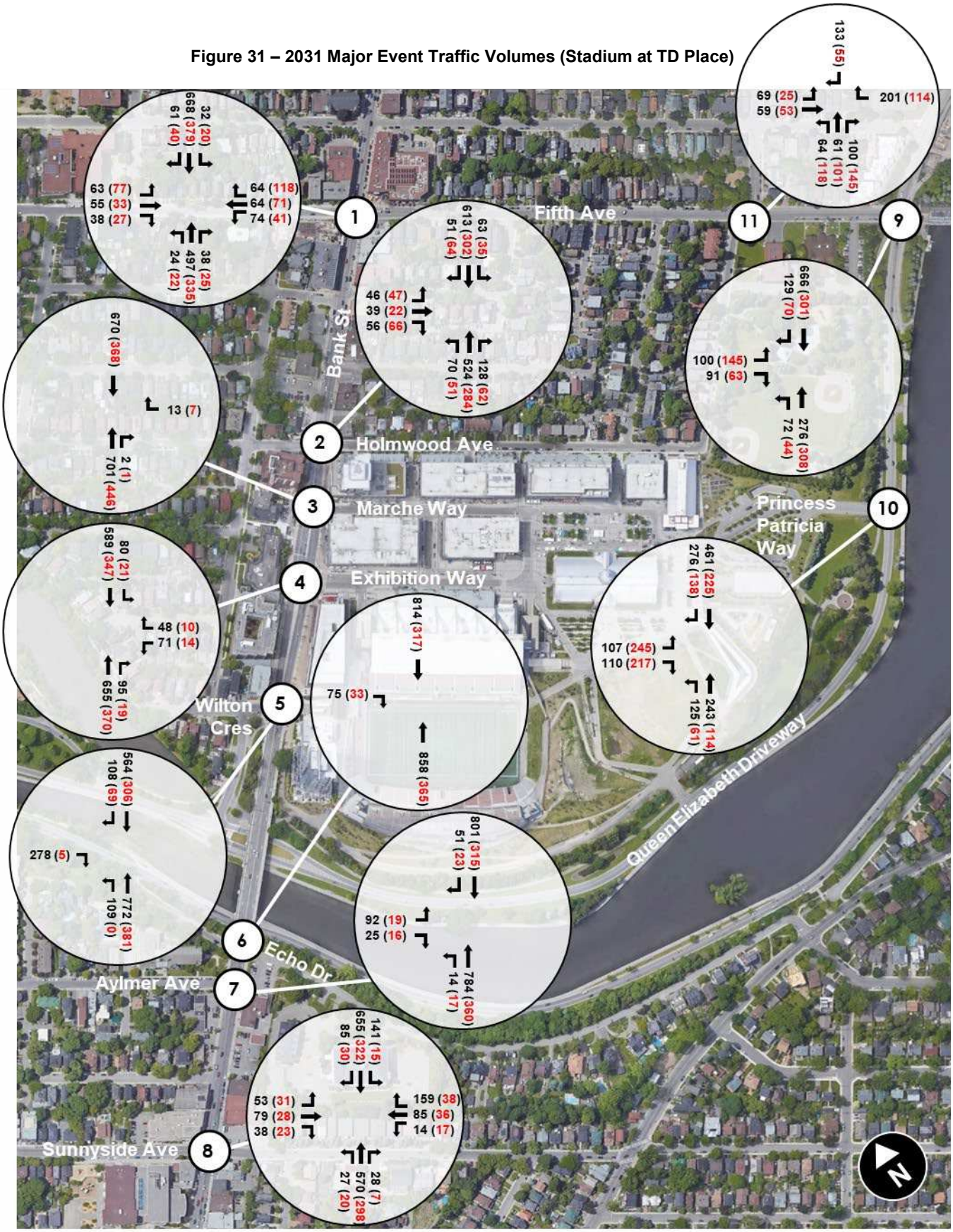
2031 Total Future Traffic Volumes (Weekend Saturday Peak Hour)

Figure 30 – 2031 Minor Event Traffic Volumes (Arena at TD Place)



2031 Minor Event Traffic Volumes (Arena at TD Place)
Ingress Peak Hour (Egress Peak Hour)

Figure 31 – 2031 Major Event Traffic Volumes (Stadium at TD Place)



2031 Major Event Traffic Volumes (Stadium at TD Place)
Ingress Peak Hour (Egress Peak Hour)

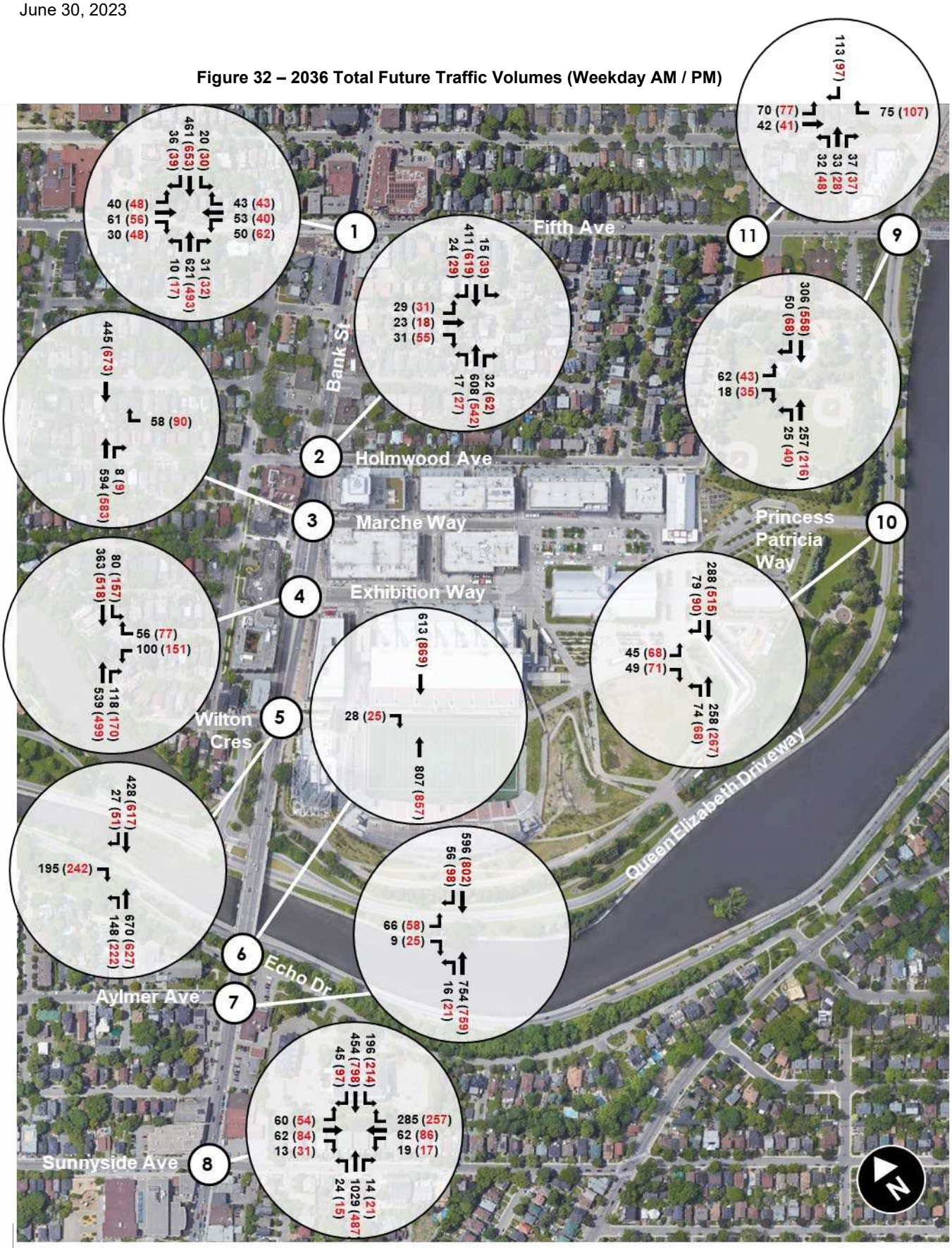
3.3.3 2036 Total Future Traffic Volumes

2036 Total Future traffic volumes were developed to forecast operating conditions 5 years after the anticipated full build-out and operations of Lansdowne 2.0.

Similar to 2031 conditions, 2036 Total Future traffic volumes were derived by applying an assumed background growth rate of 0.5% per year to existing traffic volumes. Additionally, explicit background development traffic, as well as the Lansdowne 2.0 site generated traffic volumes were added.

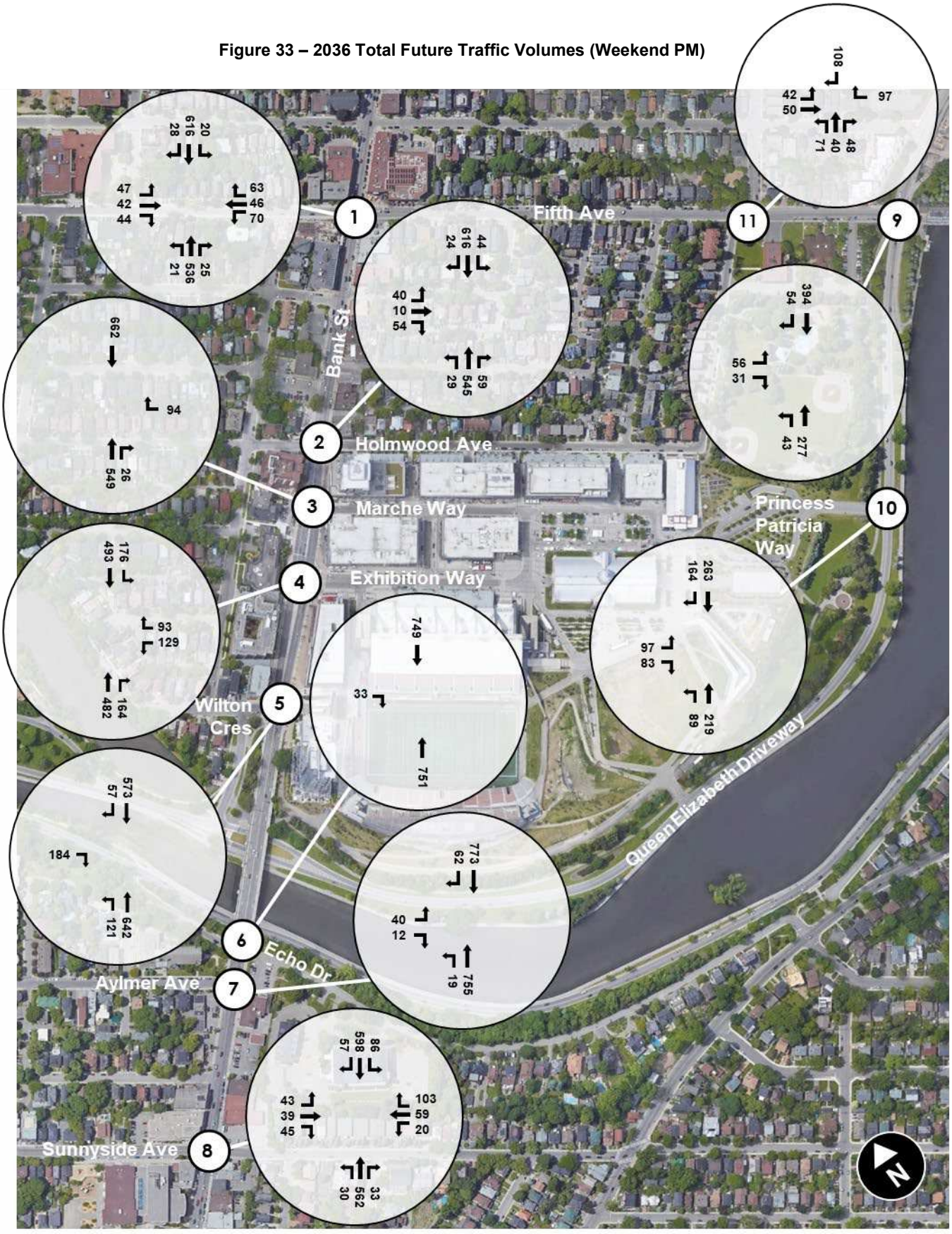
2036 Total Future traffic volumes under Weekday AM, Weekday PM, Weekend Saturday, as well as for both Minor and Major events are summarized in **Figure 32** through **Figure 35**.

Figure 32 – 2036 Total Future Traffic Volumes (Weekday AM / PM)



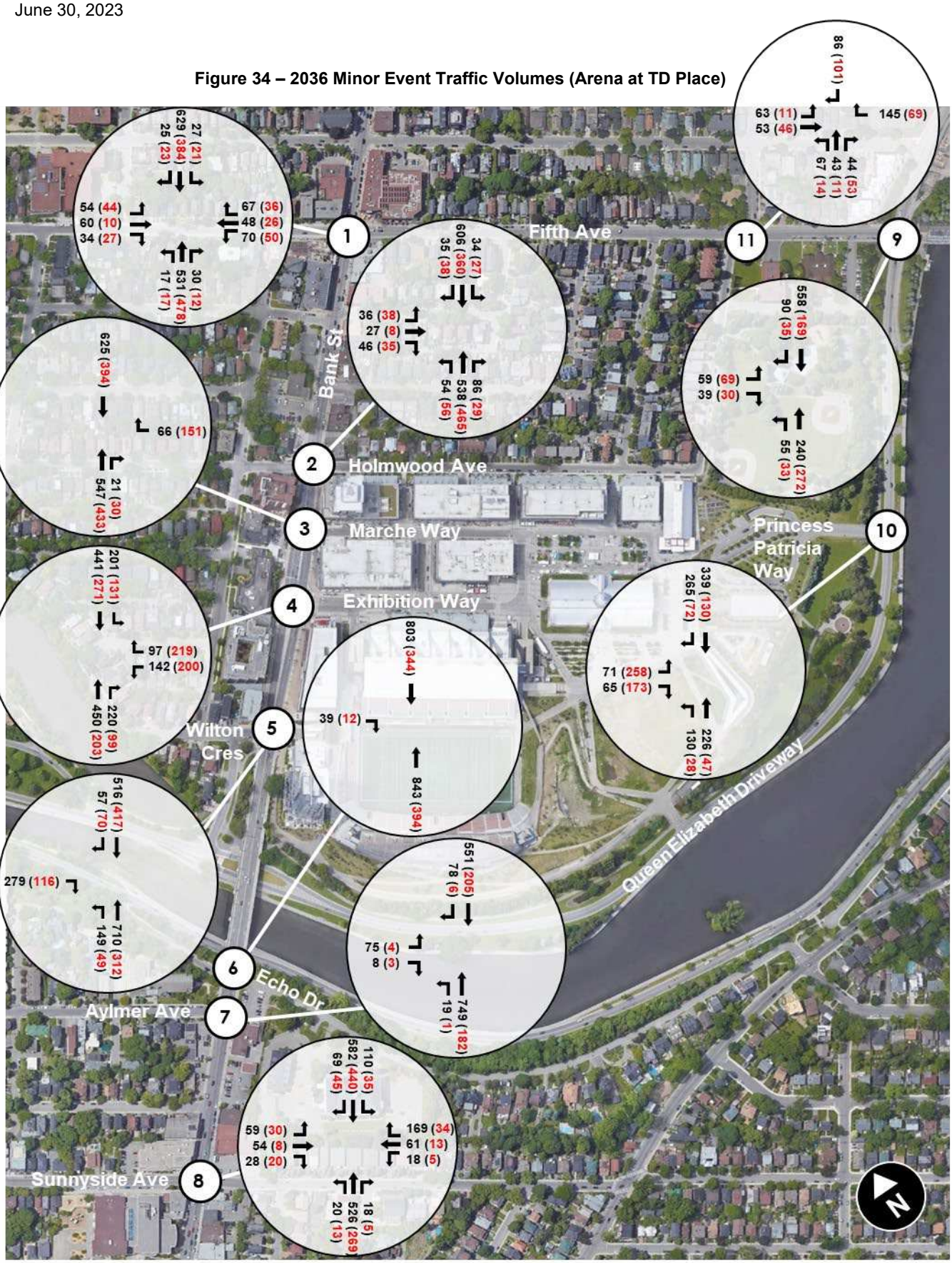
2036 Total Future Traffic Volumes (Weekday AM and PM Peak Hour)
AM Peak Hour (PM Peak Hour)

Figure 33 – 2036 Total Future Traffic Volumes (Weekend PM)



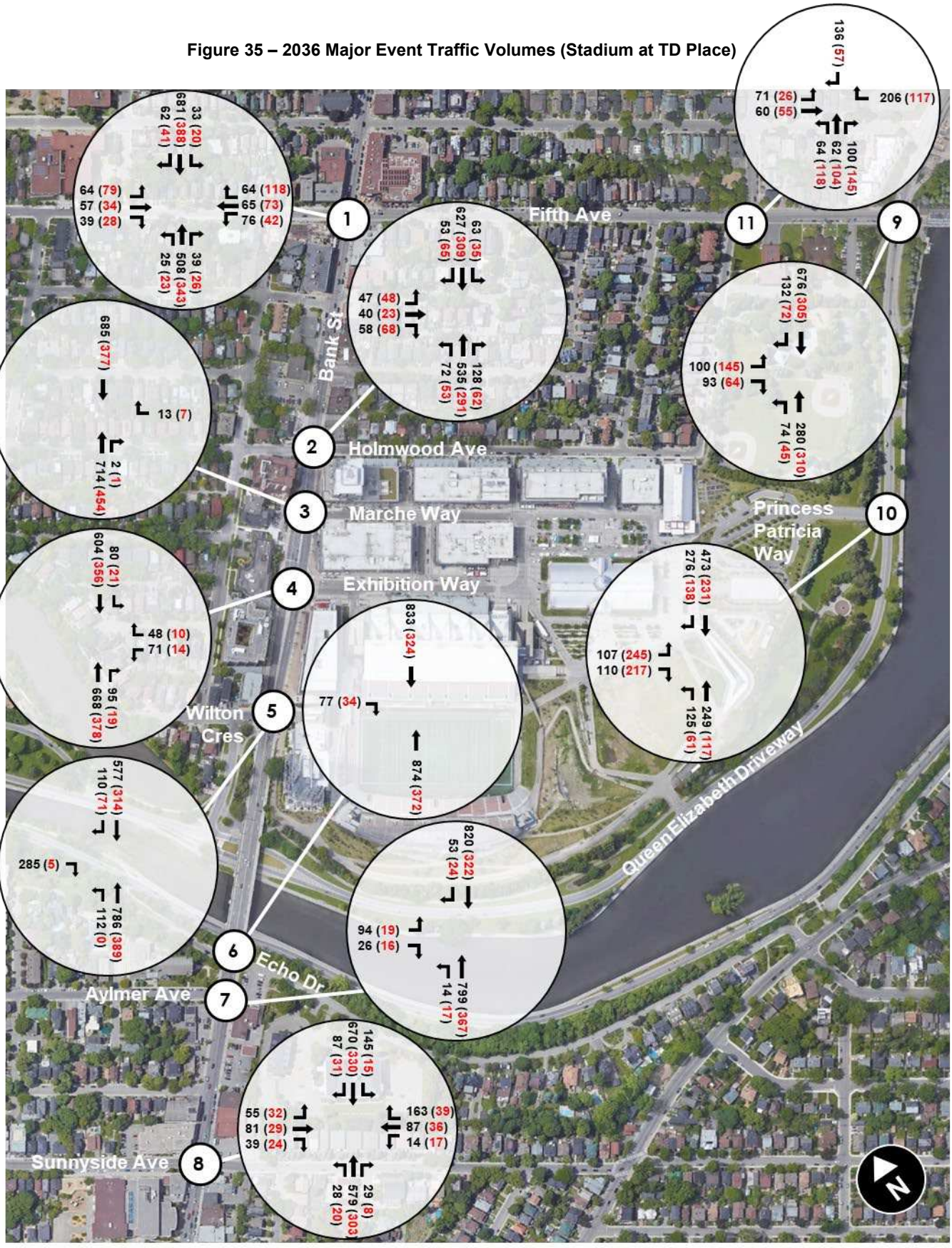
2036 Total Future Traffic Volumes (Weekend Saturday Peak Hour)

Figure 34 – 2036 Minor Event Traffic Volumes (Arena at TD Place)



2036 Minor Event Traffic Volumes (Arena at TD Place)
Ingress Peak Hour (Egress Peak Hour)

Figure 35 – 2036 Major Event Traffic Volumes (Stadium at TD Place)



2036 Major Event Traffic Volumes (Stadium at TD Place)
Ingress Peak Hour (Egress Peak Hour)

4.0 STRATEGY REPORT

4.1 DEVELOPMENT DESIGN

4.1.1 Design for Sustainable Modes

Bicycle facilities: Lansdowne is designed to accommodate cycling connectivity throughout the site. Many of the internal pathways, particularly Exhibition Way, Marche Way, and Princess Patricia Way, are designed as Pedestrian Priority Zones. Cycling access points are currently to Lansdowne are provided at Bank Street at Exhibition Way and Marche Way, as well as three cycling connections to internal pathways on Holmwood Avenue. On the east and south side of Lansdowne, connections to the multi-use pathways on Queen Elizabeth Driveway are provided at numerous locations. Improved cycling crossing facilities are currently contemplated at the Queen Elizabeth Driveway and Princess Patricia Way site access intersection to Lansdowne. Surface bicycle parking is provided throughout the public realm at Lansdowne. In addition, for major events held on site (such as RedBlacks games), free valet bike parking storage is provided.

