Residential Development
1040 Somerset Street, Ottawa

COMMUNITY TRANSPORTATION STUDY / TRANSPORTATION IMPACT STUDY

Prepared By:

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April 2013

Novatech File: 112191
Ref No. R-2013-033

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April 17, 2013

City of Ottawa
Planning and Growth Management Department
Development Review Urban Services Branch
Infrastructure Approvals Division
110 Laurier Ave. W., 4th Floor,
Ottawa, Ontario K1P 1J1

Attention: **Mr. Wally Dubyk, C.E.T.**
Project Manager, Infrastructure Approvals

Dear Sir:

Reference: **Residential Development – 1040 Somerset Street, Ottawa**
Transportation Impact Study
Our File No. : 112191

We are pleased to submit the following Community Transportation Study (CTS) / Transportation Impact Study (TIS) in support of Zoning By-law Amendment and Site Plan Control applications for the above property.

The structure and format of this report follows the 2008 City of Ottawa Transportation Impact Assessment (TIA) Guidelines. A checklist of the documentation requirements as outlined in Appendix D of the TIA guidelines is attached overleaf with reference to corresponding report sections.

A .pdf version of this report and copies of the electronic software files are provided on the enclosed disk.

Please call if you have any questions as you complete your review of the study.

Yours truly,

NOVATECH ENGINEERING CONSULTANTS LTD.

B. Byvelds

Brad Byvelds, E.I.T.
Engineering Intern

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Documentation and Reporting Checklist

Report Context (Section 1.0)

Description of the development (include all of the following that are known at the time of the application):

- ☐ Municipal address;
- ☐ Location relative to major elements of the existing transportation system (e.g., the site is located in the southwest quadrant of the intersection of Main Street/ First Street, 600 metres from the Maple Street Rapid Transit Station); Existing land uses or permitted use provisions in the Official Plan, Zoning By-law, etc.;
- ☐ Proposed land uses and relevant planning regulations to be used in the analysis;
- ☐ Proposed development size (building size, number of residential units, etc.) and location on site;
- ☐ Estimated date of occupancy;
- ☐ Planned phasing of development;
- ☐ Proposed number of parking spaces (not relevant for Draft Plans of Subdivision); and
- ☐ Proposed access points and type of access (full turns, right-in/ right-out, turning restrictions, etc.).
- ☐ Study area;
- ☐ Time periods and phasing; and
- ☐ Horizon years (include reference to phased development).

The CTS must include a key plan that shows the general location of the development in relation to the surrounding area. The CTS must also provide a draft site plan or development concept of a suitable scale that shows the general location of the development and the proposed access locations. If the proposed development/ redevelopment is to be constructed in phases, a description must be provided for each phase, identifying the proposed timing of implementation.

Existing Conditions (Section 2.0)

- ☐ Existing roads and ramps in the study area, including jurisdiction, classification, number of lanes, and posted speed limit;
- ☐ Existing intersections, indicating type of control, lane configurations, turning restrictions, and any other relevant data (e.g., extraordinary lane widths, grades, etc.);
- ☐ Existing access points to adjacent developments (both sides of all roads bordering the site);
- ☐ Existing transit system, including stations and stops;
- ☐ Existing on- and off-road bicycle facilities and pedestrian sidewalks and pathway networks;
- ☐ Existing system operations (V/C, LOS); and
- ☐ Major trip generators/ attractors within the Study Area should be indicated.

The CTS report must include figures documenting the existing travel demands by mode. A photographic inventory of the transportation network elements in the vicinity of the proposed access points would be beneficial to staff in their review of the Consultant's report.

Demand Forecasting (Section 3.0)

- ☐ General background growth;
- ☐ Other study area developments;
- ☐ Changes to the study area road network;
- ☐ Trip generation rates;
- ☐ Trip distribution and assignment:
    - include figures documenting total future travel demands by mode for each horizon year.

Impact Analysis (Section 4.0 – 9.0)

- ☐ Network Capacity Analysis;
- ☐ Non-auto network connections and continuity;
- ☐ Potential for community impacts, and
- ☐ TDM.

Mitigation Measures and Site Design Characteristics (Section 7.0 – 8.0)

The CTS must identify all mitigation measures required to offset network impacts from the development. The CTS must also identify key site design features required to implement the Official Plan and Transportation Master Plan policies regarding site development.

The CTS must include all of the following, where they are required by the subject development:

- ☐ Major network elements required to bring the screenlines to or below acceptable operating guidelines, and comments regarding consistency of the requirements with the Transportation Master Plan and Capital Budget;
- ☐ Location and timing of proposed changes to existing traffic controls at intersections (e.g., new traffic signals, Stop signs, etc.);
- ☐ Location and timing of new intersections, including proposed traffic control measures (e.g., traffic signals, etc.);
- ☐ Requirements for new auxiliary lanes;
- ☐ Mitigation measures required to offset impacts on the surface and Rapid Transit networks;
- ☐ New or modified elements of the bicycle and pedestrian networks;
- ☐ Community impact mitigation measures;
- ☐ Demonstration that Official Plan policies regarding transit-supportive developments have been incorporated appropriately; and
- ☐ Proposed TDM features or programs to support the site development.

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EXECUTIVE SUMMARY

Claridge Homes is filing Zoning By-law Amendment and Site Plan Control applications for a residential development at 1040 Somerset Street in Ottawa. The site has an area of 1,342m^2. The proposed development consists of a 38 storey high rise residential building and will provide:

- 338 condominium units,
- 204m^2 of commercial/retail floor space, and
- 162 underground parking spaces.

Vehicular access to the underground parking garage is to be located on Breezehill Avenue south of Somerset Street.

The intersections to be evaluated were confirmed with the City prior to the preparation of this report. The time periods for analysis include the weekday AM and PM peak hours. Analysis has been completed for the existing traffic condition, a build-out scenario in 2016 and a five year horizon of 2021.

A compound annual growth rate of 1% has been used to estimate future background traffic volumes. Traffic generated by a proposed adjacent mixed-use development at 1050 Somerset Street has also been accounted for as part of this study. Trips generated by the subject development have been estimated using peak hour rates identified in the *ITE Trip Generation Manual, 9th Edition*. Total future traffic volumes have been calculated by adding the proposed site traffic to the projected background traffic volumes.

Provisions for non-auto travel modes were assessed, including access to local pedestrian, bicycle and transit systems. The proposed on-site design was reviewed in terms of vehicle access, on-site parking, and loading activities. Potential for community impacts and conformance to Transportation Demand Management (TDM) principles were also evaluated.

The main conclusions and recommendations of this report are as follows:

- None of the study intersections meet the City's criteria for further analysis with respect to collision patterns or total collisions.

- All study area intersections are currently operating at an acceptable Level of Service (LOS) in the weekday AM and PM peak hours.

- The provision of traffic signals at Somerset Street / Breezehill Avenue is only 20% justified under existing traffic volumes. Based on the projected 2021 total traffic, the warrants for traffic signal control continue to be unmet.

- The screenline analysis suggests that the adjacent major road network will have adequate capacity to accommodate the proposed development in 2016.

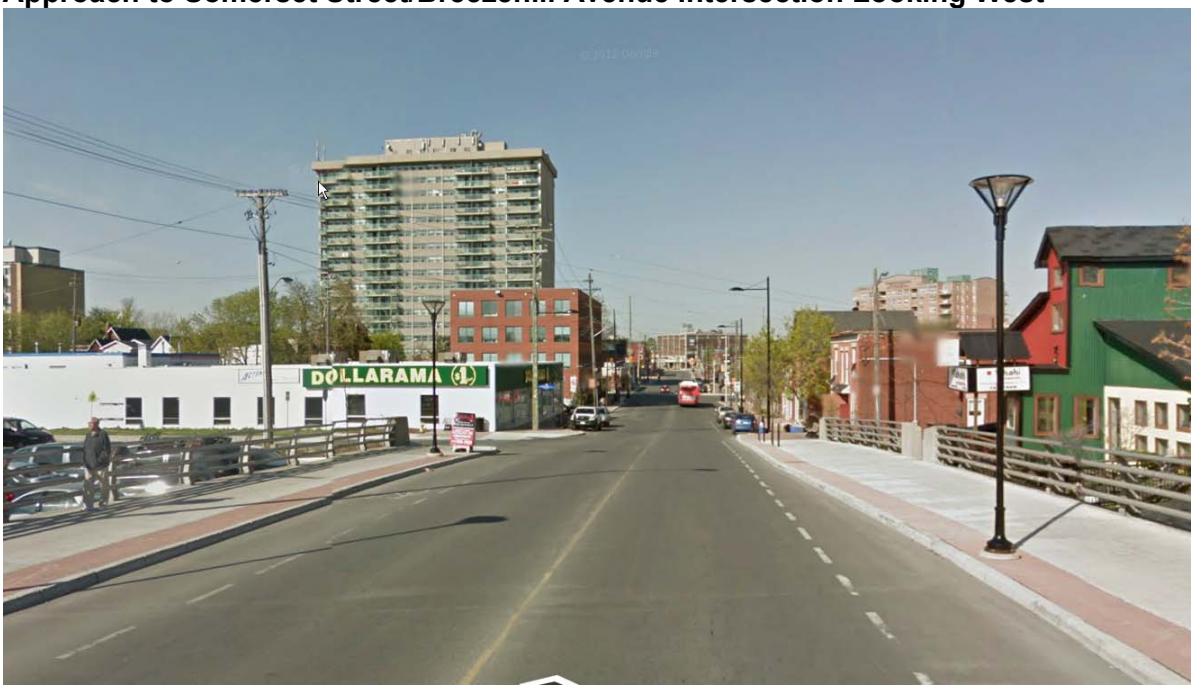
- The screenline analysis suggests that development traffic will have a marginal impact on Gladstone Avenue in the 2021 horizon year. Additional analysis has been completed to confirm that study area intersections will have adequate capacity to accommodate the development traffic.

- With minor signal timing adjustments, all movements at the study area intersections are expected to perform at an acceptable LOS based on the 2016 and 2021 background traffic projections.

- Further signal timing adjustments are required to accommodate the projected development traffic. Based on the adjusted signal timing, all movements are expected to operate at an acceptable LOS in 2016 and 2021.

- The 2016 weekday PM peak total traffic volumes meet the MTO warrant criteria for a dedicated westbound left-turn lane on Somerset Street at Breezehill Avenue. The bridge over the O-Train corridor has a width of 11 metres and consists of single through lanes in each direction and dedicated bicycle lanes as shown below.

  Approach to Somerset Street/Breezehill Avenue Intersection Looking West



  A westbound left turn lane would require the removal of dedicated bicycle lanes on the bridge over the O-Train or widening of the bridge structure.

- The sight distance for vehicles turning left out of Breezehill Avenue onto Somerset Street is limited by the bridge over the O-Train. Based on a design speed of 60 kph, a sight distance of 125m to 160m is required and field measurements show that a sight distance of 75m is available.

- Traffic signals are recommended at the Somerset Street/Breezehill Avenue intersection complete with an advance warning beacon and signage restricting the westbound left turn movement during the weekday PM peak.

- The provision of traffic signals at the Somerset Street/Breezehill Avenue intersection would enhance the safety of the existing east-west crosswalk which is heavily used by children walking to and from the Devonshire Public School and provide an opportunity for new north-south crosswalks.

- The proposed development includes adequate provisions for non-auto travel modes, including easy access to local pedestrian, bicycle, and transit systems.

- The existing site access is to be removed and replaced by a new access that meets the requirement of the Private Approach By-law for minimum spacing from the nearest intersection.

- The Zoning By-law identifies a requirement for at least 152 resident parking spaces, 60 visitor parking spaces, and five retail parking spaces. Resident parking will be provided in accordance with the minimum requirement and 10 vehicle parking spaces will be provided for visitors. The proposed reduction in visitor and retail parking will be addressed through the ZBL amendment application process.

- A total of 174 bicycle parking spaces will be provided, meeting the requirements of the ZBL. Four spaces will be provided at ground level, 107 spaces will be provided on the first three levels of underground parking and the remaining 63 spaces will be provided on the mezzanine level.

- The proposed access configuration will result in the loss of one on-street parking space on the east side of Breezehill Avenue adjacent to the site.

- The reduced amount of on-site visitor parking is expected to result in an increased demand for on-street parking. If required, consideration could be given to linking the underground parking garages of the subject development and the development at 1050 Somerset Street and sharing visitor parking between the two sites.

- The proposed development conforms to the City's TDM initiatives by providing easy access to the local pedestrian, bicycle and transit systems. Additional measures that could be implemented to further promote the use of non-auto travel modes are as follows:

    - unbundle parking space costs from dwelling/commercial units

    - offer "bonus zoning" where certain restrictions may be relaxed for developments including TDM measures, ie. permit increased building height if developer provides free transit pass/car share (ie. Vrtucar) memberships to residents for one year.

1.0 INTRODUCTION

Claridge Homes is filing Zoning By-law Amendment and Site Plan Control applications for a residential development at 1040 Somerset Street in Ottawa. The site is located in the southeast quadrant of the Somerset Street / Breezehill Avenue intersection as shown in **Figure 1A**. A key plan is also shown in **Figure 1B**.

Figure 1A: Aerial Photo of Subject Site

The proposed development consists of a 38 storey residential tower and will provide:

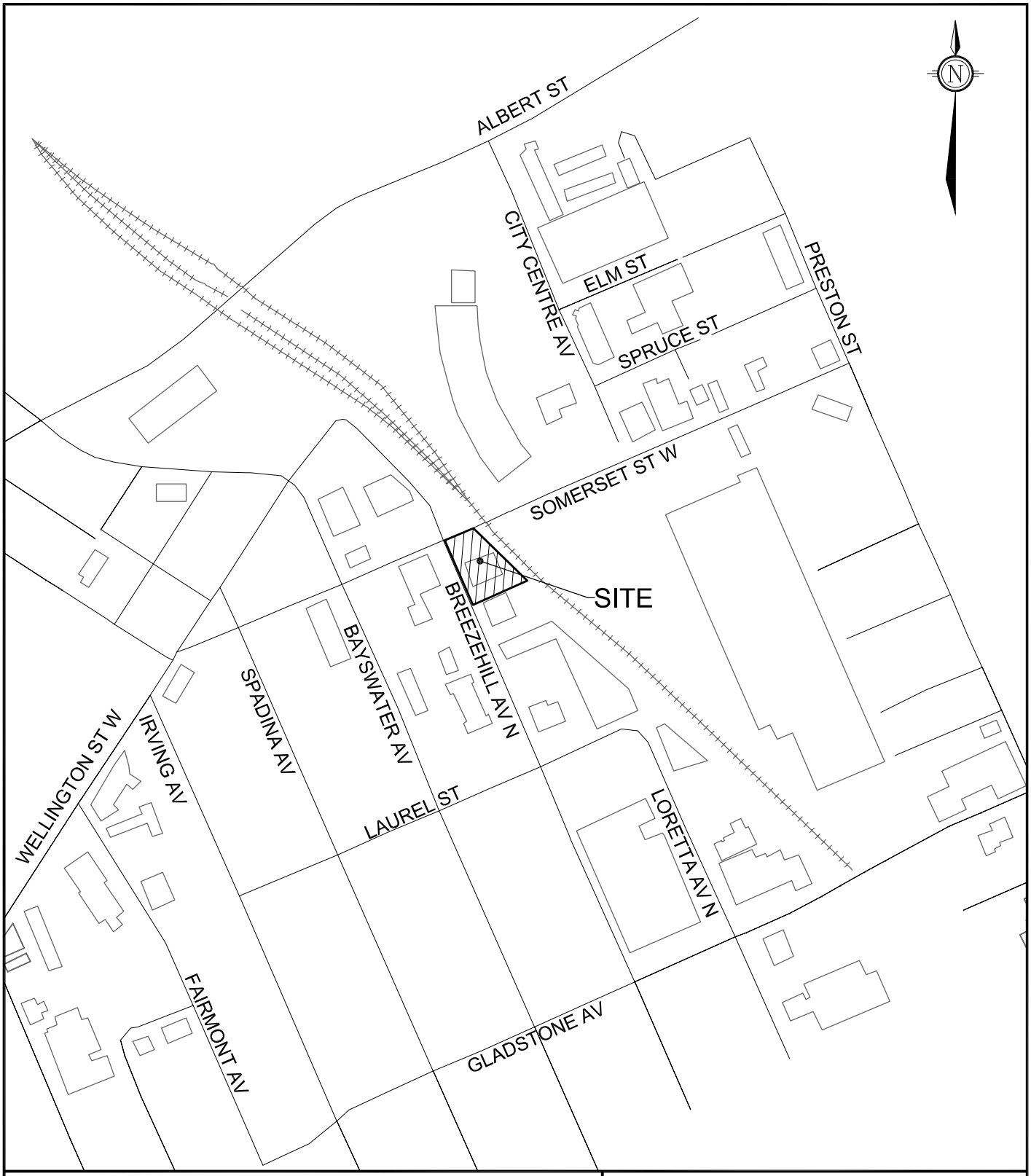
- 338 condominium units,
- 204m^2 of commercial/retail floor space, and
- 162 underground parking spaces.

