New Campus Development for The Ottawa Hospital

Hospital and Central Utility Plant

Transportation Monitoring Strategy

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1.0 INTRODUCTION

The Ottawa Hospital (TOH) has initiated the development approvals process with the City of Ottawa and the federal government to establish a New Campus Development (NCD) to replace the existing Civic Hospital Campus and become the major referral centre for Eastern Ontario, Western Quebec, and parts of Nunavut. It will be the home of the Eastern Ontario Trauma Centre with a range of specialized services, research, and education facilities, along with related ancillary uses such as resident care stay facilities, and retail service uses. The existing Civic Hospital Campus is located at 1053 Carling Avenue and the NCD will be located approximately 1km to the east on lands leased to The Ottawa Hospital from Public Services and Procurement Canada (PSPC) adjacent to the Dow's Lake Pavilion and Central Experimental Farm (CEF). The NCD site is bound by Carling Avenue to the north, Preston Street to the east, Prince of Wales Drive to the south and Maple Drive to the west as shown in **Map 1**. An overview of approvals and Council motions to date are provided below:

- Master Site Plan Approval (lifting of the "Holding Zone") – October 2021
- Parking Garage Site Plan endorsed by Planning Committee – February 2022

The Master Site Plan approved by City Council stipulated the completion of the following supporting transportation studies – in addition to the overarching Transportation Impact Assessment (TIA) that is typically required to accompany a Site Plan Control (SPC) application – before the registration of the Site Plan Agreement for the Hospital Building:

1. Off-Site Parking Strategy (OPS)
2. Neighbourhood Traffic Management Strategy (NTMS)
3. Transportation Demand Management Strategy (TDM)
4. Transportation Monitoring Strategy (TMS)

This report represents the "Transportation Monitoring Strategy," and its main purpose is to develop a framework to collect and analyze transportation data at the NCD and the surrounding municipal road network. This data will be used to monitor the outcomes of implementing the proposed Strategic Plans outlined in the OPS, NTMS, and TDM Strategy such that effective responses can be formulated.

1.1 Overview of the TOH Transportation Monitoring Strategy

1.1.1 What is the Transportation Monitoring Strategy? Why is it Important?

The NCD will be a new world-class healthcare facility that nearly doubles in size of the existing Civic Campus, generating more activity and pressures on the municipal transportation network. The sheer size, scale, and complexity of the NCD makes predicting future travel implications challenging, which is the reason for Council's direction to prepare the TMS.

The TMS is a supporting technical document accompanying the NCD SPC application. The TMS represents a framework for monitoring various transportation elements within the study area, including the municipal network surrounding the NCD as well as on campus facilities and operations.

Monitoring is crucial to achieving the long-term transportation objectives of the NCD outlined in the TIA Mobility Study and the other supporting transportation strategies. It will enable TOH to make timely and informed decisions, in collaboration with city staff and other local stakeholders, to improve the user experience in and around the NCD in the fullness of time. The strategy will provide guidance on how, when, and where to collect transportation data, suggestions on how to process the data once it's been collected, and how to properly document the information so it's easy and efficient to share with local stakeholders. The intended lifecycle of the TMS is expected to extend until full buildout of the NCD.

LEGEND

- Study Boundary
- Confederation Line / Trillium Line

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Map 1: Area Context

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Metres

1.1.2 What are the objectives of the Transportation Monitoring Strategy?

The primary purpose of the TMS is to provide framework to guide TOH on how to monitor local traffic conditions and campus operations that will track the transportation implications of the NCD, as well as the influence and efficacy of the long-term Strategic Plans described in the OPS, NTMS and TDM Strategy.

The key elements of the TMS include:

- A tailored data collection program describing where, when, and how to monitor the study area.
- A reporting and documentation guideline to help consolidate and summarize data collected.
- Establish an engagement strategy to enable TOH and local stakeholders to share information and collectively respond to outcomes from the data collection program.

1.1.3 What is not covered in the Transportation Monitoring Strategy?

The TMS represents a starting point for an overall monitoring strategy, and will provide the framework and basis from which TOH can build upon. However, we are still many years away from opening day (tentatively scheduled for 2028) and there will be opportunities to refine the strategy if priorities or key system elements change. Therefore, all of the details regarding implementation cannot be confirmed at this time, as the choices presented in this document (e.g. which third party providers or vendors will ultimately be employed, how existing city programs can be leveraged/ integrated into/with the TMS Data Collection Program etc.) as well as financial obligations, funding mechanisms, and potential cost sharing agreements will be negotiated in the coming months or years leading up to opening day of the NCD.

Note that the TMS is intended to cover operations of the NCD beginning at Opening Day. This does not include the monitoring of traffic implications related to construction activities for either the main NCD building or future phases of the NCD development. Traffic management responsibilities during construction are expected to be under the purview of the contractor.

1.1.4 What happens after the Transportation Monitoring Strategy?

This document will accompany the SPC application submission for the main Hospital building (Phase 3 and 4 of the Master Site Plan) to City of Ottawa staff for review and refinement, which will include public consultation feedback as dictated by the City of Ottawa planning approvals process.

In the time preceding opening day of the main Hospital building (currently scheduled for 2028), TOH is expected to work with the City of Ottawa and other relevant stakeholders to reach consensus on the implementation of the Data Collection Program within the TMS, including how much of the monitoring activity can be coordinated with existing city processes. It is acknowledged that some elements of the TMS can and should be initiated prior to opening day, such as employee surveys at the existing Civic Campus, which have been defined in the TDM Strategy. The Strategic Plans developed in the OPS and NTMS present only potential traffic implications related to the NCD based on current information, thus providing a long-term perspective. As local conditions change in the fullness of time, the TMS provides a mechanism to track these changes and whether refinements to the various Strategic Plans are necessary.

Keep in mind that the elements outlined in these documents are also subject to City of Ottawa standard processes and procedures. As such, additional effort will be required to confirm the feasibility/appropriateness of any future interventions, and typically require consensus amongst the community and Ward Councillor approval. Additional details on the procedural pathway to implementation relating to parking and neighbourhood traffic management have been detailed in the OPS and NTMS respectively.

1.1.5 The Established Study Area

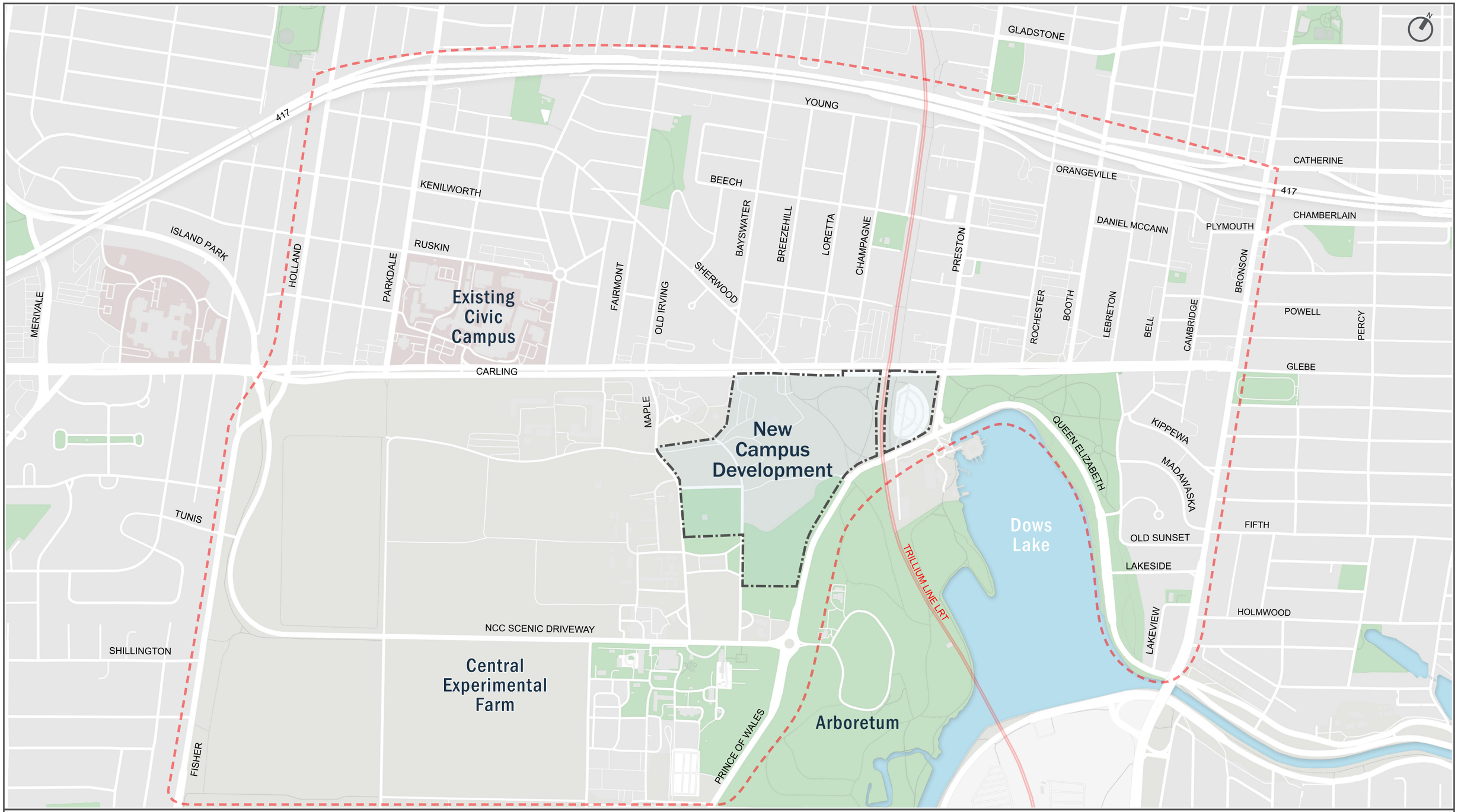
The established study area for the TMS and the transportation supporting studies was developed in consultation with City of Ottawa staff and the Community Advisory Council Transportation Subcommittee (CACTS). The proposed study area for all supporting transportation studies was defined as Holland Avenue and Fisher Avenue to the west, Hwy 417 to the north, Bronson Avenue to the east, and Central Experimental Farm (the Scenic Driveway) to the south, as shown in **Map 2**.

1.1.6 Study Area Characteristics

The NCD is located at the interface of four different City of Ottawa Wards: Somerset, Kitchissippi, Capital and River; and is adjacent to four Community Associations: Carlington, Civic Hospital, Dow's Lake, and Dalhousie, and within 1-km of Glebe Annex, Glebe, and Hintonburg, which are illustrated in **Map 3**. The NCD will be centrally located in the City of Ottawa, contributing to the variety of destinations and amenities in the area, including the Dow's Lake Pavilion, the Central Experimental Farm, the Arboretum, Little Italy, Carleton University, Tunney's Pasture, among others.

The NCD site abuts three arterial roadways: Carling Avenue, Preston Street, and Prince of Wales Drive. The urban truck route within the study area is limited to arterial and major collector streets, including Bronson Avenue, Carling Avenue, Fisher Avenue, Preston Street, Prince of Wales Drive, Holland Avenue, Rochester Street, and Booth Street.

A notable difference in the NCD surroundings compared to the existing Civic campus is the variety of high-quality facilities accommodating several alternative modes of transportation, such as the future Dow's Lake LRT station at the corner of the Preston Street/Carling Avenue intersection, the Trillium Pathway, the Rideau Canal Eastern and Western Pathways, the Central Experimental Farm Pathway, in addition to sidewalks and other cycling supporting facilities provided on several municipal streets within the study area. The importance of these active transportation and transit options cannot be understated in reducing long-term single occupant vehicle use at the NCD. **Map 4** highlights the existing active transportation, transit, and urban truck route networks within the study area.



LEGEND

Study Boundary

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Map 2: Study Area

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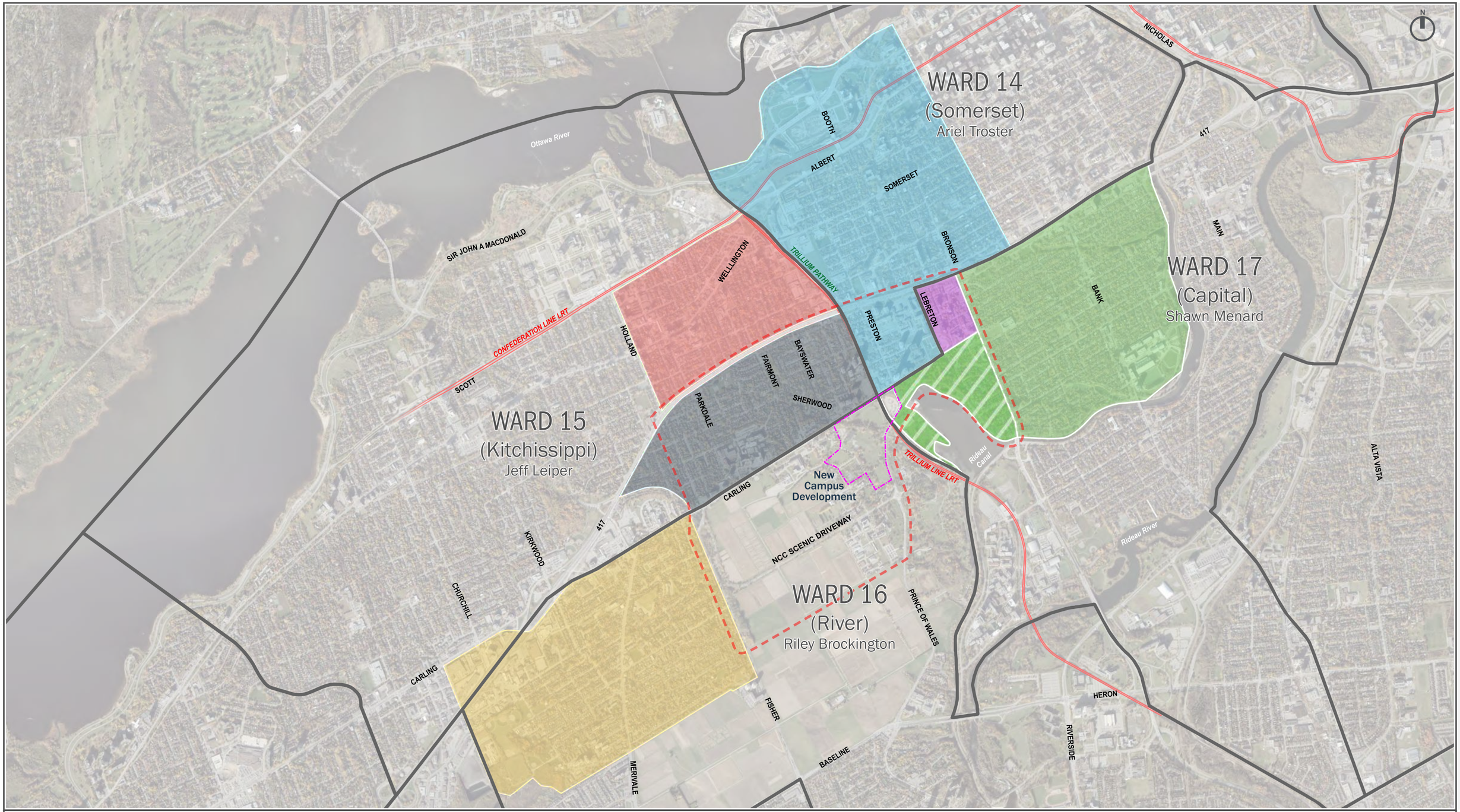