Pedestrian facilities: Lansdowne is designed to accommodate pedestrian movements throughout the site. Many of the internal pathways, particularly Exhibition Way, Marche Way, and Princess Patricia Way, are designed as Pedestrian Priority Zones. In recent years, the section of Princess Patricia Way between Exhibition Way and Marche Way (along the north side of the Aberdeen Pavilion) has been fully closed to vehicular traffic to better accommodate pedestrian flow. Pedestrian access points are currently to Lansdowne with pedestrian connections to Bank Street at Exhibition Way and Marche Way, as well as three pedestrian connections to sidewalks on Holmwood Avenue. On the east and south side of Lansdowne, pedestrian connections to the multi-use pathways on Queen Elizabeth Driveway are provided at numerous locations. Improved sidewalk and crossing facilities are currently contemplated at the Queen Elizabeth Driveway and Princess Patricia Way site access intersection to Lansdowne.

Parking areas: Lansdowne currently features an underground parking garage with a total of 1,380 spaces for public and residential use. As part of the Lansdowne 2.0 project, the underground parking garage is proposed to be expanded to include an additional 739 underground parking spaces dedicated only to support the residential units, for a total of 2,119 parking spaces. Similar to today, access to the underground parking garage will be provided through two garage ramp entrances: one on Exhibition Way east of Bank Street, the other on Princess Patricia Way west of Queen Elizabeth Driveway. A residents-only private access to the underground garage is also available on Holmwood Avenue.

Transit facilities: Transit stops for OC Transpo routes 6 and 7 are currently serviced by stops located at the intersection of Bank Street and Exhibition Way. In addition, these bus stops accommodate 450-series enhanced transit service during Major Events held at Lansdowne. There are sidewalks along both sides of Bank Street as well as adequate pedestrian crosswalks to access the transit stops.

4.1.2 Circulation and Access

Site access and circulation at Lansdowne is expected to continue to be provided at the existing site access intersections on Bank Street and QED for general public access, as well as Holmwood Avenue at the restricted, residents-only underground garage access.

This Transportation Impact Assessment assumes that access to Lansdowne will continue to be generally provided at both Bank Street and QED. It is acknowledged that QED is a federal parkway under the jurisdiction of the NCC Irrespective of Lansdowne 2.0, QED is an integral part of the city's transportation network and plays a crucial role in supporting a balanced, safe and efficient access program to Lansdowne, particularly during major events. It is assumed that the QED will generally remain as a viable secondary vehicular access point to Lansdowne. Should this assumption change, the integrity of the Lansdowne 2.0 program, and likely current Lansdowne operations, would be severely compromised from a transportation perspective.

4.1.3 New Street Networks

Not applicable; exempted during screening and scoping.

4.2 PARKING

4.2.1 Parking Supply

Auto Parking - Lansdowne currently features an underground parking garage with a total of 1,380 spaces for public and residential use. As part of the Lansdowne 2.0 project, the underground parking garage is proposed to be expanded to include an additional 739 underground parking spaces dedicated only to support the residential units, for a total of 2,119 parking spaces. Similar to today, access to the underground parking garage will be provided through two garage ramp entrances: one on Exhibition Way east of Bank Street, the other on Princess Patricia Way west of Queen Elizabeth Driveway.

Bicycle Parking - Additional bicycle parking spaces are required to support the development at Lansdowne. Based on the City of Ottawa Parking By-Law (Section 111 – Bicycle Parking Space Rates and Provisions), 600 bicycle parking spaces are required to support the additional multi-family residential units. The Lansdowne 2.0 Concept Plan currently accounts for bike storage facilities as part of the expanded underground parking garage. The total number and allocation of bicycle parking spaces will be finalized in subsequent phases of site design.

4.2.2 Spillover Parking

Not applicable.

4.3 BOUNDARY STREET DESIGN

4.3.1 Design Concept

Lansdowne is located in a unique geographic location within the City of Ottawa as it interfaces with Bank Street - a traditional Mainstreet to the west, Holmwood Avenue – a local residential street to the north, and the Queen Elizabeth Driveway – a scenic parkway with regional multi-use pathways. A Multimodal Level of Service (MMLOS) analysis was conducted for the following key roadway segments interfacing with Lansdowne:

Segment 1 – Bank Street North (Fifth Avenue to Holmwood Avenue)
Segment 2 – Bank Street at Lansdowne (Holmwood Avenue to Wilton Crescent)
Segment 3 – Bank Street Bridge (Wilton Crescent to Aylmer Avenue)
Segment 4 – Bank Street South (Aylmer Avenue to Sunnyside Avenue)
Segment 5 – Holmwood Avenue (Bank Street to O'Connor Street)
Segment 6 – QED North (Fifth Avenue to Fourth Avenue)
Segment 7 – QED at Lansdowne (Fifth Avenue to Princess Patricia Way)
Segment 8 – QED South (South of Princess Patricia Way)
Segment 9 – Fifth Avenue (Bank Street to QED)
Segment 10 – O'Connor Street (Holmwood Avenue to Fifth Avenue)

Figure 36 illustrates location of the MMLOS segments assessed.

Figure 36 – Study Area MMLOS Segments

Study Area MMLOS Segments

4.3.1.1 Existing Conditions Multi-Modal Level of Service (MMLOS)

As per the City of Ottawa Official Plan (Schedule A), Lansdowne falls within the Inner Urban Transect Policy Area, with Bank Street identified as a Mainstreet Corridor. For the purposes of the MMLOS analysis, the following designations were adopted from the Multi-Modal Level of Service (MMLOS) Guidelines:

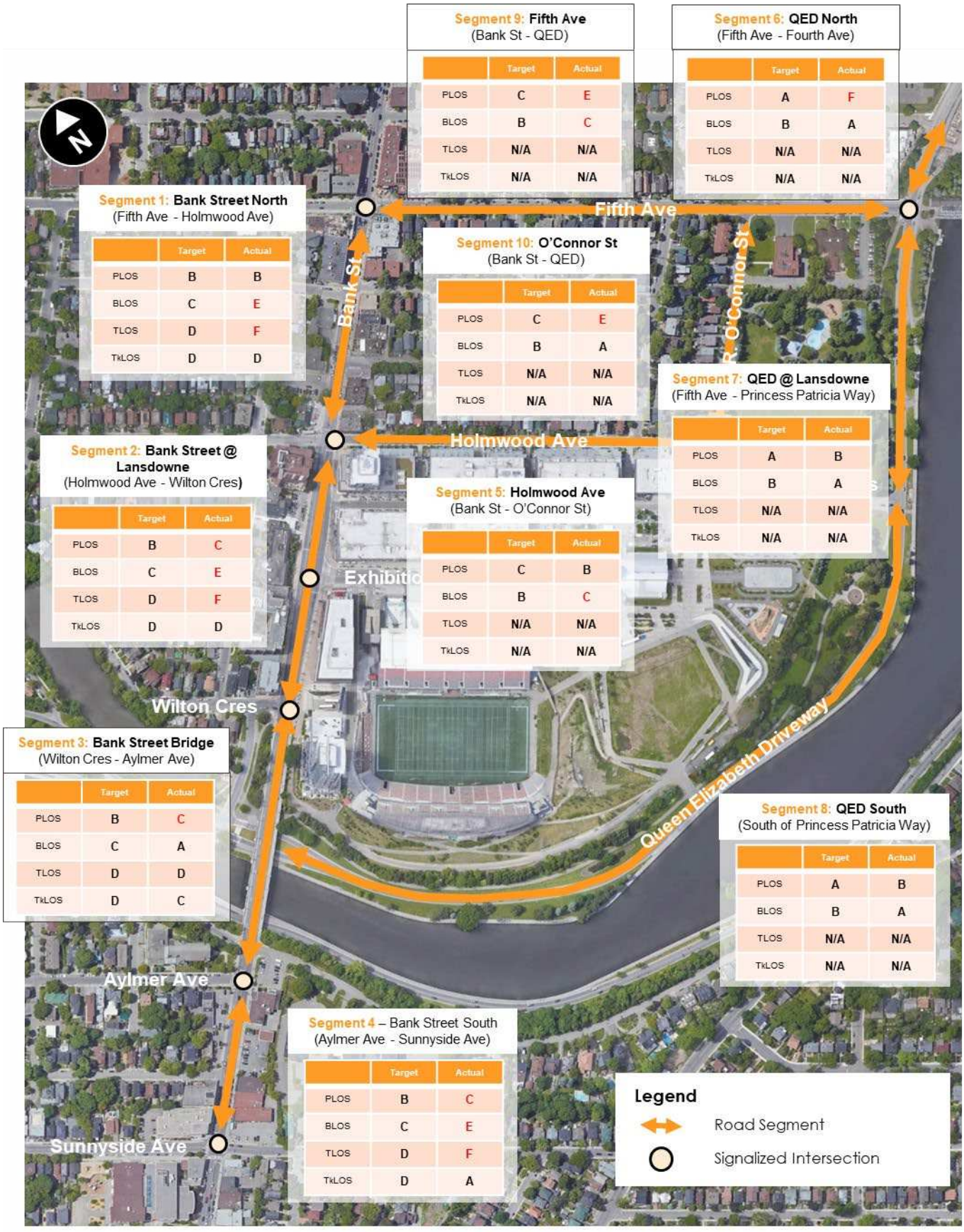
- Bank Street is classified as an Arterial road with a Traditional Main Street designation. The following MMLOS targets were assumed for Bank Street:
    - Pedestrian Level of Service (PLOS) target of B
    - Bicycle Level of Service (BLOS) target of C based on a Local Route designation
    - Transit Level of Service (TLOS) target of D
    - Truck Level of Service (TkLOS) target of D
    - Auto Level of Service (LOS) of D
- Holmwood Avenue is classified as a Local road with a General Urban Area designation. The following MMLOS targets were assumed for Holmwood Avenue:
    - Pedestrian Level of Service (PLOS) target of C
    - Bicycle Level of Service (BLOS) target of B based on a Local Route designation
    - No Transit Level of Service (TLOS) target is defined for Holmwood as it is not a transit route.
    - No Truck Level of Service (TkLOS) target is defined for Holmwood based on the designation.
    - Auto Level of Service (LOS) of D
- Queen Elizabeth Driveway is classified as an Arterial with a General Urban Area designation. The following MMLOS targets were assumed for Queen Elizabeth Driveway:
    - Pedestrian Level of Service (PLOS) target of A
    - Bicycle Level of Service (BLOS) target of B based on a Local Route designation
    - No Transit Level of Service (TLOS) target is defined for QED as it is not a transit route.
    - No Truck Level of Service (TkLOS) was adopted as QED is not a truck route.
    - Auto Level of Service (LOS) of D
- Fifth Avenue is classified as a Collector road with a General Urban Area designation. The following MMLOS targets were assumed for Fifth Avenue:
    - Pedestrian Level of Service (PLOS) target of C
    - Bicycle Level of Service (BLOS) target of B based on a Local Route designation
    - No Transit Level of Service (TLOS) target is defined for Fifth Avenue as it is not a transit route.
    - No Truck Level of Service (TkLOS) target is defined for Fifth Avenue based on the designation.
    - Auto Level of Service (LOS) of D

- O'Connor Street is classified as a Local Road with a General Urban Area designation. The following MMLOS targets were assumed for O'Connor Street:
    - Pedestrian Level of Service (PLOS) target of C
    - Bicycle Level of Service (BLOS) target of B based on a Local Route designation
    - No Transit Level of Service (TLOS) target is defined for O'Connor within the vicinity of Lansdowne.
    - No Truck Level of Service (TkLOS) target is defined for Holmwood based on the designation.
    - Auto Level of Service (LOS) of D

Figure 37 summarizes the MMLOS results for segments under Existing Conditions. Some context is provided for those areas where the target is not being met below.

Appendix C contains the detailed MMLOS analysis.

Figure 37 – Existing Conditions MMLOS Targets and Results (Segments)



Existing Conditions MMLOS Targets and Results (Segments)

Bank Street:

The PLOS target of B along Bank Street, across the frontage of Lansdowne, is currently being met on the east side of the road segment. On the west side of Bank Street, however, the target is not met due to the boulevard widths. As a whole segment, Bank Street, across the frontage of Lansdowne, does not meet the PLOS target.

The BLOS target of C along Bank Street, across the frontage of Lansdowne, is currently met in the northbound travel direction as there is a curbside bike lane. However, in the southbound travel direction there is no dedicated bicycling facility. As a whole segment, Bank Street, across the frontage of Lansdown, does not meet the BLOS target.

This BLOS target of C is not currently being met north of Wilton Crescent and south of Aylmer Avenue due to the number of vehicle lanes and lack of bicycling facilities. The BLOS target of C is, however, met over the Bank Street Bridge, between Wilton Crescent and Aylmer Avenue, due to the recently installed bicycle facilities. In order to improve the BLOS on Bank Street, improved bicycling facilities would be required.

The TLOS target of D along Bank Street, across the frontage of Lansdowne, is currently not being met due to the mixed operating condition of transit along the corridor and resulting congestion related delays. To improve the TLOS along Bank Street, improved transit priority measures can be implemented to limit delays to transit along the corridor.

Holmwood Avenue:

The BLOS target of B along Holmwood Avenue is currently being met on the southside of the road segment. However, the north side has a BLOS C due to the narrow bicycle lane width. Therefore, as a whole segment, Holmwood Avenue does not meet the BLOS target of B.

Queen Elizabeth Driveway:

The PLOS target of A along Queen Elizabeth Driveway is met for the sections south of Fifth Avenue which utilizes the multi-use pathway. North of Fifth Avenue, however, the PLOS is F because of the lack of a proper sidewalk on the west side of the corridor. It was noted, however, that there is an alternative sidewalk that is adjacent to the recent development at the Northwest corner of the intersection.

The BLOS target of B along Queen Elizabeth Driveway is currently being met due to the provision of a multi-use pathways along the Rideau Canal. It is notable however that this facility is shared with other AT users which can impact the quality of the service in practice and may put some of the higher speed cyclists into the traffic lane, especially during busy times.

Fifth Avenue:

The PLOS target of C along Fifth Avenue is currently not being met due to the sidewalk width, lack of buffer from traffic, and vehicle operating speeds.

The BLOS target of B is currently met on Fifth Avenue between Bank Street and O'Connor Street. However, this target is not met between O'Connor Street and Queen Elizabeth Driveway due to the narrow bike lane widths. As a whole, Fifth Avenue does not currently meet the BLOS target of B.

O'Connor Street:
The PLOS target of C along O'Connor Street is currently not being met due to the sidewalk widths and lack of buffer from traffic. In order to meet the PLOS target, wider sidewalks and/or boulevard buffers are needed on both sides of O'Connor Street.

The BLOS target of B along O'Connor Street is currently being met as the segment scores an LOS A in both directions of travel. It is to be noted, however, that while the southbound bike lane is separated from vehicle traffic, it traverses several residential driveways. This presents potential conflicting movements that are not reflected in the segment's BLOS.

4.3.1.2 Future Conditions Multi-Modal Level of Service (MMLOS)

The City of Ottawa is initiating an Active Transportation and Transit Operations Feasibility for Bank Street to improve transit efficiency and walkability along the corridor. The proposed improvements on Bank Street have not been identified and as a result no improvements have been assumed and carried forward as part of the MMLOS analysis for the future condition.

Figure 38 summarizes the MMLOS results for segments under Future Conditions.

Bank Street:

Should the existing pedestrian facilities be maintained into the future, The PLOS target of B along Bank Street, across the frontage of Lansdowne, is projected to continue to be met on the east side of the road segment. To improve the segment's overall PLOS, wider boulevard buffers should be considered on the west side of the corridor.

Should the existing roadway cross-section be maintained into the future, the BLOS target of C along Bank Street across the frontage of Lansdowne will not be met. In order to improve the BLOS on Bank Street, improved bicycling facilities would be required, which considering the complicated high capacity environment of Bank Street will be a complex exercise. Opportunities to implement on-street bike lanes on Bank Street will be explored as part of the forthcoming Bank Street Active Transportation and Transit Operations Feasibility Study.

Should the existing roadway cross-section be maintained into the future, the TLOS target of D along Bank Street across the frontage of Lansdowne will not be met. In order to improve the TLOS on Bank Street, enhanced transit priority measures would be required, either through lane designation of transit signals. Opportunities to implement transit improvements on Bank Street will be explored as part of the forthcoming Bank Street Active Transportation and Transit Operations Feasibility Study.

The TkLOS target of D is projected to continue to be met along the Bank Street Corridor in the future.

Holmwood Avenue:

The BLOS target of B along Holmwood Avenue, is projected to continue being met in the future along the south side of the segment. To improve the BLOS along the north side of the road segment, improvements to existing bicycling facilities, this would be most easily achieved through the expansion of the lane width, although increased protection would be a benefit.