Vehicular access to the parking garage is to be located on Breezehill Avenue south of Somerset Street. The proposed site plan is shown in **Figure 2**. The expected completion date for the development is 2016.

The site has an area of 1,342m^2, and is currently occupied by a one storey building with commercial uses, including an auto care shop, a charity organization and an art studio. The existing conditions are shown in **Figure 3**. The subject site is bounded by the following:

- to the north, single-detached dwellings converted for ground-floor commercial uses (1047-1055 Somerset Street);
- to the east, O-Train transit corridor;
- to the south, a meditation centre and an auto repair shop (53 Breezehill Avenue);
- to the west, pending a 23 storey condominium building (1050 Somerset Street).

Under the City of Ottawa Zoning By-Law, the site is zoned Traditional Mainstreet TM H(15) which allows a variety of commercial and residential uses with a maximum height of 15m. The zoning



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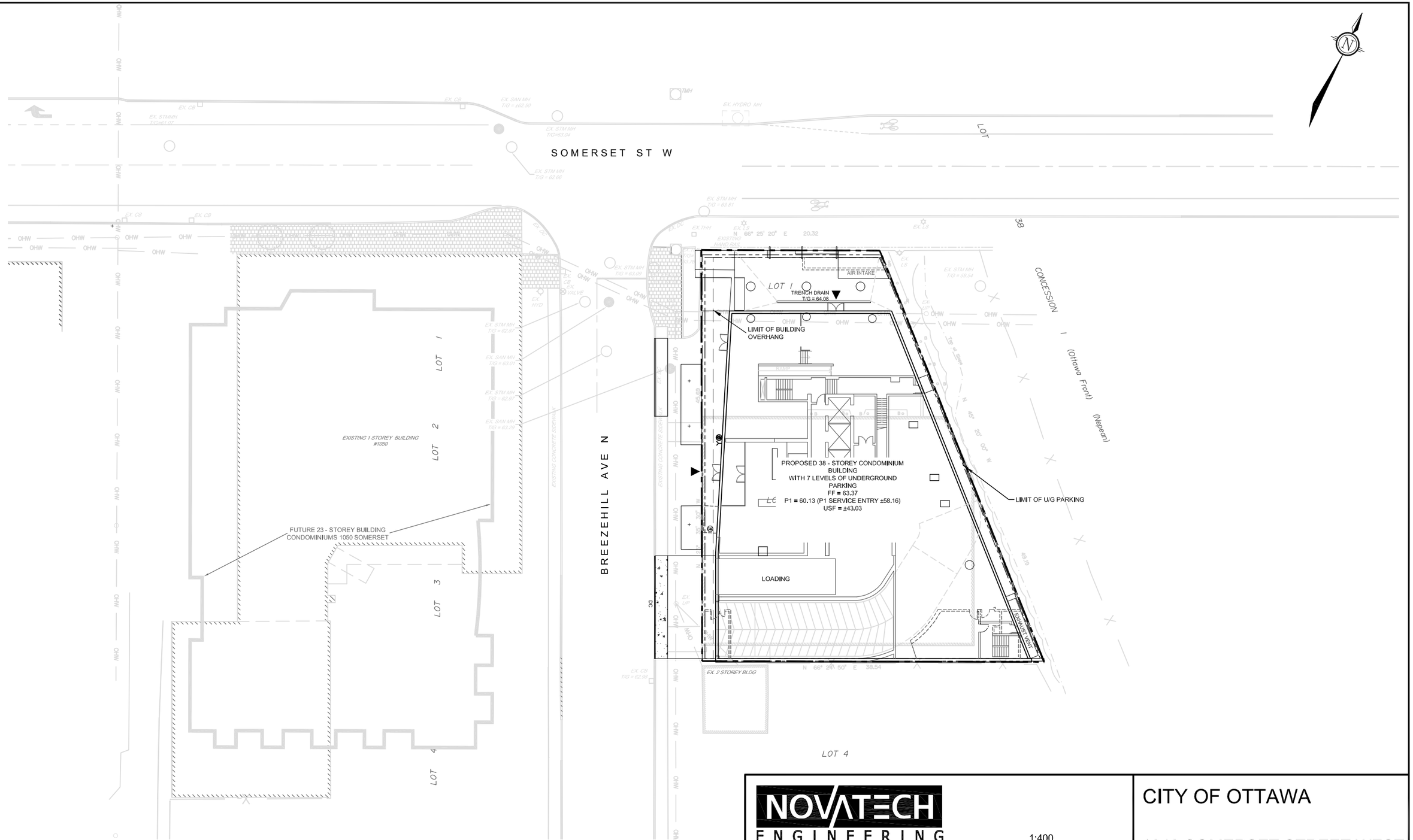
1040 SOMERSET STREET WEST

KEY PLAN

NTS | JAN 2013 | 112191 | FIGURE 1B



LEGEND

- SITE PLAN AREA
- LIMIT OF UNDERGROUND PARKING
- LIMIT OF BUILDING OVERHANG

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1040 SOMERSET STREET WEST

SITE PLAN

APRIL 2013 112191 FIGURE 2

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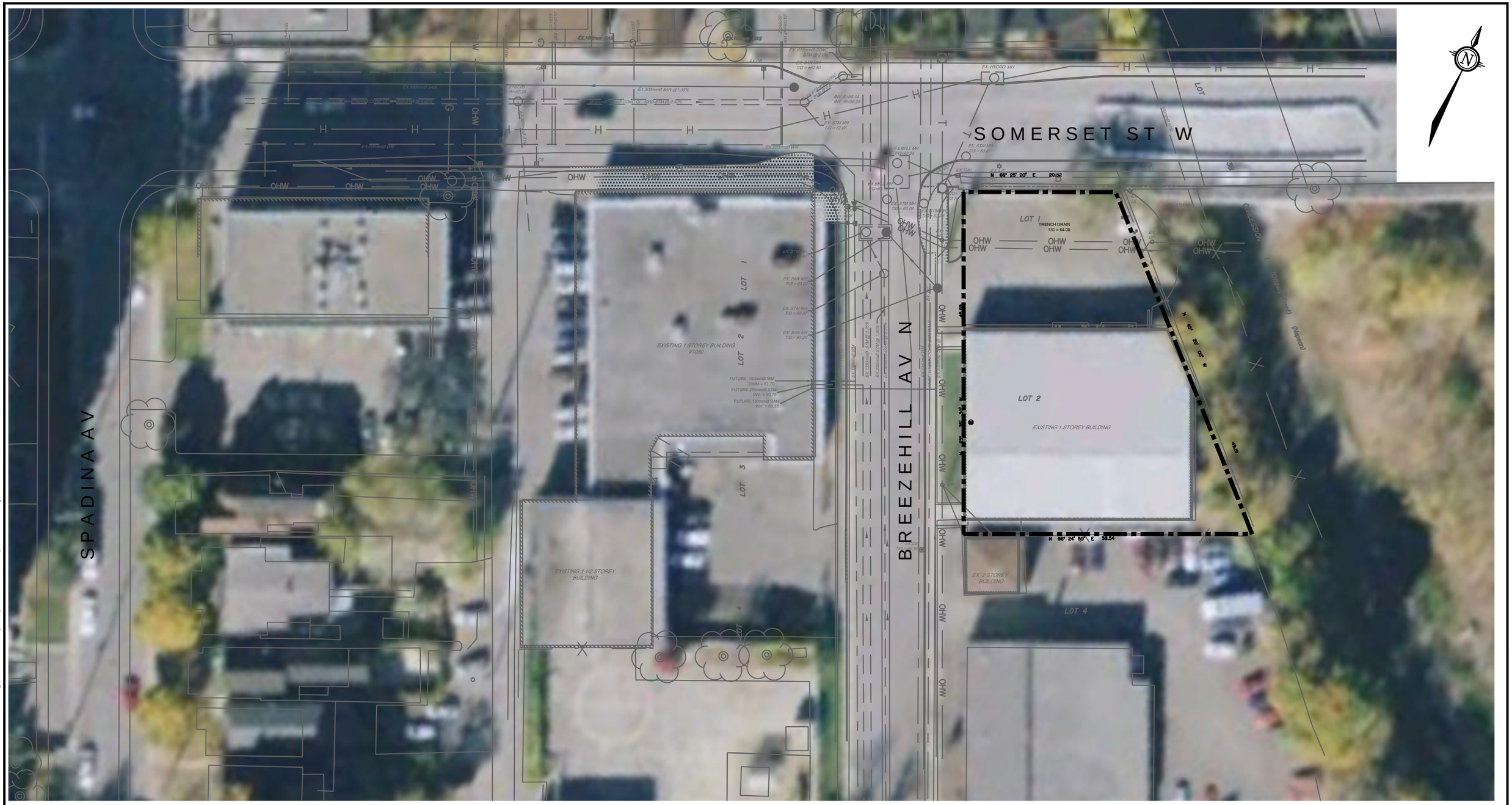

LEGEND

SITE PLAN AREA

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1040 SOMERSET STREET WEST

EXISTING CONDITIONS

APRIL 2013 112191 FIGURE 3

amendment will revise the height limit to approximately 125m and establish site-specific setbacks within the TM zone to accommodate the proposed development.

1.1 Analysis Methods

The types of analysis undertaken to assess the transportation impacts of the proposed development are consistent with the requirements of the City of Ottawa *Transportation Impact Assessment (TIA) Guidelines*, published in October 2006.

Intersection capacity analysis has been completed using the software package Synchro 8.0. This software uses methodology from the *Highway Capacity Manual 2010* (HCM), published by the Transportation Research Board, to evaluate signalized and unsignalized intersections.

Intersection operating conditions are commonly described in terms of a Level of Service (LOS). LOS is a qualitative measurement of speed, freedom to manoeuvre, interruptions, comfort and convenience. Letters are assigned to six levels, with LOS 'A' representing optimal operating conditions and LOS 'F' representing failing operating conditions.

The City of Ottawa has adopted criteria that directly relate the LOS of a signalized intersection to a volume to capacity (v/c) ratio. Vehicle capacity is defined as the maximum number of vehicles that can pass a given point during a specified period under prevailing traffic conditions. The City's criteria are as follows:

LOS	v/c ratio
A	0 to 0.60
B	0.61 to 0.70
C	0.71 to 0.80
D	0.81 to 0.90
E	0.91 to 1.00
F	>1.00

The LOS for an unsignalized intersection is based on average control delay and is defined for individual movements. Control delay includes initial deceleration, queue move-up time, stopped time and final acceleration. The HCM presents the following criteria relating the LOS for individual movements to average control delay:

LOS	Delay (sec/veh)
A	<10
B	10 to 15
C	15 to 25
D	25 to 35
E	35 to 50
F	>50

In this study, movements at signalized and unsignalized intersections have been evaluated in terms of the LOS as defined in the foregoing tables. Mitigation measures in the form of additional lane capacity and/or signal adjustments have been identified for movements with LOS F.

This combined Community Transportation Study (CTS) / Transportation Impact Study (TIS) has been prepared to provide an assessment of the development proposal. The methodologies used to analyze the transportation impacts of the proposed development are described as follows:

- A screenline analysis to compare the forecasted demand and available capacity of the major road network connecting the site to the area transportation network,
- An operational evaluation of study area intersections under the background and total traffic conditions (i.e. background traffic plus development traffic) for the weekday AM and PM peak hours,
- An assessment of provisions for non-auto travel modes, including integration with local transit service, and connections with the local pedestrian and bicycle networks,
- A review of the proposed on-site design in terms of access, parking facilities, pick-up/drop-off areas and emergency/garbage service requirements,
- An evaluation of conformance with Transportation Demand Management (TDM) principles.

1.2 Analysis Parameters

The study area for this report as confirmed with City staff includes the following intersections:

- Somerset Street / Bayswater Avenue,
- Somerset Street / Breezehill Avenue,
- Somerset Street / Preston Street,
- Laurel Street / Breezehill Avenue,
- Gladstone Avenue / Breezehill Avenue.

The selected time periods for analysis are the weekday AM and PM peak hours. The weekday AM and PM peak hours are considered to represent the 'worst-case' combination of site-generated traffic and adjacent street traffic. Existing traffic conditions within the study area have been examined, along with background and total traffic conditions at the build-out year (2016) and a five-year horizon (2021).

2.0 EXISTING CONDITIONS

2.1 Roadways

Somerset Street is an arterial roadway that runs on an east-west alignment between Queen Elizabeth Drive and Wellington Street West. East of Booth Street, Somerset Street has a four-lane undivided urban cross-section, with metered on-street parking permitted in the curbside lanes. West of Booth Street, Somerset Street has recently been reconstructed with a two-lane cross-section and designated parking lanes on both sides of the roadway. Somerset Street is a designated urban truck route between Wellington Street West and Elgin Street, with a regulatory speed of 50 kph under the Highway Traffic Act. A short curb-side loading zone is provided on the north side of Somerset Street, across from the subject site.

Bayswater Avenue is a collector road with a two-lane urban cross-section that runs on a north-south alignment between Scott Street and Carling Avenue. Bayswater Avenue has a regulatory speed of 50 kph under the Ontario Highway Traffic Act.

Breezehill Avenue is a local road with a two-lane urban cross-section that runs on a north-south alignment commencing at Somerset Street and terminating in a dead end south of Gladstone

Avenue. Breezehill Avenue has a regulatory speed of 50 kph under the Ontario Highway Traffic Act. On-street parking is permitted along the east side of Breezehill Avenue adjacent to the subject site. A school bus loading zone is located on the west side of Breezehill Avenue south of the subject site.

Preston Street is an arterial road with a two-lane urban cross-section that runs on a north-south alignment between Prince of Wales Drive / Queen Elizabeth Drive and Albert Street. Designated parking lanes are provided on the east side along sections of Preston Street north of Somerset Street and on both sides along sections south of Somerset Street. Preston Street is designated as an urban truck route, with a regulatory speed of 50 kph under the Highway Traffic Act.

Laurel Street is a local road with a two-lane urban cross section that runs on an east-west alignment between Irving Avenue and Loretta Avenue. Laurel Street has a regulatory speed of 50 kph under the Highway Traffic Act.

Gladstone Avenue is a major collector road with a two-lane urban cross section that runs on an east-west alignment between Parkdale Avenue and Cartier Street. Designated on street parking is provided east of Preston Street. Gladstone Avenue has a regulatory speed of 50 kph under the Highway Traffic Act.

On-street parking and loading zones within the vicinity of the subject site are illustrated in **Figure 4**. In the area bounded by Somerset Street, Laurel Street, Spadina Avenue and the O-Train, there is room for approximately 90 parking spaces.

2.2 Study Area Intersections

Intersection control and auxiliary turning lanes are described as follows for each of the study area intersections:

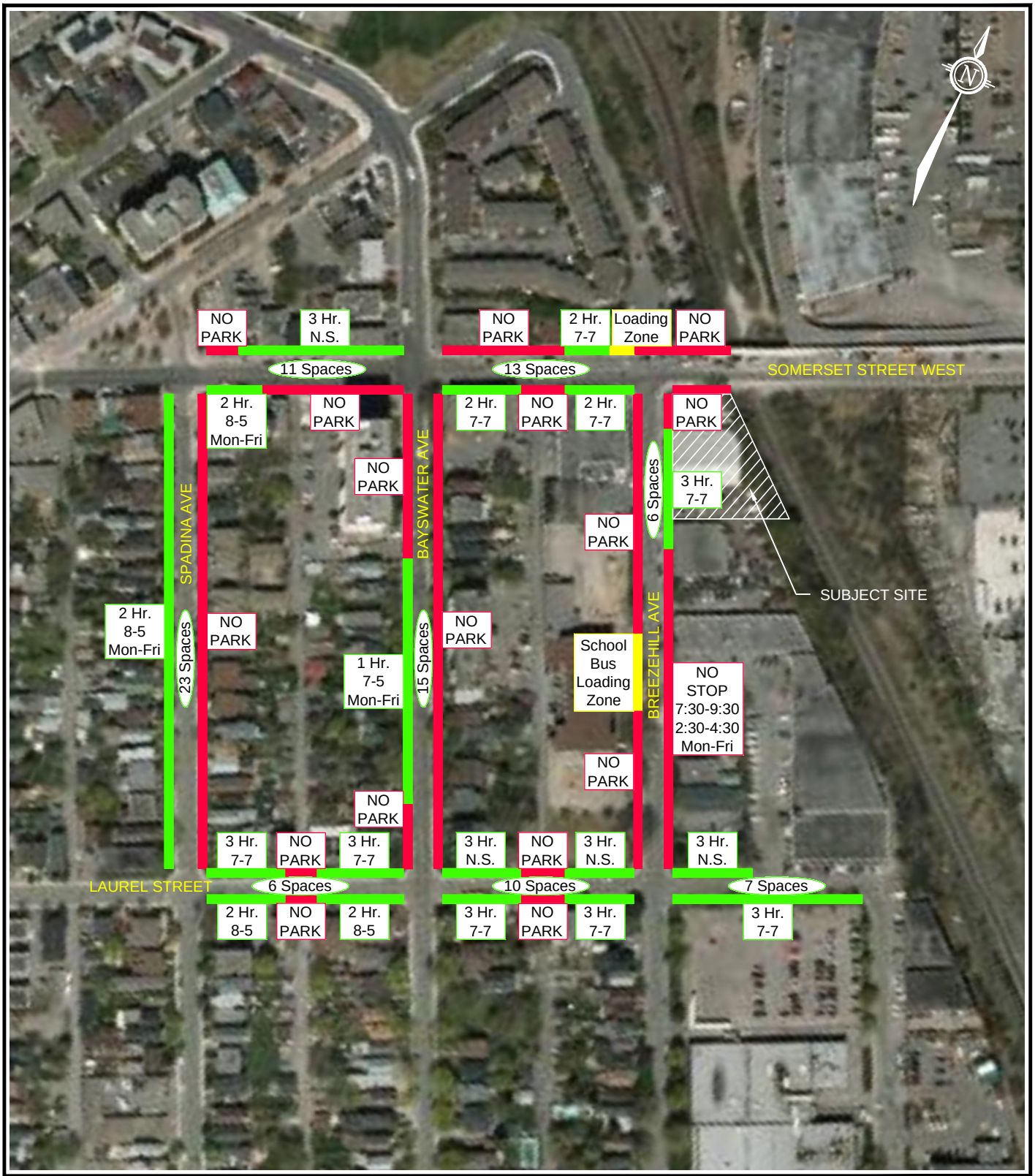
- Somerset Street and Bayswater Avenue form a signalized four-legged intersection. A designated right turn lane and one through lane are provided on the eastbound and westbound approaches. A designated left turn lane and one through lane are provided on the southbound approach. A single lane is provided on the northbound approach.