LEGEND

- Study Boundary
- Ward Boundaries
- The Glebe Community Association (GCA)
- Dow's Lake Residents Association (DLRA)
- The Glebe Annex Community Association (GACA)
- Carlington Community Association (CCA)
- Civic Hospital Neighbourhood Association (CHNA)
- Dalhousie Community Association (DCA)
- Hintonburg Community Association (HCA)

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Map 3: Adjacent Community Associations

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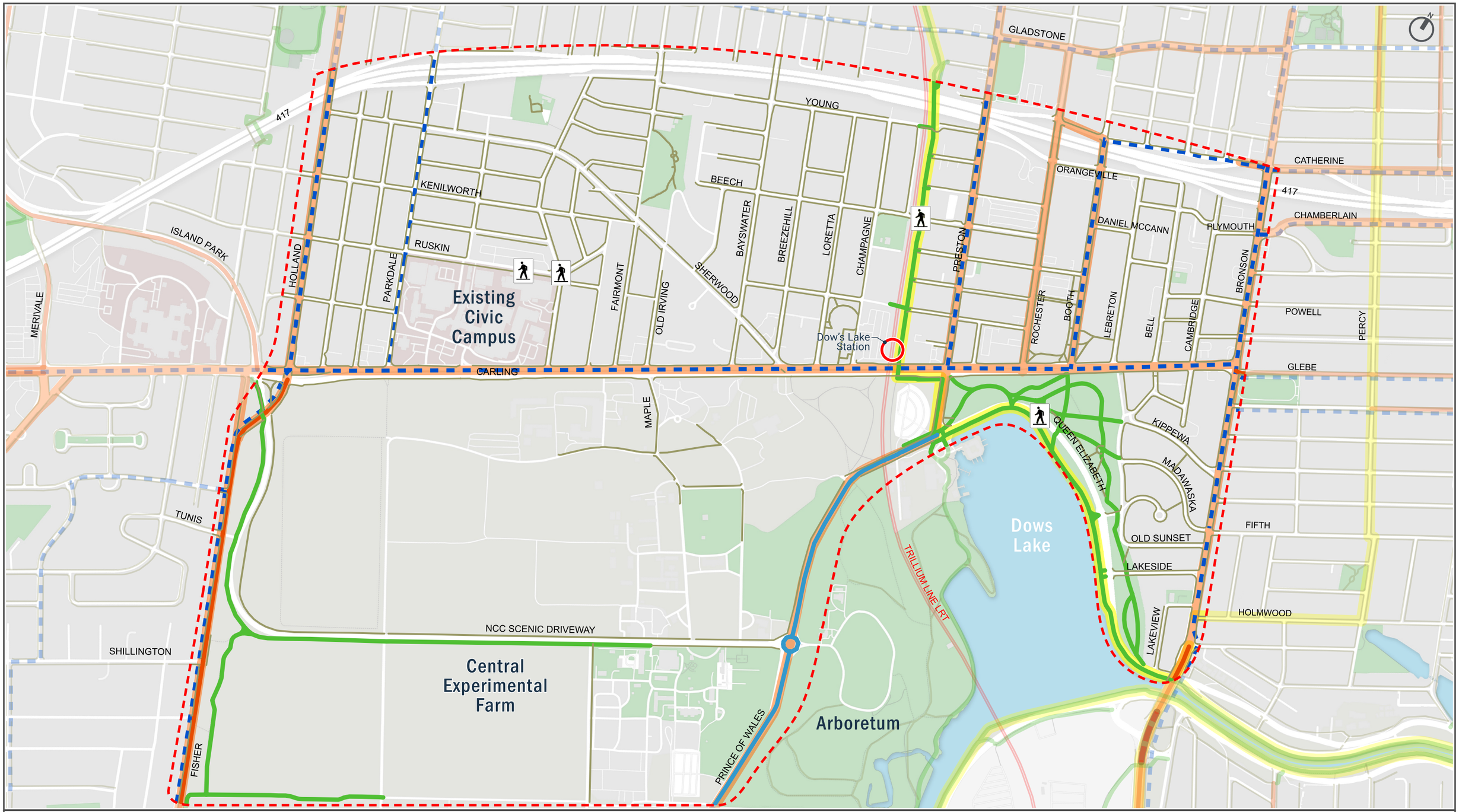

LEGEND

- Study Boundary

Existing Active Transportation Network

- Sidewalks/Paths
- Multi-Use Pathway
- Bike Lane
- Winter-Maintained Cycling Network
- Paved Shoulder
- Cycle Track
- Pedestrian Crossover

Existing Transit Routes

- Frequent or Local

Truck Routes

- Full or Restricted Load

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Map 4: Existing Active Transportation, Transit and Urban Truck Route Networks

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1.2 Stakeholder Engagement Overview

The motions that set the requirement to complete the TMS (and other supporting transportation studies) for the Site Plan Control application of the main Hospital building were introduced by the four principal Councillors representing the neighbouring Wards (Somerset – Ward 14; Kitchissippi – Ward 15; River – Ward 16; Capital – Ward 17).

Another motion dictated the formation of a Community Advisory Council comprising representatives from local community associations and the TOH network of hospitals and affiliates. A Community Advisory Council Transportation Subcommittee (CACTS) was created that included one representative from each of the five neighbouring community associations to directly engage with the project team and inform the supporting transportation studies:

- Carlington Community Association (CCA)
- Civic Hospital Neighbourhood Association (CHNA)
- Dalhousie Community Association (DCA)
- Dow's Lake Residents Association (DLRA)
- Glebe Annex Community Association (GACA)

There was extensive stakeholder engagement to help inform the NTMS, OPS and TDM Strategy, which has been documented in detail within each of those reports. The efforts included multiple meetings with the Subcommittee and City of Ottawa staff, and 1-on-1 workshops with executives from local Community Associations. The feedback, issues and opportunities heard throughout this process was used to inspire the development of the TMS.

The City of Ottawa is the ultimate approving authority for the TMS and a primary stakeholder. City staff were important contributors to the TMS, who have well-established data collection practices and experience that heavily influenced the data collection program. It is envisioned that there will be potential opportunities for collaboration and sharing of information between TOH and local stakeholders.

The project team also acknowledges other stakeholders that will be important voices during the approvals process including the National Capital Commission (NCC) and Agriculture and Agri-Food Canada (AAFC; headquartered at the Central Experimental Farm).

1.3 Existing City Processes

Transportation planning in the City of Ottawa is informed by established monitoring processes and procedures by various city departments (some listed below). The TMS presents an opportunity to leverage these resources within an implementation framework for transportation monitoring related to the NCD.

Traffic Investigations and Surveys (in the Public Works Department) - manage reviews of traffic operational/safety issues and escalate locations to the *Neighbourhood Traffic Calming Branch in Transportation Planning* that could benefit from permanent traffic calming measures if they meet the minimum Council approved qualification criteria. They also manage the *Temporary Traffic Calming Program*, which sometimes funds small straight-forward permanent traffic calming measures that don't require extensive studies.

Traffic Management – manage reviews of traffic operational/safety issues during special events, construction activities etc.

Traffic Data Collection & Analysis – manage the city's data collection program and inventory, and provide analysis to support municipal projects.

Parking Enforcement & Logistics – manage and process parking infractions on the municipal road network and facilities in the city.

2.0 DATA COLLECTION PROGRAM

This section will outline the data collection elements within the Monitoring Strategy. The framework for the Data Collection Program includes:

- An outline of the data collection and processing scope,
- An overview of relevant data types and sources, and,
- A guideline on how to process data collected.

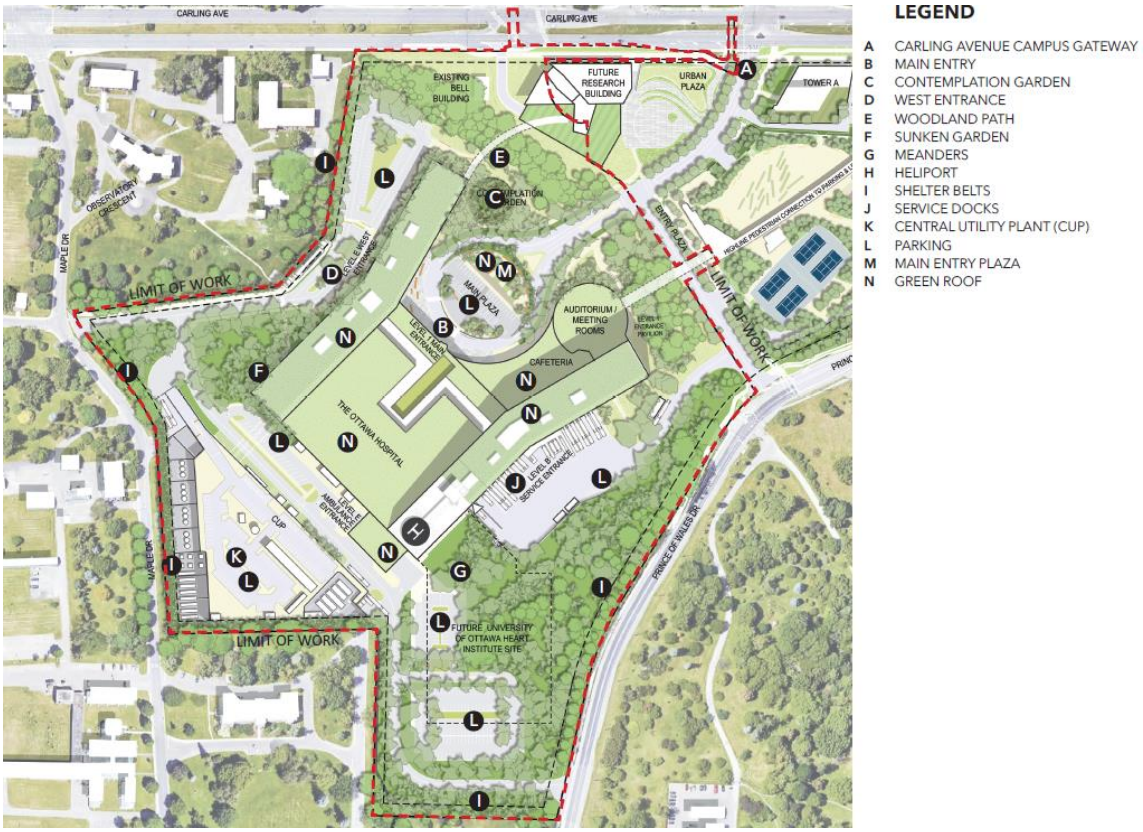
The recommendations included this section represent a starting point. The program is meant to be flexible and may be adjusted in response to observed trends and local conditions as well as to future data availability or ongoing changes to the understanding of data needs.

While TOH is well suited to coordinate and manage certain elements of the Data Collection Program, there are several elements that would benefit from transportation planning and operations expertise. **Therefore, it is recommended that TOH engage a firm specializing in transportation data management to help oversee the planning and delivery of the Data Collection Program during the early stages of implementation**. In time, TOH may elect to take ownership of the program once the systems and processes have been firmly established.

2.1 Scope

The purpose of the TMS is to monitor the outcomes of the NTMS, OPS, and TDM Strategy. The scope of data collection is informed by these other strategies and is further defined later in this section for each separate data type. An important distinction was made between data that is located or collected "off" versus "on" campus, which will help further define the scope and establish the appropriate collection strategy for each data type.

Figure 1: Current NCD Concept Plan



On-campus data is related to the NCD property limits and to network users known to be affiliated with TOH, including NCD staff, visitors, and patients. On-campus data collection *primarily informs the monitoring of TDM strategies* and should be coordinated internally through TOH staff, ideally a TDM Coordinator as recommended in the TDM Strategy.

Off-campus data is related to the broader municipal transportation network, including surrounding roads, pathways, and transit facilities, to other private and public land not owned by TOH, and comprise all network users, who both are and are not known to be affiliated with TOH. Off-campus data collection *primarily informs the monitoring of NTMS and OPS interventions*. Off-campus data collection is limited to the established study area limits shown in **Map 2** (see: **Section 1.1.5**). Collection of off-campus data will require coordination with parties external to TOH, such as the city or third part contractors/service providers.

The Data Collection Program in support of the TMS was developed with the goal of identifying future transportation issues directly related to the NCD within the established study area that was identified in the NTMS, OPS and TDM Strategy. **TMS does not monitor all potential transportation conditions or issues in the municipal network.** Concerns that are found to be outside the established study area or that are found not to be primarily driven by NCD activities – such as for instance an NCC decision to fully or partially close Queen Elizabeth Driveway – are *not within the scope of responsibility of TOH*. These concerns are expected to be addressed through existing city processes.

2.2 Data Collection Requirements by Type

The following section provides a brief discussion of the data types needed to achieve the objectives of the TMS, as well as collection strategies and providers that were considered in the formulation of the Data Collection Program.

An overview will be provided of when and how to collect which data types in order to satisfy the long-term transportation data needs of the NCD. Step-by-step details related to data processing are not provided. Broadly, data collected, either directly by TOH or through other sources (e.g., City of Ottawa), should be consistent with data types used in the NTMS, OPS and TDM Strategy. Where possible, data formats should be consistent with established city processes, such that they are familiar to City of Ottawa technical staff. Suggested formats have been provided in the section below for each data type included in the Data Collection Program. **Appendix A** provides for sample data collection outputs for each data type.

"Key metrics" have also been provided to help inform TOH of what information should be extracted from processed data, which helps establish a framework for reporting (discussed in **Chapter 3.0**).

2.2.1 Vehicle Traffic Counts

The NTMS identified long-standing concerns among community members relating to the potential impact of future NCD-related traffic infiltrating surrounding neighbourhoods, and more specifically that increased traffic on local streets could impact road safety and livability. To address these concerns, the NTMS identified several potential area traffic management measures (subject to city approval) to discourage traffic from using neighbourhood streets and remain on the major arterial/collector network when travelling to/from the NCD.

It will be necessary to regularly collect vehicle traffic counts at select locations and track the trends over time in order to monitor the efficacy of these targeted measures following the opening of the NCD. It is noted that both traffic counts and traffic speeds are being considered separately here; traffic speeds will be covered in **Section 2.2.2**. Traffic counts are typically multi-modal, but the particular focus for the TMS is vehicles. There are two types of traffic count data that are recommended to be collected for the TMS:

- **Intersection Turning Movement counts (TMC)** – multi-modal (i.e., pedestrians, cyclists, and vehicles)
- **Average Annual Daily Traffic volume counts (AADT)** – vehicles only

Traffic counts can be collected using a variety of methods, such as traditional manual counts using people in the field; more contemporary automated means such as traffic cameras (e.g., MioVision) or automated traffic recording (ATR) devices installed in the field; or using "big-data" solutions (e.g., *Streetlight)* that do not require any field presence. Each method has their advantages and disadvantages related to cost, reliability, flexibility, and general level-of-effort.