Queen Elizabeth Driveway:

The PLOS along Queen Elizabeth Driveway is projected to continue being met in the future south of Fifth Avenue. To improve the PLOS north of Fifth Avenue, the installation of a sidewalk and a boulevard on the west side of the corridor may be required, although may not be strictly necessary in this context.

Fifth Avenue:

Assuming no improvements occurs on Fifth Avenue in the future, the PLOS target of C along Fifth Avenue is projected to not being met. In order to meet the PLOS target, wider sidewalks on both sides of Fifth Avenue would provide the highest quality increase in condition to users.

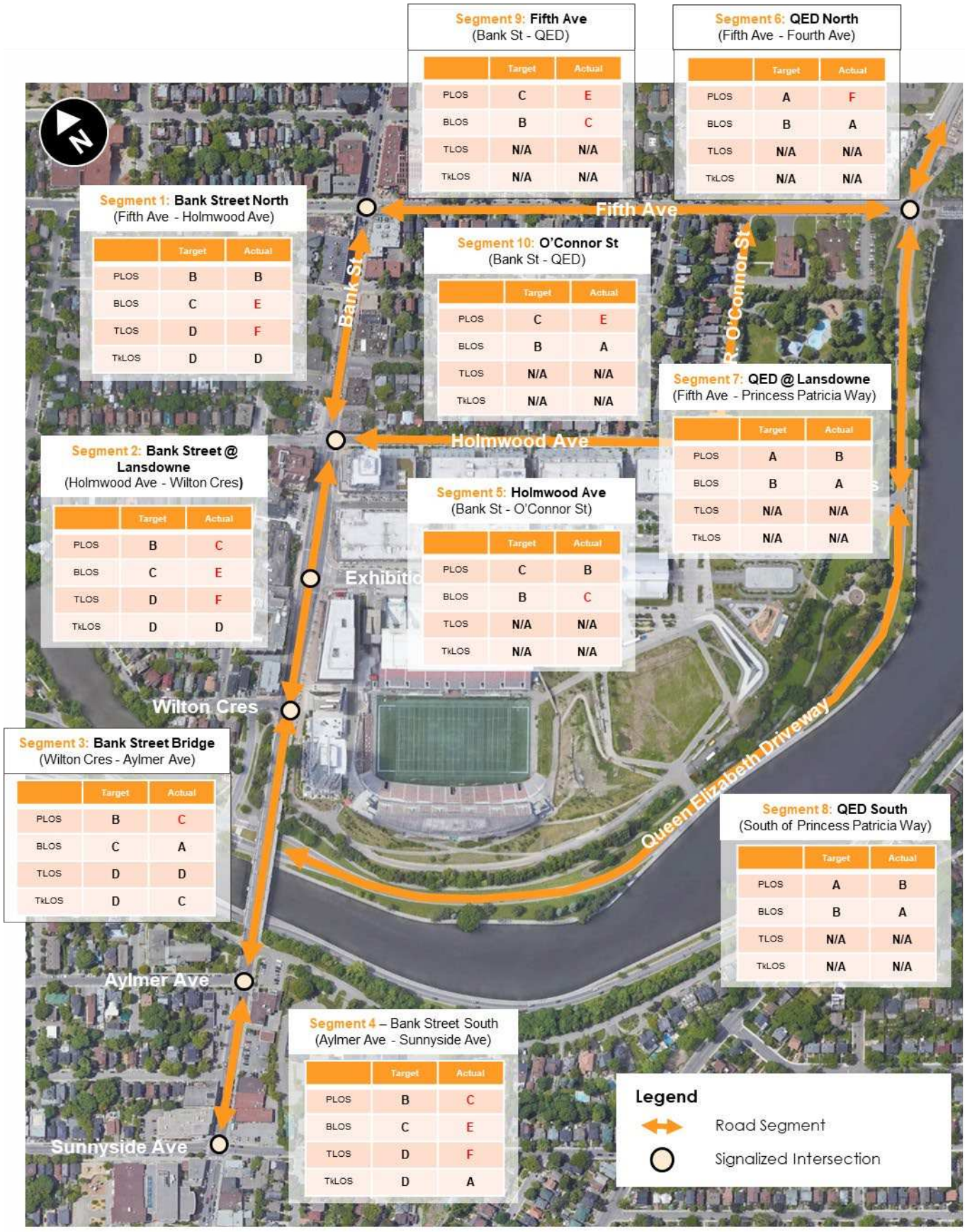
The BLOS target of B along Fifth Avenue, is projected to continue being met between Bank Street and O'Connor Street. In order for the subsegment between O'Connor Street and Queen Elizabeth Driveway to meet the BLOS target, improvements to the bicycling facilities width would be required. As part of this, this segment may benefit from redistribution of the lanes to consider putting the bike lane behind the parked cars.

O'Connor Street:

Should the existing roadway cross-section be maintained into the future on O'Connor Street, it is projected that the PLOS target of C will not be met due to sidewalk and boulevard widths. In order to meet the PLOS target, wider sidewalks and/or boulevard buffers are needed on both sides of O'Connor St.

While the BLOS target of B along O'Connor is projected to continue being met and/or exceeded, safety improvements can be considered for cyclists that travel past existing residential driveways, and some consideration for the design of the intersection of Fifth Ave could be considered.

Figure 38 – Future Conditions MMLOS Targets and Results (Segments)



Future Conditions MMLOS Targets and Results (Segments)

4.4 ACCESS INTERSECTION DESIGN

4.4.1 Access Location

Access to Lansdowne will continue to be facilitated at three key locations: a primary all-movements access at the intersection of Bank Street / Exhibition Way, a secondary all-movements access at Queen Elizabeth Driveway and Princess Patricia Way, and a minor right-in/right-out only access on Bank Street and Marche Way.

Access to the underground parking garage will continue to occur at the two garage ramps on Exhibition Way (east of Bank Street), and Princess Patricia Way (west of Queen Elizabeth Driveway).

4.4.2 Intersection Control

The primary Bank Street / Exhibition Way intersection access is signalized and accommodates all-movements. The secondary Queen Elizabeth Driveway / Princess Patricia Way intersection access is Stop-Controlled on the minor approach. The minor Bank Street / Marche Way intersection is a right-in/right-out only intersection with a Stop-Control on the minor approach.

4.5 TRANSPORTATION DEMAND MANGEMENT

4.5.1 Context for TDM Measures

The initial Lansdowne Redevelopment project featured a comprehensive Transportation Demand Management (TDM) strategy to address day-to-day and special event transportation requirements. The Transportation Demand Management Plan (October 2011) for Lansdowne outlined strategies for encouraging residents, employees, and visitors to Lansdowne to utilize transit and active transportation modes to reduce reliance on single occupant vehicles (SOV) and automobile use. The plan included recommendations for both day-to-day operations (residents, employees and retail patrons), as well as for special events with attendance levels of 10,000 patrons (arena events), 25,000 patrons (stadium events), and 40,000 plus patrons (unique, expanded stadium events).

A hallmark of the TDM plan for Lansdowne is the provision of free transit service to all ticketholders attending ticketed events at Lansdowne. This innovative TDM strategy, which is the first of its kind in North America for a large mixed-use entertainment district, provides free transit to all ticketed events starting 2 hours prior to the start of events and 2 hours after the end of events held at Lansdowne. The cost of any enhanced transit service provided for events with attendance levels of 5,000 or more are bourn by OSEG.

Appendix D includes a 'Lessons Learned Report' which summarizes the transportation experience for the initial phase of the Lansdowne redevelopment project.

4.5.2 Need and Opportunity

The mode shares for the Multi-Family Residential portion of the proposed development were taken from the *TRANS Trip Generation Summary Manual*. As the Lansdowne falls within the Inner Urban Area, a transit modal share of 25% (constitutes approximately 150 to 220 additional transit trips during the peak hours).

In addition, the Muti-Family Residential component is assumed to have a 6% cycling mode share (~35 to 50 cycling trips during peak hours), and a 37% walking mode share (~230 – 325 walking trips during the peak hours).

The modal shares for the Commercial Retail portion of Lansdowne 2.0 were also taken from the *TRANS Trip Generation Summary Manual*, which assumes a transit modal share of 14% (~10 to 45 transit trips during peak hours), a cycling mode share of 4% (up to ~ 10 cycling trips during peak hours), and a walking mode share of 49% (~ 30 to 150 walking trips during peak hours)

TDM measures will be required to promote and support transit and active modes of transportation for Lansdowne 2.0.

Should the transit modal share targets for Lansdowne 2.0 not be fully realized at full build-out, the increase in two-way traffic volumes would equate to:

- AM Peak Hour: an additional 146 vehicle trips (increasing from 204 to 350 vehicles per hour)
- PM Peak Hour: an additional 140 vehicle trips (increasing from 220 to 360 vehicles per hour)
- Saturday Peak Hour: an additional 203 vehicle trips (increasing from 321 to 524 vehicles per hour)

4.5.3 TDM Program

The City of Ottawa's TDM-supportive design and infrastructure elements checklist was consulted to identify and incorporate TDM supportive measures into the design stage. An updated Transportation Demand Management Strategy for Lansdowne 2.0 was developed. The various land uses within the proposed development are planned to include specific TDM measures.

The Lansdowne 2.0 Transportation Demand Management Strategy report is included in **Appendix E**.

4.6 NEIGHBHOURHOOD TRAFFIC MANAGEMENT

Not applicable; exempted during screening and scoping.

4.7 TRANSIT

4.7.1 Route Capacity

Transit modal shares of 25% and 14% were assumed for the proposed Multi-Family Residential and Commercial Retail, respectively. This is expected to result in a peak hour net increase in transit trips of 187 trips during the Weekday AM peak hour, 181 transit trips in the Weekday PM Peak hour, and 261 transit trips in the Weekend Saturday peak hour.

Currently, OC Transpo Route 6 and Route 7 provide service along Bank Street with connections to key destinations in Ottawa. Service is provided on weekdays and weekends with an average headway of 12 minutes for each route in both directions. This translates to a total of 20 two-way transit trips on Bank Street at Lansdowne (5 trips per bus route, per direction).

The OC Transpo fleet is comprised of various bus types including 40' standard buses, higher capacity 60' articulated buses, and double-decker buses. The passenger capacity across the fleet varies between 57 to 110 passengers per bus, depending on the bus type.

A passenger carrying capacity of 85 passengers per bus was assumed for the purposes of estimating route capacity on Bank Street. Based on this, the total two-way transit capacity on Bank Street is estimated at 1,700 transit riders in the peak hour. For the purposes of estimated surplus capacity, and the ability of the existing service to accommodate additional transit demands generated by Lansdowne 2.0, it was assumed that 75% of the current transit capacity is utilized under existing demands, resulting in 25% available capacity (425 passenger trip per hour).

Those traveling to / from the south and north equates to roughly between 181 to 261 transit trips during peak hours. As a result, the additional transit users destined to / from Lansdowne are anticipated to occupy roughly 10% to 15% of transit capacity, based on the current transit schedules.

4.8 REVIEW OF NETWORK CONCEPT

The current zoning permitted under the L2C Subzone for Lansdowne allows a variety of non-residential uses and a maximum of 280 residential dwelling units. The 1,199 residential units are expected to generate more than 200 peak hour person-trips over the existing residential zoning currently permitted at Lansdowne. The additional commercial retail density to the site is not expected to generate more than 200 peak hour person-trips over the existing zoning at Lansdowne.

As a result, a review of the transportation network was undertaken to verify that the proposed zoning by-law amendment to support additional residential density for Lansdowne 2.0 can be supported by the transportation network in line with the current Transportation Master Plan.

The total carrying capacity of Bank Street is estimated at 3,200 vehicles per hour (assuming a planning capacity of 800 vehicles per hour, per lane, per direction). This assumes that on-street parking is restricted during peak hours, and all four lanes of Bank Street are used to travel. During off-peak hours, where on-street parking is permitted, a total carrying capacity of 1,600 vehicles per hour is assumed.

Currently, Bank Street operates with approximately a total of 1,000 vehicles per hour during peak periods. The additional vehicle trips generated by Lansdowne 2.0, which range between 200 to 320 vehicles per hour, are expected to be able to be supported by Bank Street.

4.9 INTERSECTION DESIGN

4.9.1 Intersection Control

The existing intersection control for Lansdowne will be maintained as part of the Lansdowne 2.0 redevelopment. The existing intersection control and lane geometry is illustrated in **Figure 5**.

4.9.2 Intersection Design

An assessment of the study area intersections was undertaken to determine the operational characteristics under the various horizons identified in the Screening and Scoping report. Intersection operational analysis was performed with Synchro 10.0™ software package and the MMLOS analysis was completed for all modes and compared against the City of Ottawa's MMLOS targets.

4.9.2.1 Existing Conditions

Existing conditions traffic volumes at study area intersections are documented in **Figure 9** through **Figure 12**.

Intersection Capacity Analysis

Intersection operational analysis under Existing Conditions are summarized in the following tables:

Table 13 summarizes the results of the Synchro analysis for the Existing Weekday AM and PM peak hours.

Table 14 summarizes the results of the Synchro analysis for the Existing Weekend Saturday peak hour.

Table 15 summarizes the results of the Synchro analysis for an Existing Minor Event (Arena at TD Place) at Lansdowne.

Table 16 summarizes the results of the Synchro analysis for an Existing Major Event (Stadium at TD Place) at Lansdowne.

Detailed Synchro level of service analysis results can be found in **Appendix F**.

Table 13 – Existing Weekday AM and PM Peak Hour Conditions

Intersection	Intersection Control	Approach|Movement		LOS		V/C		Total Delay (s)		Queue 95th (m)	
				AM	PM	AM	PM	AM	PM	AM	PM
Bank St & Fifth Ave	Signalized	EB	Left / Through / Right	C	D	0.36	0.65	21.9	35.1	27.2	31.7
		WB	Left	C	C	0.18	0.39	22.9	33.1	14.0	17.3
			Through / Right	B	B	0.21	0.29	15.9	17.7	16.0	14.4
		NB	Left / Through / Right	A	A	0.38	0.27	3.8	9.7	8.2	43.6
		SB	Left / Through / Right	A	A	0.32	0.36	8.5	6.1	25.6	34.0
		Overall Intersection		**A**	**B**	**0.38**	**0.65**	**8.6**	**12.1**	--	--
Bank St & Holmwood Ave	Signalized	EB	Left / Through / Right	D	D	0.47	0.53	37.6	38.3	22.6	26.7
		NB	Left / Through / Right	A	A	0.29	0.30	2.6	1.9	10.8	9.0
		SB	Left / Through / Right	A	A	0.21	0.31	3.1	4.7	13.2	21.1
		Overall Intersection		**A**	**A**	**0.47**	**0.53**	**5.4**	**6.1**	--	--
Bank St & Exhibition Way	Signalized	WB	Left	C	D	0.27	0.50	32.5	35.1	17.2	30.8
			Right	B	D	0.20	0.28	13.3	10.5	7.5	9.4
		NB	Left / Through / Right	B	A	0.37	0.31	10.1	5.2	40.0	27.6
		SB	Left	A	A	0.14	0.28	8.5	4.8	11.6	6.5
			Through	A	A	0.16	0.23	6.7	3.1	22.7	9.6
		Overall Intersection		**B**	**A**	**0.37**	**0.50**	**10.1**	**7.3**	--	--
Bank St & Wilton Cr	Minor Stop	EB	Right	C	F	0.49	0.82	22.0	53.2	15.6	40.8
		Overall Intersection		**A**	**B**	**0.49**	**0.82**	**4.8**	**10.2**	--	--
Bank St & Echo Dr	Minor Stop	EB	Right	B	C	0.06	0.07	12.5	16.1	1.2	1.2
		Overall Intersection		**A**	**A**	**0.06**	**0.07**	**0.3**	**0.2**	--	--
Bank St & Aylmer Ave	Signalized	EB	Left / Right	C	C	0.26	0.34	29.5	31.1	19.9	22.8
		NB	Left / Through	A	A	0.42	0.38	3.8	4.9	16.8	19.6
		SB	Through / Right	A	A	0.33	0.45	7.2	7.6	28.1	43.7
		Overall Intersection		**A**	**A**	**0.42**	**0.45**	**6.5**	**7.5**	--	--
Bank St & Sunnyside Ave	Signalized	EB	Left / Through / Right	C	D	0.43	0.65	26.8	42.2	32.6	53.6
		WB	Left / Through / Right	C	D	0.76	0.93	22.5	53.1	67.9	98.3
		NB	Left / Through / Right	B	A	0.69	0.29	16.4	9.2	80.8	28.0
		SB	Left / Through / Right	B	C	0.78	0.88	19.2	20.2	30.7	130.2
		Overall Intersection		**B**	**C**	**0.78**	**0.93**	**18.9**	**25.2**	--	--
QED & Princess Patricia Way	Minor Stop	NB	Left / Through	A	A	0.06	0.05	8.2	8.9	1.2	1.2
		EB	Left / Right	B	C	0.10	0.32	13.1	19.5	1.8	8.4
		Overall Intersection		**A**	**B**	**0.10**	**0.32**	**1.6**	**2.6**	--	--

Intersection	Intersection Control	Approach|Movement		LOS		V/C		Total Delay (s)		Queue 95th (m)	
				AM	PM	AM	PM	AM	PM	AM	PM
Queen Elizabeth Dr & Fifth Ave	Signalized	EB	Left / Right	B	D	0.21	0.37	17.6	36.6	12.9	22.0
		NB	Left / Through	A	A	0.32	0.24	7.7	5.0	21.9	21.5
		SB	Through / Right	A	A	0.42	0.53	8.6	7.7	30.5	66.0
		Overall Intersection		**A**	**A**	**0.42**	**0.53**	**9.2**	**9.2**	**--**	**--**
Bank St & Marche Way	Minor Stop	WB	Left / Right	C	B	0.57	0.15	21.1	12.9	21.0	3.0
		Overall Intersection		**A**	**A**	**0.57**	**0.15**	**4.6**	**0.8**	**--**	**--**
Fifth Ave & O'Connor St	All-Way Stop	EB	Left / Through	A	A	0.14	0.15	7.9	8.0	--	--
		WB	Right	A	A	0.07	0.10	6.4	6.5	--	--
		NB	Left / Through / Right	A	A	0.09	0.12	7.5	7.7	--	--
		SB	Right	A	A	0.10	0.09	6.6	6.5	--	--
		Overall Intersection		**A**	**A**	**0.14**	**0.15**	**7.1**	**7.2**	**--**	**--**

1. v/c – represents the anticipated volume divided by the predicted capacity
For overall intersection v/c represents the maximum v/c among all movements
2. # 95th percentile volume exceeds capacity; queue may be longer. Queue shown is maximum after two cycles
3. Level of Service (LOS) calculation is based on volume-to-capacity (v/c) ratios for signalized intersections and delays for unsignalized intersections

As illustrated in **Table 13**, all study area intersections are currently operating with overall acceptable levels of service under the Weekday AM and PM peak hour conditions.