- Somerset Street and Breezehill Avenue form an unsignalized tee intersection with stop control provided on Breezehill Avenue, allowing free flow conditions along Somerset Street. No designated left/right turn lanes are provided on any approaches. An overpass over the O-Train corridor is located immediately east of the intersection.

- Somerset Street and Preston Street form a signalized four-legged intersection. One through lane and a designated left turn lane are provided on the all approaches.

- Laurel Street and Breezehill Avenue form a four-legged intersection with stop control provided on all four legs. Single lanes are provided on all approaches.

- Gladstone Avenue and Breezehill Avenue form an unsignalized four-legged intersection with stop control provided on Breezehill Avenue, allowing free flow conditions along Gladstone Avenue. No designated left/right turn lanes are provided on any approaches.



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1040 SOMERSET STREET WEST

ON-STREET PARKING

APRIL 2013 112191 FIGURE 4

2.3 Existing Pedestrian Facilities

Existing pedestrian facilities are described as follows for each of the study area roadways and intersections:

- Colored unit paver sidewalks are provided along both sides of Somerset Street. Concrete sidewalks are provided along both sides of Somerset Street across the bridge over the O-Train corridor.

- Concrete sidewalks are provided along both sides of Breezehill Avenue north of Laurel Street. An asphalt sidewalk is provided along the east side of Breezehill Avenue south of Laurel Street.

- Concrete sidewalks are provided along both sides of Laurel Street west of Breezehill Avenue. No pedestrian facilities are provided along Laurel Street east of Breezehill Avenue.

- Concrete sidewalks are provided along both sides of Bayswater Avenue, Gladstone Avenue and Preston Street.

- Crosswalks are provided on all four legs of the Somerset Street / Bayswater Avenue, Laurel Street / Breezehill Avenue and Somerset Street / Preston Street intersections. Unit pavers are provided on the crosswalk at the west leg of the Laurel Street / Breezehill Avenue intersection as it is heavily used by children walking to and from the Devonshire Community Public School. Unit pavers are also provided on all crosswalks at the Somerset Street / Preston Street intersection.

- Crosswalks are provided on Breezehill Avenue at the Somerset Street / Breezehill Avenue and Gladstone Avenue / Breezehill Avenue intersections. Coloured unit pavers are provided on the crosswalk at the Somerset Street / Breezehill Avenue intersection as shown in **Figure 5**.

Figure 5: Enhanced Crosswalk at Somerset Street/Breezehill Avenue

2.4 Existing Bicycle Facilities

The City of Ottawa 2008 *Transportation Master Plan* (TMP) designates Somerset Street, Preston Street, Bayswater Avenue and Gladstone Avenue as on-road cycling routes. The TMP also designates an off road cycling route (multi-use pathway) adjacent to the O-Train transit corridor east of the subject site.

The *Ottawa Cycling Plan (OCP)* classifies Somerset Street, Preston Street, Bayswater Avenue and Gladstone Avenue as a designated Spine or City-wide Cycling Routes. The O-Train corridor is designated as a community cycle route. As part of the preferred future concept plan, the OCP identifies a need to implement shared use lanes with signage along all of the aforementioned City-wide Cycling Routes.

The OCP also identifies a need to implement an off-road pathway adjacent to the O-Train transit corridor east of the subject site. This pathway is currently under construction and will extend from Highway 417 to the Ottawa River Parkway.

Bicycle lanes are provided along both sides of Somerset Street across the bridge over the O-Train corridor. There are no other designated cycling lanes provided on any other study area roadways.

2.5 Existing Transit Facilities

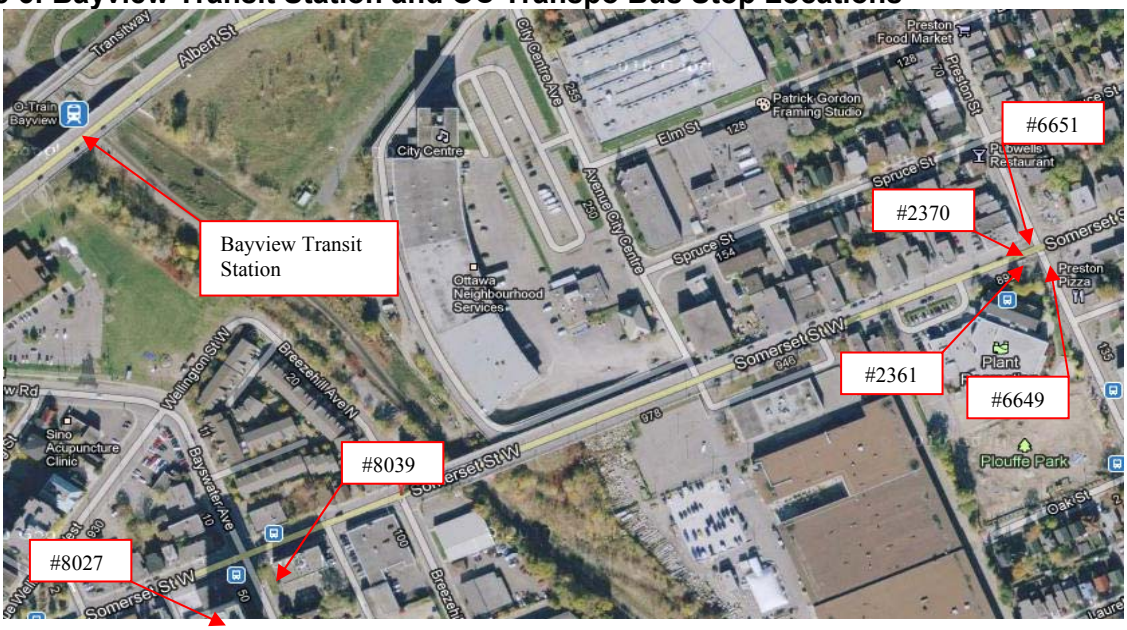
OC Transpo bus stops #8039 and #8027 are located at the northeast and southwest corners of the Bayswater Avenue / Somerset Street intersection, at a walking distance of approximately 90m from the subject site. These stops provide service to regular route 2 which runs east/west between the Rideau Centre transit station and the Bayshore transit station via Somerset Street/Richmond Road. A shelter is provided for both bus stops. Route details are provided in **Appendix A**.

OC Transpo bus stops #2361 and #2370 are located west of the Somerset Street / Preston Street intersection, at a walking distance of approximately 410m from the subject site. These stops also provide service to the regular route 2. A shelter is provided for the bus stop on the south side of the street.

OC Transpo bus stops #6649 and #6651 are located at the southeast and northwest corners of the Preston Street / Somerset Street intersection, at a walking distance of approximately 450m from the subject site. These stops provide service to regular route 85 which runs east/west between the Hurdman transit station and the Bayshore transit station via downtown Ottawa and Carling Avenue. Route details are provided in **Appendix A**.

The Bayview Transit Station is located within a 600m radius of the subject site. Using the newly constructed pathway adjacent to the O-Train, the Bayview Station will be within a walking distance of approximately 530m. It provides access to the O-Train and numerous OC-Transpo routes with coverage across the City of Ottawa. The Bayview Rapid Transit Station and aforementioned bus stop locations are shown in **Figure 6**.

Figure 6: Bayview Transit Station and OC Transpo Bus Stop Locations



2.6 Existing Traffic Volumes

Weekday traffic counts completed by Novatech and the City of Ottawa were used to determine the existing pedestrian, bicycle and motor vehicle volumes at all study area intersections. The traffic counts were completed at the following times and locations:

- Somerset Street / Bayswater Avenue, all modes – Friday, August 10, 2012
- Somerset Street / Breezehill Avenue, motor vehicles – Thursday, March 29, 2012
- Somerset Street / Breezehill Avenue, pedestrians and bicycles – Wednesday, May 30, 2012
- Somerset Street / Preston Street, all modes – Tuesday, May 2, 2006
- Laurel Street / Breezehill Avenue, all modes – Thursday, May 17, 2012
- Gladstone Avenue / Breezehill Avenue, all modes – Wednesday, December 19, 2012

Copies of the above counts are included in **Appendix B**.

It should be noted that construction on the Bronson Avenue renewal project commenced in March 2012. Lane closures included the northbound and southbound lanes along Bronson Avenue from Somerset Street to Catherine Street. Lane closures began on March 27, 2012 and were in effect throughout the 2012-2013 winter. Reduced capacity is expected at the Bronson Avenue / Somerset Street intersection until mid September 2013. The detours outlined in the traffic control plan are shown in **Appendix B**. The traffic control plan shows an alternative northbound/southbound bypass route (D-3) detouring vehicles north/south on Preston Street. The Bronson Avenue detours were expected to increase the volume of northbound and southbound vehicles on Preston Street. Therefore traffic volumes at the Somerset Street / Preston Street intersection are based on a traffic count performed on Tuesday, May 2, 2006 and increased using the compound annual growth rate outlined in Section 3.2 of this report.

The peak hours of adjacent street traffic were identified as being 8:00-9:00 AM and 4:00-5:00 PM. Peak site traffic generated by the proposed development is expected to coincide with the peak

hours of the adjacent street traffic. The existing traffic volumes for the weekday AM and PM peak hours of adjacent street traffic are shown in **Figure 7**.

2.7 Existing Intersection Analysis

Intersection capacity analysis has been completed for the existing traffic condition. The results of the analysis are summarized in the following table for the weekday AM and PM peak hours. Detailed reports are included in **Appendix C1**.

Table 1: Intersection Analysis – Existing Traffic

Intersection	AM Peak			PM Peak		
	max. v/c or Delay	LOS	Movement	max. v/c or Delay	LOS	Movement
Somerset / Bayswater[1]	0.41	A	EBT	0.48	A	WBT
Somerset / Breezehill	13 sec	B	NBL/R	15 sec	B	NBL/R
Somerset / Preston[1]	0.88	D	SBT	0.78	C	EBT
Breezehill / Laurel	8 sec	A	NBT	7 sec	A	ALL
Breezehill / Gladstone	12 sec	B	NBL/R	16 sec	C	SBT

1. Signalized Intersection

All study area intersections are currently operating at an acceptable LOS in the weekday AM and PM peak hours.

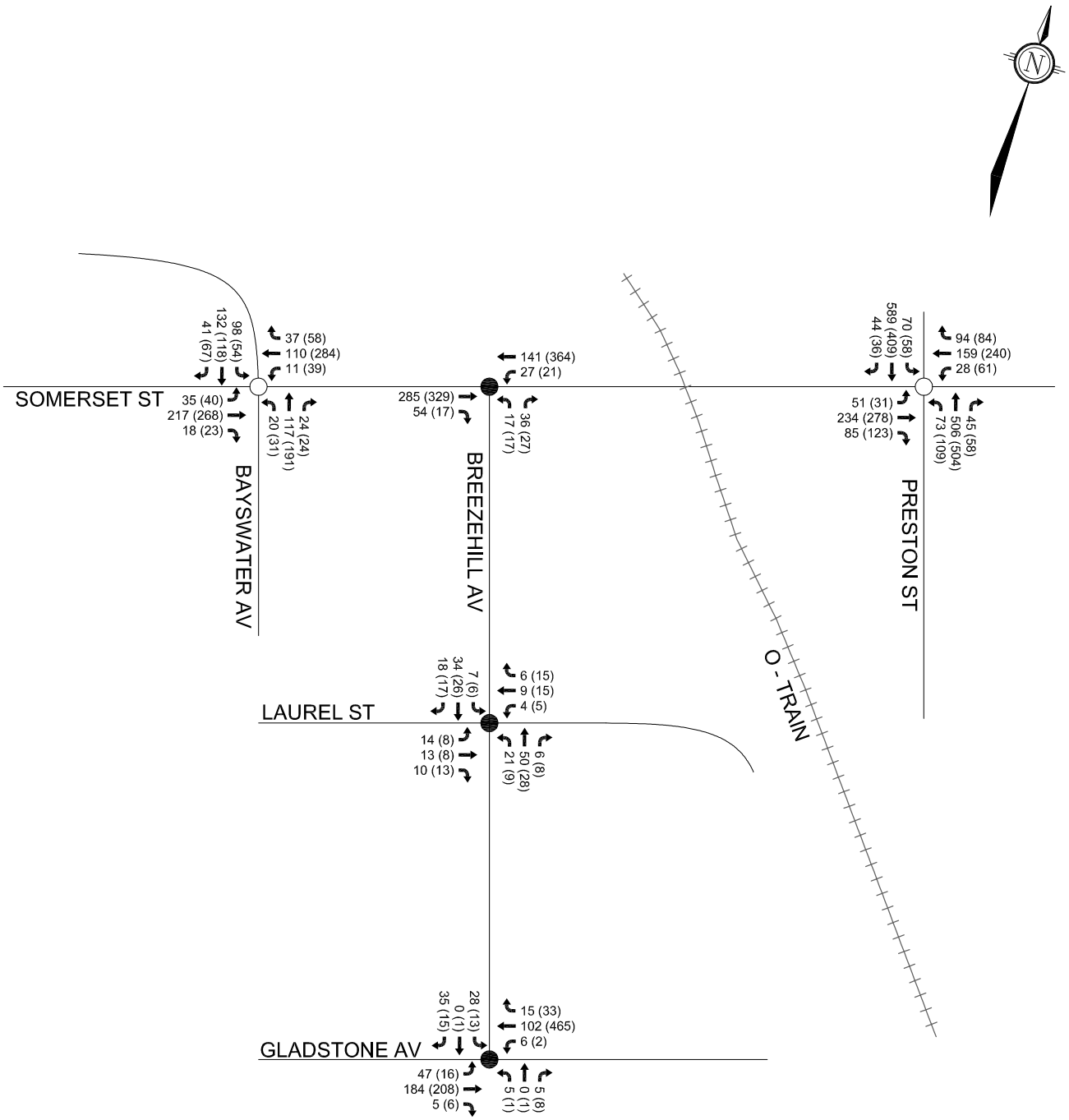
While the above results do not indicate the need for traffic signal control at Somerset Street / Breezehill Avenue to provide adequate Level of Service, the MTO warrant criteria were reviewed to determine the extent to which the provision of traffic signals is justified. A copy of the traffic signal justification calculations is included in **Appendix D**. The results show that under existing traffic conditions, the provision of traffic signals at Somerset Street / Breezehill Avenue is only 20% justified, based on observed traffic volumes over the busiest eight hours of the day.

2.8 Collision Records

Historical collision data from the last three years was obtained from the City's Public Works and Service Department for all study area intersections. Copies of the collision summary reports are included in **Appendix E**.

The collision data has been evaluated to determine if there are any identifiable collision patterns. The City of Ottawa *TIA Guidelines* define a collision pattern as more than one collision involving similar directions and impact types. Further analysis may be warranted for intersections with a pattern of six or more collisions for any one movement or a total of 33 or more collisions, over a three-year period.

The following table summarizes the number of collisions reported at each intersection from January 1, 2009 to January 1, 2012.



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LEGEND

- Unsignalized Intersection
- Signalized Intersection

xx VPH AM Peak Hour

(xx) VPH PM Peak Hour

1040 SOMERSET ST WEST

EXISTING TRAFFIC VOLUMES

APRIL 2013 112191 FIGURE 7

Table 2: Reported Collisions

Location	Number of Reported Collisions (Jan 1, 2009 to Jan 1, 2012)
Somerset Street / Bayswater Avenue	4
Somerset Street / Breezehill Avenue	1*
Somerset Street / Preston Street	13
Laurel Street/ Breezehill Avenue	0
Gladstone Avenue / Breezehill Avenue	2

*Jan 1, 2008 to Jan 1, 2011

Two of the four collisions at the Somerset Street / Bayswater Avenue intersection were rear end impacts occurring during clear conditions.