The NTMS assessed the use of StreetLight to evaluate local traffic conditions in lieu of conventional "in-field" data collection methods and found it has not yet reached the needed reliability to collect absolute traffic volume and speed data due to current limitations of the software.[1]

For the purposes of the TMS, conventional data collection approaches (i.e., captured in the field) were the preferred method of choice.

The City of Ottawa has a vast traffic data inventory, which includes traffic counts within the municipal network that is managed by the Traffic Data Collection & Analysis group. This inventory is updated with new traffic counts at select locations on an annual basis (based on budget and needs at the time), which help inform various municipal capital projects and planning studies. Additionally, the public may request of the city to share and/or collect traffic counts for a fee, which is commonly done to inform technical studies supporting development applications. The city provides the traffic count data electronically in their standard format.

Besides the City of Ottawa, there are also firms specializing in transportation data collection that have the knowledge, equipment, and experience to collect traffic counts for a fee. Similar to the city, traffic counts collected are summarized and provided electronically in the city's standard format.

It is recommended that TOH and the City of Ottawa work towards establishing a data collection arrangement, in which the city collects data meant to inform the TMS behalf of TOH for a set fee and the information is shared amongst both parties.

It may be necessary in some cases to contract a third party to address any gaps or locations that cannot be collected by the city. The traffic count data to be collected to inform the TMS include:

- Midblock ATRs to collect AADT data, and
- Intersection TMCs

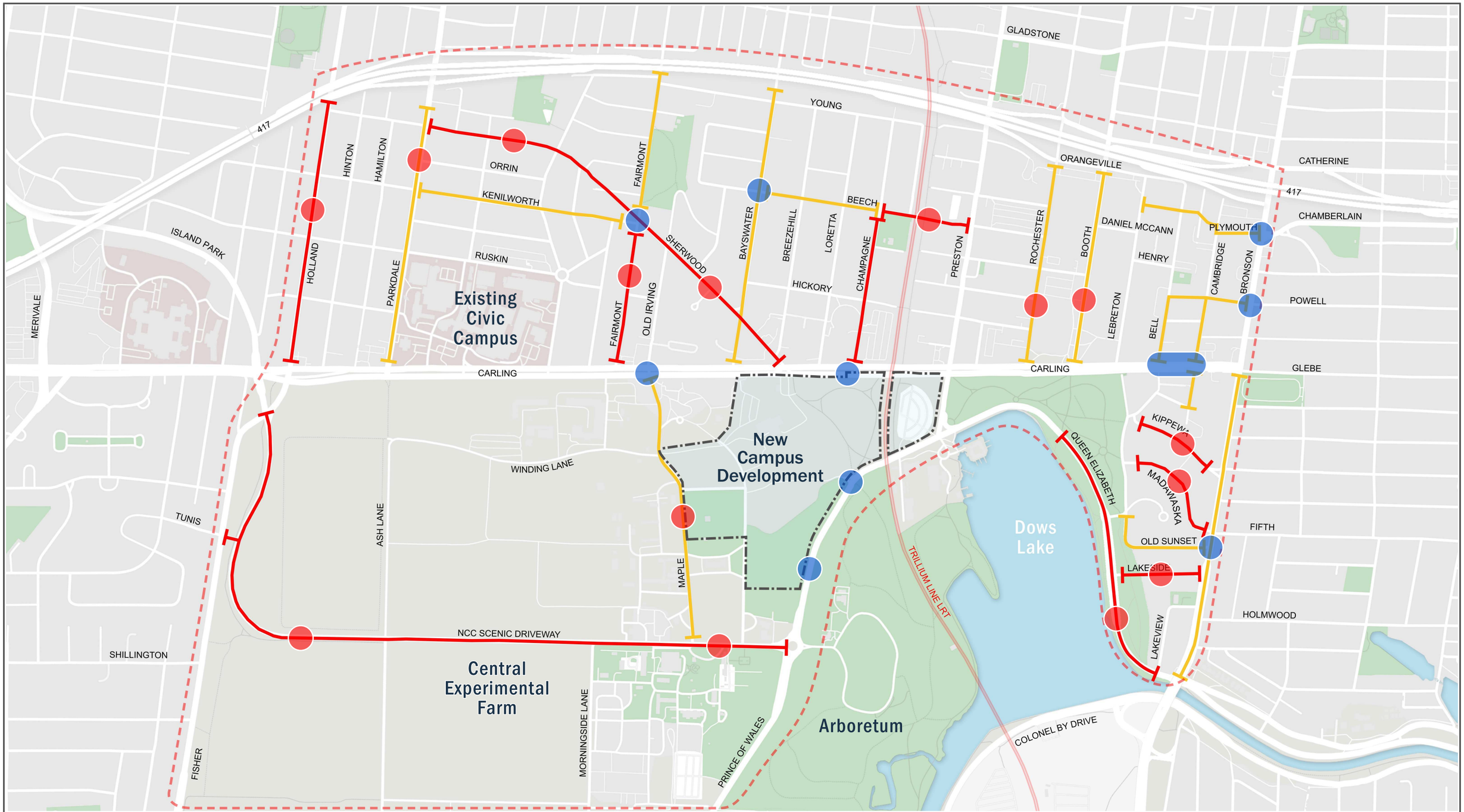
The suggested locations are illustrated in **Map 5**, which are an expression of the Strategic Plan developed in the NTMS. The exact location for ATR device installation should be assessed and confirmed by technical personnel in the field. The suggested scope of data collection for each intersection TMC by location is provided in **Table 1** below. It is important to note that after the proposed locations and scope of traffic counts may be reviewed and revised as necessary based on evaluation results in the fullness of time (further discussion of TMS reporting is provided in **Section 3.0**).

Intersection TMCs completed by the city are multi-modal, accounting for pedestrian and cyclist crossings, and heavy vehicles (e.g. trucks, buses etc.) in addition to general vehicle traffic. They are also 8-hr durations (3-hours in the AM peak period, 2-hours in the mid-day peak period, and 3-hours in the PM peak period), collected in 15-minute intervals.

Once the traffic count data is collected, the key metrics to capture and assess include:

- Intersection vehicle traffic volumes per Location
- Midblock Average Annual Daily Traffic (AADT) volume per Location

[1] Section 2.2.2.2 of NTMS, Parsons, March 2023, page 21-22



LEGEND

- Study Boundary
- Confederation Line / Trillium Line
- Tier 1: Potentially Highly Impacted
- Tier 2: Potentially Low to Moderately Impacted

Recommended Traffic Count Data Collection Locations

- ATR (Automatic Traffic Recorder)
- TMC (Turning Movement Count)

Notes:

1) All streets without a designation within the study area were not identified as areas for concern during public and stakeholder consultation, and were not expected to be impacted in the future based on current data. This may be refined over the course of the TMS.

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Map 5: Recommended Data Collection Locations - Traffic Volumes

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Table 1: Intersection Turning Movement Count Scope

Intersection	Intersection Type	Duration	Minimum Scope
Sherwood @ Fairmont/Kenilworth	Unsignalized	Standard 8-hr	All Movements All Modes
Bayswater @ Beech	Unsignalized		In/Out of Beech
Carling @ Maple	Signalized		All Movements All Modes
Carling @ Champagne/Road A	Signalized		All Movements All Modes
Carling @ Bell	Unsignalized		In/Out of Bell
Carling @ Cambridge	Unsignalized		In/Out of Cambridge (north *and* south of Carling)
Prince of Wales @ Road B	Signalized		All Movements All Modes
Prince of Wales @ Road E	Signalized		All Movements All Modes
Bronson @ Plymouth	Unsignalized		In/Out of Plymouth
Bronson @ Powell	Signalized		All Movements All Modes
Bronson @ Old Sunset	Unsignalized		In/Out of Old Sunset

2.2.2 Traffic Speeds

An increase in traffic speeds on local and collector streets in neighbourhoods surrounding the NCD were also a highlighted community concern. The NTMS identified a number of streets with the potential to be impacted by increased traffic speeds, based on existing and projected conditions, and speed data will need to be collected to monitor the efficacy of any future NTMS interventions (subject to City of Ottawa approval). As previously discussed, while *Streetlight* has the ability to estimate traffic speeds, it was not deemed accurate enough to assess instantaneous vehicle speeds needed for the TMS.

One advantage of using the city ATRs to collect mid-block AADT data is the same collection also provides traffic speeds at the chosen location. As discussed in the previous section, the public may request that the city collect and share traffic data for a fee. The city can provide ATR data in a standard, electronic format that contains both volume and speed data; this data could thus be combined into a single request for the relevant locations.

If ATR data is not available, it may be necessary in some cases to contract a third-party contractor to collect missing traffic speeds. These contractors have the capability to conduct spot-speed surveys using handheld radar devices to fill in any gaps in the ATR data. Traffic speeds should be obtained for the locations identified in **Map 5**.

Once the traffic speed data is collected, the key metric to capture and assess is:

- 85th percentile speed per Location

2.2.3 Proportional Traffic Volumes

While *StreetLight* was not the optimal choice to collection absolute traffic counts and speeds, where Streetlight does still have value for the TMS is:

- To identify the routes taken by vehicles travelling to and from the NCD (via the “Top Routes” function), which can be used to monitor potential traffic infiltration in the surrounding neighbourhoods.

Because the absolute traffic volumes produced by StreetLight may be unreliable as independent measurements, they may be of most use when compared to each-other as "proportional" traffic volumes. Specifically in this case, using the *StreetLight* "Top-Routes" analysis tool, one is able to see what proportion of the traffic captured by *StreetLight* travelling to-or-from the NCD site is using different routes throughout the surrounding road network.

The City of Ottawa currently has a licensing arrangement with *Streetlight* used to support municipal projects and planning studies. It is recommended that as part of the data collection agreement with the city, TOH request *Streetlight* outputs from the city that captures the following key metric:

- "Top Routes" analysis output showing potentially impacted streets from vehicle traffic travelling to or from the NCD (see: **Figure 2** for the suggested Top Routes analysis zone).

Figure 2: Recommended NCD zone for *StreetLight* "Top-Routes" analysis

The *Streetlight* platform could be used to examine the relative change in traffic volume outputs within *Streetlight* on segments over time. Although the absolute traffic volumes produced by *StreetLight* may be unreliable as independent measurements, comparing the change in these volumes over time could help to identify or corroborate historical trends observed in the ATR or TMC data. Additionally, it should be noted that StreetLight should be used as a "screening" tool, or as a first step in further analysis. "Top Routes" data alone should not be used as the basis for traffic engineering interventions but should be used to inform the need for further investigation. Additional information on the use of *StreetLight* "Top Routes" outputs is provided in **Section 3**.

The flexibility of the platform (in terms of its ability to isolate specific time-of-days or dates), as well as the significant volume of data samples available through the platform, could make it useful for supplementing the analysis of Traffic Count data (both intersection and AADT) if notable traffic implications are observed. This type of *StreetLight* analysis will not be recommended as part of the core Data Collection Program, but is considered a "Supplementary Data

Source" (see: **Section 3.1.2**). In light of *StreetLight's* ability to access historical traffic data (as far back as 2016), this analysis could be conducted at any time, according to need.

2.2.4 Parking Data

Parking utilization, for both vehicles and cyclists, is an essential metric for measuring the efficacy of TDM strategies, which are generally targeted at decreasing the number of single occupancy vehicles travelling to the NCD each day. Additionally, some information will be needed to assess whether the NCD is having an impact on available on-street parking in the surrounding neighbourhoods, relating to the recommendations of the OPS.

On-Campus Vehicle Parking Utilization

On-campus parking activity and utilization will be essential to track, as this is a direct measurement of parking capacity at the NCD (the ratio of the number of parked vehicles to the total supply). TOH already possesses a vehicle parking tracking system at the existing Civic Campus that is accessible through a digital platform/dashboard, which is expected to continue at the NCD. As well as overall utilization, information about parking turnover and duration should be able to be derived from this data.

TOH has yet to secure a *parking technology vendor* for the NCD, thus the particular vehicle parking technology has yet to be confirmed (e.g., license plate readers (LPR), traditional gates or other). However, whichever vendor is chosen, it is expected there will be infrastructure capable of tracking parked vehicles throughout the campus (both in the garage and in surface lots) for all user types: employees, patients, and visitors. The information is expected to be collected in real-time that can be easily accessed through the TOH parking dashboard. If there are parking lots without any tracking infrastructure, manual surveys would be required to track parking demand.

There is a wealth of potential parking information available to TOH depending on the chosen parking technology vendor and their capabilities. The following vehicle parking metrics are considered essential to capture and assess, but this list may be expanded as needed to further inform the TMS:

- Hourly Entries and Departures per Parking Location (for employees and non-employees) during peak activity periods (e.g., 6:00am – 7:00pm; subject to change based on future employee shift schedules)
- Breakdown of Parking Durations (for employees and non-employees) per Parking Location
- Hourly Vehicle Parking Utilization (for employees and non-employees)

On-Campus Bicycle Parking Utilization

While less conventional, the same opportunities to track bicycle parking utilization on-campus is available if the appropriate technology is in place, particularly in the secured and protected bike parking locations.

Although some *mobility management service providers* (e.g. Rideshark) exist which could help approximate daily sustainable travel behaviour, these platforms are somewhat dependent on high user uptake, which can be unreliable. Instead, to get a more absolute record of cycling behaviour, TOH may manually count bike parking utilization at the NCD over the course of a single day. For one data collection period, at least three weekday (Tuesday, Wednesday or Thursday) surveys should be conducted. For each survey, a count should be taken of the number of bikes parked at leach NCD bicycle parking location every 1-hour between the hours of 6:00am and 7:00pm. Surveys should be targeted for May-October.

Once on-campus bike parking data is collected, the key metric to capture and assess is:

- Hourly Bike Parking Utilization on campus

Off-Campus (On-Street) Parking Utilization

Off-campus parking utilization surveys can help inform the need for additional or more stringent parking regulations on neighbourhood streets. However, it only tells part of the story. It will not identify the user's destination, which limits our understanding of the triggers. However, if a baseline utilization is established prior to the implementation of any OPS recommendations (e.g. new parking regulations) or as new phases of advance at NCD, we can infer the parking implications of that change.

To gather this data requires a survey of on-street parking utilization within the study area. The utilization is reported as a ratio between the number of parked vehicles to the number of permitted parking spaces along the segment/block. It is suggested the survey be performed on municipal streets within a 900m radius of the NCD, which aligns with the more impacted streets near the NCD (see: **Figure 3** below), and only where on-street parking is permitted. The survey should be conducted three (3) times on a typical weekday (avoiding long-weekends, holidays, or under atypical conditions) in the following time periods:

- 1 morning (between 9am and 11am)
- 1 mid-afternoon (between 12pm and 2pm), and
- 1 late afternoon (between 3pm and 5pm).