The intersection of Bank Street and Sunnyside Avenue is currently operating with specific movements at or close to theoretical capacity in the southbound approach (AM Peak) and westbound approach (PM Peak).

In addition, the eastbound approach at intersection of Bank Street and Wilton Crescent is currently operating with a LOS F with average vehicle delays of 53s during the PM peak hour. The delays are associated with limited gaps in traffic in the southbound direction associated with the recently installed 3-lane cross-section of Bank Street.

No mitigation measure are recommended to improve intersection operations. Opportunities to optimize signal timing splits will be reviewed as part of the future conditions analyses.

Table 14 – Existing Weekend Saturday Peak Hour Conditions

Intersection	Intersection Control	Approach|Movement		LOS	V/C	Total Delay (s)	Queue 95th (m)
Bank St & Fifth Ave	Signalized	EB	Left / Through / Right	C	0.63	34.2	28.1
		WB	Left	D	0.46	36.6	19.4
			Through / Right	B	0.39	18.5	17.0
		NB	Left / Through / Right	A	0.27	3.7	14.5
		SB	Left / Through / Right	A	0.29	5.1	28.2
		Overall Intersection		**A**	**0.63**	**9.7**	--
Bank St & Holmwood Ave	Signalized	EB	Left / Through / Right	D	0.54	38.5	26.7
		NB	Left / Through / Right	A	0.29	2.2	9.2
		SB	Left / Through / Right	A	0.30	3.6	16.1
		Overall Intersection		**A**	**0.54**	**5.7**	--
Bank St & Exhibition Way	Signalized	WB	Left	C	0.39	33.9	23.9
			Right	B	0.33	11.8	10.4
		NB	Left / Through / Right	A	0.28	4.5	22.7
		SB	Left	A	0.28	6.9	16.5
			Through	A	0.21	4.5	22.2
		Overall Intersection		**A**	**0.39**	**7.0**	--
Bank St & Wilton Cr	Minor Stop	NB	Left	B	0.19	11.6	4.2
		EB	Right	D	0.58	29.9	20.4
		Overall Intersection		**B**	**0.58**	**5.1**	--
Bank St & Echo Dr	Minor Stop	EB	Right	B	0.08	14.3	1.8
		Overall Intersection		**A**	**0.08**	**0.3**	--
Bank St & Aylmer Ave	Signalized	EB	Left / Right	C	0.20	30.2	15.8
		NB	Left / Through	A	0.37	5.5	22.4
		SB	Through / Right	A	0.40	7.2	38.4
		Overall Intersection		**A**	**0.40**	**7.1**	--
Bank St & Sunnyside Ave	Signalized	EB	Left / Through / Right	E	0.75	59.8	37.5
		WB	Left / Through / Right	D	0.71	35.9	38.6
		NB	Left / Through / Right	A	0.31	6.6	32.6
		SB	Left / Through / Right	A	0.44	4.1	11.2
		Overall Intersection		**B**	**0.75**	**13.2**	--
QED & Princess Patricia Way	Minor Stop	NB	Left / Through	A	0.05	8.3	1.2
		EB	Left / Right	C	0.28	15.2	6.6
		Overall Intersection		**A**	**0.28**	**3.0**	--

Intersection	Intersection Control	Approach | Movement		LOS	V/C	Total Delay (s)	Queue 95th (m)
QED & Fifth Ave	Signalized	EB	Left / Right	D	0.42	37.3	25.2
		NB	Left / Through	A	0.29	5.4	27.5
		SB	Through / Right	A	0.37	6.1	40.5
		Overall Intersection		**A**	**0.42**	**9.2**	**--**
Bank St & Marche Way	Minor Stop	WB	Left / Right	B	0.14	12.4	3.0
		Overall Intersection		**A**	**0.14**	**0.8**	**--**
Fifth Ave & O'Connor St	All-Way Stop	EB	Left / Through	A	0.11	7.9	--
		WB	Right	A	0.09	6.5	--
		NB	Left / Through / Right	A	0.16	7.9	--
		SB	Right	A	0.10	6.6	--
		Overall Intersection		**A**	**0.16**	**7.2**	**--**

Notes:

1. **v/c – represents the anticipated volume divided by the predicted capacity**
   For overall intersection v/c represents the maximum v/c among all movements
2. **# 95th percentile volume exceeds capacity; queue may be longer.**
   Queue shown is maximum after two cycles
3. **Level of Service (LOS) calculation is based on volume-to-capacity (v/c) ratios for signalized intersections and delays for unsignalized intersections**

As illustrated in **Table 14**, all study area intersections are currently operating with overall acceptable levels of service under Weekend Saturday peak hour conditions.

Table 15 – Existing Minor Event (Arena at TD Place) Peak Hour Conditions

Intersection	Intersection Control	Approach|Movement		LOS		V/C		Total Delay (s)		Queue 95th (m)	
				Ingress	Egress	Ingress	Egress	Ingress	Egress	Ingress	Egress
Bank St & Fifth Ave	Signalized	EB	Left / Through / Right	D	C	0.65	0.51	36.9	31.9	32.3	18.8
		WB	Left	C	C	0.42	0.34	33.3	34.4	18.8	15.5
			Through / Right	B	B	0.30	0.30	19.0	19.5	15.6	12.6
		NB	Left / Through / Right	B	A	0.30	0.24	10.0	6.0	49.8	34.2
		SB	Left / Through / Right	A	A	0.35	0.20	6.3	3.6	33.6	15.6
		Overall Intersection		**B**	**A**	**0.65**	**0.51**	**12.6**	**9.0**	--	--
Bank St & Holmwood Ave	Signalized	EB	Left / Through / Right	D	D	0.54	0.47	38.1	37.7	27.8	22.3
		NB	Left / Through / Right	A	A	0.37	0.29	2.9	3.7	13.9	22.1
		SB	Left / Through / Right	A	A	0.32	0.20	4.8	4.4	20.2	24.4
		Overall Intersection		**A**	**A**	**0.54**	**0.47**	**6.5**	**6.6**	--	--
Bank St & Exhibition Way	Signalized	WB	Left	D	D	0.50	0.64	35.1	36.4	30.8	43.5
			Right	B	D	0.37	0.57	10.5	9.6	11.2	16.2
		NB	Left / Through / Right	A	A	0.33	0.17	4.9	4.9	26.6	12.4
		SB	Left	A	A	0.41	0.25	7.4	5.8	10.5	8.8
			Through	A	A	0.20	0.14	3.1	4.4	8.8	7.6
		Overall Intersection		**A**	**B**	**0.50**	**0.64**	**7.6**	**11.6**	--	--
Bank St & Wilton Cr	Minor Stop	EB	Right	F	C	0.85	0.32	52.8	18.8	45.6	7.8
		Overall Intersection		**B**	**A**	**0.85**	**0.32**	**10.5**	**2.9**	--	--
Bank St & Echo Dr	Minor Stop	EB	Right	C	B	0.11	0.02	15.8	10.4	2.4	0.6
		Overall Intersection		**A**	**A**	**0.11**	**0.02**	**0.4**	**0.2**	--	--
Bank St & Aylmer Ave	Signalized	EB	Left / Right	D	C	0.35	0.03	36.4	27.2	26.1	4.4
		NB	Left / Through	A	A	0.39	0.08	5.4	5.3	23.6	8.1
		SB	Through / Right	A	A	0.32	0.10	6.4	5.2	28.0	9.6
		Overall Intersection		**A**	**A**	**0.39**	**0.10**	**7.6**	**5.7**	--	--
Bank St & Sunnyside Ave	Signalized	EB	Left / Through / Right	D	D	0.73	0.48	52.2	44.4	#42.6	19.1
		WB	Left / Through / Right	C	C	0.76	0.33	32.6	20.8	49.7	11.9
		NB	Left / Through / Right	A	A	0.30	0.12	8.1	3.2	32.2	11.0
		SB	Left / Through / Right	A	A	0.53	0.24	7.5	3.5	23.4	21.2
		Overall Intersection		**B**	**A**	**0.76**	**0.48**	**15.2**	**7.0**	--	--
QED & Princess Patricia Way	Minor Stop	NB	Left / Through	A	A	0.13	0.01	9.3	7.6	2.4	0.0
		EB	Left / Right	C	C	0.36	0.59	21.6	16.1	9.6	24.0
		Overall Intersection		**C**	**A**	**0.36**	**0.59**	**3.4**	**10.4**	--	--

Intersection	Intersection Control	Approach|Movement		LOS		V/C		Total Delay (s)		Queue 95th (m)	
				Ingress	Egress	Ingress	Egress	Ingress	Egress	Ingress	Egress
Queen Elizabeth Dr & Fifth Ave	Signalized	EB	Left / Right	C	C	0.38	0.39	28.6	28.7	22.4	23.4
		NB	Left / Through	A	A	0.34	0.32	6.8	6.5	27.9	29.4
		SB	Through / Right	B	A	0.63	0.20	10.7	5.6	78.2	18.0
		Overall Intersection		**B**	**A**	**0.63**	**0.39**	**11.2**	**9.8**	--	--
Bank St & Marche Way	Minor Stop	WB	Left / Right	B	B	0.11	0.27	12.3	13.4	2.4	6.6
		Overall Intersection		**A**	**A**	**0.11**	**0.27**	**0.6**	**2.1**	--	--
Fifth Ave & O'Connor St	All-Way Stop	EB	Left / Through	A	A	0.15	0.07	8.1	7.4	--	--
		WB	Right	A	A	0.13	0.06	6.7	6.4	--	--
		NB	Left / Through / Right	A	A	0.18	0.08	8.0	7.0	--	--
		SB	Right	A	A	0.08	0.09	6.5	6.5	--	--
		Overall Intersection		**A**	**A**	**0.18**	**0.09**	**7.4**	**6.8**	--	--

Notes:

1. **v/c – represents the anticipated volume divided by the predicted capacity**
   For overall intersection v/c represents the maximum v/c among all movements
2. **# 95th percentile volume exceeds capacity; queue may be longer. Queue shown is maximum after two cycles**
3. **Level of Service (LOS) calculation is based on volume-to-capacity (v/c) ratios for signalized intersections and delays for unsignalized intersections**

As illustrated in **Table 15**, all study area intersections are currently operating with overall acceptable levels of service during Minor Events held at the Arena at TD Place.

The eastbound approach at intersection of Bank Street and Wilton Crescent is currently operating with a LOS F with average vehicle delays of 53s. This occurs during the Ingress period which overlaps with the regular PM peak period. The delays at this intersection are not directly attributed to event traffic held at Lansdowne, and are associated with limited gaps in traffic in the southbound direction associated with the recently installed 3-lane cross-section of Bank Street.

No mitigation measure are recommended to improve intersection operations. Opportunities to optimize signal timing splits will be reviewed as part of the future conditions analyses.

Table 16 – Existing Major Event (Stadium at TD Place) Peak Hour Conditions

Intersection	Intersection Control	Approach|Movement		LOS		V/C		Total Delay (s)		Queue 95th (m)	
				Ingress	Egress	Ingress	Egress	Ingress	Egress	Ingress	Egress
Bank St & Fifth Ave	Signalized	EB	Left / Through / Right	D	D	0.67	0.65	35.8	36.0	34.5	31.8
		WB	Left	C	C	0.42	0.21	30.3	24.7	19.8	12.1
			Through / Right	B	B	0.40	0.45	17.4	19.3	20.3	23.1
		NB	Left / Through / Right	A	A	0.32	0.20	6.5	5.6	28.7	18.9
		SB	Left / Through / Right	A	A	0.42	0.23	7.4	5.6	41.4	21.1
		Overall Intersection		**B**	**B**	**0.67**	**0.65**	**11.6**	**11.8**	--	--
Bank St & Holmwood Ave	Signalized	EB	Left / Through / Right	D	D	0.61	0.61	38.5	38.7	34.1	32.8
		NB	Left / Through / Right	A	A	0.48	0.25	7.1	5.0	38.8	17.4
		SB	Left / Through / Right	A	A	0.42	0.23	6.7	4.8	37.4	16.6
		Overall Intersection		**A**	**B**	**0.61**	**0.61**	**9.8**	**10.0**	--	--
Bank St & Exhibition Way	Signalized	WB	Left	*Movements Temporarily Restricted During Major Events*							
			Right								
		NB	Left / Through / Right	A	A	0.24	0.12	0.2	0.1	0.0	0.0
		SB	Left	*Movements Temporarily Restricted During Major Events*							
			Through	A	A	0.21	0.12	0.1	0.1	0.0	0.0
		Overall Intersection		**A**	**A**	**0.24**	**0.12**	**0.2**	**0.1**	--	--
Bank St & Wilton Cr	Minor Stop	EB	Right	F	B	0.97	0.01	81.9	13.2	60.0	0.0
		Overall Intersection		**C**	**A**	**0.97**	**0.01**	**14.2**	**0.1**	--	--
Bank St & Echo Dr	Minor Stop	EB	Right	C	B	0.22	0.05	17.7	10.3	4.8	1.2
		Overall Intersection		**A**	**A**	**0.22**	**0.05**	**0.8**	**0.5**	--	--
Bank St & Aylmer Ave	Signalized	EB	Left / Right	D	C	0.50	0.17	38.1	23.5	33.9	11.4
		NB	Left / Through	A	A	0.41	0.19	7.8	5.9	43.3	16.6
		SB	Through / Right	A	A	0.43	0.17	7.9	5.5	47.0	14.4
		Overall Intersection		**A**	**A**	**0.50**	**0.19**	**9.9**	**6.6**	--	--
Bank St & Sunnyside Ave	Signalized	EB	Left / Through / Right	E	D	0.84	0.53	64.5	42.8	62.2	24.9
		WB	Left / Through / Right	D	C	0.82	0.48	43.7	28.2	69.7	21.2
		NB	Left / Through / Right	A	A	0.36	0.15	7.8	4.1	31.4	13.6
		SB	Left / Through / Right	B	A	0.68	0.18	12.8	4.1	64.8	15.4
		Overall Intersection		**C**	**B**	**0.84**	**0.53**	**20.2**	**10.6**	--	--
QED & Princess Patricia Way	Minor Stop	NB	Left / Through	A	A	0.14	0.05	9.9	8.2	3.0	0.6
		EB	Left / Right	F	E	0.77	0.87	50.5	39.7	34.2	58.8
		Overall Intersection		**D**	**C**	**0.77**	**0.87**	**8.7**	**19.2**	--	--

Intersection	Intersection Control	Approach | Movement		LOS		V/C		Total Delay (s)		Queue 95th (m)	
				Ingress	Egress	Ingress	Egress	Ingress	Egress	Ingress	Egress
QED & Fifth Ave	Signalized	EB	Left / Right	C	D	0.58	0.68	33.3	36.7	35.6	45.8
		NB	Left / Through	B	A	0.56	0.40	11.9	8.6	49.3	39.1
		SB	Through / Right	B	A	0.81	0.39	18.9	8.4	156.5	39.1
		Overall Intersection		**B**	**B**	**0.81**	**0.68**	**18.8**	**14.6**	--	--
Bank St & Marche Way	Minor Stop	WB	Left / Right	*Movements Temporarily Restricted During Major Events*							
		Overall Intersection									
Fifth Ave & O'Connor St	All-Way Stop	EB	Left / Through	A	A	0.17	0.11	8.5	8.5	--	--
		WB	Right	A	A	0.19	0.11	6.9	6.6	--	--
		NB	Left / Through / Right	A	B	0.26	0.43	8.4	10	--	--
		SB	Right	A	A	0.13	0.05	6.7	6.4	--	--
		Overall Intersection		**A**	**B**	**0.26**	**0.43**	**7.7**	**8.8**	--	--

Notes:

1. **v/c – represents the anticipated volume divided by the predicted capacity**
   For overall intersection v/c represents the maximum v/c among all movements
2. **# 95th percentile volume exceeds capacity; queue may be longer. Queue shown is maximum after two cycles**
3. **Level of Service (LOS) calculation is based on volume-to-capacity (v/c) ratios for signalized intersections and delays for unsignalized intersections**

As illustrated in **Table 16**, all study area intersections are currently operating with overall acceptable levels of service during Major Events held at the Arena at TD Place.

The eastbound approach at intersection of Bank Street and Wilton Crescent is currently operating with a LOS F with average vehicle delays of 53s. This occurs during the event Ingress period which overlaps with the regular PM peak period. The delays at this intersection are not directly attributed to event traffic held at Lansdowne, and are associated with limited gaps in traffic in the southbound direction associated with the recently installed 3-lane cross-section of Bank Street.

In addition, the eastbound approach at the Queen Elizabeth Drive and Princess Patricia Way intersection is shown to operate with an LOS rating of F and E for the Ingress and Egress periods, respectively. Although the analysis indicates that the movements are operating with delays, the performance of these intersections are adequately managed through the deployment of Ottawa Police Point duty as part of the traffic management measures for Major Events at Lansdowne.

No mitigation measure are recommended to improve intersection operations. Opportunities to optimize signal timing splits will be reviewed as part of the future conditions analyses.

Existing Intersection Multi-Modal Level of Service (MMLOS)

A multi-modal level of service (MMLOS) assessment using the City of Ottawa MMLOS guidelines was completed for the signalized intersection within the study area. The results of this analyses are summarized in the **Figure 39**.

Detailed MMLOS summary worksheets are included in **Appendix C**.

Bank Street and Fifth Avenue:

The PLOS target of B is not being met at this intersection due to high pedestrian exposure at the intersection. The only crossings which are evaluated at achieving the target are the east and west side crossings which have longer effective walk times and reduced crossing lanes.

The BLOS target of C is not being met at this intersection as traffic lanes are shared with cyclists at the intersection approaches. The only approaches that achieve the target BLOS are the east and west approaches, which do not require bicyclists to cross any lanes for left turn movements.

The TLOS target of D is not met at this intersection due to the high average signal delay on the west approach.

The TkLOS target of D is not met at this intersection due to the smaller effective corner radiuses at this intersection and limited number of receiving lanes. Only the east approach, which has two receiving lanes on departure from the intersection, meets the TkLOS target.

Additionally, in accordance with the City of Ottawa MMLOS guidelines, during the AM Peak hour, the Auto LOS at this intersection meets the target LOS of D.

Bank Street and Holmwood Avenue:

The PLOS target of B is not being met at this intersection due to a combination of pedestrian exposure to traffic and experienced pedestrian delay. The only crossings which are evaluated at achieving the target are the east and west side crossings which have longer effective walk times and reduced crossing lanes.

The BLOS target of C is not being met at this intersection as traffic lanes are shared with cyclists at the intersection approaches. The only approaches that achieve the target BLOS are the east and west approaches, which do not require bicyclists to cross lanes for left turn movements.

The TLOS target of D is not met at this intersection due to the high average signal delay on the west approach.

The TkLOS target of D is also not met at this intersection due to smaller effective corner radiuses at this intersection and limited number of receiving lanes for turning trucks.

Additionally, in accordance to the City of Ottawa MMLOS guidelines, during the AM Peak hour, the Auto LOS at this intersection meets the target LOS of D.