The only collision within the last three years at the Somerset Street / Breezehill Avenue intersection was a single vehicle impact occurring around midnight on a Saturday.

Four of the thirteen collisions at the Somerset Street / Preston Street intersection were angle collisions, three of which involved a southbound and westbound vehicle. One of the angle impacts included a cyclist, resulting in non-fatal injuries. Four of the thirteen collisions were single vehicle impacts between a vehicle and a pedestrian. All single vehicle impacts resulted in non fatal injuries. Three of the thirteen collisions were turning impact, one of which involved a cyclist.

The two collisions at the Gladstone Avenue / Breezehill Avenue intersection were angle impacts occurring during the daylight under dry surface conditions. One of the collisions involved a cyclist, resulting in non-fatal injuries.

None of the study area intersections meet the City of Ottawa's criteria for further analysis with respect to collision pattern or total collisions.

3.0 TRAVEL DEMAND FORECASTING

3.1 Planned Network Changes

The 2008 TMP identifies Somerset Street West between West Wellington Street and Bank Street as a Transit Priority Corridor. Future transit priority measures may include transit priority signals, queue jump lanes and other operational measures giving transit vehicles preferential treatment over other vehicles.

The Downtown Ottawa Transit Tunnel (DOTT): Tunney's Pasture to Blair Station will include converting part of the Transitway to electric Light Rail Transit (LRT) technology, constructing a tunnel to replace the existing on-street bus operations on Albert Street and Slater Street and building three LRT stations and a maintenance and storage facility. The DOTT is identified as increment one of Phase One required transit projects in the 2008 TMP. Construction is scheduled for early 2013 with completion estimated by the end of 2017.

Increment two identifies a future North-South LRT line which will involve twinning and converting the existing O-Train route from Bayview to South Keys. The Bayview Station will be a transfer point between the DOTT and the O-Train/future North-South LRT. The North-South LRT line will provide fast, reliable service between downtown and Ottawa South and promote development along the corridor at Confederation Heights and between Carling Avenue and Bayview Station.

The City has re-launched the Carling-Bayview Light Rail Transit (LRT) Corridor Community Design Plan (CDP) study, originally initiated in 2005. This study will focus on the underutilized properties located along the LRT corridor. The subject site is identified as an underutilized property within the CDP study area. The main purpose of the study will be to capture development opportunities arising from the introduction of LRT, and to ensure that developments are compact, transit-oriented, and context sensitive. The Bayview Station area concept includes extending a Wellington Street pedestrian connection over the future North-South LRT to reconnect the Dalhousie and Hintonburg communities and improve pedestrian access to and from the Bayview Station. The concept also includes the provision of a multi-use pathway along the North-South LRT line to link the Ottawa River to Dow's Lake.

3.2 General Background Growth

Traffic counts at Somerset Street / Bayswater Avenue intersection were obtained from the City of Ottawa for 2002, 2003, 2007, and 2012. Based on this data, it was determined that the recent annual background growth rates on Somerset Street during the AM and PM peak hours were -6.5% and -3.5% respectively. Similarly, it was also determined that the recent annual background growth rate of the annual average daily traffic (AADT) was -3%, which is consistent with projections identified in the City of Ottawa TMP and outputs from the long range planning model provided by the City of Ottawa Strategic Planning Group.

However, in the interest of ensuring a conservative and robust analysis of future operating conditions within the study area, background traffic volumes for the 2016 and 2021 analysis years were estimated by applying a nominal 1% annual compound growth rate to the most recent traffic count data available at all study area intersections.

3.3 Other Planned Developments

Other study area developments that are currently proposed include:

- a residential/commercial development at 288 Booth Street, located approximately 750m east of the subject site. This development consists of a seven storey condominium tower containing 54 residential units and 219m^2 of commercial space.

- a residential development at 347-357 Booth Street, east of the Booth Street/Poplar Street intersection. This development consists of four multi-attached dwelling blocks containing 20 residential units.

- a residential development at 261-267 Rochester Street, northeast of the Rochester Street / Balsom Street intersection. The development consists of nine separate three storey structures containing a total of 33 residential townhouse units.

- a residential development at 13 Balsam Street, east of Booth Street. The development consists of a five-storey residential apartment building with a total of eight units.

- a mixed-use development at 1050 Somerset Street, southwest of the Somerset Street / Breezehill Avenue intersection. This development is also proposed by Claridge Homes and consists of a 23 storey residential tower with a five storey commercial podium (23 storeys total). The development will contain 197 condominium units, 7 townhouse units, 466m^2 of commercial/retail floor space and 2,424m^{2}of office floor space.

No form of traffic impact analysis was completed in support of the first four developments, as the scope of development is below the 75-unit threshold that would typically require the production of a traffic study to support a Site Plan Control application. Therefore, it is concluded that the nominal 1% growth rate applied to the background traffic volumes will be sufficient to account for the traffic likely to be generated by these developments.

A Transportation Impact Study was completed by Novatech Engineering for the 1050 Somerset Street mixed-use development on October 3rd, 2012. Relevant excerpts are included in **Appendix F**. For the purposes of this analysis it is assumed that the 1050 Somerset development will be constructed by 2016. Therefore, future background traffic volumes will reflect the trips generated by the 1050 Somerset Street mixed-use development.

The 2016 and 2021 background traffic projections are shown in **Figures 8 and 9**, respectively.

3.4 Trip Generation

3.4.1 Existing Site Traffic

Trips generated by the existing site uses have been estimated using the peak hour rates identified in the *Institute of Transportation Engineers (ITE) Trip Generation Manual, 9th Edition* for an auto repair shop.

The estimated peak hour vehicle trips currently being generated by the existing development are outlined in the table below.

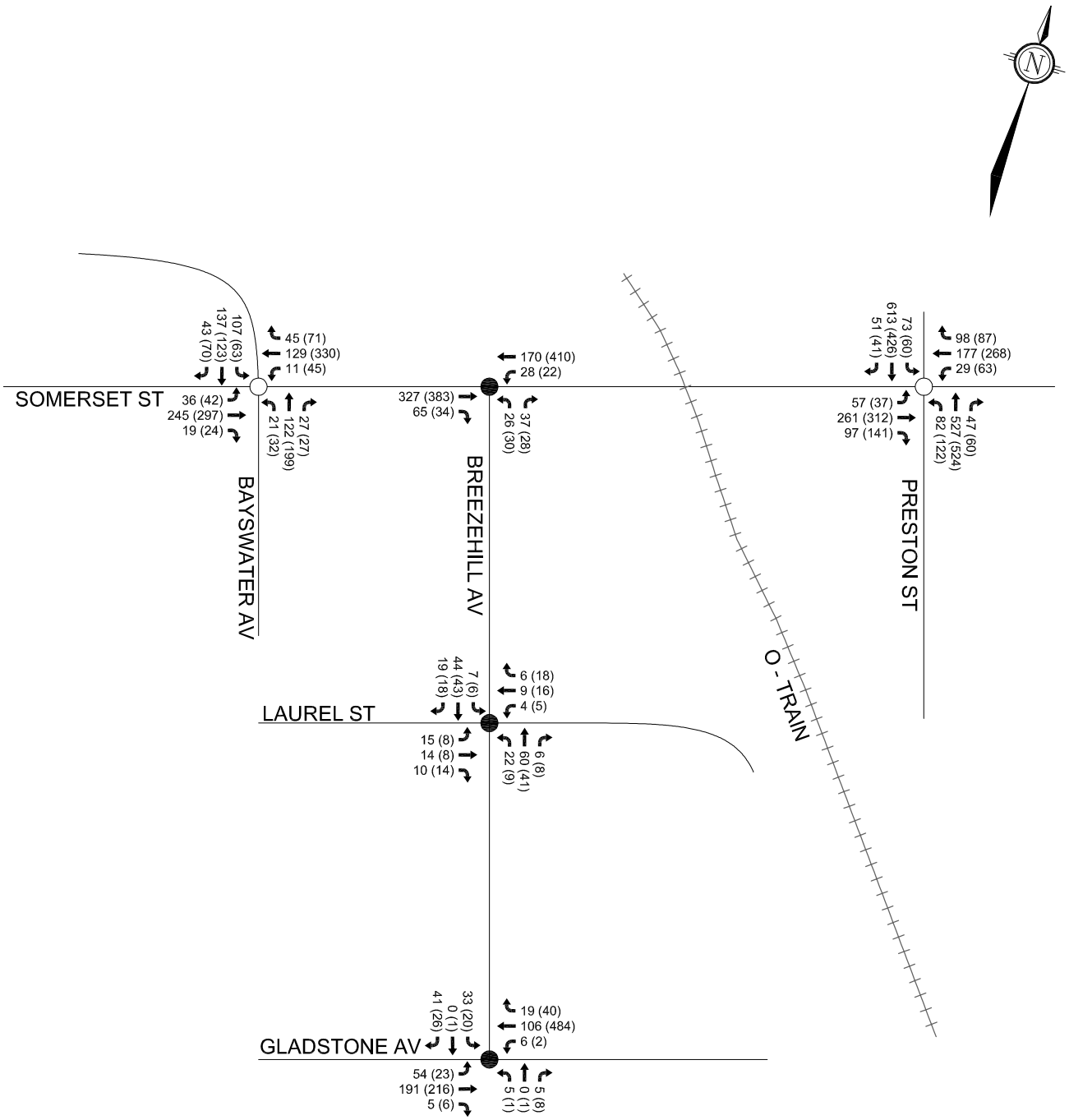
Table 3: Existing Site Traffic

Land Use	ITE Code	GFA (ft^2)	Trip Rates / 1,000ft^2 GFA		Vehicle Trips	
			AM Peak	PM Peak	AM Peak	PM Peak
Auto Care Center	942	8,525	2.25	3.11	19 vph[1] 13 in / 6 out	27 vph 13 in / 14 out

1. vph = Vehicles Per Hour

Due to the nature of the development all trips to the auto care center are assumed to be primary vehicle trips. The projections presented in the above table indicate that the existing on-site development is currently generating 19 vehicle trips during the weekday AM peak hour, and 27 vehicle trips during the weekday PM peak hour.

In order to determine the net increase in traffic that is likely to result from the re-development of the subject site, the existing peak hour traffic volumes should be deducted from the projected peak hour traffic volumes. It has been assumed that the distribution of existing site traffic is identical to the trip distribution identified in Section 3.5 of this report.



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LEGEND

- Unsignalized Intersection
- Signalized Intersection
- xx VPH AM Peak Hour
- (xx) VPH PM Peak Hour

1040 SOMERSET ST WEST

2016 BACKGROUND + 1050 SOMERSET TRAFFIC

APRIL 2013 112191 FIGURE 8

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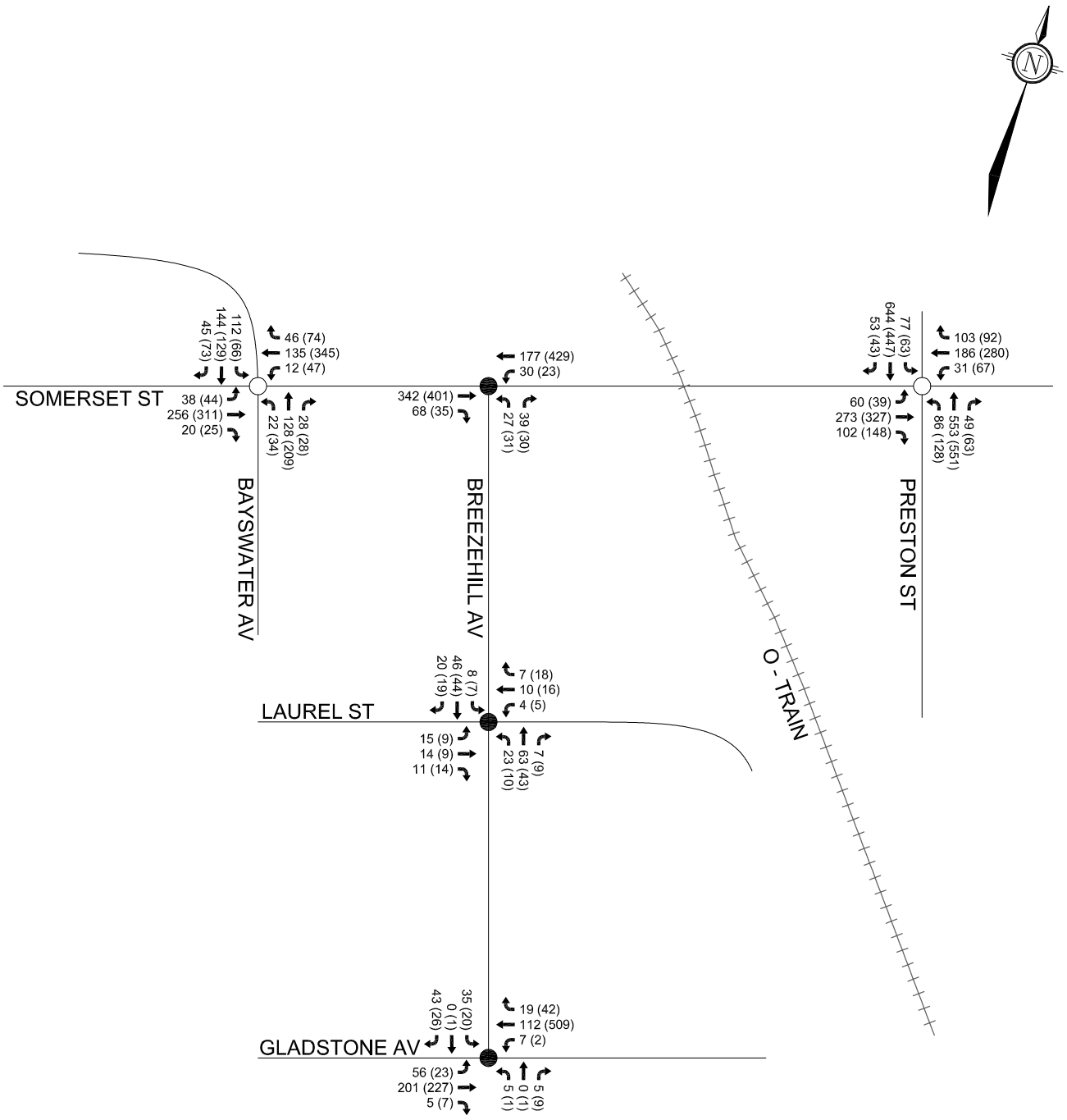

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LEGEND

- Unsignalized Intersection
- Signalized Intersection
- xx VPH AM Peak Hour
- (xx) VPH PM Peak Hour

1040 SOMERSET ST WEST

2021 BACKGROUND + 1050 SOMERSET TRAFFIC

APRIL 2013 112191 FIGURE 9

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The buildout and horizon year traffic projections presented in this report reflect the deduction of existing site traffic that is currently generated by the subject site. The distribution of existing site traffic throughout the study area is presented in **Figure 10**.

3.4.2 Proposed Site Traffic

Trips generated by the proposed development have been estimated using the peak hour rates identified in the *Institute of Transportation Engineers (ITE) Trip Generation Manual, 9th Edition* for residential condominiums/townhomes and specialty retail.

The trip generation surveys compiled in the *ITE Trip Generation Manual* only record vehicle trips, and the sites surveyed are typically located in suburban locations in the United States where non-auto modes of transportation typically have a modal share of 10% or less. For urban infill developments in downtown locations such as Somerset Street, where multiple modes of transportation are readily available, it is considered good practice to express projected trip generation volumes in terms of person trips, instead of vehicle trips. To convert ITE vehicle trip rates to person trip rates, two adjustment factors have been applied:

- Vehicle occupancy factor: **1.23** (taken from the TRANS 2005 O-D Survey Report)
- Non-auto usage factor: **1.1** (non-auto trips not counted in ITE surveys, assumed 10%)

Combining the two factors gives an overall vehicle trip to person trip adjustment factor of approximately 1.35. The conversion of vehicle trips into person trips for each distinct land use is shown in the following table.