These survey hours generally align with the most common employee shift schedules and visitor hours, when the demand for parking is expected to be highest on the campus.

Completion of an on-street parking utilization survey comes with a significant level of effort, time, and resources. Different techniques and technologies can bring efficiencies, the conventional approach is "boots on the ground" with people walking the study area and recording information (information may include just the number of vehicles, but may also include license plates to understand duration/turnover). As such, additional opportunities for reducing the scope of the collection process for this data type should be evaluated in the future, according to need and informed by the outcomes of the initial rounds of data collection. Such opportunities could include focusing the study area as needed (e.g. where parking regulation changes are planned) or limiting the survey periods to a specific period in the day known to have the highest utilization.

It is recommended that TOH coordinate a survey of on-street parking utilization on neighbourhood streets surrounding the NCD, and assess the following key metric:

- Ratio between the number of vehicles parked vs. the number of permitted vehicle parking spaces on municipal streets within 900m walking distance of the NCD, stratified by street segment and time of day.

Figure 3: Radial Walking Distance Map (Map 10 from OPS)

2.2.5 People Travel Surveys

The most common and effective way to track broad behavioural trends among hospital visitors, patients, and staff is through personalized travel surveys. Travel surveys are an essential tool to assess the effectiveness of TDM measures as well as identify gaps in the NCD transportation strategies through direct user feedback. These surveys are typically administered through an online or paper questionnaire.

A survey for staff can be coordinated and to a degree enforced by TOH. Surveys for patients and visitors will, by necessity, be voluntary. This has the potential to introduce some form of response bias, although the magnitude of this bias will be difficult to measure. There is some research suggesting that individuals who primarily commute using a non-private vehicle mode (i.e. public transit, walk, bike) are more likely to opt-in to voluntary travel survey follow-ups[2]. However, some sort of incentive could be provided to ensure as high a response rate as possible.

There is additionally an opportunity for TOH to engage a multimodal mobility management provider (e.g., Rideshark), the platform would provide an abundance of travel behavioural information, but only amongst registered users. There would still be value in travel surveys to capture users that do not utilize the platform, as well as to pose questions related to their decision-making (e.g., "what would encourage you to change your mode of travel?" or "what discourages you from taking transit?" etc.) that may not be possible through a mobility management platform.

The key metrics to capture and assess through these travel surveys are:

- Overall employee auto-driver mode share
- Overall visitor/patient auto-driver mode share

[2] Wang, X., Shaw, F.A., Mokhtarian, P.L. et al. Response willingness in consecutive travel surveys: an investigation based on the National Household Travel Survey using a sample selection model. Transportation (2022). https://doi.org/10.1007/s11116-022-10312-w

Employee Survey

The TDM Strategy included an employee travel survey that was administered by TOH to all staff under the TOH network, this survey has been included in **Appendix B**. It is recommended that a similar survey be released to employees at the NCD including TOH staff, volunteers, students, and support workers that may not be affiliated with TOH if possible (such as food court operators, commissionaires, custodians, etc.). This survey will provide direct insight into the travel behaviour amongst users that have the greatest influence on mode shares at the NCD on a daily basis. Determining the method for administering the survey will be left to the NCD (ideally a TDM coordinator); however, a digital format may increase response rates and reduce the effort to compile the responses. The target response rate for the survey should be as close to 100% as can be achieved.

Topics that should be included in the survey include, but not necessarily limited to:

- Origin of commute (either postal code, ward, nearest major intersection etc.)
- Typical mode of commute (or proportional modal split, if regularly commuting by different modes)
  - If transit, which service (LRT vs bus)
  - If rideshare, which service
  - If driving, parking location on campus
  - If cycling/walking
- Frequency of commute (i.e. proportion of “in-person” work)
- Request for input on what would influence a person to change the mode of their commute.

Patient/Visitor Survey

A survey should also be provided to visitors and patients, but this presents challenges to limit bias and ensuring proper coverage of different users. In this case, the target for this survey should be regular or non-emergency patients and visitors, rather than those that arrive for an emergency since their choice on what mode to use is the least likely to change.

Providing a mix of online and paper surveys with incentives could be used to encourage responses, such as food vouchers, gift certificates etc. However, it is important that these incentives do not introduce any additional response bias. For instance, a program to validate parking for respondents may disproportionately weight responses towards drivers.

The patient and visitor survey should be collected continuously, maximizing the number of opportunities to potential respondents. The survey could be rolled into other feedback avenues, such as if patients receive a standardized comment card. Copies of the survey, or QR-code links, could be placed in waiting rooms or other communal visitor spaces. Both digital and paper versions of the survey should be available, to broaden the response pool as much as possible. Exact administrative procedures are to be determined by TOH.

Topics included in the patient/visitor survey should include:

- Where they started their trip, i.e. origin (e.g. your neighbourhood, nearest main intersection or landmark etc.)
- Nature of visit (e.g., regular appointment/visit or unplanned visit)
- Duration of visit
- Chosen mode of travel (e.g., drove, passenger, transit, walk, or bike)
  - If transit, which service (LRT vs bus)
  - If rideshare, which service
  - If driving, parking location
  - If cycling/walking
- Request for input on what would influence a person to change the mode of their visit if they drove.

2.2.6 OC Transpo Ridership Data

The primary source of data relating to TDM strategies should be the people travel surveys (or a *mobility management provider*, if applicable), which will provide a direct link between travel behaviour and TOH activity. However, it may be useful to supplement this information with some other sources which can provide practical insight into appropriate policy measures. One such source should be transportation ridership data, which should be requested from City Transportation Services (and/or OC Transpo directly). This data could be used to discern which transit services around the NCD are being used (or underused); confirm or corroborate the results of the travel surveys, as they pertain to transit; and provide additional detail regarding the demographics of transit users at the NCD.

Data requested, if available, should include:

- Boardings and alighting's for:
  - All bus-stops on streets fronting the NCD, including those at:
    - Carling/Maple
    - Carling/Sherwood
    - Carling/Dow's Lake Station
    - Carling/Preston
  - The Dow's Lake O-Train Station
- Farebox information for boardings at the above listed locations, delineated by fare-type (i.e. adult, senior, child, EquiPass, Community Pass, etc.).
- Ridership for Para Transpo services to/from the NCD.

If such a program is in place at the time, data on staff transit-pass usage should also be included. If applicable, the data request should also cover fronting stops on the Official Plan proposed future Carling at-grade rapid transit corridor. Availability of data should be confirmed through future collaboration with relevant city staff.

Once OC Transpo Ridership data is collected, the key metrics to capture and assess are:

- Total AM and PM peak boardings and alightings for the Dow's Lake LRT Station
- Total AM and PM peak boardings and alightings for all NCD adjacent bus stops

2.2.7 Other Data Types For Consideration by City of Ottawa (Community Improvement Measures)

The NTMS outlines a series of suggested "Community Improvement Measures" (CIM) for the NCD study area. These are measures for consideration not directly related to the NCD, but were valuable insights of current issues heard during the stakeholder engagement process for the NTMS. The CIMs present opportunities for enhancements to overall neighbourhood safety and active transportation facilities. *Monitoring of these measures is not included in the TMS*, but it is acknowledged that there may be a desire from local stakeholders for the city to be aware of and potentially monitor as the implementation of the NTMS unfolds. As outlined in the NTMS, the CIMs are for consideration by the relevant planning authority, i.e. the city or the NCC (in the case of Queen Elizabeth Drive).

Data for the city to consider collecting and evaluation relating to the NTMS CIM include:

- Active transportation counts for the proposed pedestrian crossovers (PXOs) along Queen Elizabeth Drive (at Old Sunset Boulevard, Lakeside Avenue, and Lakeview Terrace)
- Active transportation counts for the proposed improved pathway connections at Fisher Avenue/Shillington Avenue and Fisher Avenue/Tunis Avenue
- Active transportation counts on major pathways leading to the NCD (including the Trillium Pathway, the NCC Experimental Farm Pathway, the Rideau Eastern Pathway and Rideau Western Pathway).

It is noted that the city may already be collecting some of this data, such as through an agreement with the active transportation monitoring platform EcoCounter. Continued collaboration with the city (and NCC, where required) should determine if this data can be made available to TOH. Otherwise, recommendations for collecting this data are not included in the scope of this TMS.

2.3 Data Collection Program Schedule

The following section outlines the proposed schedule for the Data Collection Program. A generalized approach has been taken to maintain schedule flexibility, as exact timelines pertaining to the NCD are not known at this time. The suggested schedule for the Data Collection has been broken down into three Phases:

1. Pre-Opening Day
2. Opening Day
3. Long-Term

TOH acknowledges they will be a partner in funding the data collection program outlined herein. A formal agreement will need to be coordinated between TOH and City staff prior to implementation.

Pre-Opening Day

There are elements within the Data Collection Program that should begin prior to opening day of the NCD. It will be essential for TOH to have solidified all the administrative foundations to support the program, such as required agreements/ arrangements with City of Ottawa and any third-party contractors/transportation consultants, TOH staffing, coordination needs between internal departments (e.g., TDM coordinator, parking management, human resources etc.), secured technology vendors or mobility management providers etc.

Note that the purpose of the "Pre-Opening Day" data collection is intended to establish a baseline for future collection cycles. It is not intended to inform the monitoring of traffic implications related to construction activities at the NCD site. Traffic management requirements and responsibilities during construction will be under the purview of the contractor.

It is important that the collection of pre-opening day data should target a time period when construction activities have largely finished, but still prior to any significant hospital-related activity beginning; this would provide the best representation of pre-opening travel conditions.

- Coordinate about transition from Civic to NCD to help determine optimal time period.
- Requires cooperation between contractors, TOH, other stakeholders.

Once these foundations are established, it is recommended the following elements of the Data Collection Program be initiated prior to opening day of the NCD:

- **On-Campus People Surveys** for existing Civic Campus employees and patients/visitors. Develop a regular schedule (suggest annually) with an incentive and promotional program to increase response rates that could easily transition to the NCD. This is essential to monitor the efficacy of certain recommendations within the TDM Strategy that are to be initiated at the existing Civic Campus. It also establishes a strong baseline to compare the change in travel behaviour when the campus moves to its new location.
- **One set of Traffic Counts and Traffic Speeds** should be collected *in the year prior* to the confirmed opening day of the NCD to develop a baseline for network traffic conditions right before the campus moves to its new location.

- **One set of Off-Campus Parking Infraction and OC Transpo Ridership Data** should be requested *in the year prior* to the confirmed opening day of the NCD to establish a baseline of parking conditions on the local streets and at existing transit points right before the campus moves to its new location.

Opening Day

Once the NCD is officially open, it is recommended that:

- One set of the full **Data Collection Program** be collected after 3-months, but no later than 1-year of operation of the NCD. The timing of this first collection avoids the early stages of the NCD transition when travel behaviour and activities are expected to be more variable, and programs may not be operating at full capacity. It is important that the first collection more closely represent steady state conditions.

Despite the above, there may be value in collecting certain data types (specifically, **Traffic Counts, Traffic Speeds, and Parking Utilization**) more frequently within the first year depending on travel experiences from staff, observed traffic operations surrounding the NCD, and public feedback. Collecting other data types more frequently was not considered necessary in some cases (e.g., OC Transpo ridership and parking infractions) or were not feasible due to the time and effort needed to collect and process the data (e.g., people travel surveys).

Long-Term

After the first year of operation of the NCD, the Data Collection Program should continue on an annual basis unless there is reason to collect additional data sets for certain data types, such as tracking the traffic and/or travel behaviour implications of:

- A new phase of development
- A notable TOH policy change (e.g., parking pricing, transit subsidy, work-from-home etc.)

It is acknowledged that collecting travel surveys from NCD staff annually may be challenging. As well as representing a significant administrative task, there is likely to be some "response fatigue" over time, resulting in lower and lower response rates. Similarly, depending on response rates, administering, and tabulating visitor surveys annually may also prove to be difficult. Although the TMS recommends that people travel surveys be collected annually with the rest of the Data Collection Program, future consideration should be given to whether this is feasible. It may be appropriate to reduce the frequency of travel survey collection sometime after opening day.

The choice to cease or reduce the scope of the Data Collection Program will be made collectively between TOH and established stakeholders (see: **Section 4.0**). **It is recommended that the TMS program continue until full buildout of the NCD is achieved, currently expected by 2048.** Details related to the reporting and future action items stemming from the Data Collection Program are provided later on in this report.

2.4 Summary of Data Collection Program

The **Recommended Data Collection Program** is summarized in **Table 2** below. This table may be used as a guide (by TOH staff or potential transportation consultant) to implement the Data Collection Program, summarizing the critical aspect discussed in the preceding sections.