Bank Street and Exhibition Way:

The PLOS target of B is not being met at this intersection due to a combination of pedestrian exposure to traffic and experienced pedestrian delay at all crossings. Due to the high volume of pedestrians crossings, particularly during events and busy weekends periods, opportunities to implement a pedestrian scramble phase should be evaluated as a way of accommodating high pedestrian volumes.

The BLOS target of C is not met at this intersection because of the number of approach lanes cyclists need to cross at the north approach to make a left turn at this intersection and the length of the right turn lane on the east approach.

Additionally, in accordance to the City of Ottawa MMLOS guidelines, during the AM Peak hour, the Auto LOS at this intersection exceeds the target LOS of D.

Bank Street and Aylmer Avenue:

The PLOS target of B is not being met at this intersection due to the experienced pedestrian delays at the intersection. The only crossing that met the PLOS target is the west side crossing because of its high effective walking time and limited pedestrian exposure.

The BLOS target of C is not being met at this intersection as traffic lanes are shared with cyclists at the intersection approaches. The only approach that achieves the target BLOS is the west approach, which does not require bicyclists to cross lanes for left turn movements.

The TLOS target of D is not met at this intersection due to high average signal delay at the west approach.

The TkLOS target of D is also not met at this intersection due to smaller effective corner radiuses at this intersection and limited number of receiving lanes. Only the west approach, which has two receiving lanes on departure from the intersection, meets the TkLOS target.

Additionally, in accordance to the City of Ottawa MMLOS guidelines, during the AM Peak hour, the Auto LOS at this intersection exceeds the target LOS of D.

Bank Street and Sunnyside Avenue:

The PLOS target of B is not being met at this intersection primarily because of experienced pedestrian delay at all crossings.

The BLOS target of C is not being met at this intersection as traffic lanes are shared with cyclists at the intersection approaches. The only approaches that achieve the target BLOS are the east and west approaches, which do not require bicyclists to cross lanes for left turn movements.

The TLOS target of D is not met at this intersection due to high average signal delay on the east and west approach.

The TkLOS target of D is also not met at this intersection due to smaller effective corner radiuses at this intersection and number of receiving lanes. The west and east approaches, which have two receiving lanes for trucks on departure from the intersection, meet the TkLOS target.

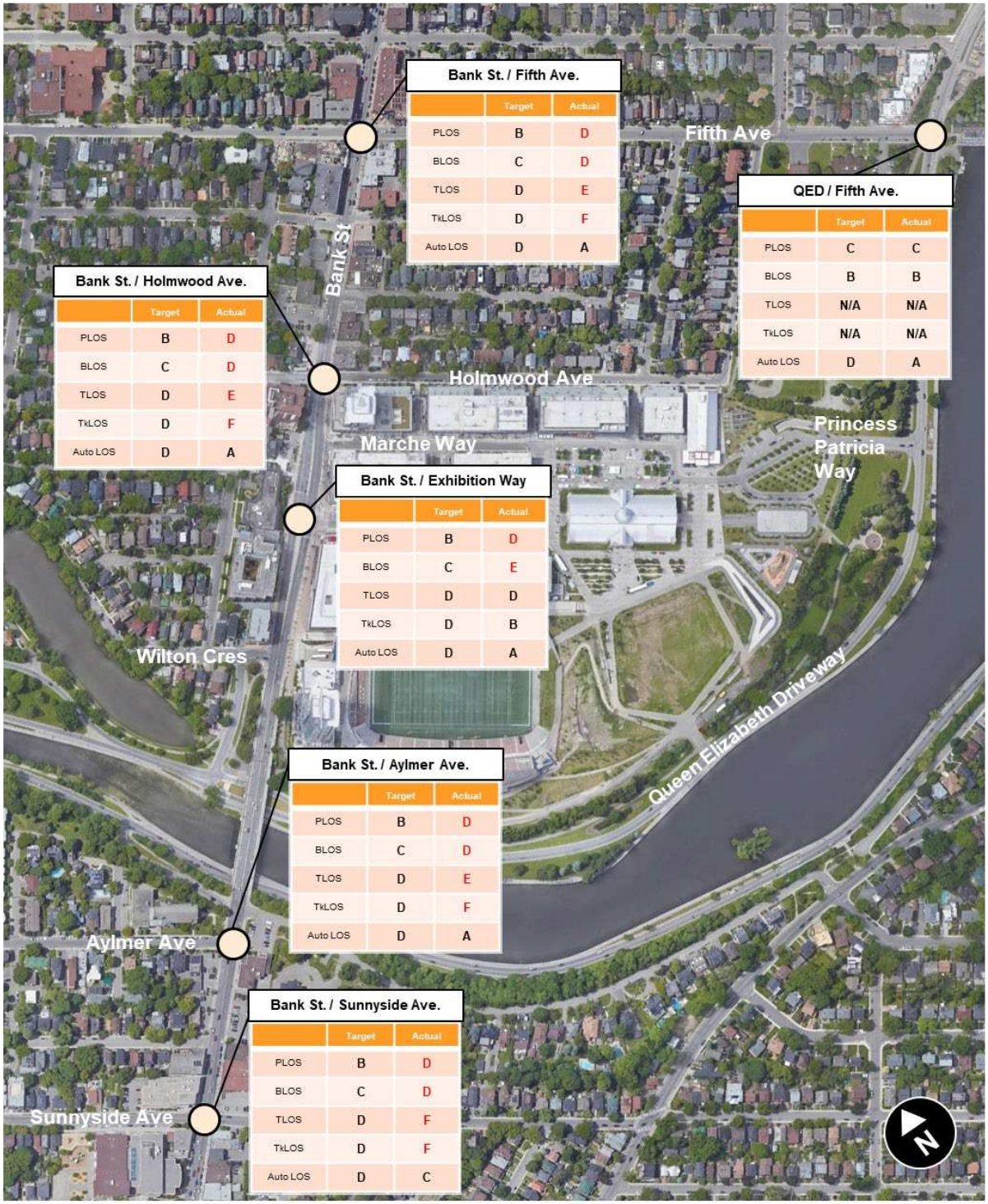
Additionally, in accordance to the City of Ottawa MMLOS guidelines, during the AM Peak hour, the Auto LOS at this intersection exceeds the target LOS of D.

Queen Elizabeth Driveway and Fifth Avenue:

The TLOS is not evaluated at this intersection as there is no transit route operating through this intersection. There is also no TkLOS target for this road classification.

In accordance to the City of Ottawa MMLOS guidelines, during the AM Peak hour, the Auto LOS at this intersection exceeds the target LOS of D.

Figure 39 – Existing Conditions MMLOS Targets and Results (Intersections)



Existing Conditions MMLOS Targets and Results (Signalized Intersections)

4.9.2.2 2031 Future Background Conditions

Figure 25 illustrates 2031 Future Background traffic volumes at the study area intersections during the AM and PM peak hours, respectively.

Figure 26 illustrates 2031 Future Background traffic volumes at the study area intersections during the Weekend Saturday peak hour.

Special event demands were not assessed under 2031 Future Background conditions as they are expected to operate similarly to current conditions. An assessment of special event traffic operations is included in subsequent sections that cover the 2031 Total Future and 2036 Total Future demands that are inclusive of Lansdowne 2.0 activity.

Intersection Capacity Analysis

Table 17 summarizes the results of the Synchro analysis for the Weekday AM and PM peak hours under 2031 Future Background intersection operations.

Table 18 summarizes the results of the Synchro analysis for the Weekend Saturday peak hour under 2031 Future Background intersection operations.

Synchro analysis results can be found in **Appendix F**.

Table 17 – 2031 Future Background Weekday AM and PM Peak Hour Conditions

Intersection	Intersection Control	Approach|Movement		LOS		V/C		Total Delay (s)		Queue 95th (m)	
				AM	PM	AM	PM	AM	PM	AM	PM
Bank St & Fifth Ave	Signalized	EB	Left / Through / Right	D	D	0.63	0.67	36.5	35.6	30.5	32.6
		WB	Left	C	C	0.33	0.41	31.5	33.3	15.2	18.0
			Through / Right	C	B	0.34	0.30	21.1	17.3	17.3	14.6
		NB	Left / Through / Right	A	B	0.34	0.30	1.4	11.2	4.4	50.3
		SB	Left / Through / Right	A	A	0.29	0.39	5.4	6.8	24.9	38.6
		Overall Intersection		**A**	**B**	**0.63**	**0.67**	**8.5**	**12.9**	--	--
Bank St & Holmwood Ave	Signalized	EB	Left / Through / Right	D	D	0.48	0.55	37.8	38.8	23.3	27.6
		NB	Left / Through / Right	A	A	0.31	0.33	2.1	2.0	4.6	9.4
		SB	Left / Through / Right	A	A	0.22	0.34	3.2	4.9	14.3	22.3
		Overall Intersection		**A**	**A**	**0.48**	**0.55**	**5.1**	**6.2**	--	--
Bank St & Exhibition Way	Signalized	WB	Left	C	D	0.28	0.53	32.6	35.8	17.5	31.8
			Right	B	D	0.20	0.29	13.2	10.3	7.4	9.4
		NB	Left / Through / Right	B	A	0.40	0.34	10.3	5.7	43.1	31.3
		SB	Left	A	A	0.16	0.31	9.1	5.5	12.2	7.1
			Through	A	A	0.17	0.25	6.8	3.2	24.2	10.6
		Overall Intersection		**B**	**A**	**0.40**	**0.53**	**10.3**	**7.6**	--	--
Bank St & Wilton Cr	Minor Stop	EB	Right	C	F	0.53	0.91	24.1	71.7	18.0	50.4
		Overall Intersection		**A**	**C**	**0.53**	**0.91**	**5.1**	**13.1**	--	--
Bank St & Echo Dr	Minor Stop	EB	Right	B	C	0.06	0.08	12.9	17.1	1.2	1.8
		Overall Intersection		**A**	**B**	**0.06**	**0.08**	**0.3**	**0.3**	--	--
Bank St & Aylmer Ave	Signalized	EB	Left / Right	C	C	0.30	0.37	29.7	31.5	22.1	24.2
		NB	Left / Through	A	A	0.45	0.42	3.9	5.1	17.7	22.2
		SB	Through / Right	A	A	0.35	0.48	7.4	8.1	30.0	48.9
		Overall Intersection		**A**	**A**	**0.45**	**0.48**	**6.7**	**7.9**	--	--
Bank St & Sunnyside Ave	Signalized	EB	Left / Through / Right	C	D	0.48	0.70	28.4	46.2	35.4	58.2
		WB	Left / Through / Right	C	E	0.80	0.97	26.0	62.2	75.1	105.4
		NB	Left / Through / Right	B	A	0.72	0.31	17.4	9.4	87.6	29.7
		SB	Left / Through / Right	C	C	0.83	0.93	22.5	26.0	79.9	143.1
		Overall Intersection		**C**	**C**	**0.83**	**0.97**	**21.0**	**30.1**	--	--
QED & Princess Patricia Way	Minor Stop	NB	Left / Through	A	A	0.06	0.06	8.3	9.0	1.2	1.2
		EB	Left / Right	B	C	0.10	0.35	13.5	21.0	1.8	9.0
		Overall Intersection		**A**	**C**	**0.10**	**0.35**	**1.6**	**2.8**	--	--

Intersection	Intersection Control	Approach | Movement		LOS		V/C		Total Delay (s)		Queue 95th (m)	
				AM	PM	AM	PM	AM	PM	AM	PM
QED & Fifth Ave	Signalized	EB	Left / Right	C	D	0.31	0.38	30.4	36.8	19.1	22.8
		NB	Left / Through	A	A	0.22	0.24	4.2	4.7	22.9	23.1
		SB	Through / Right	A	A	0.29	0.52	4.6	7.1	32.1	72.2
		Overall Intersection		**A**	**A**	**0.31**	**0.52**	**7.0**	**8.9**	**--**	**--**
Bank St & Marche Way	Minor Stop	WB	Left / Right	B	B	0.08	0.17	12.9	13.7	1.8	3.6
		Overall Intersection		**A**	**A**	**0.08**	**0.17**	**0.4**	**0.8**	**--**	**--**
Fifth Ave & O'Connor St	All-Way Stop	EB	Left / Through	A	A	0.14	0.15	8.0	8.1	--	--
		WB	Right	A	A	0.07	0.10	6.4	6.6	--	--
		NB	Left / Through / Right	A	A	0.09	0.13	7.5	7.7	--	--
		SB	Right	A	A	0.11	0.09	6.6	6.5	--	--
		Overall Intersection		**A**	**A**	**0.14**	**0.15**	**7.2**	**7.3**	**--**	**--**

Notes:

1. **v/c – represents the anticipated volume divided by the predicted capacity**
   For overall intersection v/c represents the maximum v/c among all movements
2. **# 95th percentile volume exceeds capacity; queue may be longer. Queue shown is maximum after two cycles**
3. **Level of Service (LOS) calculation is based on volume-to-capacity (v/c) ratios for signalized intersections and delays for unsignalized intersections**

As illustrated in **Table 17**, all study area intersections are projected to continue to operate with overall acceptable levels of service under the 2031 Future Background Weekday AM and PM peak hour conditions.

The intersection of Bank Street and Sunnyside Avenue is projected to continue to operate with specific movements at or close to theoretical capacity in the southbound approach (AM Peak) and westbound approach (PM Peak).

In addition, the eastbound approach at intersection of Bank Street and Wilton Crescent is projected to continue to operate with a LOS F due to vehicle delays during the PM peak hour. The delays are associated with limited gaps in traffic in the southbound direction associated with the recently installed 3-lane cross-section of Bank Street.

Intersection signal timings were optimized throughout the Bank Street corridor. No mitigation measure are recommended to improve intersection operations.

Table 18 – 2031 Future Background Weekend Saturday Peak Hour Conditions

Intersection	Intersection Control	Approach|Movement		LOS	V/C	Total Delay (s)	Queue 95th (m)
Bank St & Fifth Ave	Signalized	EB	Left / Through / Right	C	0.65	35.0	29.3
		WB	Left	D	0.48	36.7	20.0
			Through / Right	B	0.40	18.1	17.4
		NB	Left / Through / Right	A	0.31	9.7	50.6
		SB	Left / Through / Right	A	0.34	5.9	31.5
		Overall Intersection		**B**	**0.65**	**12.3**	--
Bank St & Holmwood Ave	Signalized	EB	Left / Through / Right	D	0.55	38.8	27.3
		NB	Left / Through / Right	A	0.32	2.3	9.6
		SB	Left / Through / Right	A	0.33	5.8	45.6
		Overall Intersection		**A**	**0.55**	**6.8**	--
Bank St & Exhibition Way	Signalized	WB	Left	C	0.42	34.6	24.8
			Right	B	0.34	11.6	10.4
		NB	Left / Through / Right	A	0.31	4.8	25.6
		SB	Left	A	0.31	5.0	6.5
			Through	A	0.23	2.8	9.5
		Overall Intersection		**A**	**0.42**	**6.4**	--
Bank St & Wilton Cr	Minor Stop	NB	Left	B	0.20	12.0	4.8
		EB	Right	E	0.64	35.0	24.6
		Overall Intersection		**B**	**0.64**	**5.9**	--
Bank St & Echo Dr	Minor Stop	EB	Right	C	0.09	15.0	1.8
		Overall Intersection		**A**	**0.09**	**0.3**	--
Bank St & Aylmer Ave	Signalized	EB	Left / Right	C	0.23	30.3	17.1
		NB	Left / Through	A	0.40	5.9	29.3
		SB	Through / Right	A	0.43	7.5	41.7
		Overall Intersection		**A**	**0.43**	**7.5**	--
Bank St & Sunnyside Ave	Signalized	EB	Left / Through / Right	D	0.61	44.8	43.7
		WB	Left / Through / Right	C	0.64	31.8	43.8
		NB	Left / Through / Right	C	0.55	22.2	56.7
		SB	Left / Through / Right	A	0.54	4.7	9.8
		Overall Intersection		**B**	**0.64**	**17.3**	--
QED & Princess Patricia Way	Minor Stop	NB	Left / Through	A	0.05	8.3	1.2
		EB	Left / Right	C	0.30	15.9	7.2
		Overall Intersection		**B**	**0.30**	**3.2**	--

Intersection	Intersection Control	Approach|Movement		LOS	V/C	Total Delay (s)	Queue 95th (m)
QED & Fifth Ave	Signalized	EB	Left / Right	D	0.43	37.4	25.5
		NB	Left / Through	A	0.30	5.6	29.4
		SB	Through / Right	A	0.39	6.3	43.1
		Overall Intersection		**A**	**0.43**	**9.4**	**--**
Bank St & Marche Way	Minor Stop	WB	Left / Right	B	0.16	13.3	3.6
		Overall Intersection		**A**	**0.16**	**0.8**	**--**
Fifth Ave & O'Connor St	All-Way Stop	EB	Left / Through	A	0.12	7.9	--
		WB	Right	A	0.09	6.5	--
		NB	Left / Through / Right	A	0.17	7.9	--
		SB	Right	A	0.10	6.6	--
		Overall Intersection		**A**	**0.17**	**7.3**	**--**

Notes:

1. **v/c – represents the anticipated volume divided by the predicted capacity**
   For overall intersection v/c represents the maximum v/c among all movements
2. **# 95th percentile volume exceeds capacity; queue may be longer.**
   Queue shown is maximum after two cycles
3. **Level of Service (LOS) calculation is based on volume-to-capacity (v/c) ratios for signalized intersections and delays for unsignalized intersections**

As illustrated in **Table 18**, all study area intersections are projected to continue to operate with acceptable levels of service under 2031 Future Background Weekend conditions.

4.9.2.3 2031 Total Future Conditions

An assessment of 2031 Total Future conditions was undertaken. This scenario takes into account general growth to traffic volumes due to developments across the City of Ottawa, in addition to site specific growth forecasted as part of the Lansdowne 2.0 project.

2031 Total Future conditions traffic volumes at study area intersections are documented in **Figure 28** to **Figure 31**.

Intersection Capacity Analysis

Intersection operational analysis under 2031 Total Future Conditions are summarized in the following tables:

Table 19 summarizes the results of the Synchro analysis for the 2031 Total Future Weekday AM and PM peak hours.

Table 20 summarizes the results of the Synchro analysis for the 2031 Total Future Weekend Saturday peak hour.

Table 21 summarizes the results of the Synchro analysis for the 2031 Minor Event (Arena at TD Place) at Lansdowne scenario.

Table 22 summarizes the results of the Synchro analysis for 2031 Major Event (Stadium at TD Place) at Lansdowne scenario.

Detailed Synchro level of service analysis results can be found in **Appendix F**.