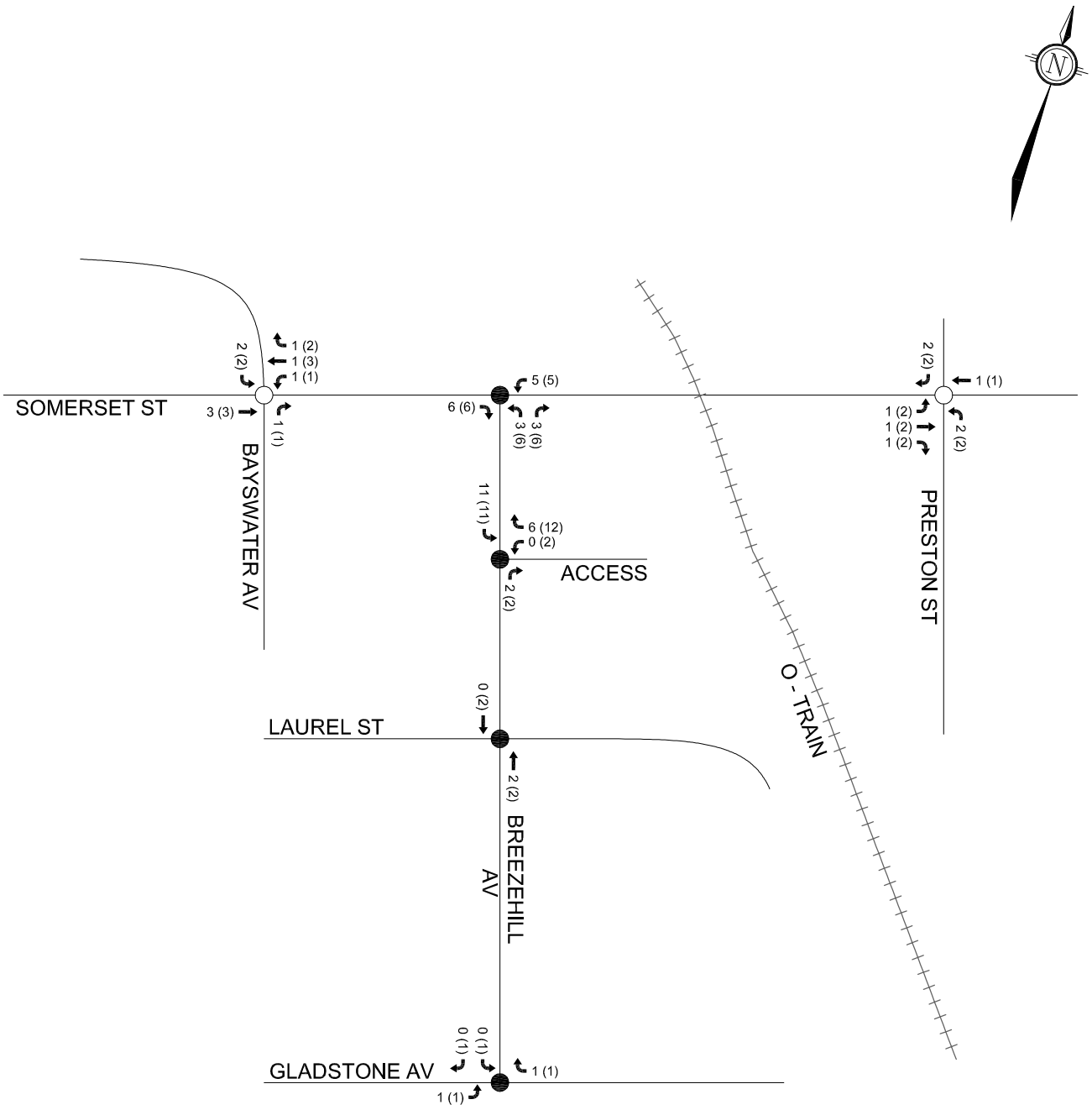
Table 4: Proposed Person Trips

Land Use	ITE Vehicle Trips			Person Trips	
	AM Peak	PM Peak		AM Peak	PM Peak
Residential Condominium/ Townhouse	137 vph[1] 23 in, 114 out	163 vph 109 in, 54 out	x 1.35 →	185 pph[2] 31 in, 154 out	220 pph 147 in, 73 out
Specialty Retail	7 vph 3 in, 4 out	27 vph 12 in, 15 out		9 pph 4 in, 5 out	36 pph 16 in, 20 out
			Total	**194 pph** **35 in, 159 out**	**256 pph** **163 in, 93 out**

1. vph = Vehicle Per Hour
2. pph = Persons Per Hour

The number of car trips that the site will generate has been estimated by categorizing the person trips by modal share. The auto-driver trip shares are based on observed percentages in the *2005 Trans O-D Survey Report* that are specific to the region referred to as the Ottawa West District. An auto modal share of 40% is assumed for trips generated by the proposed commercial retail, based on observed trips from the TRANS O-D survey having an origin and destination within the Ottawa West District, as it is considered unlikely that specialty retail would generate a significant volume of trips with an origin destination beyond the Ottawa West district. An auto modal share of 55% is assumed for trips generated by the proposed residential units based on all observed trips within the Ottawa West District, including those with an origin or destination beyond that area.

A full breakdown of the projected number of trips by modal share is shown in the following table.



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LEGEND

- Unsignalized Intersection
- Signalized Intersection

xx VPH AM Peak Hour

(xx) VPH PM Peak Hour

1040 SOMERSET ST WEST

EXISTING SITE TRAFFIC (ESTIMATED)

APRIL 2013 112191 FIGURE 10

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Table 5: Proposed Site Traffic by Modal Share

Travel Mode	Modal Share	AM Peak			PM Peak		
		In	Out	Total	In	Out	Total
Proposed Residential Condominium/Townhouse							
Total Person Trips		31	154	185	147	73	220
Auto Driver	**55%**	**17**	**85**	**102**	**81**	**41**	**122**
Auto Passenger	10%	3	15	18	15	7	22
Transit	25%	8	39	47	36	18	54
Non-Auto	10%	3	15	18	15	7	22
Proposed Specialty Retail							
Total Person Trips		4	5	9	16	20	36
Auto Driver	**40%**	**2**	**2**	**4**	**6**	**8**	**14**
Auto Passenger	10%	0	0	0	2	2	4
Transit	10%	0	1	1	2	2	4
Non-Auto	40%	2	2	4	6	8	14
Total Proposed							
Total Person Trips		35	159	194	163	93	256
Auto Driver		**19**	**87**	**106**	**87**	**49**	**136**
Auto Passenger		3	15	18	17	9	26
Transit		8	40	48	38	20	58
Non-Auto		5	17	22	21	15	36

The specialty retail land use is the only component of the proposed development that is likely to generate vehicular pass-by trips. However, due to the small volume of total vehicular trips that the specialty retail land use is likely to generate (<20vph), no adjustment has been made to account for pass-by trips. All traffic generated by the proposed development is conservatively assumed to consist of primary (i.e. new) trips only.

3.5 Trip Distribution

3.5.1 Vehicular Trips

The distribution of residential trips is based on observed traffic patterns at the study area intersections. Specifically, the distribution of all trips departing the site is based on the prevailing AM peak hour traffic patterns, and the distribution of all trips arriving at the site is based on the prevailing PM peak hour traffic patterns. The distribution of trips generated by the proposed residential units is summarized as follows:

- 15% to/from the south via Breezehill Avenue,
- 35% to/from the west via Somerset Street,
- 50% to/from the east via Somerset Street,

The distribution of retail trips is based on the prevailing off-peak hour traffic patterns. The assumed distribution of trips generated by the proposed specialty retail is summarized as follows:

- 15% to/from the south via Breezehill Avenue,
- 45% to/from the west via Somerset Street,
- 40% to/from the east via Somerset Street,

The distribution of the proposed site traffic is shown in **Figure 11**.

Total traffic volumes for 2016 and 2021 have been calculated by deducting the existing site traffic from the background traffic projections and adding the proposed site traffic. The total traffic volumes are shown in **Figures 12 and 13**.

3.5.2 Transit Trips

The distribution of transit trips to and from the proposed development has been derived from the data presented in Exhibits 6-2 and 6-3 of the *2005 Trans O-D Survey Report*, which are included in this report as **Appendix G**.

The top origins/destinations for all arriving and departing trips generated within the Ottawa West Area are summarized in the following table.

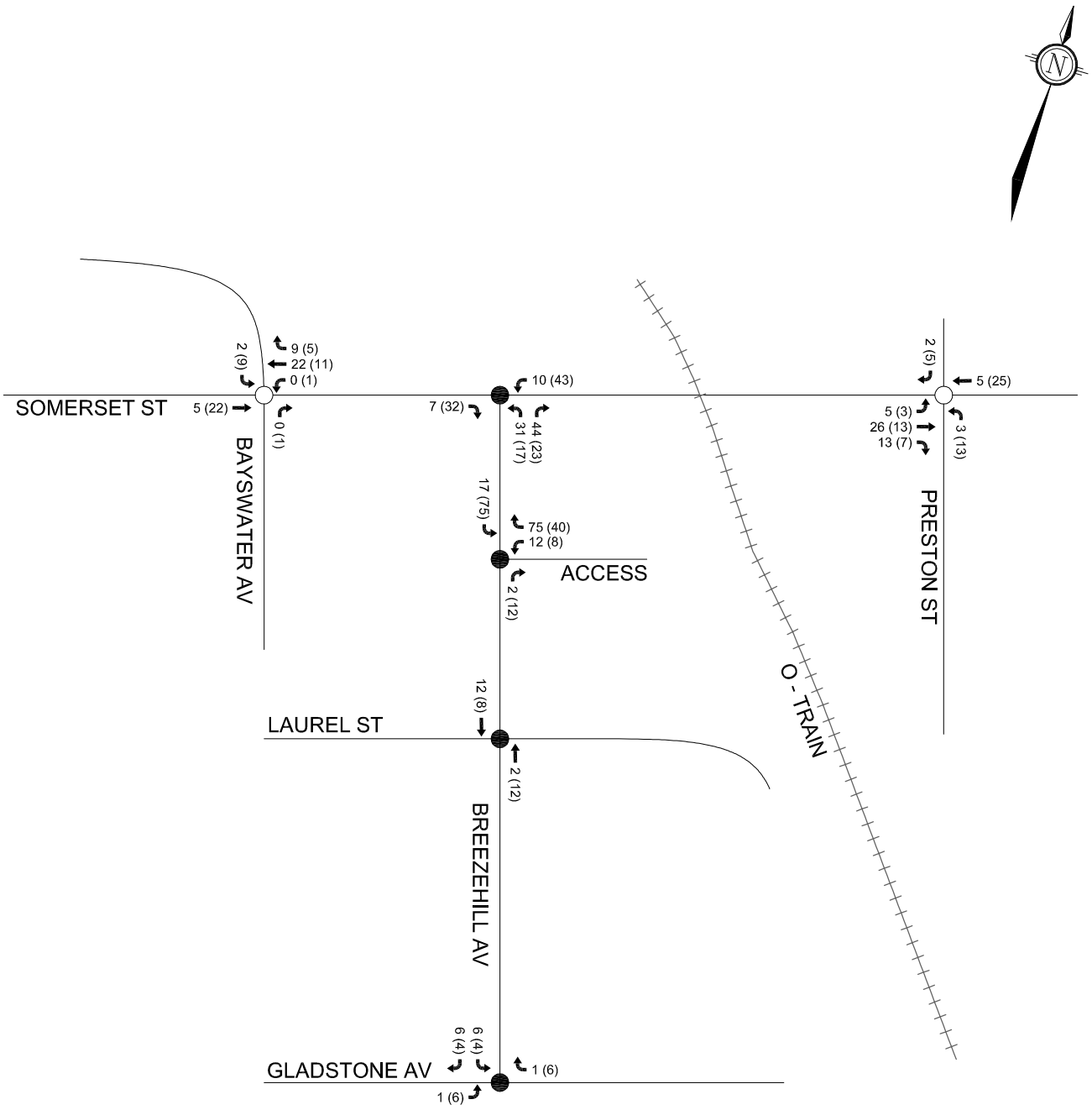
Table 6: Top Origins/Destinations of Ottawa West Area Trips

	Origin of Arrivals	% Trips	Destination of Departures	% Trips
AM Peak Hour	Ottawa West	26%	Ottawa West	32%
	Merivale	13%	Ottawa Centre	13%
	Bayshore/Cedarview	13%	Merivale	12%
	Ottawa Inner Area	7%	Ottawa Inner Area	11%
PM Peak Hour	Ottawa West	38%	Ottawa West	32%
	Merivale	11%	Bayshore/Cedarview	12%
	Bayshore/Cedarview	11%	Merivale	12%
	Ottawa Inner Area	10%	Ottawa Inner Area	8%

The data presented in the above table indicates that approximately 30% of all trips generated by the Ottawa West Area in the AM and PM peak hours have an origin or destination within the Ottawa West Area. The top origins and destinations for all external trips generated by the Ottawa West Area are Merivale, Ottawa Centre, Ottawa Inner Area and Bayshore/Cedarview regions.

It has been conservatively assumed that all transit users will use the curbside bus stops on Somerset Street and Preston Street, which are in closer proximity to the subject site than the Bayview Station.

For the purposes of this analysis, the future distribution of site-generated transit trips across the study area is assumed to be as follows:



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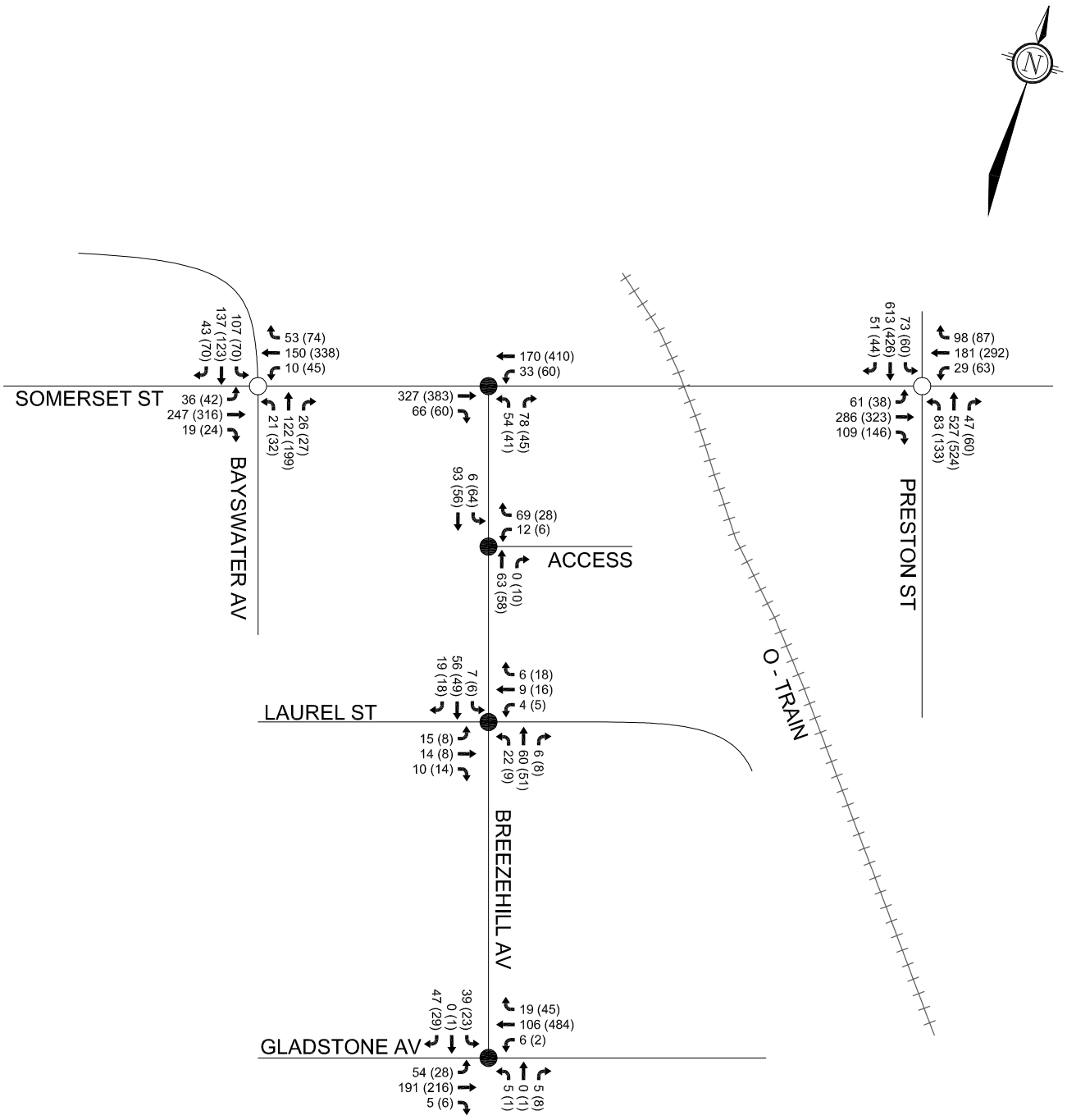
LEGEND

- Unsignalized Intersection
- Signalized Intersection
- xx VPH AM Peak Hour
- (xx) VPH PM Peak Hour

1040 SOMERSET ST WEST

PROPOSED SITE TRAFFIC

APRIL 2013 112191 FIGURE 11



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LEGEND

- Unsignalized Intersection
- Signalized Intersection
- xx VPH AM Peak Hour
- (xx) VPH PM Peak Hour