Data Type	On/Off Campus	Use Case	Key Metrics	Suggested Collection Schedule	Collection Scope	Suggested Collection Source	Notes
Traffic Speed	Off	Monitor travel behaviour and efficacy of implemented interventions proposed within the NTMS.	▪ 85th percentile speed	Start Pre-Opening Day; Collect Annually [1]	Select locations based on "potentially impacted" streets, as identified by NTMS (see: **Map 5**).	Request data from city [2] Or Collect via contractor	- Midblock traffic volumes and traffic speeds can be collected concurrently via ATRs. - Collection locations indicated in **Map 5** are suggestions and should be assessed and confirmed by technical field personnel.
Traffic Count (Midblock)	Off	Monitor potential traffic infiltration and efficacy of implemented interventions proposed within the NTMS.	▪ Midblock Average Annual Daily Traffic Volume (AADT)	Start Pre-Opening Day; Collect Annually [1]	Select locations based on "potentially impacted" streets, as identified by NTMS (see: **Map 5**).		
Traffic Count (Intersection)	Off		▪ Hourly vehicle traffic volumes	Start Pre-Opening Day; Collect Annually [1]	Select locations based on "potentially impacted" streets, as identified by NTMS (see: **Map 5**).Refer to **Table 1** for collection details.	Request data from city [2] Or Collect via contractor	- Intersection counts are multi-modal, including active users and heavy vehicles; while vehicles are the key metric to evaluate, multi-modal data should be retained for supporting analysis if needed.
Proportional Traffic Volumes	Off		▪ "Top Routes" Trip Routing	Start Pre-Opening Day; Collect Annually [1]	"Top Routes" analysis to and from NCD zone (see: **Figure 2**).	Request *StreetLight* analysis from city [3] Or Collect via contractor	- Rather than collect "absolute" traffic volumes from *StreetLight* (which may be unreliable), use the "Top-Routes" analysis tool to get the proportion of vehicles (those captured by the *StreetLight* platform) travelling to/from the NCD using different routes through the surrounding road network. - Limit *StreetLight* analysis to Tuesday, Wednesday, and Thursday.
On-Campus Vehicle Parking Utilization	On	Monitor the efficacy of implemented measures proposed in the TDM Strategy and help inform future policy and investment decisions by TOH.	▪ Hourly Entries and Departures by Location ▪ Breakdown of Parking Duration ▪ Hourly utilization	Start Opening Day; Collect Annually [1]	On-Campus vehicle parking facilities (parking garages and all public/employee surface lots or spaces, e.g. Zone 1/4/5 lots from TIA Addendum #2, March 2023).	Coordinated by TOH through parking technology vendor	- A *parking technology vendor* has not been confirmed; however, it is expected that automated tracking infrastructure will be in place that will allow data to be collected continuously. - Stratify results by employees, visitors, and patients if possible. - Confirm peak activity periods for data collection (e.g., 7:00am to 5:00pm)
On-Campus Bike Parking Utilization	On		▪ Hourly utilization	Start Opening Day; Collect Annually [1]	All formal on-site NCD bicycle parking facilities.	Coordinated by TOH; potentially supplemented by mobility management vendor data (if applicable)	- Data would ideally be provided by a *mobility management vendor*, e.g. *Rideshark* (to be confirmed) - If manual survey needed, conduct at least three weekday (Tuesday/Wednesday/Thursday) surveys per data collection cycle. - For each survey, count the number of bikes parked per location every 1-hour between the hours of 7:00am and 6:00pm. - Target surveys for peak cycling season (May – October)
Off-Campus Parking Utilization	Off	Monitor efficacy and implications of implemented measures proposed in the OPS and help inform future policy and regulatory decisions by the City, NCC or TOH.	▪ Utilization by street segment and time of day	Start Pre-Opening Day; Collect Annually [1]	Local streets within 900m of the NCD as identified in the OPS.	Collect via contractor	- Stratify by walking distance to NCD (within 600m; between 600-900m) - Limit survey to streets where parking is permitted. - Conduct survey for at least three off-peak hours (i.e. 10am-11am, 2pm-3pm, and 6pm-7pm) - Stratify data by block to help identify specific problem locations.
Employee Survey	On	Monitor the efficacy of implemented measures proposed in the TDM Strategy and help track travel behaviour patterns over time and how they compare to established targets, e.g., auto-driver mode share.	▪ Employee auto-driver mode share	Start Pre-Opening Day; Collect Annually [1]	All NCD Staff.	Coordinated by TOH; potentially supplemented by mobility management vendor data (if applicable)	- The target survey response rate for employees as close to 100% as possible. - Consider incentives and promotions to encourage participation where possible. - Consider administering the survey through an internal TOH platform which is already accessible by all employees, if possible, to increase the response rate.
Visitor/Patient Survey	On		▪ Visitor/patient auto-driver mode share	Start Pre-Opening Day; Collect Annually [1]	Participating Visitors / Patients.		- Visitor survey data may be best collected on a continuous basis (giving more opportunities to potential respondents). The recommended collection frequency will defer to the frequency this data is aggregated and processed by TOH. - Consider administering the survey through existing feedback processes (such as a patient/visitor comment card); consider providing both a paper and digital version of the survey, where relevant. - Consider incentives and promotions to encourage participation where possible.
OC Transpo Ridership	Off	Help inform future policy and investment decisions by the City or TOH.	▪ AM and PM peak period boardings and alightings	Start Pre-Opening Day; Collect Annually [1]	Dow's Lake LRT Station; bus stops on NCD fronting roads.	Request data from city [5]	- Stratify results by Dow's Lake LRT Station; and all NCD adjacent bus stops.

Notes:
1. This data type may be collected more frequently if required/desired.
2. Traffic Data Collection & Analysis – as per data collection agreement between TOH/City
3. Transportation Modelling
4. Parking Enforcement & Logistics
5. OC Transpo | Transit Service

Table 2: Summary of Data Collection Program

3.0 REPORTING

The following section offers guidance on how TOH should report information collected under the Data Collection Program. While it is possible for TOH to complete the reporting in-house, as previously discussed in **Section 2.0**, **it is recommended that a firm specializing in transportation data management be engaged to process and report on outputs from the Data Collection Program during the early stages of implementation**. Over time, as staffing, digital infrastructure and processes are more firmly established, TOH may gradually take over ownership of these tasks.

3.1 Evaluation

3.1.1 Key Metrics and Considerations

Once all the data has been collected and processed, the outputs should be analyzed and evaluated. **Table 3** summarizes certain considerations relating to the evaluation of each data type, which will guide the reporting process discussed in **Section 3.2**. Processing the data gathered under the Data Collection Program is provided at a high-level, leaving flexibility to customize outputs based on needs/context at the time. Future work will be required to establish standard procedures for isolating the information indicated below.

Table 3: Summary of Key Metrics to Capture and Assess from Data Collection Program

Data Type	Metric	Results to Consider in the Reporting Memo
Traffic Speed	85th Percentile Speed	- Locations where the 85th percentile speed exceeds the speed limit; suggested that a screening threshold of >=6km/h be used, as per City TTCMP procedures. - Locations where the 85th percentile speed exceeds the pre-opening day baseline; suggested that a screening threshold of >=6km/h be used, as per City TTCMP procedures. - Locations where speed trends are generally increasing from previous data collection cycles.
Traffic Volume (Midblock)	AADT	- Locations where the AADT exceeds industry standards for that road classification, e.g., *Transportation Association of Canada Geometric Design Guide for Canadian Roads (2018) and City of Ottawa TIA Guidelines (2017).* - Locations where the AADT exceeds the pre-opening day baseline. - Locations where the AADT trends are generally increasing from previous data collection cycles.
Traffic Volume (Intersection)	Hourly vehicle traffic volumes	- The hourly traffic volume on approaches listed in **Appendix C** if it is consistently increasing every data collection cycle; or, where there is a significant one-time increase in hourly volume (>20% and at least over 80 trips per hour).
Proportional Traffic Volumes	"Top Routes" Trip Routing	- Streets where StreetLight top-routes analysis suggests potential increase or consistent traffic infiltration, particularly on potentially impacted streets shown in **Map 5**. - Absolute vehicle traffic volume outputs from the *StreetLight* "Top Routes" analysis should not be used; ATR and/or TMC data are more reliable sources to gauge the true magnitude of vehicle traffic volumes on neighbourhood streets; the one limitation is these sources do not isolate NCD-related traffic. - *StreetLight* "Top Routes" analysis should focus on percentage outputs (e.g., the percent of total traffic accessing the NCD that travel on local streets such as Madawaska, Bell, Fairmont, etc.). This will help determine which neighbourhood streets are being most directly impacted by NCD-related traffic. - Note that *StreetLight* should be used as a screening tool as a first step in further analysis. "Top Routes" data alone should not be used as the basis for traffic engineering interventions, but be used to inform the need for further investigation.

On-Campus Vehicle Parking Utilization	Hourly % vehicle parking utilization	- The date and time for any hour where % vehicle parking utilization reaches 100% and the frequency at which this takes place. - Whether the peak vehicle parking utilization % is increasing or decreasing from previous data collection cycles.
On-Campus Bike Parking Utilization	Average % bicycle parking utilization	- Whether peak bicycle parking utilization is increasing or decreasing. - Whether certain bicycle parking facilities are over/under utilized compared to other facilities.
Off-Campus Parking Utilization	Total # of parked vehicles by block (within 600m and b/w 600m-900m)	- Whether the total number of parked vehicles within 600m; and between 600-900m from the NCD is increasing from previous data collection cycles. - If an increase is observed, note on which streets the increase is occurring (i.e. which are most vulnerable to parking overflow from the NCD).
Employee and Visitor/Patient Travel Surveys	Auto-driver mode share	- Whether the auto-driver mode share exceeds established TDM targets (50% in 2028; 35% by 2048). To better track progress towards TDM objectives, these mode share targets should be linearly interpolated. So, the targeted auto-driver mode share to which survey results are compared to should decrease by 0.75% per year between 2028 and 2048 (i.e. 49.25% in 2029, 48.50% in 2028, etc.) It is noted that these interpolated targets should be considered guideposts, and that modal shifts may not occur linearly; the targets established in the TDMS will remain the key triggers for action. - Stratify auto-driver mode share for each target group (employee, visitor, and patients) to help inform potential mitigation options.

3.1.2 Supporting Data

The following data types are captured under the recommended Data Collection Program, but do not need to be part of the detailed evaluation process unless needed to augment or provide additional context to results indicated in other data types. Below are some recommendations for how these data types could be utilized:

- **Sustainable mode share results (transit, carpooling/ridesharing, walking, and biking)** – if auto-driver targets are not met, understanding alternative mode shares results can inform where best to target resources/investment.
- **Transit ridership at nearby bus stops and Dow's Lake Station** – if transit mode share is underperforming, understanding ridership at local access points can help identify which services are underutilized.
- **Streetlight: Relative Traffic Volume** – if traffic count data shows a notable increase in traffic volumes (either hourly or AADT) along a corridor or intersection approach, Streetlight may be used to track the relative change in traffic volumes over different time periods or seasons (dating back as far as 2016). This provides opportunities for deeper analysis to help validate the noted issue with a greater number of samples.
- **People Travel Survey: Where Users Park** – this question provides additional clarity of on-campus parking demand and parking choices amongst NCD users, which may be informative if a parking short-fall or a notable increase in parking infractions are observed.
- **People Travel Survey: Specific Responses** – there is a wealth of information that could be drawn from survey responses that relate to the user travel experience at the NCD and can help identify trends amongst different types of users (e.g., physicians vs admin staff, patients vs visitors, etc.) as well as tailored user responses to help determine how best to alter travel behaviour if needed. For example, if the cost of transit is a strong deterrent for users to alter their mode of travel and the data validates there is a greater imbalance than expected between auto-driver and transit mode share amongst users, TOH may consider strengthening transit subsidies to encourage a shift towards transit use.

3.2 Documentation

Following each round of data collection, the results of the monitoring process should be compiled and summarized in a memo-style document. Important sections of the memo are as follows:

- Identify current data collection cycle scope.
- Summarize prior results and implemented mitigation.
- The evaluation of key metrics (see: **Section 3.1.1**).
- The analysis of supporting data, if applicable (see: **Section 3.1.2**).
- Identification of potential traffic implications.
- Formulate potential recommendations to mitigation traffic implications.

The memo should conclude with:

- A recommended target date for the next scheduled data collection event, and any adjustments to the Data Collection Program that may be required.
- Feedback received from key stakeholders ("Working Group"), see **Section 4.0**.
- Identify immediate next steps towards potential implementation.
- All raw data from each data collection event should be stored electronically for future reference if needed.
- Processed data outputs should be attached in appendices within the final memo, including but not limited to:
  - 8-hour TMC data sheets.
  - ATR survey data sheets.
  - *StreetLight* Viz3D outputs.
  - Digitized on-site bicycle parking survey sheets.
  - Tabulated employee and visitor survey results.

A more detailed sample memo outline is provided in **Appendix D**.

Note that any pre-Opening Day data collection cycles are intended to establish baselines for comparison with future cycles. Therefore, there is no requirement to engage with the working group (see: **Section 4.0**) nor provide recommended mitigation measures, since conditions will not reflect normal NCD operations. However, data could be shared with appropriate departments within the city for use in their standard monitoring procedures.

It is important to stipulate that any identified issues and potential mitigation options within the municipal or federal road network must be disclosed and vetted by the appropriate approving authority (City of Ottawa and/or NCC) prior to consideration.

The engagement process to support the TMS amongst the various local stakeholders will be discussed in further detail in **Section 4.0**.

4.0 Collaboration and Engagement

The vision established within the various Strategic Plans developed for the NCD was based on fundamental concepts:

- There are no "magic bullet."
- Change is difficult, but necessary.
- Collaboration and communication are vital.
- The Strategic Plans developed today are "living documents."

The need for a modern regional healthcare facility is significant, but so are the challenges faced by local stakeholders impacted by such a landmark development. Meeting these challenges requires collaboration and engagement amongst these stakeholder groups if success is to be achieved.

It is recommended that a "TMS Working Group" be established with select representatives from the City of Ottawa, the NCC and local community associations' executive leadership (the same associations among the transportation subcommittee) whose primary function is to share information and help inform the Transportation Monitoring efforts by TOH.

The key role of the TMS Working Group (WG) is as follows:

- To review TMS reports prepared by TOH, and
- To provide feedback on any issues or potential mitigation proposals.

If issues are flagged within the study area that are confirmed to be triggered or related to NCD operations, the WG shall collaborate on how best to approach the solution and formulate a response at that time. This may include the following:

- Do nothing and continue to monitor to see if trends improve with time,
- Collect additional data,
- Modify an existing mitigation option,
- Implement a new mitigation option,
- Adjust the Data Collection Program, and
- Complete additional analysis.

It is critical to emphasize that the ultimate approving authority for any mitigation options located within or in the direct purview of TOH, City of Ottawa, AAFC or NCC rest with those groups.

In these cases, there would be additional processes related to those jurisdictions that need to be followed before any implementation can proceed. For example, if the Monitoring Report identifies a notable increase in the 85th percentile speed of an adjacent street, the existing City of Ottawa processes outlined in traffic calming policies and guidelines must be followed before any potential mitigation option could be implemented.

It is recommended that at least an annual engagement schedule for the Working Group is recommended following opening day. During this period, the need for more, or less frequent meetings can be determined. It is suggested that prior to opening day, there two significant milestones at which times the Working Group should be engaged: first, prior to the first round of data collection (i.e. the collection of "baseline" data); and second, following the collection of baseline data to review results.

TMS Working Group Purview and Funding

The TMS is unique and is intended to monitor the specific Strategies developed in support of the NCD, i.e., the OPS, NTMS and TDM Strategy. This process operates outside the normal request/response mechanism of either the city or TOH and their network of affiliates. **The focus of the TMS WG is to define action items stemming from the Data Collection Program validated through the data evaluation criteria established herein. Public comments/issues received outside of this scope can be shared, but it is not the obligation of TOH to respond to issues that do not fall under the monitoring framework established in Sections 2.0 and 3.0.**

However, if such issues are captured through the course of the TMS, they should be forwarded to the appropriate city personnel as part of this collaborative process. It is also plausible that community members will try to contact TOH directly regarding transportation-related concerns, through non-transportation-specific avenues of communication. In these cases, TOH should identify the appropriate city department and, working through the relevant community association executive leadership, help direct these concerns through the standard city processes to a resolution.

Finally, any financial obligations to support mitigation measure(s) stemming from the TMS Reporting shall be agreed upon at that time by the relevant parties. It is anticipated that TOH will be the primary funding body for the recommended

monitoring plan contained above, however the terms and conditions of cost and/or data sharing agreements will be negotiated between TOH and city stakeholders at a future date.

5.0 Next Steps

5.1.1 Site Plan Control Application

The TMS is one of four supporting transportation studies to the Transportation Impact Assessment (Addendum #2) that will accompany the SPC application for the main Hospital building at the NCD. Once submitted, there will be an extensive approvals process with the City of Ottawa that will include a detailed review of all technical studies accompanying the application. These studies will be made publicly available on the City of Ottawa Development Application website for comment from any member of the public. There will be opportunities to refine the TMS as the SPC approval process unfolds.