Table 19 – 2031 Total Future Weekday AM and PM Peak Hour Conditions

Intersection	Intersection Control	Approach | Movement		LOS		V/C		Total Delay (s)		Queue 95th (m)	
				AM	PM	AM	PM	AM	PM	AM	PM
Bank St & Fifth Ave	Signalized	EB	Left / Through / Right	D	D	0.63	0.67	36.5	35.6	30.5	32.6
		WB	Left	C	C	0.33	0.41	31.5	33.3	15.2	18.0
			Through / Right	C	B	0.34	0.30	21.1	17.3	17.3	14.6
		NB	Left / Through / Right	A	B	0.37	0.34	1.7	12.1	5.3	59.1
		SB	Left / Through / Right	A	A	0.30	0.42	5.5	7.0	25.7	41.8
		Overall Intersection		**A**	**B**	**0.63**	**0.67**	**8.3**	**13.1**	--	--
Bank St & Holmwood Ave	Signalized	EB	Left / Through / Right	D	D	0.48	0.55	37.8	38.8	23.3	27.6
		NB	Left / Through / Right	A	A	0.34	0.36	1.6	2.4	7.6	13.2
		SB	Left / Through / Right	A	A	0.23	0.36	3.2	4.9	14.9	22.4
		Overall Intersection		**A**	**A**	**0.48**	**0.55**	**4.7**	**6.2**	--	--
Bank St & Exhibition Way	Signalized	WB	Left	D	D	0.48	0.66	35.2	37.1	28.6	43.8
			Right	B	D	0.29	0.34	10.9	8.2	9.4	10.4
		NB	Left / Through / Right	B	A	0.42	0.43	11.8	8.1	50.1	39.6
		SB	Left	B	B	0.20	0.53	11.2	12.9	14.7	15.9
			Through	A	A	0.17	0.29	7.9	4.5	24.4	12.8
		Overall Intersection		**B**	**B**	**0.48**	**0.66**	**12.6**	**10.9**	--	--
Bank St & Wilton Cr	Minor Stop	NB	Left	B	C	0.22	0.42	11.4	15.8	4.8	12.6
		EB	Right	D	F	0.58	1.01	27.4	98.8	21.0	60.0
		Overall Intersection		**B**	**C**	**0.58**	**1.01**	**5.4**	**16.3**	--	--
Bank St & Echo Dr	Minor Stop	EB	Right	B	C	0.07	0.09	13.6	18.5	1.2	1.8
		Overall Intersection		**A**	**B**	**0.07**	**0.09**	**0.3**	**0.3**	--	--
Bank St & Aylmer Ave	Signalized	EB	Left / Right	C	C	0.30	0.37	29.7	31.5	22.1	24.2
		NB	Left / Through	A	A	0.45	0.44	3.9	7.9	17.9	43.3
		SB	Through / Right	A	A	0.38	0.52	7.7	8.5	33.4	54.6
		Overall Intersection		**A**	**A**	**0.45**	**0.52**	**6.8**	**9.3**	--	--
Bank St & Sunnyside Ave	Signalized	EB	Left / Through / Right	C	D	0.61	0.71	28.4	49.7	35.4	63.0
		WB	Left / Through / Right	C	E	0.84	0.99	26.0	69.4	75.1	116.7
		NB	Left / Through / Right	B	B	0.68	0.33	17.7	10.1	89.7	35.4
		SB	Left / Through / Right	C	D	0.82	0.99	28.8	44.9	90.5	172.0
		Overall Intersection		**C**	**D**	**0.84**	**0.99**	**23.1**	**41.0**	--	--
QED & Princess Patricia Way	Minor Stop	NB	Left / Through	A	A	0.07	0.08	8.3	9.2	1.2	1.8
		EB	Left / Right	C	D	0.25	0.50	15.5	27.2	6.0	15.6
		Overall Intersection		**B**	**C**	**0.25**	**0.50**	**2.8**	**4.2**	--	--

Intersection	Intersection Control	Approach | Movement		LOS		V/C		Total Delay (s)		Queue 95th (m)	
				AM	PM	AM	PM	AM	PM	AM	PM
QED & Fifth Ave	Signalized	EB	Left / Right	C	D	0.31	0.38	30.4	36.8	19.1	22.8
		NB	Left / Through	A	A	0.24	0.25	4.3	4.8	25.7	24.7
		SB	Through / Right	A	A	0.29	0.54	4.6	7.4	32.9	77.0
		Overall Intersection		**A**	**A**	**0.31**	**0.54**	**6.9**	**9.0**	--	--
Bank St & Marche Way	Minor Stop	WB	Left / Right	B	C	0.14	0.26	13.7	15.0	3.0	6.0
		Overall Intersection		**A**	**A**	**0.14**	**0.26**	**0.8**	**1.2**	--	--
Fifth Ave & O'Connor St	All-Way Stop	EB	Left / Through	A	A	0.15	0.15	8.0	8.1	--	--
		WB	Right	A	A	0.07	0.10	6.4	6.6	--	--
		NB	Left / Through / Right	A	A	0.13	0.14	7.6	7.8	--	--
		SB	Right	A	A	0.11	0.09	6.6	6.5	--	--
		Overall Intersection		**A**	**A**	**0.15**	**0.15**	**7.2**	**7.3**	--	--

Notes:

1. **v/c – represents the anticipated volume divided by the predicted capacity**
   For overall intersection v/c represents the maximum v/c among all movements
2. **# 95th percentile volume exceeds capacity; queue may be longer. Queue shown is maximum after two cycles**
3. **Level of Service (LOS) calculation is based on volume-to-capacity (v/c) ratios for signalized intersections and delays for unsignalized intersections**

As illustrated in **Table 19**, all study area intersections are projected to continue to operate with overall acceptable levels of service under the 2031 Total Future Weekday AM and PM peak hour conditions.

The intersection of Bank Street and Sunnyside Avenue is projected to continue to operate with specific movements at or close to theoretical capacity in the southbound approach (AM Peak) and westbound approach (PM Peak).

In addition, the eastbound approach at intersection of Bank Street and Wilton Crescent is projected to continue to operate with a LOS F due to vehicle delays during the PM peak hour. The delays are associated with limited gaps in traffic in the southbound direction associated with the recently installed 3-lane cross-section of Bank Street.

Intersection signal timings were optimized throughout the Bank Street corridor. No mitigation measure are recommended to improve intersection operations.

Table 20 – 2031 Total Future Weekend Saturday Peak Hour Conditions

Intersection	Intersection Control	Approach|Movement		LOS	V/C	Total Delay (s)	Queue 95th (m)
Bank St & Fifth Ave	Signalized	EB	Left / Through / Right	C	0.65	35.0	29.3
		WB	Left	D	0.48	36.7	20.0
			Through / Right	B	0.40	18.1	17.4
		NB	Left / Through / Right	A	0.33	4.3	16.4
		SB	Left / Through / Right	A	0.37	6.1	35.4
		Overall Intersection		**B**	**0.65**	**10.0**	--
Bank St & Holmwood Ave	Signalized	EB	Left / Through / Right	D	0.55	38.8	27.3
		NB	Left / Through / Right	A	0.34	2.4	12.5
		SB	Left / Through / Right	A	0.36	4.0	20.4
		Overall Intersection		**A**	**0.55**	**5.8**	--
Bank St & Exhibition Way	Signalized	WB	Left	D	0.55	36.0	32.8
			Right	B	0.38	10.1	11.1
		NB	Left / Through / Right	A	0.39	6.3	32.1
		SB	Left	B	0.54	16.0	46.9
			Through	A	0.26	6.9	29.2
		Overall Intersection		**B**	**0.55**	**10.4**	--
Bank St & Wilton Cr	Minor Stop	NB	Left	B	0.21	12.4	4.8
		EB	Right	E	0.68	40.1	27.6
		Overall Intersection		**B**	**0.68**	**6.3**	--
Bank St & Echo Dr	Minor Stop	EB	Right	C	0.10	15.8	1.8
		Overall Intersection		**A**	**0.10**	**0.3**	--
Bank St & Aylmer Ave	Signalized	EB	Left / Right	C	0.23	30.3	17.1
		NB	Left / Through	A	0.43	5.8	25.3
		SB	Through / Right	A	0.45	7.7	45.0
		Overall Intersection		**A**	**0.45**	**7.5**	--
Bank St & Sunnyside Ave	Signalized	EB	Left / Through / Right	E	0.75	57.8	38.7
		WB	Left / Through / Right	D	0.71	35.7	40.1
		NB	Left / Through / Right	A	0.36	7.4	40.7
		SB	Left / Through / Right	A	0.51	4.4	10.3
		Overall Intersection		**B**	**0.75**	**13.0**	--
QED & Princess Patricia Way	Minor Stop	NB	Left / Through	A	0.09	8.6	1.8
		EB	Left / Right	C	0.47	20.7	14.4
		Overall Intersection		**B**	**0.47**	**4.9**	--

Intersection	Intersection Control	Approach|Movement		LOS	V/C	Total Delay (s)	Queue 95th (m)
QED & Fifth Ave	Signalized	EB	Left / Right	D	0.43	37.4	25.5
		NB	Left / Through	A	0.33	5.8	32.6
		SB	Through / Right	A	0.42	6.6	47.6
		Overall Intersection		**A**	**0.43**	**9.4**	**--**
Bank St & Marche Way	Minor Stop	WB	Left / Right	B	0.21	14.1	4.8
		Overall Intersection		**A**	**0.21**	**1.0**	**--**
Fifth Ave & O'Connor St	All-Way Stop	EB	Left / Through	A	0.12	8.0	--
		WB	Right	A	0.09	6.5	--
		NB	Left / Through / Right	A	0.20	8.1	--
		SB	Right	A	0.10	6.6	--
		Overall Intersection		**A**	**0.20**	**7.4**	**--**

Notes:

1. **v/c – represents the anticipated volume divided by the predicted capacity**
   For overall intersection v/c represents the maximum v/c among all movements
2. **# 95th percentile volume exceeds capacity; queue may be longer.**
   Queue shown is maximum after two cycles
3. **Level of Service (LOS) calculation is based on volume-to-capacity (v/c) ratios for signalized intersections and delays for unsignalized intersections**

As illustrated in **Table 20**, all study area intersections are projected to continue to operate with acceptable levels of service under 2031 Total Future Weekend conditions.

Table 21 – 2031 Minor Event (Arena at TD Place) Peak Hour Conditions

Intersection	Intersection Control	Approach|Movement		LOS		V/C		Total Delay (s)		Queue 95th (m)	
				Ingress	Egress	Ingress	Egress	Ingress	Egress	Ingress	Egress
Bank St & Fifth Ave	Signalized	EB	Left / Through / Right	D	C	0.66	0.52	37.1	32.2	33.5	19.4
		WB	Left	C	C	0.43	0.35	33.5	34.7	19.6	15.9
			Through / Right	B	B	0.30	0.31	18.6	19.4	16.1	13.0
		NB	Left / Through / Right	B	A	0.35	0.26	11.9	6.5	62.1	39.8
		SB	Left / Through / Right	A	A	0.39	0.22	6.8	3.7	38.8	17.5
		Overall Intersection		**B**	**A**	**0.66**	**0.52**	**13.3**	**9.1**	--	--
Bank St & Holmwood Ave	Signalized	EB	Left / Through / Right	D	D	0.55	0.48	38.2	37.9	28.8	23.3
		NB	Left / Through / Right	A	A	0.42	0.31	3.2	4.0	18.8	24.6
		SB	Left / Through / Right	A	A	0.35	0.22	4.9	4.5	20.4	27.2
		Overall Intersection		**A**	**A**	**0.55**	**0.48**	**6.5**	**6.7**	--	--
Bank St & Exhibition Way	Signalized	WB	Left	D	D	0.64	0.69	36.4	36.4	42.8	48.8
			Right	A	D	0.40	0.57	8.6	8.7	11.8	15.7
		NB	Left / Through / Right	A	A	0.41	0.20	6.7	5.4	34.5	14.3
		SB	Left	B	A	0.64	0.31	18.2	7.2	62.6	11.0
			Through	A	A	0.24	0.15	4.2	4.9	10.6	8.9
		Overall Intersection		**B**	**B**	**0.64**	**0.69**	**11.1**	**12.2**	--	--
Bank St & Wilton Cr	Minor Stop	NB	Left	B	B	0.25	0.08	12.6	10.6	6.0	1.2
		EB	Right	F	C	1.00	0.35	89.3	20.6	63.6	9.6
		Overall Intersection		**C**	**A**	**1.00**	**0.35**	**16.0**	**3.1**	--	--
Bank St & Echo Dr	Minor Stop	EB	Right	C	B	0.13	0.02	17.7	10.7	2.4	0.6
		Overall Intersection		**B**	**A**	**0.13**	**0.02**	**0.4**	**0.2**	--	--
Bank St & Aylmer Ave	Signalized	EB	Left / Right	D	C	0.36	0.03	36.6	27.2	26.8	4.4
		NB	Left / Through	A	A	0.43	0.10	5.5	5.4	26.1	9.2
		SB	Through / Right	A	A	0.37	0.12	6.9	5.4	34.0	11.3
		Overall Intersection		**A**	**A**	**0.43**	**0.12**	**7.8**	**5.7**	--	--
Bank St & Sunnyside Ave	Signalized	EB	Left / Through / Right	D	D	0.70	0.50	48.2	45.8	44.8	19.6
		WB	Left / Through / Right	C	C	0.76	0.32	33.0	20.2	56.0	12.2
		NB	Left / Through / Right	A	A	0.35	0.14	9.0	3.7	36.5	12.3
		SB	Left / Through / Right	A	A	0.62	0.28	8.9	4.2	25.0	24.3
		Overall Intersection		**B**	**A**	**0.76**	**0.50**	**15.4**	**7.4**	--	--
QED & Princess Patricia Way	Minor Stop	NB	Left / Through	A	A	0.16	0.03	9.6	7.7	3.6	0.6
		EB	Left / Right	D	C	0.54	0.65	30.4	18.4	17.4	28.8
		Overall Intersection		**D**	**A**	**0.54**	**0.65**	**5.1**	**11.6**	--	--

Intersection	Intersection Control	Approach|Movement		LOS		V/C		Total Delay (s)		Queue 95th (m)	
				Ingress	Egress	Ingress	Egress	Ingress	Egress	Ingress	Egress
QED & Fifth Ave	Signalized	EB	Left / Right	C	C	0.39	0.40	28.8	28.9	23.1	24.1
		NB	Left / Through	A	A	0.37	0.33	7.2	6.7	31.5	31.2
		SB	Through / Right	B	A	0.68	0.22	11.8	5.8	89.4	20.0
		Overall Intersection		**B**	**A**	**0.68**	**0.40**	**12.0**	**9.9**	--	--
Bank St & Marche Way	Minor Stop	WB	Left / Right	B	B	0.19	0.32	13.4	14.1	4.2	8.4
		Overall Intersection		**A**	**A**	**0.19**	**0.32**	**0.9**	**2.3**	--	--
Fifth Ave & O'Connor St	All-Way Stop	EB	Left / Through	A	A	0.16	0.07	8.2	7.5	--	--
		WB	Right	A	A	0.14	0.07	6.7	6.4	--	--
		NB	Left / Through / Right	A	A	0.20	0.09	8.2	7.1	--	--
		SB	Right	A	A	0.08	0.10	6.5	6.5	--	--
		Overall Intersection		**A**	**A**	**0.20**	**0.10**	**7.5**	**6.8**	--	--

Notes:

1. **v/c – represents the anticipated volume divided by the predicted capacity**
   For overall intersection v/c represents the maximum v/c among all movements
2. **# 95th percentile volume exceeds capacity; queue may be longer. Queue shown is maximum after two cycles**
3. **Level of Service (LOS) calculation is based on volume-to-capacity (v/c) ratios for signalized intersections and delays for unsignalized intersections**

As illustrated in **Table 21**, all study area intersections are projected to continue to operate with overall acceptable levels of service in the 2031 Total Future horizon year for Minor Events held at TD Place.

The eastbound approach at intersection of Bank Street and Wilton Crescent is projected to continue to operate with a LOS F due to vehicle delays incurred on the minor approach. This occurs during the Ingress period which overlaps with the regular PM peak period. The delays at this intersection are not directly attributed to event traffic held at Lansdowne and are associated with limited gaps in traffic in the southbound direction as a result of the recently installed 3-lane cross-section of Bank Street.

No mitigation measure are recommended to improve intersection operations.

Table 22 – 2031 Major Event (Stadium at TD Place) Peak Hour Conditions

Intersection	Intersection Control	Approach|Movement		LOS		V/C		Total Delay (s)		Queue 95th (m)	
				Ingress	Egress	Ingress	Egress	Ingress	Egress	Ingress	Egress
Bank St & Fifth Ave	Signalized	EB	Left / Through / Right	D	C	0.69	0.52	36.5	32.2	36.0	19.4
		WB	Left	C	C	0.43	0.35	30.6	34.7	20.6	15.9
			Through / Right	B	B	0.41	0.31	17.7	19.4	21.1	13.0
		NB	Left / Through / Right	A	A	0.37	0.26	7.1	6.5	35.0	39.8
		SB	Left / Through / Right	A	A	0.47	0.22	8.0	3.7	47.7	17.5
		Overall Intersection		**B**	**A**	**0.69**	**0.52**	**11.9**	**9.1**	--	--
Bank St & Holmwood Ave	Signalized	EB	Left / Through / Right	D	D	0.62	0.48	38.5	37.9	35.0	23.3
		NB	Left / Through / Right	A	A	0.55	0.31	4.0	4.0	7.5	24.6
		SB	Left / Through / Right	A	A	0.47	0.22	7.4	4.5	44.3	27.2
		Overall Intersection		**A**	**A**	**0.62**	**0.48**	**8.5**	**6.7**	--	--
Bank St & Exhibition Way	Signalized	WB	Left	*Movements Temporarily Restricted During Major Events*							
			Right								
		NB	Left / Through / Right	A	A	0.38	0.20	5.9	5.4	39.2	14.3
		SB	Left	*Movements Temporarily Restricted During Major Events*							
			Through	A	A	0.28	0.15	4.3	4.9	18.9	8.9
		Overall Intersection		**A**	**B**	**0.49**	**0.69**	**7.6**	**12.2**	--	--
Bank St & Wilton Cr	Minor Stop	NB	Left	B	B	0.21	0.08	13.0	10.6	4.8	1.2
		EB	Right	F	C	1.15	0.35	143.0	20.6	81.6	9.6
		Overall Intersection		**D**	**A**	**1.15**	**0.35**	**22.8**	**3.1**	--	--
Bank St & Echo Dr	Minor Stop	EB	Right	C	B	0.27	0.02	20.7	10.7	6.6	0.6
		Overall Intersection		**B**	**A**	**0.27**	**0.02**	**0.9**	**0.2**	--	--
Bank St & Aylmer Ave	Signalized	EB	Left / Right	D	C	0.52	0.03	38.7	27.2	35.2	4.4
		NB	Left / Through	A	A	0.45	0.10	8.3	5.4	49.3	9.2
		SB	Through / Right	A	A	0.49	0.12	8.5	5.4	55.6	11.3
		Overall Intersection		**B**	**A**	**0.52**	**0.12**	**10.4**	**5.7**	--	--
Bank St & Sunnyside Ave	Signalized	EB	Left / Through / Right	E	D	0.86	0.50	68.1	45.8	65.8	19.6
		WB	Left / Through / Right	D	C	0.85	0.32	47.2	20.2	75.6	12.2
		NB	Left / Through / Right	A	A	0.40	0.14	8.4	3.7	36.0	12.3
		SB	Left / Through / Right	B	A	0.79	0.28	16.6	4.2	84.4	24.3
		Overall Intersection		**C**	**A**	**0.86**	**0.50**	**22.4**	**7.4**	--	--
QED & Princess Patricia Way	Minor Stop	NB	Left / Through	B	A	0.17	0.03	10.3	7.7	3.6	0.6
		EB	Left / Right	F	C	1.04	0.65	114.1	18.4	61.8	28.8
		Overall Intersection		**E**	**A**	**1.04**	**0.65**	**20.1**	**11.6**	--	--

Intersection	Intersection Control	Approach | Movement		LOS		V/C		Total Delay (s)		Queue 95th (m)	
				Ingress	Egress	Ingress	Egress	Ingress	Egress	Ingress	Egress
QED & Fifth Ave	Signalized	EB	Left / Right	C	C	0.60	0.40	33.8	28.9	37.0	24.1
		NB	Left / Through	B	A	0.67	0.33	16.1	6.7	64.6	31.2
		SB	Through / Right	C	A	0.87	0.22	22.7	5.8	171.3	20.0
		Overall Intersection		**C**	**A**	**0.87**	**0.40**	**22.3**	**9.9**	**--**	**--**
Bank St & Marche Way	Minor Stop	WB	Left / Right	*Movements Temporarily Restricted During Major Events*							
		Overall Intersection		**A**	**A**	**0.09**	**0.32**	**0.3**	**2.3**	**--**	**--**
Fifth Ave & O'Connor St	All-Way Stop	EB	Left / Through	A	A	0.19	0.12	8.6	8.6	--	--
		WB	Right	A	A	0.20	0.12	7.0	6.6	--	--
		NB	Left / Through / Right	A	B	0.28	0.45	8.7	10.3	--	--
		SB	Right	A	A	0.13	0.06	6.7	6.4	--	--
		Overall Intersection		**A**	**A**	**0.28**	**0.45**	**7.8**	**9.0**	**--**	**--**

Notes:

1. **v/c – represents the anticipated volume divided by the predicted capacity**
   For overall intersection v/c represents the maximum v/c among all movements
2. **# 95th percentile volume exceeds capacity; queue may be longer. Queue shown is maximum after two cycles**
3. **Level of Service (LOS) calculation is based on volume-to-capacity (v/c) ratios for signalized intersections and delays for unsignalized intersections**

As illustrated in **Table 22**, all study area intersections are projected to continue to operate with overall acceptable levels of service during 2031 Total Future horizon year for Major Events held at TD Place.