1040 SOMERSET ST WEST

2016 TOTAL TRAFFIC VOLUMES

APRIL 2013 112191 FIGURE 12

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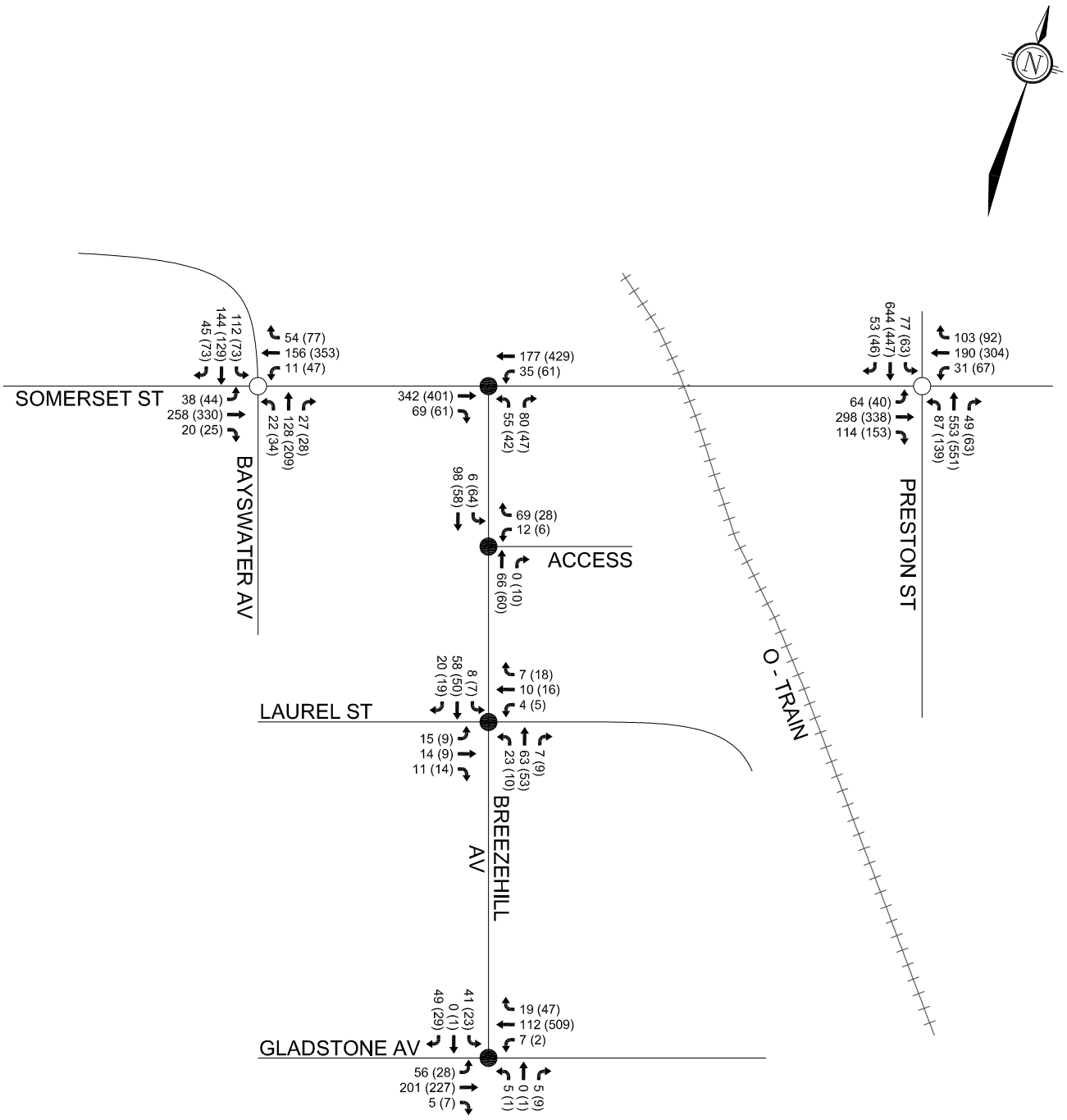

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LEGEND

- Unsignalized Intersection
- Signalized Intersection
- xx VPH AM Peak Hour
- (xx) VPH PM Peak Hour

1040 SOMERSET ST WEST

2021 TOTAL TRAFFIC VOLUMES

APRIL 2013 112191 FIGURE 13

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- 50% of all transit trips to and from the development will use Route 2 on Somerset Street;
- 50% of all transit trips to and from the development will use the Route 85 on Preston Street;

The foregoing implies that transit users who wish to use the express/high-frequency routes that run along the Transitway can use Routes 2 or 85 to make a transfer, as required. Applying these distribution percentages to the projected transit trip volumes presented in Table 6 yields the following passenger loadings:

AM Peak Hour

- 24 people (4 alighting, 20 boarding) at Stops #8039 / #8027 on Somerset Street;
- 24 people (4 alighting, 20 boarding) at Stops #6649 / #6651 on Preston Street.

PM Peak Hour

- 29 people (19 alighting, 10 boarding) at Stops #8039 / #8027 on Somerset Street;
- 29 people (19 alighting, 10 boarding) at Stops #6649 / #6651 on Preston Street.

Based on the projected transit trip volumes associated with the proposed development, no capacity problems are anticipated on the adjacent bus routes, or at the nearby bus stops.

4.0 IMPACT ANALYSIS

4.1 Screenline Analysis

The TIA guidelines define screenline analysis as a comparison of forecasted demands and lane capacities on the major road network connecting a site to the area transportation network. Typical lane capacities are established based on roadway classification and general characteristics (ie. suburban with limited access, urban with on-street parking, etc.). The typical lane capacities used in this study are based on the City's guidelines for the TRANS Long-Range Transportation Model. The TIA guidelines require the identification of mitigation measures in the form of additional lane capacity where the volume to capacity ratio exceeds 0.9, except in the Urban Core (bounded by the Ottawa River, Rideau River, Queensway and the O-Train line) where 1.0 is acceptable.

The TMP identifies a number of strategic screenlines to determine the major regional travel patterns and assess future infrastructure needs. The CPR screenline extends along the O-Train corridor from the Sir John A. MacDonald Parkway to Colonel By Drive and intersects the subject study area. This screenline captures volumes on the Sir John A. MacDonald Parkway, Scott Street, Somerset Street, Gladstone Avenue, Highway 417, Carling Avenue, Prince of Wales Drive and Colonel By Drive.

Directional capacity and the future background and total traffic projections are summarized in the following table for the major study area roads crossing the CPR screenline.

Table 7: Screenline Analysis

Road Segment	AM Peak			PM Peak		
	Volume (vph)	Capacity (vph)	v/c	Volume (vph)	Capacity (vph)	v/c
2016 Background						
Somerset (Arterial)						
Eastbound	360	600	0.60	410	600	0.68
Westbound	200	600	0.33	430	600	0.72
Gladstone (Mjr Collector)						
Eastbound	230	600	0.38	240	600	0.40
Westbound	130	600	0.22	530	600	0.88
2021 Background						
Somerset (Arterial)						
Eastbound	380	600	0.63	430	600	0.72
Westbound	210	600	0.35	450	600	0.75
Gladstone (Mjr Collector)						
Eastbound	240	600	0.40	260	600	0.43
Westbound	140	600	0.23	550	600	**0.92**
2016 Total						
Somerset (Arterial)						
Eastbound	400	600	0.67	430	600	0.72
Westbound	200	600	0.33	470	600	0.78
Gladstone (Mjr Collector)						
Eastbound	230	600	0.38	250	600	0.42
Westbound	130	600	0.22	530	600	0.88
2021 Total						
Somerset (Arterial)						
Eastbound	420	600	0.70	450	600	0.75
Westbound	210	600	0.35	490	600	0.82
Gladstone (Mjr Collector)						
Eastbound	250	600	0.42	260	600	0.43
Westbound	140	600	0.23	560	600	**0.93**

All major study area roads crossing the CPR screenline are projected to have peak hour v/c ratios of 0.88 or less in 2016. The screenline analysis suggests that the adjacent major road network will have adequate capacity to accommodate the proposed development based on the 2016 traffic projections.

A v/c ratio of 0.92 is anticipated for westbound traffic crossing the CPR screenline at Gladstone Avenue during the weekday PM peak based on the 2021 background traffic projection. The CPR screenline forms the western boundary of the Urban Core, where a v/c ratio of 1.0 is acceptable. The addition of development traffic will have a marginal impact on Gladstone Avenue, increasing the v/c ratio of westbound traffic crossing the CPR screenline to 0.93 during the weekday PM peak.

Additional analysis is required to determine if the study area intersections will have adequate capacity to accommodate the projected background and total traffic volumes.

4.2 Intersection Analysis

4.2.1 2016 Background Traffic

Intersection capacity analysis has been completed for the projected 2016 background traffic condition. The results of the analysis are summarized in the following table for the weekday AM and PM peak hours. Detailed reports are included in **Appendix C1**.

Table 8: Intersection Analysis – 2016 Background Traffic

Intersection	AM Peak			PM Peak		
	max. v/c or Delay	LOS	Movement	max. v/c or Delay	LOS	Movement
Somerset / Bayswater[1]	0.45	A	EBT	0.57	A	WBT
Somerset / Breezehill	14 sec	B	NBL/R	19 sec	B	NBL/R
Somerset / Preston[1]	**0.92**	**E**	**SBT**	0.88	D	EBT
Breezehill / Laurel	8 sec	A	NBT	7 sec	A	ALL
Breezehill / Gladstone	12 sec	B	NBT	17 sec	C	SBT

1. Signalized Intersection

The results presented in the table above indicate that the southbound through movement at the Somerset Street / Preston Street intersection is expected to operate at a LOS E (v/c = 0.92) during the weekday AM peak hour. An acceptable LOS can be achieved by providing the north-south signal phase with an additional five seconds of green time, resulting in a 65 second cycle length. This is expected to improve the southbound through movement to a LOS D (v/c = 0.85), while maintaining an acceptable LOS for all other movements.

4.2.2 2021 Background Traffic

Intersection capacity analysis has been completed for the projected 2021 background traffic condition. The following analysis is based on the Somerset Street/Preston Street signal timing adjustment discussed in the foregoing section. The results of the analysis are summarized in the following table for the weekday AM and PM peak hours. Detailed reports are included in **Appendix C1**.

Table 9: Intersection Analysis – 2021 Background Traffic

Intersection	AM Peak			PM Peak		
	max. v/c or Delay	LOS	Movement	max. v/c or Delay	LOS	Movement
Somerset / Bayswater[1]	0.47	A	EBT	0.60	A	WBT
Somerset / Breezehill	14 sec	B	NBL/R	20 sec	C	NBL/R
Somerset / Preston[1]	0.90	D	SBT	**0.93**	**E**	**EBT**
Breezehill / Laurel	8 sec	A	NBT	7 sec	A	ALL

Intersection	AM Peak			PM Peak		
	max. v/c or Delay	LOS	Movement	max. v/c or Delay	LOS	Movement
Breezehill / Gladstone	12 sec	B	NBT	18 sec	C	SBT

1. Signalized Intersection

The results presented in the table above indicate that the eastbound through movement at the Somerset Street / Preston Street intersection is expected to operate at a LOS E (v/c = 0.93) during the weekday PM peak hour. An acceptable LOS can be achieved by providing all signal phases with an additional five seconds of green time, resulting in an 80 second cycle length. This is expected to improve the eastbound through movement to a LOS D (v/c = 0.89), while maintaining an acceptable LOS for all other movements.

4.2.3 2016 Total Traffic

Intersection capacity analysis has been completed for the projected 2016 total traffic condition, which is the sum total of the projected background traffic and the traffic likely to be generated by the proposed development. The adjusted signal timing outlined in Section 4.2.1 for the Somerset Street / Preston Street intersection has been assumed for the following analysis. The results of the analysis for the weekday AM and PM peak hours are summarized in the following table. Detailed reports are included in **Appendix C2**.

Table 10: Intersection Analysis – 2016 Total Traffic

Intersection	AM Peak			PM Peak		
	max. v/c or Delay	LOS	Movement	max. v/c or Delay	LOS	Movement
Somerset / Bayswater[1]	0.46	A	EBT	0.58	A	WBT
Somerset / Breezehill	16 sec	C	NBL/R	23 sec	C	NBL/R
Somerset / Preston[1]	0.89	D	EBT	**0.92**	**E**	**EBT**
Breezehill / Access	9 sec	A	WBL/R	9 sec	A	WBL/R
Breezehill / Laurel	8 sec	A	NBT	7 sec	A	ALL
Breezehill / Gladstone	12 sec	B	NBT	18 sec	C	SBT

1. Signalized Intersection

The results presented in the table above indicate that the eastbound approach to the Somerset Street / Preston Street intersection is expected to operate at a LOS E (v/c = 0.92) during the weekday PM peak hour. An acceptable LOS can be achieved by providing the east-west signal phase with an additional five seconds of green time, yielding a 75 second cycle length. This results in a LOS D (v/c = 0.86) for the northbound through movement, while maintaining an acceptable LOS for all other movements.

4.2.4 2021 Total Traffic

Intersection capacity analysis has been completed for the projected 2021 total traffic condition. The signal timing adjustments outlined in Section 4.2.1 and 4.2.3 for the Somerset Street / Preston

Street intersection have been assumed for the following analysis. The results of the analysis for the weekday AM and PM peak hours are summarized in the following table. Detailed reports are included in **Appendix C2**.

Table 11: Intersection Analysis – 2021 Total Traffic

Intersection	AM Peak			PM Peak		
	max. v/c or Delay	LOS	Movement	max. v/c or Delay	LOS	Movement
Somerset / Bayswater[1]	0.48	A	EBT	0.61	B	WBT
Somerset / Breezehill	17 sec	C	NBL/R	25 sec	C	NBL/R
Somerset / Preston[1]	**0.93**	**E**	**EBT**	**0.92**	**E**	**EBT**
Breezehill / Access	9 sec	A	WBL/R	9 sec	A	WBL/R
Breezehill / Laurel	8 sec	A	NBT	8 sec	A	ALL
Breezehill / Gladstone	12 sec	B	NBT	19 sec	C	SBT

1. Signalized Intersection

The results presented in the table above indicate that the eastbound through movement at the Somerset Street / Preston Street intersection is expected to operate at a LOS E (v/c = 0.93) during the weekday AM peak hour. An acceptable LOS can be achieved by providing all phases with an additional five seconds of green time, yielding a 75 second cycle length. This results in a maximum LOS D (v/c = 0.90) for the southbound through movement, while maintaining an acceptable LOS for all other movements.

The eastbound approach to the Somerset Street / Preston Street intersection is expected to operate at a LOS E (v/c = 0.92) during the weekday PM peak hour. An acceptable LOS can be achieved by providing the east-west signal phases with an additional five seconds of green time, yielding an 85 second cycle length. This results in a maximum LOS D (v/c = 0.90) for the northbound through movement, while maintaining an acceptable LOS for all other movements.

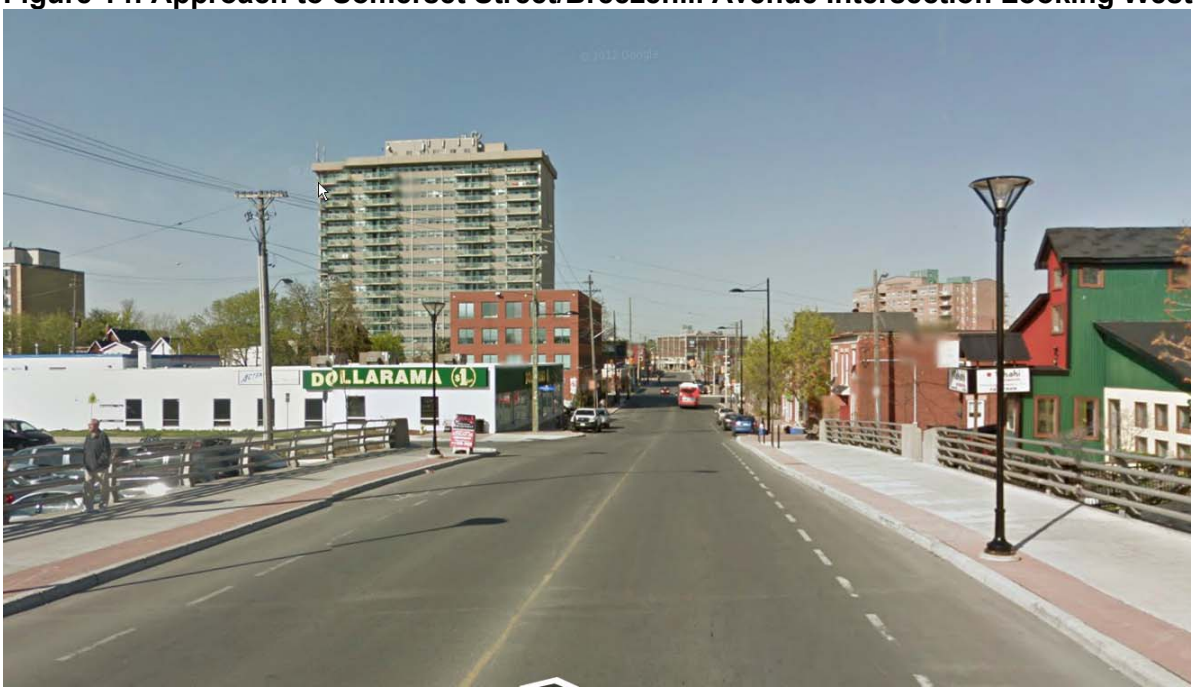
Using the methodology outlined in Book 12 of the Ontario Traffic Manual (OTM), projected Average Hourly Volumes (AHV) were estimated for the Somerset Street / Breezehill Avenue intersection by dividing the sum of the projected AM and PM peak hour volumes by four. A copy of the traffic signal justification calculations is included in **Appendix D**. Based on the projected AHV, the warrants for traffic signal control are not met at the Somerset Street / Breezehill Avenue intersection under the 2021 total traffic conditions.