5.1.2 Implementation Strategy

The preceding document provides a framework and guidance for TOH to monitor various traffic implications at the future NCD and within the established study area surrounding the future campus. The TMS was inspired by the strategic plans developed in the OPS, NTMS and TDM Strategy in support of the NCD SPC application.

Opening day of the NCD is currently scheduled for 2028, which presents a window of opportunity for TOH to begin planning and laying the foundation for the TMS. It is essential that all required financial and legal arrangements with corresponding parties are established with enough time to test protocols and procedures, ensuring the TMS is prepared to launch by opening day. The following list includes important considerations for TOH moving forward once the TMS is approved by the City of Ottawa:

- Confirm on-campus parking technology and mobility management vendors (if applicable) to assess what user information will be available to TOH to support the TMS.
- Secure appropriate TOH department staffing (e.g., TDM Coordinator as recommended in the TDM Strategy) and resources to oversee/manage the TMS.
- Establish City of Ottawa (and NCC, AAFC if applicable) funding and agreements related to the Data Collection Program.
- Secure agreement with a firm specializing in transportation data collection and/or management to oversee the implementation of the TMS, including the Data Collection Program, processing, evaluation, and reporting.
- Establish the TMS Working Group.
- Target implementation of pre-opening day data collection items at the existing Civic Campus within the next 3 years.

As previously discussed, it is outside the scope of the TMS to assign financial responsibility for any future mitigation options proposed in the NTMS or OPS since they still require must follow the standard review following the city's internal vetting process and are subject to approval at the time of design and implementation. While it is acknowledged TOH will be expected to contribute financially to the long-term solutions, the details surrounding the funding mechanism and arrangements to support future mitigation measures as well as an agreed upon schedule of implementation are expected to be developed with city staff in the time leading up to opening day of the NCD.

6.0 GLOSSARY

Accessibility - Refers to the design of products, devices, services, or environments for people who experience disabilities. (Accessibility Ontario)

Active Transportation - Any form of human-powered transportation is considered active transportation, including walking and cycling.

Capacity - The capacity of a facility is the maximum hourly rate at which persons or vehicles reasonably can be expected to traverse a point or a uniform section of a lane or roadway during a given time period under prevailing roadway, traffic, and control conditions. (Highway Capacity Manual)

Deflection - A vertical and / or horizontal change in the course or path of a vehicle as the result of a physical feature of a roadway. For example, a speed hump deflects the wheels, suspension, and chassis of a vehicle in a vertical direction. A bulb-out requires that the vehicle be steered or deflected horizontally from its straight path to maneuver past the bulb-out. (Canadian Guide to Traffic Calming)

Equity - Treating everyone fairly by acknowledging their unique situation and addressing systemic barriers. The aim of equity is to ensure that everyone has access to equal results and benefits. (Equity and Inclusion Lens Handbook)

Inclusion - Acknowledging and valuing people's differences so as to enrich social planning, decision making and quality of life for everyone. In an inclusive city, we all have a sense of belonging, acceptance, and recognition as valued and contributing members of society. (Equity and Inclusion Lens Handbook)

Mobility Management (Multi-modal) – the principal goal is to design solutions intended to connect people to the transportation options that can best get them to their destination. It is meant to encourage innovation and flexibility to reach the optimal solution for users, plans for sustainability, strives for easy information and referral to assess customers in learning about and using services, and continually incorporates customer feedback as services are evaluated and adjusted. [3]

Measure - A physical device, regulation, or action which affects the movement of motor vehicles, bicycles and / or pedestrians. (Canadian Guide to Traffic Calming)

Road - "Road" generally refers to the shared road surface intended for use by vehicles and bicycles and any features that fall within that surface (e.g. general-purpose travel lanes, on-street parking, on-road bike lanes, median islands, etc.). (City of Ottawa, Traffic Calming Design Guidelines)

Sensitive Land Use - Describes buildings, amenity areas, or outdoor spaces where routine or normal activities occurring at reasonably expected times would experience one or more adverse effects from contaminant discharges generated by a nearby major facility. Sensitive land uses may be a part of the natural or built environment. Examples may include, but are not limited to: residences, day care centres, and educational and health facilities. (Provincial Policy Statement).

Speed - The 85th percentile speed of all vehicles passing along a roadway during a specified time period is typically regarded as the representative speed of traffic. The 85th percentile speed is the speed exceeded by the fastest 15% of vehicles. When the 85th percentile speed exceeds the maximum legal vehicle speed, this is generally considered as indicating a speeding problem. (Canadian Guide to Traffic Calming)

Street - Refers to the elements in the corridor right-of-way including the road. This could include boulevards, sidewalks, segregated cycling facilities, property frontage, etc. (City of Ottawa, Traffic Calming Design Guidelines)

Streetscaping – A means of enhancing the environment for all users of the right-of-way, and a means of modifying motorists behaviour, through the use of physical features which provide protection, coherence, security, convenience,

[3] https://nationalcenterformobilitymanagement.org/for-mobility-managers/. Date Accessed May 29, 2023.

community identity, wayfinding and orientation, aesthetic quality and interest along an urban street. (Canadian Guide to Traffic Calming)

TIA and Mobility Study – The Transportation Impact Assessment approved by the City of Ottawa (2021) in support of the Master Site Plan Application and lifting of the holding provision.

TIA Addendum #1 – The Transportation Impact Assessment addendum report that was approved by the City of Ottawa (2022) in support of the Parking Garage Site Plan Control Application.

TIA Addendum #2 – The Transportation Impact Assessment addendum report that has been prepared in support of the main Hospital building Site Plan Control Application (2022).

Through Traffic -Traffic which travels through a neighbourhood, and does not originate from, nor is destined to, a location within the neighbourhood. (Canadian Guide to Traffic Calming)

Traffic Calming – The combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behaviour, and improve conditions for non-motorized street users. (Canadian Guide to Traffic Calming)

Traffic Calming Plan – Includes all the elements that lead to a recommended traffic calming concept for implementation. (City of Ottawa, Traffic Calming Design Guidelines)

Traffic Management – The change in traffic routing or flow within a neighbourhood street system through a combination of measures which alter route options and driver behaviour. (Canadian Guide to Traffic Calming)

Parking Utilization – The ratio between the number of parked vehicles to the total vehicle parking supply within a defined street segment, block, or zone at a given time period.

Volume - When referring to traffic, volume is a measure of the number of vehicles which travel along a section of roadway or made a particular movement during a specific time period. Most often, traffic volumes are indicated as vehicles per hour during the peak hour, or vehicles per 24-hour period. (Canadian Guide to Traffic Calming)

Vulnerable Road User - A term applied to those most at risk in traffic (i.e. those not protected by an outside shield) including pedestrians, cyclists, and motorcyclists. Vulnerable road users may also include children, the elderly, and persons with disabilities. (City of Ottawa, Traffic Calming Design Guidelines)

APPENDIX A

Sample of Processed Outputs

Traffic Counts

This is sample summary of **vehicle** turning movement volumes during the AM, PM, and Saturday peak hours (data below is a sample of actual count data for the Study Area).

Node #	Intersection	AM & PM & SAT	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
1	Carling WB/Saigon (April 2018)	AM	22	52	0	41	26	9	0	0	0	23	854	46
		PM	37	9	0	71	87	15	0	0	0	26	1509	10
		SAT	0	0	0	86	0	0	0	0	0	0	14	0
			22(37)[0]	52(9)[0]	0(0)[0]	41(71)[86]	26(87)[0]	9(15)[0]	0(0)[0]	0(0)[0]	0(0)[0]	23(26)[0]	54(1509)[14	46(10)[0]
2	Carling EB/Saigon (April 2018)	AM	0	0	0	42	0	0	84	1460	0	0	0	0
		PM	0	0	0	119	0	0	36	988	0	0	0	0
		SAT	0	0	0	0	0	0	0	12	0	0	0	0
			0(0)[0]	0(0)[0]	0(0)[0]	42(119)[0]	0(0)[0]	0(0)[0]	84(36)[0]	460(988)[12	0(0)[0]	0(0)[0]	0(0)[0]	0(0)[0]
3	Carling/Kirkwood N (April 2018)	AM	278	258	0	0	384	345	0	0	0	311	949	162
		PM	198	495	0	0	456	378	0	0	0	186	1669	217
		SAT	0	0	0	0	0	0	0	0	0	0	9	0
			278(198)[0]	258(495)[0]	0(0)[0]	0(0)[0]	384(456)[0]	345(378)[0]	0(0)[0]	0(0)[0]	0(0)[0]	311(186)[0]	949(1669)[9]	162(217)[0]
4	Carling/Kirkwood S (April 2018)	AM	0	427	413	374	410	0	99	1326	145	0	0	0
		PM	0	304	302	397	329	0	314	910	268	0	0	0
		SAT	0	0	0	0	0	0	0	12	0	0	0	0
			0(0)[0]	427(304)[0]	413(302)[0]	374(397)[0]	410(329)[0]	0(0)[0]	99(314)[0]	1326(910)[12	145(268)[0]	0(0)[0]	0(0)[0]	0(0)[0]
5	Carling/73m E Archibald (Jan 2018)	AM	0	0	0	10	0	23	2	773	0	0	894	15
		PM	0	0	0	31	0	38	2	863	0	0	1257	3
		SAT	0	0	0	0	0	0	0	20	0	0	17	0
			0(0)[0]	0(0)[0]	0(0)[0]	10(31)[0]	0(0)[0]	23(38)[0]	2(2)[0]	773(863)[20]	0(0)[0]	0(0)[0]	94(1257)[17	15(3)[0]
6	Carling/Westgate SC (March 2018)	AM	11	1	12	47	2	68	145	557	8	2	766	73
		PM	17	4	8	76	4	124	124	523	13	5	1381	78
		SAT	0	0	0	0	0	0	0	20	0	0	17	0
			11(17)[0]	1(4)[0]	12(8)[0]	47(76)[0]	2(4)[0]	68(124)[0]	145(124)[0]	557(523)[20]	8(13)[0]	2(5)[0]	766(1381)[17	73(78)[0]
7	Carling/Merivale (April 2018)	AM	109	229	407	36	252	132	0	870	66	122	473	31
		PM	104	207	228	70	313	130	1	811	132	334	1356	39
		SAT	0	0	0	0	0	0	0	11	0	0	10	0
			109(104)[0]	229(207)[0]	407(228)[0]	36(70)[0]	252(313)[0]	132(130)[0]	0(1)[0]	870(811)[11]	66(132)[0]	122(334)[0]	473(1356)[10	31(39)[0]
8	Carling/Island Park (March 2018)	AM	85	105	1	98	253	26	0	845	46	0	526	24
		PM	210	169	0	55	178	35	0	481	31	0	1236	42
		SAT	0	0	0	0	0	0	0	8	0	0	8	0
			85(210)[0]	105(169)[0]	1(0)[0]	98(55)[0]	253(178)[0]	26(35)[0]	0(0)[0]	845(481)[8]	46(31)[0]	0(0)[0]	526(1236)[8]	24(42)[0]

(From TIA Addendum #2)

This is sample summary is for **pedestrian** and **cyclist** traffic volumes over 8 hours. Note, values were invented for this sample and do not reflect an actual count.

Pedestrians

Intersection	8-Hr Total	North Crossing ↔	South Crossing ↔	West Crossing ↕	East Crossing ↕
Carling/ Road A	AM	30	30	30	30
	PM	30	30	30	30
Carling/ Preston	AM	30	30	30	30
	PM	30	30	30	30
Carling/ Road B	AM	30	30	30	30
	PM	30	30	30	30

Cyclists

Intersection	8-Hr Total	North Crossing ↔	South Crossing ↔	West Crossing ↕	East Crossing ↕
Carling/ Road A	AM	5	5	5	5
	PM	5	5	5	5
Carling/ Preston	AM	5	5	5	5
	PM	5	5	5	5
Carling/ Road B	AM	5	5	5	5
	PM	5	5	5	5

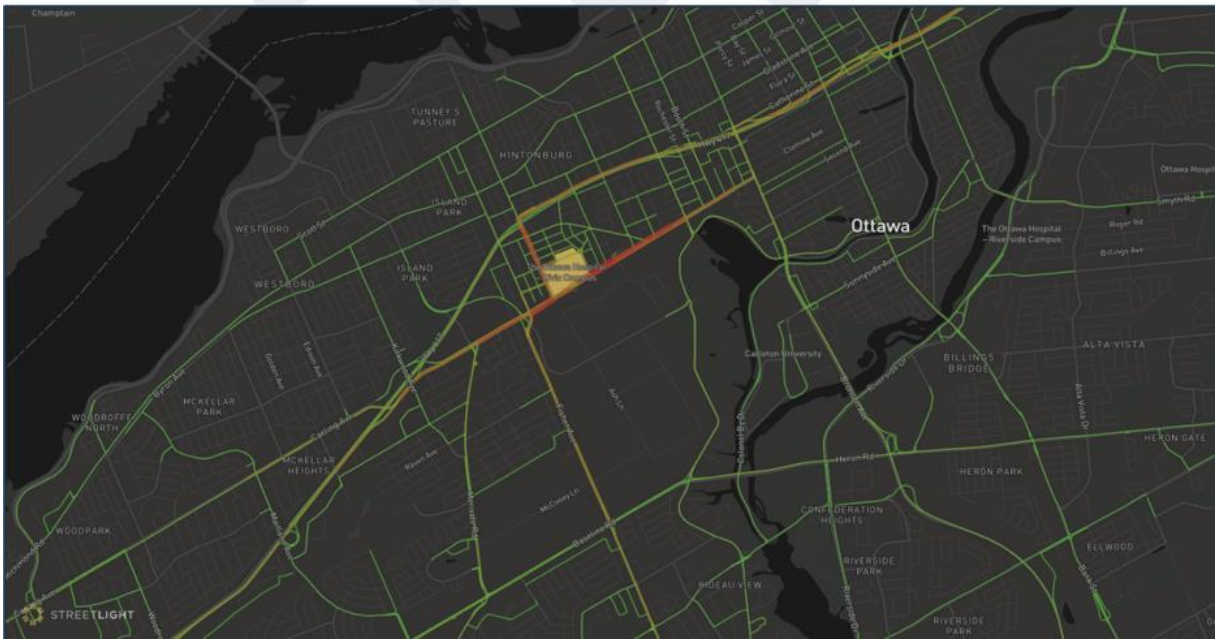
ATRs

The following is sample summary for **85th percentile speed** and **AADT**. Values were invented for this sample and do not reflect actual data.