The eastbound approach at intersection of Bank Street and Wilton Crescent is projected to continue to operate with a LOS F due to vehicle delays incurred on the minor approach. This occurs during the event Ingress period which overlaps with the regular PM peak period. The delays at this intersection are not directly attributed to event traffic held at Lansdowne and are associated with limited gaps in traffic in the southbound direction due to the recently installed 3-lane cross-section of Bank Street.

In addition, the eastbound approach at the Queen Elizabeth Drive and Princess Patricia Way intersection is shown to operate with an LOS rating of E for the Ingress periods. Although the analysis indicates that the movements are operating with delays, the performance of these intersections are expected to continue to be adequately managed through the deployment of Ottawa Police Point duty as part of the traffic management measures for Major Events at Lansdowne.

No mitigation measure are recommended to improve intersection operations.

4.9.2.4 2036 Total Future Conditions

An assessment of 2036 Total Future conditions was undertaken. This scenario takes into account general growth to traffic volumes five years after full build-out and occupancy of Lansdowne 2.0.

2036 Total Future conditions traffic volumes at study area intersections are documented in **Figure 32** to **Figure 35**.

Intersection Capacity Analysis

Intersection operational analysis under 2036 Total Future Conditions are summarized in the following tables:

Table 23 summarizes the results of the Synchro analysis for the 2036 Total Future Weekday AM and PM peak hours.

Table 24 summarizes the results of the Synchro analysis for the 2036 Total Future Weekend Saturday peak hour.

Table 25 summarizes the results of the Synchro analysis for the 2036 Minor Event (Arena at TD Place) at Lansdowne scenario.

Table 26 summarizes the results of the Synchro analysis for 2036 Major Event (Stadium at TD Place) at Lansdowne scenario.

Detailed Synchro level of service analysis results can be found in **Appendix F**.

Table 23 – 2036 Total Future Weekday AM and PM Peak Hour Conditions

Intersection	Intersection Control	Approach | Movement		LOS		V/C		Total Delay (s)		Queue 95th (m)	
				AM	PM	AM	PM	AM	PM	AM	PM
Bank St & Fifth Ave	Signalized	EB	Left / Through / Right	D	D	0.63	0.67	36.7	36.0	31.0	33.4
		WB	Left	C	C	0.34	0.42	31.7	33.0	15.6	18.2
			Through / Right	C	B	0.35	0.30	21.0	17.2	17.8	14.7
		NB	Left / Through / Right	A	A	0.38	0.35	1.7	1.7	5.4	4.3
		SB	Left / Through / Right	A	A	0.30	0.43	5.7	7.2	26.6	43.8
		Overall Intersection		**A**	**A**	**0.63**	**0.67**	**8.4**	**9.4**	--	--
Bank St & Holmwood Ave	Signalized	EB	Left / Through / Right	D	D	0.49	0.56	37.8	38.7	23.9	27.9
		NB	Left / Through / Right	A	A	0.34	0.37	1.7	2.5	7.6	12.9
		SB	Left / Through / Right	A	A	0.23	0.37	3.3	6.8	15.5	49.5
		Overall Intersection		**A**	**A**	**0.49**	**0.56**	**4.8**	**7.1**	--	--
Bank St & Exhibition Way	Signalized	WB	Left	D	D	0.49	0.67	35.2	37.1	29.1	44.4
			Right	B	D	0.29	0.34	10.8	8.2	9.3	10.6
		NB	Left / Through / Right	B	A	0.43	0.44	12.0	8.3	51.8	41.3
		SB	Left	B	B	0.20	0.55	11.4	17.1	14.9	#25.9
			Through	A	A	0.18	0.30	8.0	6.5	25.0	18.6
		Overall Intersection		**B**	**B**	**0.49**	**0.67**	**12.7**	**12.0**	--	--
Bank St & Wilton Cr	Minor Stop	NB	Left	B	C	0.23	0.44	11.5	16.3	0.0	0.0
		EB	Right	D	F	0.60	1.05	28.9	114.1	0.0	0.0
		Overall Intersection		**B**	**C**	**0.60**	**1.05**	**5.7**	**18.6**	--	--
Bank St & Echo Dr	Minor Stop	EB	Right	B	C	0.07	0.10	13.8	19.0	0.0	0.0
		Overall Intersection		**A**	**B**	**0.07**	**0.10**	**0.3**	**0.3**	--	--
Bank St & Aylmer Ave	Signalized	EB	Left / Right	C	C	0.31	0.38	29.7	31.8	22.4	25.0
		NB	Left / Through	A	A	0.46	0.45	3.9	5.2	18.2	22.7
		SB	Through / Right	A	A	0.39	0.53	7.8	8.8	34.4	57.4
		Overall Intersection		**A**	**A**	**0.46**	**0.53**	**6.9**	**8.3**	--	--
Bank St & Sunnyside Ave	Signalized	EB	Left / Through / Right	C	E	0.50	0.79	29.1	56.0	36.2	64.0
		WB	Left / Through / Right	C	E	0.82	1.00	27.3	69.9	78.1	109.3
		NB	Left / Through / Right	B	A	0.76	0.34	18.3	9.6	93.7	33.6
		SB	Left / Through / Right	C	D	0.92	1.03	32.3	47.3	94.3	166.6
		Overall Intersection		**C**	**D**	**0.92**	**1.03**	**24.7**	**42.8**	--	--
QED & Princess Patricia Way	Minor Stop	NB	Left / Through	A	A	0.07	0.09	8.3	9.3	0.0	0.0
		EB	Left / Right	C	D	0.26	0.52	16.0	29.0	0.0	0.0
		Overall Intersection		**B**	**C**	**0.26**	**0.52**	**2.8**	**4.4**	--	--

Intersection	Intersection Control	Approach | Movement		LOS		V/C		Total Delay (s)		Queue 95th (m)	
				AM	PM	AM	PM	AM	PM	AM	PM
QED & Fifth Ave	Signalized	EB	Left / Right	C	D	0.32	0.38	30.5	36.8	19.3	22.8
		NB	Left / Through	A	A	0.30	0.26	5.7	4.8	26.4	25.3
		SB	Through / Right	A	A	0.36	0.55	6.1	7.7	34.0	80.7
		Overall Intersection		**A**	**A**	**0.36**	**0.55**	**8.2**	**9.1**	**--**	**--**
Bank St & Marche Way	Minor Stop	WB	Left / Right	B	C	0.14	0.26	13.8	15.2	0.0	0.0
		Overall Intersection		**A**	**A**	**0.14**	**0.26**	**0.8**	**1.2**	**--**	**--**
Fifth Ave & O'Connor St	All-Way Stop	EB	Left / Through	A	A	0.15	0.16	8.1	8.2	--	--
		WB	Right	A	A	0.07	0.11	6.5	6.6	--	--
		NB	Left / Through / Right	A	A	0.13	0.14	7.7	7.8	--	--
		SB	Right	A	A	0.11	0.10	6.6	6.5	--	--
		Overall Intersection		**A**	**A**	**0.15**	**0.16**	**7.3**	**7.3**	**--**	**--**

Notes:

1. **v/c – represents the anticipated volume divided by the predicted capacity**
   For overall intersection v/c represents the maximum v/c among all movements
2. **# 95th percentile volume exceeds capacity; queue may be longer. Queue shown is maximum after two cycles**
3. **Level of Service (LOS) calculation is based on volume-to-capacity (v/c) ratios for signalized intersections and delays for unsignalized intersections**

As illustrated in **Table 23**, all study area intersections are projected to continue to operate with overall acceptable levels of service under 2036 Ultimate Weekday AM and PM peak hour conditions.

The intersection of Bank Street and Sunnyside Avenue is projected to continue to operate with specific movements at or close to theoretical capacity in the southbound approach (AM Peak) and westbound approach (PM Peak).

In addition, the eastbound approach at intersection of Bank Street and Wilton Crescent is projected to continue to operate with a LOS F due to vehicle delays during the PM peak hour. The delays are associated with limited gaps in traffic in the southbound direction associated with the recently installed 3-lane cross-section of Bank Street.

Intersection signal timings were optimized throughout the Bank Street corridor. No mitigation measure are recommended to improve intersection operations.

Table 24 – 2036 Total Future Weekend Saturday Peak Hour Conditions

Intersection	Intersection Control	Approach|Movement		LOS	V/C	Total Delay (s)	Queue 95th (m)
Bank St & Fifth Ave	Signalized	EB	Left / Through / Right	D	0.65	35.2	29.8
		WB	Left	D	0.48	36.8	20.4
			Through / Right	B	0.40	17.9	17.6
		NB	Left / Through / Right	B	0.34	11.2	59.2
		SB	Left / Through / Right	A	0.38	6.3	36.7
		Overall Intersection		**B**	**0.65**	**12.7**	--
Bank St & Holmwood Ave	Signalized	EB	Left / Through / Right	D	0.56	38.9	27.9
		NB	Left / Through / Right	A	0.35	2.4	12.7
		SB	Left / Through / Right	A	0.37	5.9	52.1
		Overall Intersection		**A**	**0.56**	**6.8**	--
Bank St & Exhibition Way	Signalized	WB	Left	D	0.55	36.0	33.5
			Right	A	0.38	9.9	11.2
		NB	Left / Through / Right	A	0.40	6.5	33.6
		SB	Left	B	0.56	13.6	21.0
			Through	A	0.27	3.7	10.7
		Overall Intersection		**A**	**0.56**	**9.2**	--
Bank St & Wilton Cr	Minor Stop	NB	Left	B	0.22	12.6	4.8
		EB	Right	E	0.71	43.4	30.0
		Overall Intersection		**C**	**0.71**	**6.7**	--
Bank St & Echo Dr	Minor Stop	EB	Right	C	0.10	16.1	1.8
		Overall Intersection		**A**	**0.10**	**0.3**	--
Bank St & Aylmer Ave	Signalized	EB	Left / Right	C	0.24	30.2	17.4
		NB	Left / Through	A	0.44	7.9	43.1
		SB	Through / Right	A	0.46	7.9	46.3
		Overall Intersection		**A**	**0.46**	**8.5**	--
Bank St & Sunnyside Ave	Signalized	EB	Left / Through / Right	E	0.77	59.1	44.4
		WB	Left / Through / Right	D	0.73	36.2	42.4
		NB	Left / Through / Right	A	0.38	7.1	35.5
		SB	Left / Through / Right	A	0.53	8.9	49.7
		Overall Intersection		**B**	**0.77**	**15.0**	--
QED & Princess Patricia Way	Minor Stop	NB	Left / Through	A	0.09	8.6	1.8
		EB	Left / Right	C	0.49	21.7	15.6
		Overall Intersection		**B**	**0.49**	**5.1**	--

Intersection	Intersection Control	Approach|Movement		LOS	V/C	Total Delay (s)	Queue 95th (m)
QED & Fifth Ave	Signalized	EB	Left / Right	D	0.44	37.5	26.2
		NB	Left / Through	A	0.34	6.0	33.8
		SB	Through / Right	A	0.43	6.7	49.7
		Overall Intersection		**A**	**0.44**	**9.6**	**--**
Bank St & Marche Way	Minor Stop	WB	Left / Right	B	0.21	14.3	4.8
		Overall Intersection		**A**	**0.21**	**1.0**	**--**
Fifth Ave & O'Connor St	All-Way Stop	EB	Left / Through	A	0.13	8.0	--
		WB	Right	A	0.10	6.5	--
		NB	Left / Through / Right	A	0.20	8.1	--
		SB	Right	A	0.11	6.6	--
		Overall Intersection		**A**	**0.20**	**7.4**	**--**

Notes:

1. **v/c – represents the anticipated volume divided by the predicted capacity**
   For overall intersection v/c represents the maximum v/c among all movements
2. **# 95th percentile volume exceeds capacity; queue may be longer.**
   Queue shown is maximum after two cycles
3. **Level of Service (LOS) calculation is based on volume-to-capacity (v/c) ratios for signalized intersections and delays for unsignalized intersections**

As illustrated in **Table 24**, all study area intersections are projected to continue to operate with acceptable levels of service under 2036 Ultimate Weekend peak hour conditions.

Table 25 – 2036 Minor Event (Arena at TD Place) Peak Hour Conditions

Intersection	Intersection Control	Approach|Movement		LOS		V/C		Total Delay (s)		Queue 95th (m)	
				Ingress	Egress	Ingress	Egress	Ingress	Egress	Ingress	Egress
Bank St & Fifth Ave	Signalized	EB	Left / Through / Right	D	C	0.67	0.53	37.1	32.1	34.1	19.7
		WB	Left	C	C	0.44	0.36	33.4	34.9	19.9	16.3
			Through / Right	B	B	0.30	0.32	18.3	19.3	16.1	13.2
		NB	Left / Through / Right	B	A	0.36	0.26	12.3	6.7	64.5	40.7
		SB	Left / Through / Right	A	A	0.40	0.22	7.1	3.8	40.4	18.1
		Overall Intersection		**B**	**A**	**0.67**	**0.53**	**13.6**	**9.3**	--	--
Bank St & Holmwood Ave	Signalized	EB	Left / Through / Right	D	D	0.56	0.49	38.2	37.9	29.0	23.5
		NB	Left / Through / Right	A	A	0.43	0.32	3.3	4.0	18.8	24.7
		SB	Left / Through / Right	A	A	0.36	0.23	4.9	4.6	18.5	27.7
		Overall Intersection		**A**	**A**	**0.56**	**0.49**	**6.5**	**6.8**	--	--
Bank St & Exhibition Way	Signalized	WB	Left	D	D	0.64	0.69	36.4	36.4	42.8	48.8
			Right	A	D	0.40	0.57	8.6	8.7	11.8	15.7
		NB	Left / Through / Right	A	A	0.42	0.20	6.9	5.4	35.7	14.6
		SB	Left	B	A	0.65	0.32	18.8	7.2	63.0	10.8
			Through	A	A	0.25	0.16	4.2	4.9	10.9	9.1
		Overall Intersection		**B**	**B**	**0.65**	**0.69**	**11.2**	**12.1**	--	--
Bank St & Wilton Cr	Minor Stop	NB	Left	B	B	0.26	0.08	12.8	10.6	6.6	1.8
		EB	Right	F	C	1.04	0.37	101.9	21.1	69.6	9.6
		Overall Intersection		**C**	**A**	**1.04**	**0.37**	**18.1**	**3.1**	--	--
Bank St & Echo Dr	Minor Stop	EB	Right	C	B	0.14	0.02	18.1	10.7	3.0	0.6
		Overall Intersection		**B**	**A**	**0.14**	**0.02**	**0.4**	**0.2**	--	--
Bank St & Aylmer Ave	Signalized	EB	Left / Right	D	C	0.37	0.03	36.9	27.2	27.6	4.4
		NB	Left / Through	A	A	0.43	0.10	5.6	5.4	27.4	9.2
		SB	Through / Right	A	A	0.37	0.12	7.0	5.4	35.2	11.3
		Overall Intersection		**A**	**A**	**0.43**	**0.12**	**7.9**	**5.7**	--	--
Bank St & Sunnyside Ave	Signalized	EB	Left / Through / Right	D	D	0.68	0.50	45.8	46.0	46.6	20.0
		WB	Left / Through / Right	C	B	0.75	0.33	32.0	19.9	60.8	12.3
		NB	Left / Through / Right	A	A	0.36	0.14	9.4	3.7	37.1	12.6
		SB	Left / Through / Right	A	A	0.65	0.29	9.6	4.3	26.3	24.8
		Overall Intersection		**B**	**A**	**0.75**	**0.50**	**15.6**	**7.5**	--	--
QED & Princess Patricia Way	Minor Stop	NB	Left / Through	A	A	0.16	0.03	9.6	7.7	3.6	0.6
		EB	Left / Right	D	C	0.55	0.65	31.7	18.5	18.6	29.4
		Overall Intersection		**D**	**A**	**0.55**	**0.65**	**5.2**	**11.6**	--	--

Intersection	Intersection Control	Approach|Movement		LOS		V/C		Total Delay (s)		Queue 95th (m)	
				Ingress	Egress	Ingress	Egress	Ingress	Egress	Ingress	Egress
QED & Fifth Ave	Signalized	EB	Left / Right	C	C	0.40	0.42	29.0	29.2	23.7	24.7
		NB	Left / Through	A	A	0.38	0.33	7.4	6.7	32.7	31.6
		SB	Through / Right	B	A	0.69	0.22	12.1	5.8	92.3	20.3
		Overall Intersection		**B**	**B**	**0.69**	**0.42**	**12.3**	**10.1**	--	--
Bank St & Marche Way	Minor Stop	WB	Left / Right	B	B	0.19	0.32	13.5	14.2	4.2	8.4
		Overall Intersection		**A**	**A**	**0.19**	**0.32**	**0.9**	**2.3**	--	--
Fifth Ave & O'Connor St	All-Way Stop	EB	Left / Through	A	A	0.16	0.07	8.2	7.5	--	--
		WB	Right	A	A	0.14	0.07	6.7	6.4	--	--
		NB	Left / Through / Right	B	A	0.20	0.09	8.2	7.1	--	--
		SB	Right	A	A	0.09	0.10	6.5	6.6	--	--
		Overall Intersection		**A**	**A**	**0.20**	**0.10**	**7.5**	**6.8**	--	--

Notes:

1. **v/c – represents the anticipated volume divided by the predicted capacity**
   For overall intersection v/c represents the maximum v/c among all movements
2. **# 95th percentile volume exceeds capacity; queue may be longer. Queue shown is maximum after two cycles**
3. **Level of Service (LOS) calculation is based on volume-to-capacity (v/c) ratios for signalized intersections and delays for unsignalized intersections**

As illustrated in **Table 25**, all study area intersections are projected to continue to operate with overall acceptable levels of service during the 2036 Ultimate horizon year for Minor Events held at TD Place.