4.3 Turn Lane Requirements

The 2016 weekday PM peak total traffic volumes meet the MTO warrant criteria for a dedicated westbound left-turn lane on Somerset Street at Breezehill Avenue. A copy of the relevant MTO left-turn warrant graph is included in **Appendix D**.

The bridge over the O-Train corridor has a width of 11 metres and consists of single through lanes in each direction and dedicated bicycle lanes as shown in **Figure 14**.

Figure 14: Approach to Somerset Street/Breezehill Avenue Intersection Looking West



Providing a westbound left turn lane would require removal of the dedicated bicycle lanes or widening of the bridge structure.

Other mitigation measures include traffic signals with split phase timing (traffic on one approach proceeds while traffic on all other approaches is stopped) or restriction of the westbound left turn movement by signage and/or a channelized island. A channelized island would likely have a significant impact on the Devonshire Public School as the school bus loading zone is located on the west side of Breezehill Avenue, approximately 100 metres south of the Somerset Street right-of-way limit (across the street and 60 metres south from the proposed access to the underground parking garage, measured to the south limit of the access). Signage could be used to prohibit the westbound left turn movement during the weekday p.m. peak only and permit buses at all times if required.

Additional intersection analysis is provided in Section 4.5 to assess the impact of traffic signals with split phase timing at the Somerset Street/Breezehill Avenue intersection.

4.4 Assessment of Safety and Operations

A comprehensive appraisal of the sight distances has been completed for the intersection of Somerset Street and Breezehill Avenue, using the relevant standards and guidelines presented in the Transportation Association of Canada *Geometric Design Guide* (GDG). The guidelines outline minimum requirements for stopping sight distance (SSD) and turning sight distance (TSD) for a range of design speeds. With respect to the subject site, SSD is the distance required for vehicles travelling on Somerset Street to perceive, react and brake for a vehicle stopped on Somerset Street waiting to turn onto Breezehill Avenue. TSD is the distance required for vehicles exiting Breezehill Avenue to turn left or right onto Somerset without significantly affecting vehicles travelling on Somerset Street.

Field measurements have been conducted to confirm the available SSD for vehicles approaching Breezehill Avenue from the east (i.e. coming across the bridge over the O-Train), and the available TSD for vehicles turning left or right out of Breezehill Avenue onto Somerset Street.

Based on a design speed of 60 kph, the minimum SSD required along Somerset Street is 105m. A minimum SSD of approximately 105m is available for vehicles approaching Breezehill Avenue from the east, which meets the minimum requirement.

Figure 2.3.3.4b of the GDG outlines upper and lower boundaries for TSD requirements based on design speed. The lower boundary is based on vehicles travelling on the major road not needing to reduce their speed to less than 70% of the initial speed. The upper boundary is based on vehicles travelling on the major roadway not reducing their speed to less than 85% of the design speed and maintaining a gap of two seconds between the turning vehicle and the approaching vehicle. Based on a design speed of 60 kph, vehicles turning left out of Breezehill Avenue require 125m to 160m of sight distance. Vehicles turning right out of Breezehill Avenue require 110m to 160m of sight distance.

There is adequate sight distance west of Breezehill Avenue for vehicles to turn right. The sight distance east of Breezehill Avenue for vehicles to turn left is limited by the vertical curve of the bridge over the O-Train and further obstructed by the concrete end treatment of the guiderail. Based on field measurements, a TSD of 75m is available for a vehicle stopped in advance of the concrete end treatment (ie. looking through the guiderail), and approximately 50m is available for a vehicle stopped at the concrete end treatment. The guiderail and concrete end treatment are to be cut back approximately 16m as part of the proposed development, which should eliminate the obstruction caused by the end treatment however the TSD will continue to be limited by the overpass.

Traffic signal control may be used to safely and efficiently alternate the right-of-way when visibility is inadequate. Advance flashing beacons are typically required for 85th percentile speeds of 60 kph or higher and visibility distances of less than 110m.

Other mitigation measures could include restriction of the northbound left turn movement through a channelized island on Breezehill Avenue. This would likely result in an additional 60 vph along Laurel Street and Bayswater Avenue during the weekday a.m. peak and while there would likely be sufficient lane capacity to accommodate the added traffic, extra precautions may be required at the crosswalk on the west leg of the Laurel Street/Breezehill Avenue intersection as it is heavily used by children walking to the Devonshire Community Public School.

Based on the foregoing, traffic signal control is recommended at the Somerset Street/Breezehill Avenue intersection to address the inadequate TSD even though the justification criteria are not met. A continuous advance warning beacon should be provided based on the available sight distance of 105 metres for vehicles traveling west on Somerset Street.

4.5 Analysis of Traffic Signals at Somerset/Breezehill

Intersection capacity analysis has been completed for the projected 2021 total traffic condition assuming traffic signal control with split phase timing at the intersection of Somerset Street and Breezehill Avenue. Detailed reports are included in **Appendix C2**. The results show failing operating conditions in the weekday AM and PM peaks with v/c ratios in excess of 1.0 for the eastbound and westbound approaches.

Further analysis was completed assuming standard two-phase traffic signal operation with restriction of the westbound left turn movement during the weekday PM peak. The PM peak westbound left turn traffic was reassigned to the Somerset Street/Bayswater Avenue intersection and optimized signal timing was assumed to account for the change in traffic pattern. The westbound left turn movement is assumed to be permitted at the Somerset Street/Breezehill Avenue intersection during the weekday AM peak when the left turn lane warrant is not met. The results are summarized in the following table and detailed reports are included in **Appendix C2**.

Table 12: Analysis of Signals at Somerset/Breezehill – 2021 Total Traffic

Intersection	AM Peak			PM Peak		
	max. v/c or Delay	LOS	Movement	max. v/c or Delay	LOS	Movement
Somerset / Bayswater	0.48	A	EBT/L	0.71	C	WBT/L
Somerset / Breezehill	0.51	A	EBT/R	0.60	A	EBT/R
Somerset / Preston	0.90	D	SBT/R	0.90	D	NBT/R

The results show acceptable operating conditions in 2021 based on the projected total traffic volumes. A maximum queue of 85 metres is expected for the westbound approach of the Somerset Street/Bayswater Avenue intersection in the weekday PM peak. A maximum queue of 70 metres is expected for the eastbound approach of the Somerset Street/Breezehill Avenue intersection in the weekday PM peak. Sufficient storage is available for the projected queue lengths as the spacing between the Bayswater Avenue and proposed Breezehill Avenue stop bars is approximately 85 metres.

The above analysis shows that the projected 2021 total traffic volumes can be safely and adequately accommodated through the provision of traffic signals at the Somerset Street/Breezehill Avenue intersection. Signage restricting the westbound left turn movement during the weekday PM peak is recommended.

4.6 Provisions For Non-Auto Modes

The provision of traffic signals at the Somerset Street/Breezehill Avenue intersection would enhance the safety of the existing east-west crosswalk which is heavily used by children walking to and from the Devonshire Public School and provide an opportunity for new north-south crosswalks. The north-south crosswalks would provide a pedestrian connection between Breezehill Avenue north and south of Somerset Street via an existing set of stairs on the north side of the intersection. The land uses on the north side of Somerset Street include a variety of commercial uses and an automotive repair shop with a residential development located in behind at a lower grade.

Unit pavers are proposed along the Somerset Street frontage adjacent to the existing concrete sidewalk and boulevard. The guiderail and concrete cap on the south side of the Somerset Street bridge are to be cut back approximately 16 metres and two steps will be introduced leading to a six metre wide paved plaza. Building entrances to the retail area will be provided on Somerset Street and Breezehill Avenue. Unit pavers are proposed along Breezehill Avenue, creating a wide boulevard complete with planters and benches near the main building entrance. A clear width of three metres will be provided between the planters and the Breezehill Avenue curbline.

Bicycle parking will be provided at the corner of Somerset Street and Breezehill Avenue, on the first three levels of underground parking and on the mezzanine level. The bicycle parking requirements and provisions are outlined in Section 4.7.2 below.

OC Transpo bus stops #8039 and #8027 are located at a walking distance of approximately 90m from the entrance to the residential tower. OC Transpo bus stops #6649 and #6651 are located at a walking distance of approximately 450m from the entrance of the residential tower. The above bus stops provide service to the regular routes 2 and 85. Details for the aforementioned routes are found in **Appendix A**.

4.7 On-Site Design

This section of the report provides a review of the on-site design in terms of vehicle access, on-site parking, and on-site loading activities.

4.7.1 Proposed Access

The access to the existing development is located 9.5m south of Somerset Street as measured from the Somerset Street right-of-way limit to the nearest edge of the access. The existing access is to be removed and replaced by a new access to the underground parking approximately 38 m south of Somerset Street, measured from the nearest edge of the access to the Somerset Street right-of-way limit. The driveway will have a width of 6.1m and meets the requirement outlined in the Private Approach By-law for minimum distance from the nearest intersecting street line.

A loading driveway is proposed immediately north of the access to the underground parking. The loading driveway will have a width of four metres and will be used for garbage pick-up and moving operations. The loading driveway will not be used by the public on a regular basis and should not be considered as a second access to the site in terms of meeting the Private Approach By-law requirement for minimum spacing between accesses.

4.7.2 On-site Parking

The site is located in Area B of Schedule 1 to the Zoning By-law (ZBL), and is located within 600m of the Bayview Rapid Transit Station. Minimum parking space rates for each of the proposed land uses are identified in the ZBL as follows:

- Residential (occupants) — 0.5 per dwelling unit
- Residential (visitors) — 0.2 per dwelling unit after the first 12 units, to a maximum of 300 units
- Commercial Retail — 2.5 per 100m^2 gross floor area per unit over 150m^2

The ZBL states that where all parking spaces for a permitted land use are located below grade in the same building as the land use, the parking required for that land use may be reduced by 10% to a maximum of 20 spaces. Based on the foregoing, a minimum of 152 resident parking spaces, 60 visitor parking spaces, and five retail parking spaces are required for a total of 217 parking spaces.

Maximum parking space rates are outlined in the ZBL as follows:

- Residential (occupants) — 1.75 per dwelling unit, occupant and visitor combined
- Commercial Retail — 3.6 per 100m^2 gross floor area

Based on the above rates, the ZBL permits a maximum of 599 vehicle parking spaces for the proposed development.

A total of 152 spaces will be provided for resident parking and 10 spaces will be provided for visitor parking. The proposed resident parking meets the requirement of the ZBL. The proposed reduction in visitor and retail parking will be addressed through the ZBL amendment application process.

Minimum bicycle parking requirements for each of the proposed land uses are identified in the ZBL as follows:

- Residential (occupants) 0.5 per dwelling unit
- Commercial Retail 1.0 per 250m^2 gross floor area

Based on the above rates, the ZBL identifies a minimum requirement to provide 170 bicycle parking spaces as part of the proposed development. A total of 174 bicycle parking spaces will be provided, four of which will be located at ground level, 107 on the first three levels of underground parking and the remaining 63 spaces on the mezzanine level.

4.7.3 Loading Activities

The ZBL indicates that in the TM zone a loading space is only required for uses that have a gross floor area of 1,000m^2 or more. As the proposed retail component is approximately 200 m^2, a loading space is not required.

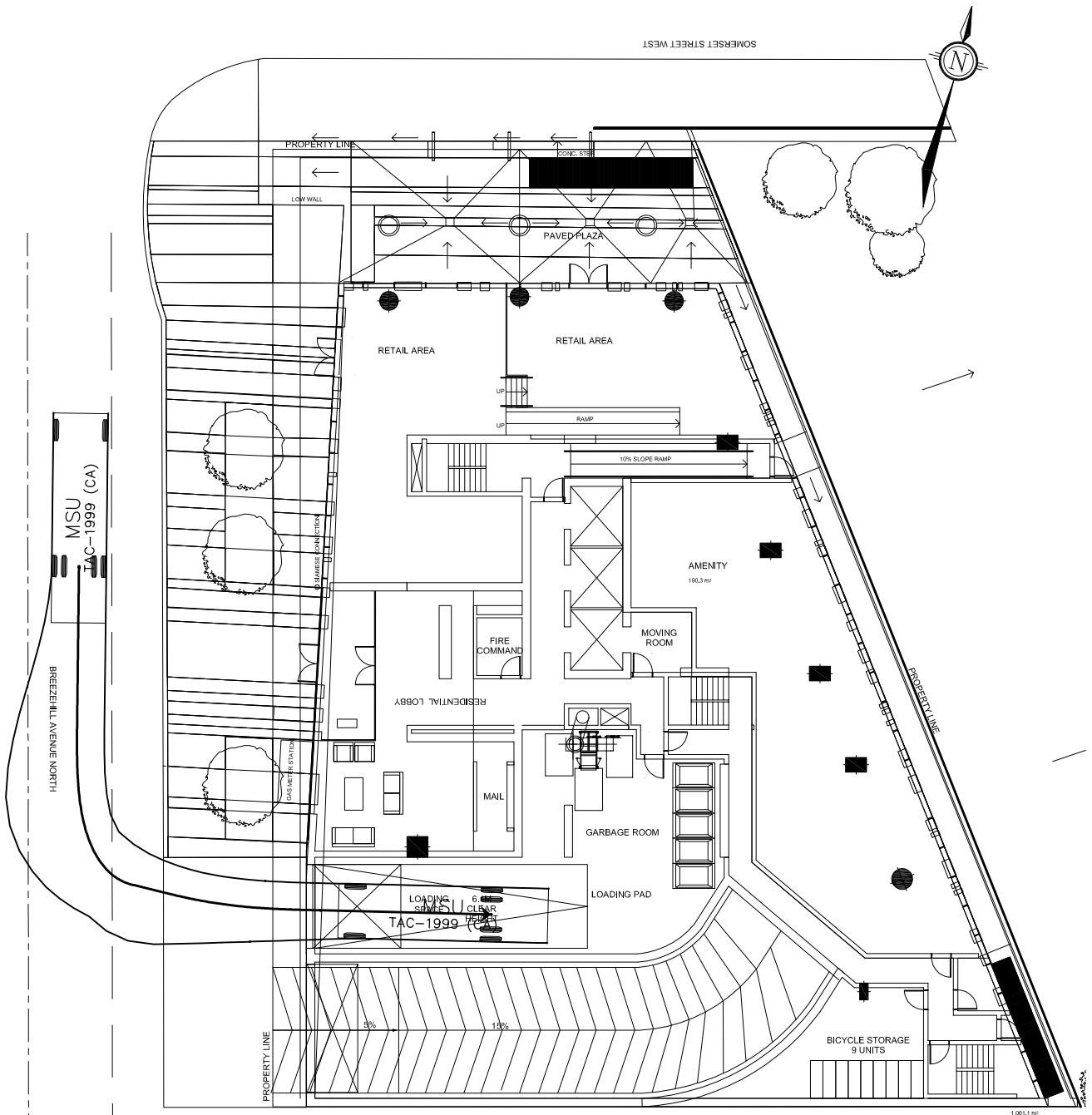
As indicated above, a loading space and separate driveway is proposed immediately north of the parking garage access to accommodate loading activities such as garbage collection and moving operations.

The swept vehicle paths for a medium single unit truck (MSU) reversing into the loading access and driving out in a forward motion, similar to the operation of a moving truck, are shown in **Figures 15 and 16**. Swept vehicle paths for an MSU driving into the loading access and reversing out, similar to the operation of a garbage truck, are shown in **Figures 17 and 18**. Both scenarios were tested for the right turn movements only, as right turns generally more require more space than left turns.

4.8 Community Impacts

Access to the site is proposed on Breezehill Avenue, in close proximity to Somerset Street which is classified as an arterial road.

Under full movement operation at the Somerset Street/Breezehill Avenue intersection, it is anticipated that the majority of vehicular trips generated by the development will access the site via Somerset Street as opposed to travelling to and from the south on Breezehill Avenue. If westbound left turns are to be restricted at the Somerset Street/Breezhill Avenue intersection during the weekday PM peak there will likely be an increase of approximately 60 vph on Bayswater Avenue and Laurel Street. Based on the 2016 and 2021 total traffic projections, both roads should have sufficient lane capacity to accommodate the additional traffic.