Segment	Road Class	Current Posted Speed	One-Day 85th % ATR Speed	AADT
Kenilworth Street	Local	40km/h	18 km/h (07/2020)	1,030
Kippewa Drive	Local	40km/h	43 km/h (05/2022)	759
Beech Street	Local	50km/h	38 km/h (10/2022)	1,304
Fairmont Avenue	Local	30km/h	42 km/h (06/2021)	902
Bayswater Avenue	Local	30km/h	39 km/h (10/2021)	1,003
Champagne Avenue	Local	40km/h	44 km/h (08/2021)	620
Madawaska Drive	Local	40km/h	42 km/h (05/2022)	823
NCC Scenic Driveway – West of Morningside	Federal	60km/h	50 km/h (06/2021)	3,702

Relative Traffic Volumes (Streetlight – Top Routes)

Figure 6: Routes for Vehicle Trips to the Ottawa Hospital - Civic Campus (2017)



(From NTMS, 2023; note that road segments are represented by a colour gradient from green to red, with green indicating the lowest relative traffic intensity and red indicating the highest)

People Surveys (all sample exhibits taken from TDM Strategy)

Figure 3-7: Entire TOH Network Mode Share

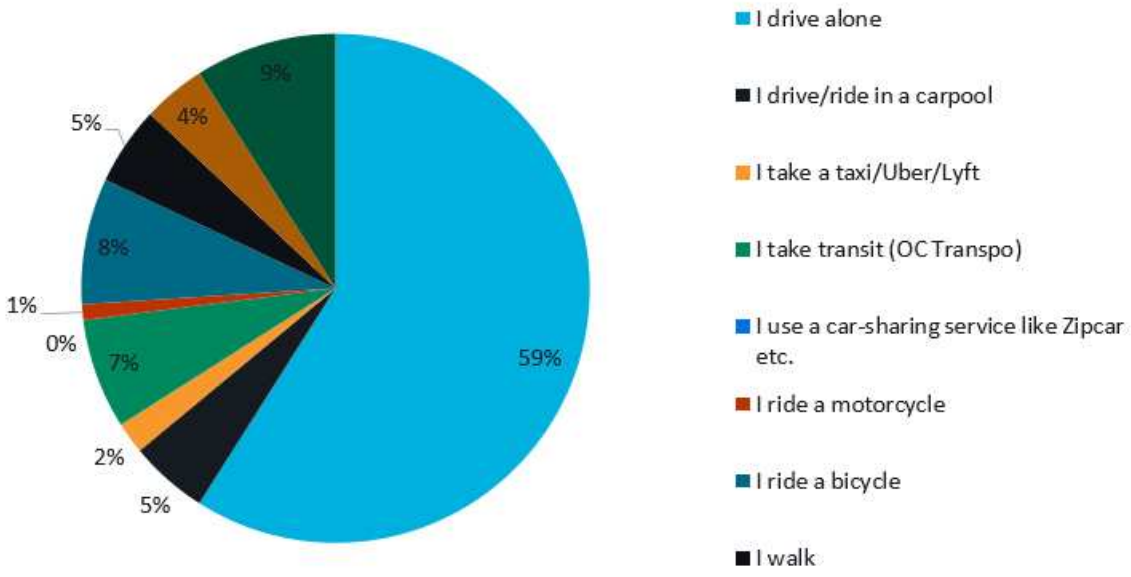


Figure 3-9: Existing Civic Campus-Mode Share by Employee Group

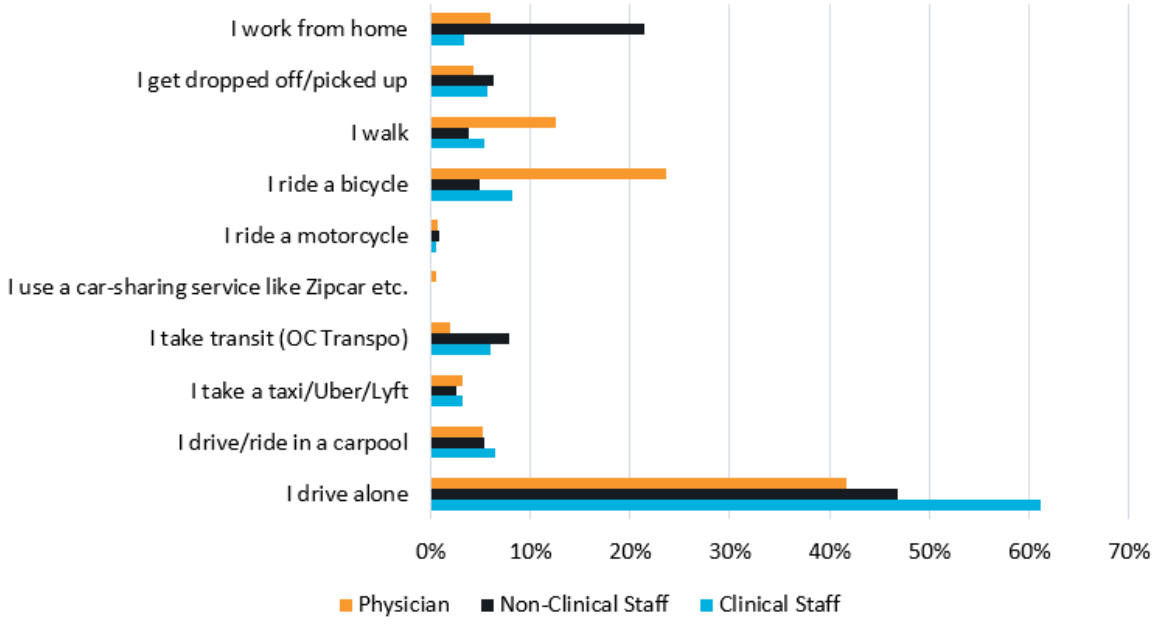


Figure 3-10: Existing Civic Campus-Reasons for Driving Alone

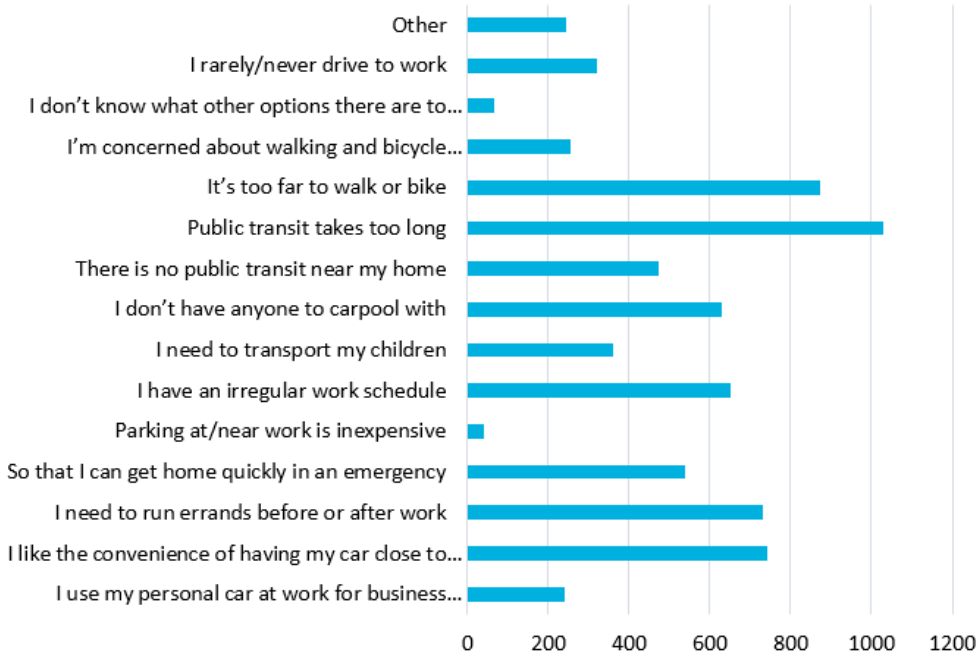


Figure 3-11: Existing Civic Campus-Willingness to use Alternate Modes

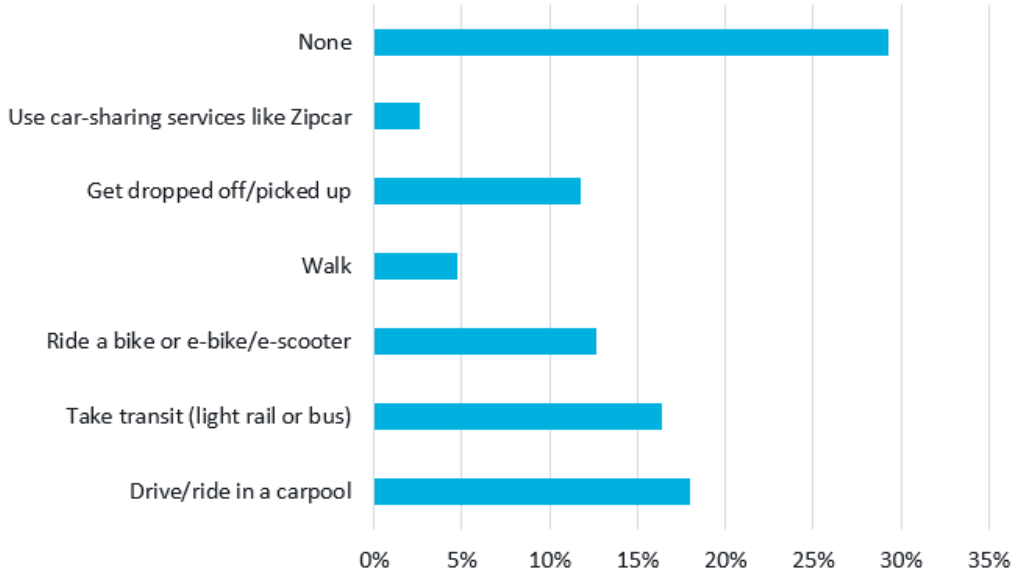
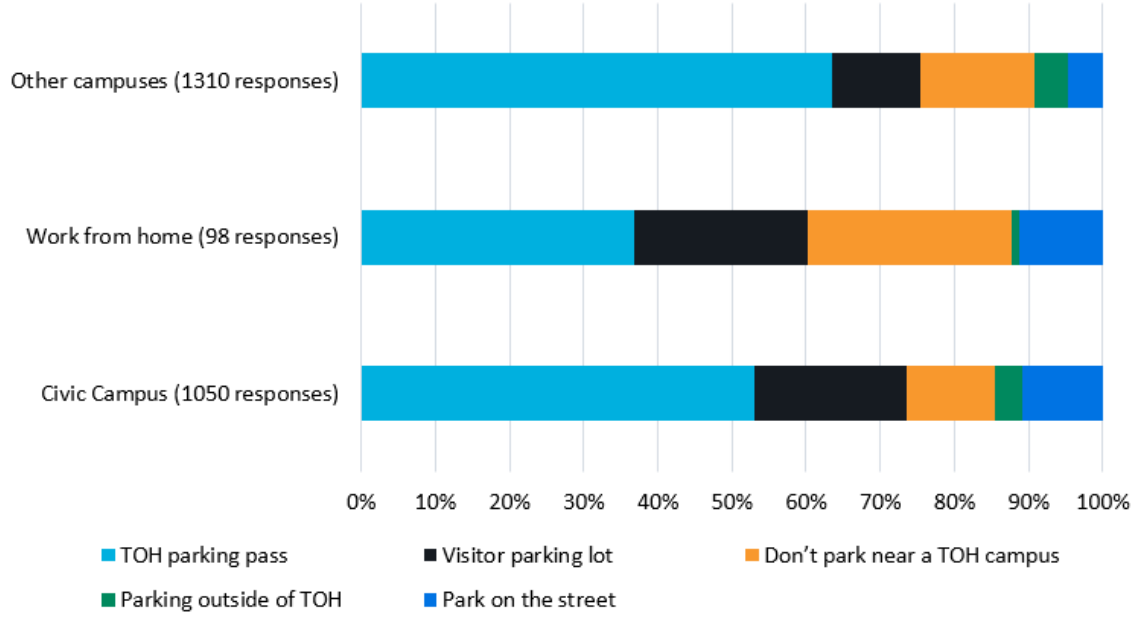


Figure 3-13: Where Employees Park



Parking Utilization

Figure A.1: Employee Parking Dashboard

Figure A.2: Visitor Parking Dashboard

OC Transpo Ridership (sample data received)

Values consider weekdays only“"A”" service is any activity from 6 to 9h“"P”" service is any activity from 15 to 18h“"Non-Pea”" is any activity outside of AM and PM service hours

Stop Activity (Peak Periods)

Area	Location		Stop Id	Route	AM On	AM Off	PM On	PM Off	Non Peak On	Non Peak Off	TOTAL ON	Total OFF	TOTAL	ON	OFF	TOTAL
North of Hemlock Rd	ST LAURENT / HEMLOCK	SB	8724	7	7		4	17	16	29	27	46	73	27	46	73

Southbound Stop Activity (24 Hours)

Location	Stop ID	Distance from Previous Stop (m)	Passengers On	Passengers Off	Passenger Activity Total
Hemlock	8724	-	27	46	73

APPENDIX B

Sample Employee Travel Survey (TDM Strategy, 2023)

Survey Questions

Q.1. What is your home postal code? _ _ _ _ _ _

Q2. What campus do you spend the most time at?

a. Civic Campus
b. General Campus
c. Riverside Campus
d. Satellite Campus
e. Other location
f. I work from home most or all of the time

Q.2. What department are you based in?

a. X
b. Y
c. Z

Q.3. What is your role at The Ottawa Hospital?

a. Physician
b. Staff (Clinical)
c. Staff (Non-Clinical)
d. Research
e. Volunteer
f. Other (please specify) _____

Q.4. Does your role allow you to work from home?

a. Yes, I currently work from home
b. Yes, I have the option to work from home but choose to go to the site
c. Yes, my role allows me to work in on a hybrid schedule (partly work from home)
d. No, my role does not allow me to work from home.

Q.5. On average, how many **days per week** do you normally commute by each option in a week? If you used more than one option in a typical week, select multiple options (e.g., drove 3 days, rode a bicycle 2 days).

	1 day	2 days	3 days	4 days	5+ days
I drive alone	☐	☐	☐	☐	☐
I drive/ride in a carpool	☐	☐	☐	☐	☐
I take a taxi/Uber/Lyft	☐	☐	☐	☐	☐
I take transit (OC Transpo)	☐	☐	☐	☐	☐
I use a car-sharing service like Zipcar etc.	☐	☐	☐	☐	☐
I ride a motorcycle	☐	☐	☐	☐	☐
I ride a bicycle	☐	☐	☐	☐	☐
I walk	☐	☐	☐	☐	☐
I get dropped off/picked up	☐	☐	☐	☐	☐
I work from home	☐	☐	☐	☐	☐
Other (please specify below) _____	☐	☐	☐	☐	☐

Q.7. Do you currently park at or near a TOH campus? (Select up to three)

a. Yes, I have a TOH parking pass
b. Yes, I park in the visitor parking lot
c. No, I don't park near a TOH campus
d. Yes, I have arrangements for parking outside of TOH
e. Yes, I park on the street

Q.8. How often have you experienced the following issues at the hospital due to parking constraints?