The eastbound approach at intersection of Bank Street and Wilton Crescent is projected to continue to operate with a LOS F due to vehicle delays incurred on the minor approach. This occurs during the Ingress period which overlaps with the regular PM peak period. The delays at this intersection are not directly attributed to event traffic held at Lansdowne and are associated with limited gaps in traffic in the southbound direction as a result of the recently installed 3-lane cross-section of Bank Street.

No mitigation measure are recommended to improve intersection operations.

Table 26 – 2036 Major Event (Stadium at TD Place) Peak Hour Conditions

Intersection	Intersection Control	Approach|Movement		LOS		V/C		Total Delay (s)		Queue 95th (m)	
				Ingress	Egress	Ingress	Egress	Ingress	Egress	Ingress	Egress
Bank & Fifth	Signalized	EB	Left / Through / Right	D	D	0.69	0.69	36.9	38.3	36.9	34.2
		WB	Left	C	C	0.44	0.23	30.8	24.9	20.9	13.0
			Through / Right	B	B	0.41	0.46	17.8	19.5	21.5	25.0
		NB	Left / Through / Right	A	A	0.38	0.26	7.2	6.3	35.9	22.6
		SB	Left / Through / Right	A	A	0.49	0.28	8.2	6.3	49.3	24.4
		Overall Intersection		**B**	**B**	**0.69**	**0.69**	**12.1**	**12.3**	--	--
Bank & Holmwood	Signalized	EB	Left / Through / Right	D	D	0.63	0.63	38.6	38.9	35.8	34.8
		NB	Left / Through / Right	A	A	0.57	0.29	4.4	3.3	55.3	23.4
		SB	Left / Through / Right	A	A	0.49	0.26	7.7	5.4	46.3	20.2
		Overall Intersection		**A**	**A**	**0.63**	**0.63**	**8.8**	**9.2**	--	--
Bank & Exhibition	Signalized	WB	Left	*Movements Temporarily Restricted During Major Events*							
			Right								
		NB	Left / Through / Right	A	A	0.39	0.17	6.0	3.2	40.3	33.7
		SB	Left	*Movements Temporarily Restricted During Major Events*							
			Through	A	A	0.29	0.15	4.3	2.5	19.3	44.8
		Overall Intersection		**A**	**A**	**0.49**	**0.19**	**7.6**	**4.4**	--	--
Bank & Wilton	Minor Stop	NB	Left	B	A	0.22	-	13.2	0.0	0.0	0.0
		EB	Right	F	B	1.21	0.01	164.1	13.9	0.0	0.0
		Overall Intersection		**D**	**A**	**1.21**	**0.01**	**26.1**	**0.1**	--	--
Bank & Echo	Minor Stop	EB	Right	C	B	0.28	0.06	21.4	10.8	0.0	0.0
		Overall Intersection		**B**	**A**	**0.28**	**0.06**	**0.9**	**0.5**	--	--
Bank & Aylmer	Signalized	EB	Left / Right	D	C	0.53	0.17	38.8	23.5	35.8	11.9
		NB	Left / Through	A	A	0.46	0.22	8.4	6.1	50.9	19.1
		SB	Through / Right	A	A	0.50	0.20	8.7	5.7	57.5	17.4
		Overall Intersection		**B**	**A**	**0.53**	**0.22**	**10.5**	**6.7**	--	--
Bank & Sunnyside	Signalized	EB	Left / Through / Right	E	D	0.91	0.56	77.4	43.7	69.2	26.9
		WB	Left / Through / Right	D	C	0.87	0.49	49.8	28.2	78.7	22.2
		NB	Left / Through / Right	A	A	0.42	0.17	8.5	4.4	37.0	16.3
		SB	Left / Through / Right	B	A	0.81	0.21	17.8	4.4	89.7	19.1
		Overall Intersection		**C**	**B**	**0.91**	**0.56**	**24.2**	**10.5**	--	--
QED & Princess Patricia Way	Minor Stop	NB	Left / Through	B	A	0.18	0.06	10.4	8.3	0.0	0.0
		EB	Left / Right	F	F	1.07	0.97	123.5	60.5	0.0	0.0
		Overall Intersection		**E**	**C**	**1.07**	**0.97**	**21.3**	**28.2**	--	--

Intersection	Intersection Control	Approach | Movement		LOS		V/C		Total Delay (s)		Queue 95th (m)	
				Ingress	Egress	Ingress	Egress	Ingress	Egress	Ingress	Egress
QED & Fifth	Signalized	EB	Left / Right	C	D	0.60	0.72	34.0	39.0	37.8	53.5
		NB	Left / Through	B	A	0.71	0.42	18.8	9.0	82.6	41.8
		SB	Through / Right	C	A	0.88	0.42	24.3	8.8	175.7	43.4
		Overall Intersection		**C**	**B**	**0.88**	**0.72**	**24.0**	**15.5**	**--**	**--**
Bank & Marche	Minor Stop	WB	Left / Right	*Movements Temporarily Restricted During Major Events*							
		Overall Intersection		**A**	**A**	**0.09**	**0.04**	**0.3**	**0.3**	**--**	**--**
Fifth Ave & O'Connor St	All-Way Stop	EB	Left / Through	A	A	0.19	0.12	8.6	8.6	--	--
		WB	Right	A	A	0.20	0.12	7.0	6.6	--	--
		NB	Left / Through / Right	A	B	0.28	0.45	8.7	10.3	--	--
		SB	Right	A	A	0.13	0.06	6.7	6.4	--	--
		Overall Intersection		**A**	**A**	**0.28**	**0.45**	**7.8**	**9.0**	**--**	**--**

Notes:

1. **v/c – represents the anticipated volume divided by the predicted capacity**
   For overall intersection v/c represents the maximum v/c among all movements
2. **# 95th percentile volume exceeds capacity; queue may be longer. Queue shown is maximum after two cycles**
3. **Level of Service (LOS) calculation is based on volume-to-capacity (v/c) ratios for signalized intersections and delays for unsignalized intersections**

As illustrated in **Table 26**, all study area intersections are projected to continue to operate with overall acceptable levels of service during 2036 Ultimate conditions for Major Events held at TD Place.

The eastbound approach at intersection of Bank Street and Wilton Crescent is projected to continue to operate with a LOS F due to vehicle delays incurred on the minor approach. This occurs during the event Ingress period which overlaps with the regular PM peak period. The delays at this intersection are not directly attributed to event traffic held at Lansdowne and are associated with limited gaps in traffic in the southbound direction due to the recently installed 3-lane cross-section of Bank Street.

In addition, the eastbound approach at the Queen Elizabeth Drive and Princess Patricia Way intersection is shown to operate with an LOS rating of E for the Ingress periods. Although the analysis indicates that the movements are operating with delays, the performance of these intersections are expected to continue to be adequately managed through the deployment of Ottawa Police Point duty as part of the traffic management measures for Major Events at Lansdowne.

No mitigation measure are recommended to improve intersection operations.

Ultimate Conditions Intersection Multi-Modal Level of Service (MMLOS)

A multi-modal level of service (MMLOS) assessment was completed for the signalized intersection within the study area under future conditions. The results of this analyses are summarized in **Figure 40**.

Detailed MMLOS summary worksheets are included in **Appendix C**.

Bank Street Intersections:

Should the existing pedestrian facilities be maintained into the future at all the Bank Street signalized intersections, the PLOS target of B is projected to continue to not be met in the future. To improve the PLOS, improvements that reduce pedestrian exposure to traffic and delayed experience should be considered at each intersection. Alternative signal timing plans, or considerations for other signal designs should be evaluated.

Should the existing bicycling facilities be maintained into the future at all the Bank Street Intersections, the BLOS target of C is projected to continue to not be met in the future. To improve the BLOS at these intersections, improvements such as dedicated facilities and two-stage left turn bike boxes should be considered. Opportunities to implement on-street bike lanes on Bank Street will be explored as part of the forthcoming Bank Street Active Transportation and Transit Operations Feasibility Study.

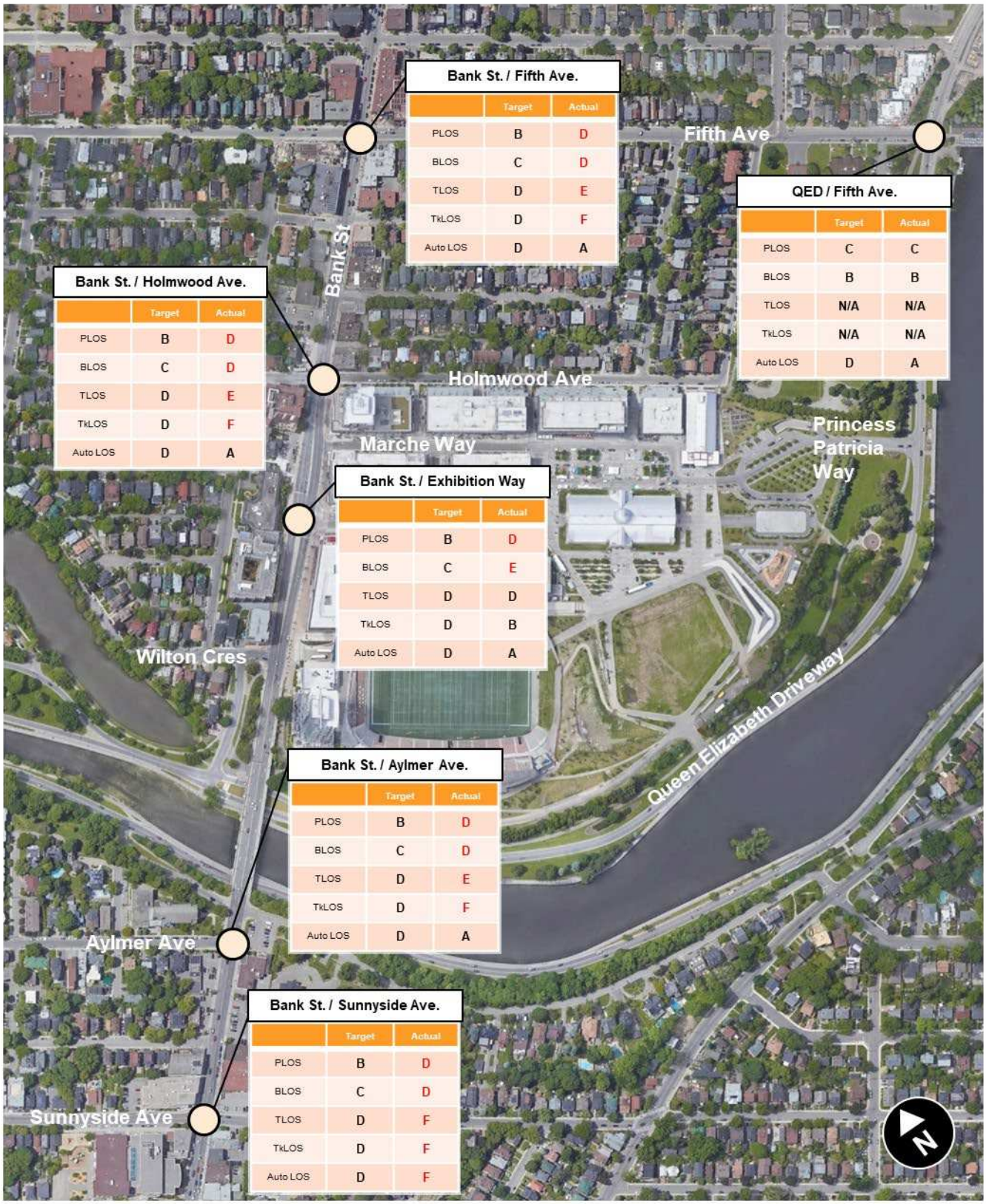
Should the existing facilities be maintained into the future at the Bank Street Intersections, the TLOS target of D is projected to continue to not be met at most intersections. To improve the TLOS, transit priority measures and/or signal optimization may be required.

Auto LOS targets are expected to be met at the Bank Street signalized intersections, except for the Bank Street and Sunnyside Avenue intersection, As shown in the summarized results, the Auto LOS is expected to reach an LOS of F, a decline from existing conditions.

Queen Elizabeth Driveway and Fifth Avenue:

Should the existing facilities be maintained into the future this intersection, all the relevant multi-modal targets are expected to be met.

Figure 40 – Ultimate Conditions Signalized Intersections MMLOS Targets and Results



Future Conditions MMLOS Targets and Results (Signalized Intersections)

5.0 SUMMARY AND CONCLUSIONS

This Transportation Impact Assessment (TIA) was prepared in support of a zoning by-law amendment for the proposed Lansdowne 2.0 project in the Glebe Annex community in Ottawa, Ontario.

The Lansdowne 2.0 plan seeks to replace existing city-owned infrastructure while adding additional density to the site. The proposed plan includes the following elements:

- Replacing the existing functionally obsolete north stadium stands and arena complex with a new 11,200 seat (12,100 spectator) north stand structure for the Stadium at TD Place. This new facility replaces the existing north stadium stands and would result in a reduction of approximately 2,000 spectator capacity at the Stadium at TD Place.
- Replace the existing 9,800 seat indoor arena and event space attached to the north stadium stands with a new standalone 5,500 seat (6,500 spectator) multi-purpose event center.
- Construction of three new residential towers with a total of 1,199 dwelling units that include rental, owned and affordable housing.
- Replacing the existing 41,000 ft^2 of commercial retail and box office annex to the Stadium on Exhibition Way with 79,176 ft^2 of new podium-level commercial retail space. This represents a net increase of 39,000 ft^2 of commercial retail space from what is currently provided today.
- As part of the new podium level retail space, a new indoor 27,845 ft^2 music hall with a capacity of 1,500 people.

The Lansdowne 2.0 plan is anticipated to be built-out in three phases with full build-out and occupancy anticipated to occur by 2029:

- *Phase 1* consists of building the new 5,500 seat multipurpose event center which is planned to be completed in mid-2026. This phase of development replaces exiting land uses and activities currently provided at Lansdowne. This phase of development is not expected to generate any additional transportation demands.
- *Phase 2* consist of building the new 11,200 seat north stand structure at TD Place and a portion of the podium level retail space. This phase is anticipated to be completed in late-2028 or early 2029 and replaces existing land uses and activities currently provided at Lansdowne. This phase of development is not expected to generate any additional transportation demands.
- *Phase 3* consists of building the three new residential towers with a total of 1,199 new residential units. This phase is anticipated to be completed in phases between 2032 and 2036 and is representative of additional land use density to the site. This phase of development is anticipated to generate additional transportation demands.

The Lansdowne 2.0 development is anticipated to generate 204, 220, and 321 net new auto trips (two-way) during the Weekday AM, Weekday PM, and Weekend Saturday peak hours, respectively. The trip generation accounted for transit modal shares identified for the Ottawa Inner Urban Area. This included an assumed transit modal share of 25% for the multi-family residential units, and 14% for the commercial retail component of the development. The additional transit trips forecasted for Lansdowne 2.0 range between 180 to 260 additional two-way transit trips during peak hours.

Active modes of transportation are also expected to play a critical role in accommodating Lansdowne 2.0. In order to achieve the identified modal shares, additional Transportation Demand Management (TMD) measures will be required to support transit, walking, and cycling. This includes measures such as implementing transit operational improvements along Bank Street, as well as improved pedestrian and bicycle crossings at both Bank Street and Queen Elizabeth Driveway to further support walking and cycling. A full list of supplemental transportation demand management measures are discussed in the *Lansdowne 2.0 Transportation Demand Management Strategy* report.

An analysis of study area intersections was completed under the Existing 2023 condition, the 2031 Future Background, 2031 Total Future, and 2036 Total Future (Build-Out + 5 years) scenarios.

Under Existing 2023 conditions, all study area intersections were found to operate with overall acceptable levels of service. Two intersections were found to operate with specific movement that are operating at or close to capacity during the Weekday AM and PM peak periods:

- The SB and EB approach of Bank Street and Sunnyside Avenue and Bank Street: this is associated with the current signal timing phasing and operations of a shared thru-left turn lane approach during peak periods, rendering the inside through lane as a de-facto left turn lane. While these movements are shown to operate at or close to capacity, vehicle delays and queuing were found to be acceptable.

- The eastbound approach at intersection of Bank Street and Wilton Crescent is currently shown to operate, with a LOS F due to vehicle delays incurred on the minor approach during the Weekday PM peak hour period. The delays on the Wilton Crescent minor approach are associated with limited gaps in traffic in the southbound direction due to the recently installed 3-lane cross-section of Bank Street. The poor level of service on the minor approach is projected to continue into the future for the PM peak hour.

Overall, the transportation network in the immediate area of Lansdowne is anticipated to be able to accommodate Lansdowne 2.0 traffic generated demands with no additional improvements required to support vehicular traffic or access to the site. This assumes that the current access provisions to Lansdowne continue to be provided with Bank Street functioning as the primary access, and the intersection of QED and Princess Patricia Way as a secondary access point.

It is acknowledged that QED is a federal parkway under the jurisdiction of the NCC Irrespective of Lansdowne 2.0, QED is an integral part of the city's transportation network and plays a crucial role in supporting a balanced, safe and efficient access program to Lansdowne, particularly during major events. This TIA assumes that the QED will generally remain as a viable secondary vehicular access point to Lansdowne. Should this assumption change, the integrity of the Lansdowne 2.0 program, and likely current Lansdowne operations, would be severely compromised from a transportation perspective.

In conclusion, the analysis found that the anticipated Lansdowne 2.0 development generated site traffic was found to result in minimal impact to the overall traffic operations in the area. From a transportation standpoint, the proposed Lansdowne 2.0 development can be accommodated by the future transportation network through a comprehensive Transportation Demand Management strategy that supports transit, active modes and limits the reliance of the automobile for travel – particularly for future residents living in Lansdowne.

Appendix A TRAFFIC DATA

Appendix B INTERSECTION COLLISION DATA

Appendix C MMLOS ANALYSIS

Appendix D LESSONS LEARNED REPORT

Appendix E TRANSPORTATION DEMAND MANAGEMENT STRATEGY

Appendix F INTERSECTION PERFORMANCE WORKSHEETS

Appendix G NCHRP REPORT 684 ITE SPREADSHEET