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1040 SOMERSET ST WEST

LOADING ACCESS - NORTHBOUND REVERSE MOVEMENT IN

APRIL 2013 112191 FIGURE 15

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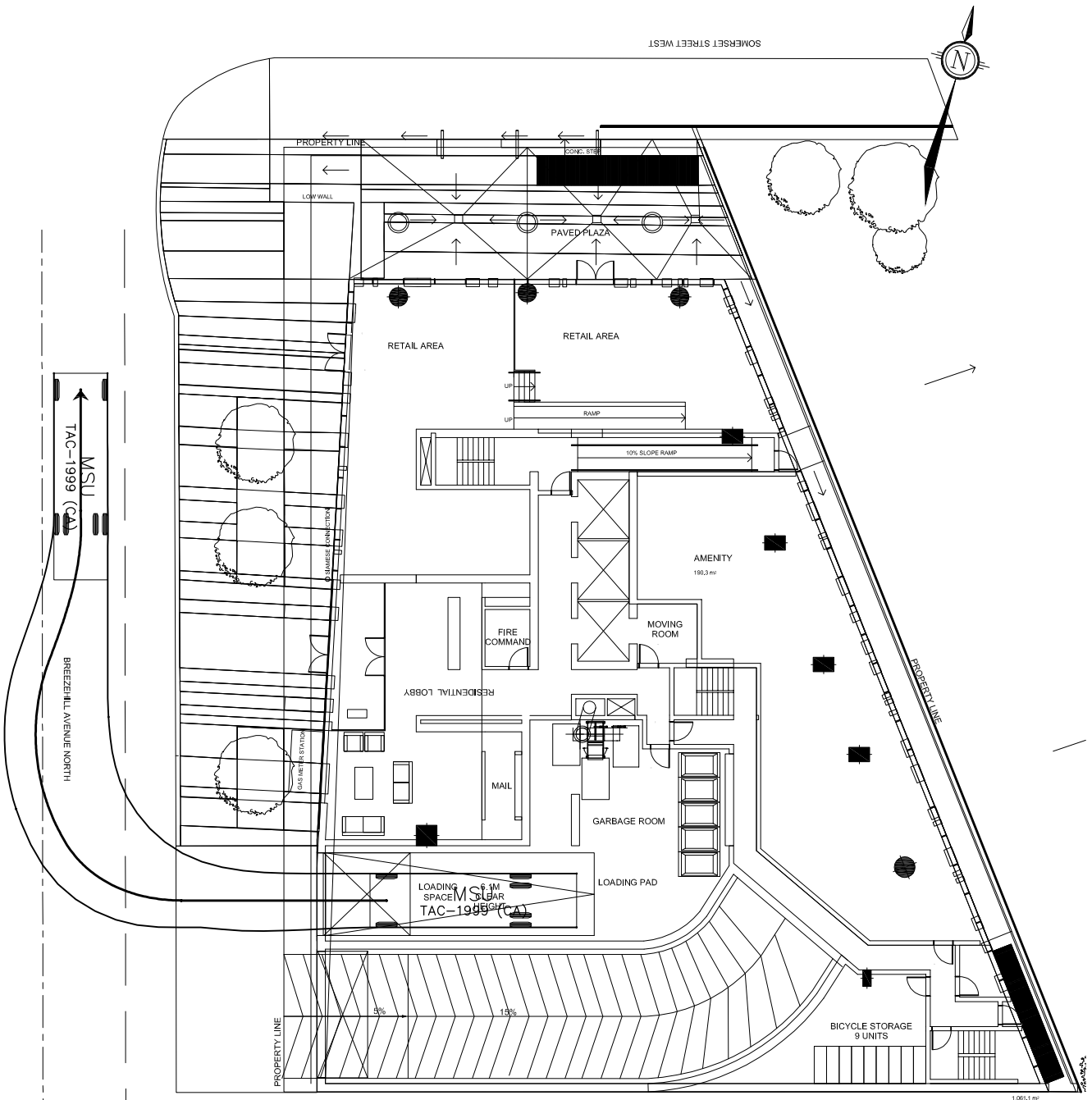

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1040 SOMERSET ST WEST

LOADING ACCESS - NORTHBOUND FORWARD MOVEMENT OUT

APRIL 2013 112191 FIGURE 16

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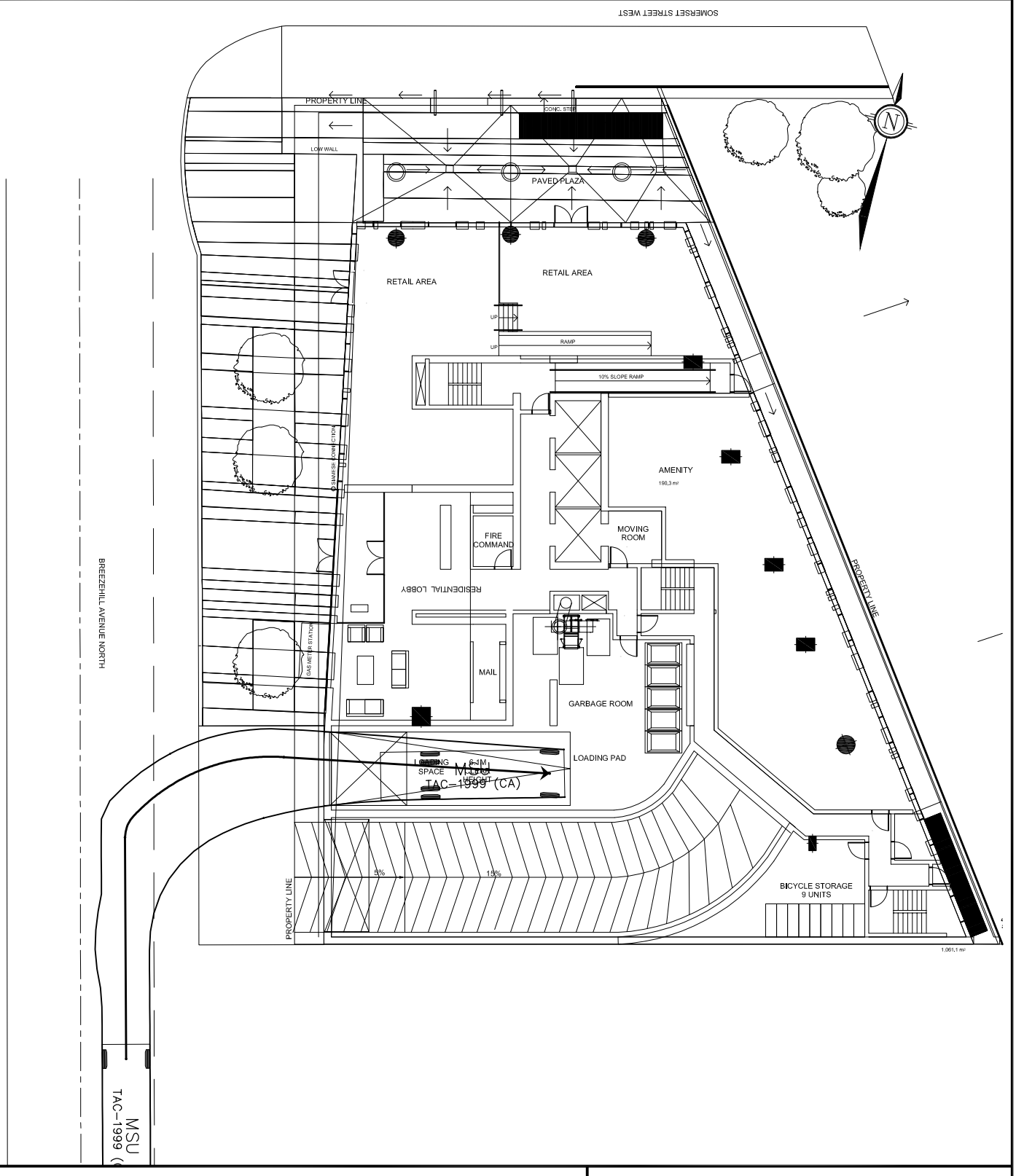

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1040 SOMERSET ST WEST

LOADING ACCESS - NORTHBOUND FORWARD MOVEMENT IN

APRIL 2013 112191 FIGURE 17

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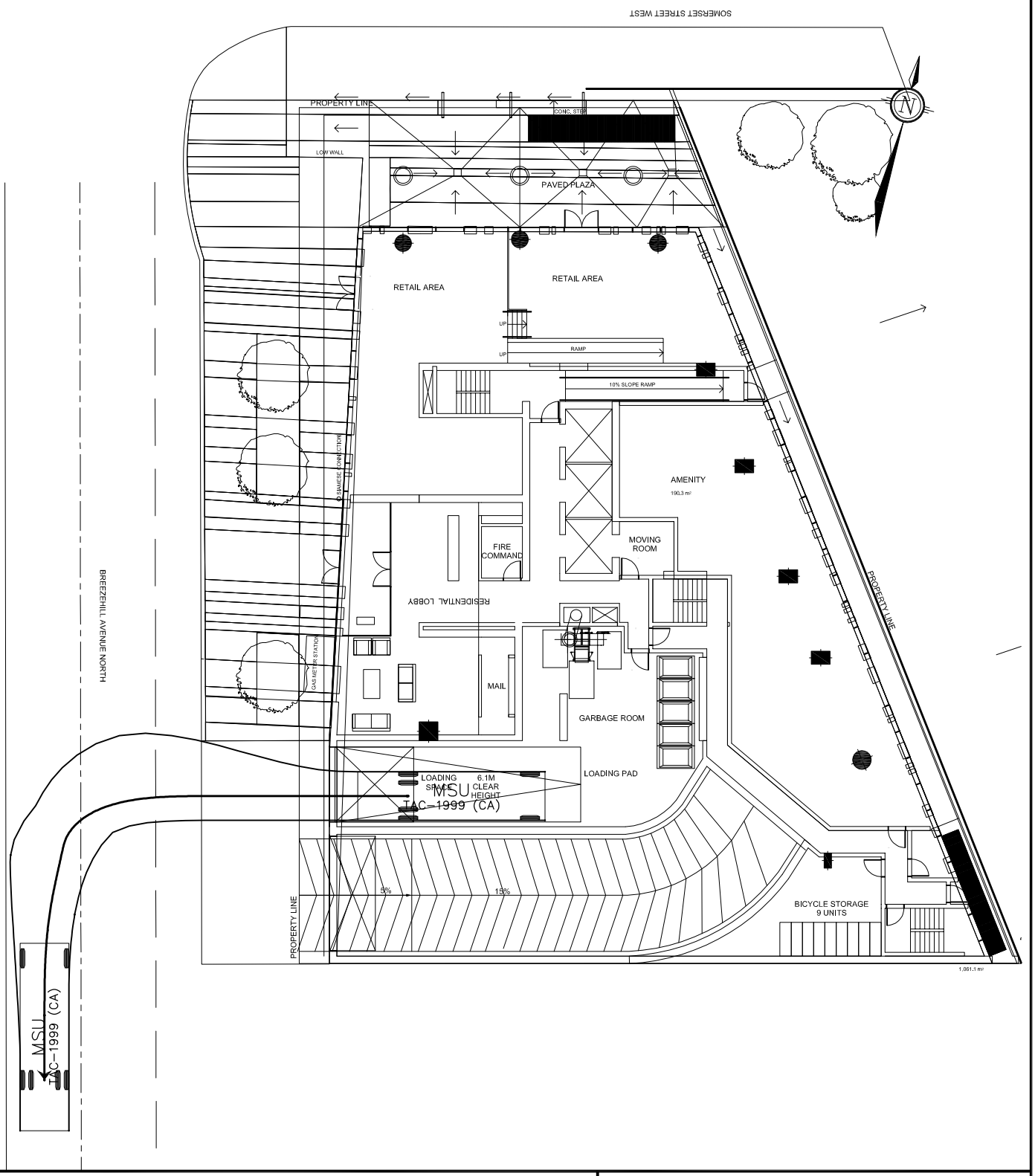

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1040 SOMERSET ST WEST

LOADING ACCESS - NORTHBOUND REVERSE MOVEMENT OUT

APRIL 2013 112191 FIGURE 18

M:\2012\112191\CAD\Design\Figures\Traffic\FIGURE 1 - UG PARKING.dwg, TM-18 P1 LEVEL (8), Apr 10, 2013 - 11:08am, mmckeough

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On-street parking is permitted along the east side of Breezehill Avenue adjacent to the subject site. Based on the existing access configuration, there is room for four on-street parking spaces along the frontage of the site. The proposed access configuration will result in the loss of one on-street parking space based on the current parking regulations which include a minimum distance of nine metres from an intersection and 1.5 metres from a driveway.

As previously noted, there are approximately 90 on-street parking spaces within a short distance of the site. The proposed commercial retail is intended to serve residents and the local community and is not expected to generate a significant parking demand. The reduced amount of on-site visitor parking is expected to result in an increased demand for on-street parking.

If required, a link between the underground parking garages of the subject development and the development at 1050 Somerset Street could be considered. Seven levels of underground parking are proposed as part of the subject development and five levels of underground parking are proposed as part of the 1050 Somerset Street development. A total of 244 underground parking spaces are to be provided as part of the 1050 Somerset Street development, which exceeds the minimum requirement of 193 spaces. Consideration could be given to sharing a combined total of visitor parking spaces between the two sites.

4.9 Transportation Demand Management

The City of Ottawa has developed a comprehensive Transportation Demand Management (TDM) strategy as part of its efforts to reduce automobile dependency. TDM measures can reduce transportation infrastructure requirements by encouraging people to change their travel mode, timing or destination.

The proposed development conforms to the City's TDM initiatives by providing easy access to the local pedestrian, bicycle and transit systems as outlined in Section 4.6.

Additional measures that could be implemented to further promote the use of non-auto travel modes are as follows:

- unbundle parking space costs from dwelling/commercial units
- offer "bonus zoning" where certain restrictions may be relaxed for developments including TDM measures, ie. permit increased building height if developer provides free transit pass/car share (ie. Vrtucar) memberships to residents for one year.

The developer plans to unbundle the proposed parking by selling or renting spaces separately from the residential units.

The potential to provide free transit passes and/or dedicated car share vehicles in exchange for "bonus zoning" should be considered by the City and the developer.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the foregoing analysis, the main conclusions and recommendations of this report are as follows:

- None of the study intersections meet the City's criteria for further analysis with respect to collision patterns or total collisions.

- All study area intersections are currently operating at an acceptable Level of Service (LOS) in the weekday AM and PM peak hours.

- The provision of traffic signals at Somerset Street / Breezehill Avenue is only 20% justified under existing traffic volumes. Based on the projected 2021 total traffic, the warrants for traffic signal control continue to be unmet.

- The screenline analysis suggests that the adjacent major road network will have adequate capacity to accommodate the proposed development in 2016.

- The screenline analysis suggests that development traffic will have a marginal impact on Gladstone Avenue in the 2021 horizon year. Additional analysis has been completed to confirm that study area intersections will have adequate capacity to accommodate the development traffic.

- With minor signal timing adjustments, all movements at the study area intersections are expected to perform at an acceptable LOS based on the 2016 and 2021 background traffic projections.

- Further signal timing adjustments are required to accommodate the projected development traffic. Based on the adjusted signal timing, all movements are expected to operate at an acceptable LOS in 2016 and 2021.

- The 2016 weekday PM peak total traffic volumes meet the MTO warrant criteria for a dedicated westbound left-turn lane on Somerset Street at Breezehill Avenue. The bridge over the O-Train corridor has a width of 11 metres and consists of single through lanes in each direction and dedicated bicycle lanes. A westbound left turn lane would require the removal of dedicated bicycle lanes on the bridge over the O-Train or widening of the bridge structure.

- The sight distance for vehicles turning left out of Breezehill Avenue onto Somerset Street is limited by the bridge over the O-Train. Based on a design speed of 60 kph, a sight distance of 125m to 160m is required and field measurements show that a sight distance of 75m is available.

- Traffic signals are recommended at the Somerset Street/Breezehill Avenue intersection complete with an advance warning beacon and signage restricting the westbound left turn movement during the weekday PM peak.

- The provision of traffic signals at the Somerset Street/Breezehill Avenue intersection would enhance the safety of the existing east-west crosswalk which is heavily used by children walking to and from the Devonshire Public School and provide an opportunity for new north-south crosswalks.

- The proposed development includes adequate provisions for non-auto travel modes, including easy access to local pedestrian, bicycle, and transit systems.

- The existing site access is to be removed and replaced by a new access that meets the requirement of the Private Approach By-law for minimum spacing from the nearest intersection.

- The Zoning By-law identifies a requirement for at least 152 resident parking spaces, 60 visitor parking spaces, and five retail parking spaces. Resident parking will be provided in accordance with the minimum requirement and 10 vehicle parking spaces will be provided for visitors. The proposed reduction in visitor and retail parking will be addressed through the ZBL amendment application process.

- A total of 174 bicycle parking spaces will be provided, meeting the requirements of the ZBL. Four spaces will be provided at ground level, 107 spaces will be provided on the first three levels of underground parking and the remaining 63 spaces will be provided on the mezzanine level.

- The proposed access configuration will result in the loss of one on-street parking space on the east side of Breezehill Avenue adjacent to the site.

- The reduced amount of on-site visitor parking is expected to result in an increased demand for on-street parking. If required, consideration could be given to linking the underground parking garages of the subject development and the development at 1050 Somerset Street and sharing visitor parking between the two sites.

- The proposed development conforms to the City's Transportation Demand Management (TDM) initiatives by providing easy access to the local pedestrian, bicycle and transit systems. Additional measures that could be implemented to further promote the use of non-auto travel modes are as follows:

    - unbundle parking space costs from dwelling/commercial units

    - offer "bonus zoning" where certain restrictions may be relaxed for developments including TDM measures, ie. permit increased building height if developer provides free transit pass/car share (ie. Vrtucar) memberships to residents for one year.

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