	Never	Less than 25% of my shifts	25 - 50% of my shifts	More than 50% of my shifts
Late for shift/work	☐	☐	☐	☐
Missed shift/work completely	☐	☐	☐	☐
Parked in an undesignated/ unofficial space onsite	☐	☐	☐	☐
Parked offsite (please specify) _____	☐	☐	☐	☐
Other (please specify) _____	☐	☐	☐	☐

Q.9. When you drive alone to the hospital, what are your main reasons? (Select up to three reasons)

a. I use my personal car at work for business purposes
b. I like the convenience of having my car close to me
c. I need to run errands before or after work
d. So that I can get home quickly in an emergency
e. Parking at/near work is inexpensive
f. I have an irregular work schedule
g. I need to transport my children
h. I don't have anyone to carpool with
i. There is no public transit near my home
j. Public transit takes too long
k. It's too far to walk or bike
l. I'm concerned about walking and bicycle conditions/safety along my route to work
m. I don't know what other options there are to get to work
n. I rarely/never drive to work
o. Other (please specify) _____

Q.10. What other commute options would you be willing to try? (Select up to 3)

a. Drive/ride in a carpool (skip to question 11)
b. Take transit (light rail or bus) (skip to question 12)
c. Ride a bike or e-bike/e-scooter (skip to question 13)
d. Walk (skip to question 14)
e. Get dropped off/picked up (skip to question 11)
f. Use car-sharing services like Zipcar (skip to question 11)
g. None (skip to question 15)
h. Other (please specify) _____ (skip to question 15)

Q.11. What would encourage you to try carpooling? (Select all that apply)

a. Help finding people to carpool with
b. Priority parking for carpools or car-sharing
c. Carsharing discount
d. Cheaper parking for carpools
e. Prizes or contests
f. A guaranteed ride home (e.g., taxi/Uber/Lyft) in the event of an emergency or unexpected issue
g. Other (please specify) _____

Q.12. What would encourage you to try transit? (Select all that apply)

a. Public transit subsidy/discount
b. Information about transit routes and schedules
c. Expanded transit network
d. Prizes or contests
e. A guaranteed ride home (e.g., taxi/Uber/Lyft) in the event of an emergency or unexpected issue
f. Other (please specify) _____

Q.13. What would encourage you to try cycling/e-bike? (Select all that apply)

a. Maps and information about bicycle/trail routes
b. On-site secure bike parking and changing rooms/showers/lockers
c. Support/loan to purchase a bike
d. Prizes or contests
e. A guaranteed ride home (e.g., taxi/Uber/Lyft) in the event of an emergency or unexpected issue
f. Improvements to the safety/comfort of my cycling route
g. Other (please specify) _____

Q.14. What would encourage you to try walking to the TOH Campus? (Select all that apply)

a. Prizes or contests
b. A guaranteed ride home (e.g., taxi/Uber/Lyft) in the event of an emergency or unexpected issue
c. Improvements to the safety/comfort of my walking route
d. Other (please specify) _____

Q.15. What would encourage you to try a new commute? (Select up to three choices)

e. Help finding people to carpool with
f. Priority parking for carpools or car-sharing
g. Cheaper parking for carpools
h. Transit: Public transit subsidy/discount
i. Transit Information about transit routes and schedules
j. A guaranteed ride home (e.g., taxi/Uber/Lyft) in the event of an emergency or unexpected issue
k. Bike/E-bike/E-scooter: Maps and information about bicycle routes
l. On-site secure bike parking and changing rooms/showers/lockers
m. Support/loan to purchase a bike
n. Prizes or contests
o. Nothing/not interested
p. Other (please specify) _____

Q.16. To the best of your knowledge, do you anticipate travelling to the New Campus Development site once it opens?

a. Yes, I will be primarily based in the new site
b. Yes, I might be frequently travelling to the new site
c. Yes, I might be occasionally travelling to the new site
d. No, I will not be travelling to the new site
e. I am not sure yet
f. Other (please specify) _____

Q.17. Please feel free to share any other comments or insights you have regarding commuting or transportation to/from the hospital in the space provided below.

[open-ended]

Public Transit	Having a direct transit line to the hospital is the most important thing for me. I spend over 300 dollars a month on parking alone, not to mention the price of gas. Taking the bus/train would be PREFERABLE to me, but there are no direct bus lines to either the Civic or the General currently. It should be top priority to ensure the new site is easily accessible by public transit.
	New Campus - transit concerns: longer commute, less reliable bus service and train service, unsure of locking station availability for e-bike or e-scooter
	OC transpo should not cancel trips for busses that service the hospitals. The route 55 does not run late enough for those working evening or night shift, so this would prevent those shift workers from using public transit along that route.
	If light rail goes to the suburbs and has a station at Civic maybe more staff would take public. However if they break down and don't work in the winter like they currently do, no nurse is going to be able to/ want to take it. Otherwise you could have half your staff late or no shows
	Transit is an option I have seriously considered, yet I find the additional 1.5-2 hour commute time is untenable especially when considering a low work/life balance schedule to begin with. Additionally, working odd hours with a changing schedule makes car pooling impossible, and transit options are even more limited and difficult or feel unsafe at strange hours. Also, my work requires me to be on-site before the person I am replacing can leave; this requires prompt arrival times that transit does not offer.
	I rely on OCTranspo buses, but they are frequently late or don't show up at all. There are times I've had to jog all the way from my home at Gladstone/Lyon to Civic because the GPS system on the bus routes was reading a 55 minute wait for the next bus and I would have been late if I tried to wait for it. Those times were around 7:30 am, when there should be no more than 20 minutes between buses. Anyway, this is just to say that transportation to the hospital is difficult due to poor service from OCTranspo.
	A bus pass discount would be a huge help in promoting greener transportation options. Biking and walking works, but it becomes difficult in these Ottawa winters. Please subsidize bus passes.

	If LRT station is directly connected (via indoor route) to New Campus, and if Park & Ride option were to exist close by, then I would consider taking transit
	subsidy for transit for staff as parking is expensive and far
	Hope hospital will provide pick up and drop off.
	The transit system needs to be significantly improved before I would consider using it. The transit time is too long, the buses are too full, there are no washrooms on along the way, the stops are unsafe at night, the buses are unreliable during the winter months I was once left on campus with no ride home during a snow storm, the park and ride parking are sometimes full, it's just not s good system.
	The Ottawa Hospital (TOH) shuttle service has been an excellent way to commute. For example, I live near the General campus; so I plan to take the shuttle to the New Campus when needed.
Active Transportation	Currently I have to pay for a Good Life membership just to rent a locker to use when riding bike to General site. This is ridiculously expensive and a blot on the hospital's claim to encourage cycling.
	I am hoping to buy an eBike, and would be on campus more if I knew the bike would be safe from theft. I am really hoping that the new campus allows for safer bike parking, especially for those who are planning to eBike from further distances. I live in Manotick, so I would consider driving to Huntclub, and biking the rest of the way to work. Thank you!
	Having access to showers and winter cycling routes would make a difference
	Bike locker should be situated near staff entry doors. Larger campuses should having more than 1 bike locker for easy access to different areas of hospital. To encourage more active transportation, biking or walking, can we put parking passes on hold during summer months.
	Anything to help people with bike have more secure location to store their bike would be amazing. I would definitely bike 50% of the time. I work full time. Too many people I know have had their bikes stolen from the current CIVI C Campus
	I use an e-scooter to get to work and there's very little room to store it in the office. Unfortunately it's not really possible to lock it on the bike rack securely due to its shape. It would be nice to have a storage space for this kind of equipment.
	i would love to ride my bike but i have to ride on main roads and its dangerous. I would take public transit but my 20 min drive would take 2 hours both ways....
	More secure bike racks that are easily accessed please! A safe ride down Carling Ave please! More showers in the ORs please! Well lit pathways and hospital access please!
	Weather is a barrier in Ottawa. I live pretty close to Civic but it is a dangerous walk in winter. I pay for a parking pass so I can park in winter/poor weather. As you currently need to either "in" or "out" of parking for the year, I feel I may as well use the parking lot if I am paying for it. Would there ever be an option to park for the months you need to drive(other than the daily rate which is not affordable for the whole winter)? Some kind of defrayed pay per use?
	My primary route to the Civic when I ride my bike is to go along Carling, but I take a bit of a longer route to avoid it because it is a busy street and there is no dedicated bike lane. Something to consider would be dedicated bike lanes along the routes to the new campus and on campus (I know bike lanes to the new campus is a City of Ottawa responsibility but wanted to bring it up).

	Biking is an option for me in the warmer months. I would love to be able to put my parking pass on hold for those times but reinstate it when the weather turns cold.
Parking	NEED designated Staff parking. These wait times are ridiculous to get a day parking pass. Also Pregnancy parking would be nice for pregnant patient and workers. I recently requested accommodations for closer parking for my last 4 weeks of work before mat leave and was told " I cannot jump the line for day parking". we truly do not care about our staff here at TOH.
	Parking waitlist for staff resulting in taking up visitor parking, increased rate for parking pass/daily uses. Maintenance of walking routes from designated parking spaces are slippery in winter abs poorly maintained
	I will be driving an electric car, charging stations are poorly displayed and very limited at the current campus parking garage, it would be ideal if there were more electric car charging stations and priority parking spots.
	I would prefer to have the option of having a monthly parking pass vs paying the whole year. I would likely be inclined to ride my bike more over the summer if I did jut also pay for parking.
	Given where I live it's very challenging to find people to car share with. I also need a flexible schedule for family reasons. I'd appreciate cheaper parking though for a hybrid WFH/at work approach where parking isn't always needed.
Work from home	Working from home meant a huge boost in my work/life balance, I have a more comfortable, more private space; I save about 2 hours a day in commuting time (some of which I donate to the hospital as free labour) and my productivity is much higher than before while I am eating better, saving on gas/food/clothes. I think WFH should be the norm for everyone whose job allows it
	I would prefer to work from home more often if that was an option.
	I would be happy to work from home 5 days a week to avoid commuting/parking but a 3 day minimum on campus was implemented.
	Preference for working from home at the new campus (administrative based position), with 1 to 2 days/week in office.
Carpooling	Commuting from a rural area 40 minutes away has limited travel abilities. Carpooling seems like a good idea but logistically does not seem like it will work due to last minute and mid shift floating to another campus, also in the winter depending on the weather my time I depart changes frequently, so coordinating this would be difficult and possibly unreliable.
	Please consider taxi chits, discounted car sharing, discounted corporate Uber/Lyft accounts for those who must go on site infrequently or a temporary parking pass.
	It would be nice to have carpooling discount for the parking
	I have to be on call for strokes and aortic aneurysm ruptured. There is a 30 minute response time. With the location of the new site and my home, I am not within that time frame. Very concerned with on-call expectations given how far the new campus is from the highway.
Park n ride	Thank you for sending out such a survey. Living in a more rural area, the OC transpo bus service would mean 2-3 buses from here so not feasible. There is a park n ride on Eagleson road, near Kanata, however, I am not aware of a bus that goes directly to the Civic campus for example. I surrendered my Dow's Lake parking pass finally recently this year and now have the option of the 9 bucks a

	day rate for the external champagne street TOH parking lot to use on the occasion I am going to be onsite and then using the TOH shuttle etc.
General	Please factor in the staff that has kids, i have no choice to take my car because my daycare closes early and i have to rush to get my kids after my shift.

APPENDIX C

Suggested Intersection Approaches to Monitor

Rationale for chosen locations was established through the development of the NTMS. These are subject to change throughout TMS implementation, as transportation conditions within the study evolve. For each intersection, suggested approaches for monitoring are identified, as well as the anticipated "short-cutting" route that will be captured by each approach.

- Sherwood @ Fairmont/Kenilworth:
  - West approach (Kenilworth) – Carling-Sherwood-Kenilworth-Parkdale
  - North approach (Fairmont) – Carling-Sherwood-Fairmont
- Carling @ Maple:
  - South approach (Maple) – Carling-Maple-NCC Scenic Driveway
- Bayswater @ Beech:
  - All approaches – Preston-Beech-Bayswater-Carling
- Carling @ Champagne:
  - North approach (Champagne) – Preston-Champagne-Carling/Road A
- Carling @ Bell:
  - North approach (Bell) – Bronson-Powell-Bell-Carling
- Carling @ Cambridge:
  - North approach (Cambridge) – Bronson-Powell-Cambridge-Carling
  - South approach (Cambridge) – QED-Dows Lake-Cambridge-Carling
- Bronson @ Plymouth:
  - West approach (Plymouth) – Bronson-Ploymouth-Lebreton-Daniel McCann-Booth
- Bronson @ Powell:
  - West approach (Powell) – Bronson-Powell-Cambridge/Bell-Carling
- Bronson @ Old Sunset:
  - West approach (Old Sunset) – QED-Dows Lake-Old Sunset-Bronson
- Prince of Wales @ Road B:
  - West approach (Road B) – Prince of Wales-Road B-Road A-Carling
- Prince of Wales @ Road E:
  - West approach (Road E) – Prince of Wales-Road E-Road D-Maple-Carling

APPENDIX D

Sample TMS Reporting Memo Outline

1.0 BACKGROUND

1.1 Review of Prior Results and Mitigation

- A review of results from the previous data collection and reporting cycle should be included:
  - A brief summary of previously identified trends in key data metrics
  - A brief summary of previously identified problem areas
- An update should be provided on any mitigation measures that were recommended and/or implemented after the previous data collection and reporting cycle. This section should include:
  - List of recommended mitigation measures
  - Implementation status of recommended mitigation measures

2.0 ANALYSIS

2.1 Evaluation of Key Metrics

- Summarize analysis results from the current data collection cycle, and evaluate the key metrics for each data type as indicated in **Section 3.1.1**.
- Summarize trends in key metrics for each data type from previous data collection cycles. Plot or otherwise visualize results if relevant.
- List key metrics that do not meet evaluation criteria (see: **Table 3**).

2.2 Analysis of Supporting Data

- Based on observed trends, identify areas where additional supporting data may be needed.
- Summarize additional analysis additional analysis of supporting data (as outlined in **Section 3.1.2**) where applicable or deemed necessary based on evaluation results in previous section.
- Compile and summarize feedback received in the People Travel Surveys – such as from employees, visitors, or community members.

2.3 Identification of Potential Traffic Implications

- Based on the analysis included in the prior two sections, identify potential traffic implications and problem areas.

3.0 ACTION ITEMS

- Formulate recommendations for mitigating the potential traffic implications identified in the previous section, based on the contents of the NTMS, OPS, and TDM Strategy.
- Circulate draft results to Working Group, summarize feedback received and revise TMS accordingly.
- Identify immediate next steps for the implementation of any mitigation measures; refer to the relevant strategy for additional guidance, i.e., if the need for additional traffic calming is identified, refer to the NTMS to find the relevant city process, pass recommendations onto the appropriate city department.
- Identify important considerations for next data collection cycle, e.g., any adjustments to Data Collection Program including schedule, problem areas to prioritize, etc.

APPENDIX