# Appendix B. Modelling Memo

# Midtown Oakville Travel Demand Modelling

Revision: Draft Report

Town of Oakville

Midtown Implementation Program
November 24, 2025

# Contents

## Tables

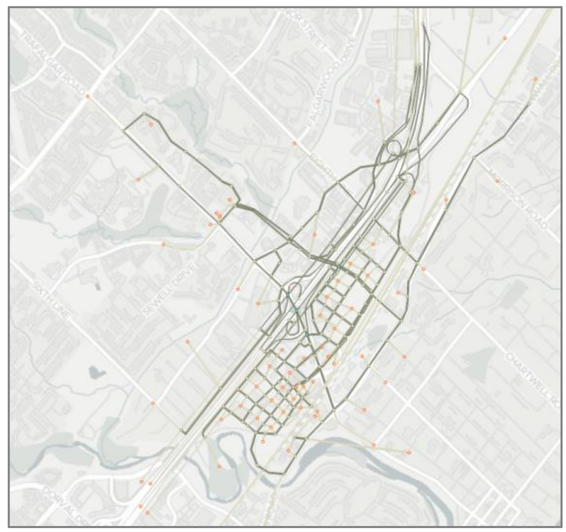
# Figures

# 1. Overview

The Midtown Subarea model aims at providing a tool for testing different development and growth forecasts proposed for Midtown, including road networks and modal splits on a block-by-block level. The model is based primarily on the Oakville Subarea Model, which is a subarea model of the Halton Region model (managed and developed by Halton Region), which is based on the GTAModel V4.0 travel demand model developed by the Travel Modelling Group (TMG) at the University of Toronto.

The Oakville Subarea Model covers the areas of the Town of Oakville, bounded by the 407 in the north, Lake Ontario in the south, Winston Churchill Boulevard in the east, and Burloak Drive/ Tremaine Road in the west. Figure 1 below indicates the extents of the model network of the Oakville subarea model compared to the Midtown subarea network, which covers the extents of the Midtown area only.


Oakville Subarea Model Extents (EMME)



**Midtown Subarea Network Extents (EMME)**

**Figure 1: Oakville and Midtown Subarea Model Extents**

## 1.1 Purpose and Limitations

The goal of the subarea model for Midtown is to provide a more detailed understanding of travel patterns within the study area. It relies on existing information from Regional and Town-wide transportation models for trips to and from the broader Town and Region. Other organizations maintain other transportation models that do cover Oakville (including Midtown), which includes the following:

- GTAModel V4.0 travel demand model – Developed and maintained by TMG at the University of Toronto;
- Halton Regional Model – Maintained by Halton Region; and,
- Town of Oakville Model, variants used in Transportation Master Plan (TMP) and elsewhere – Maintained by Consultants and Town of Oakville

However, regional and town-wide models do not include detailed local and collector roads, nor do they include individual development blocks. This subarea model for Midtown was used to identify potential pinch points and areas of congestion to help evaluate potential solutions that are reflective of actual development and localized travel patterns.

The subarea model relies heavily on existing regional models. The model inherently assumes that the broader town-wide and region-wide travel demand models are reasonably calibrated, and travel demands through the Midtown area are an accurate reflection of travel patterns.

This report assumes that the Halton Regional Model and Town of Oakville Model networks account for the majority of the committed and planned transit and road projects. This model development report in addition, benchmarks and adjusts mode splits for future trips to and from Midtown as these are anticipated to be impacted by the proposed infrastructure and recommendations. The Chartwell Grade Separation Class EA is also completed as part of this modelling memo.

Readers of this report should note that while some scenario results are presented, the intent of this report is to document the model development process. The majority of scenario results are discussed in detail within a wider transportation context in companion reports including:

- Midtown Transportation Plan Report (2025)
- Midtown Transit Needs and Opportunities Report (2025)
- Midtown Active Transportation Report (2025)

# 2. Model Network & Zones

## 2.1 Overview

The Midtown subarea model network was modified from the Oakville subarea model to include the proposed changes related to the Midtown redevelopment and new/finer zones. The proposed road network of the Midtown model is shown in Figure 2 below and covers an area of approximately 103 hectares plus additional areas north and east of the urban growth centre limits. This figure displays the road network of the Midtown subarea model 2051 base network, which includes anticipated future road and transit projects. This figure is displayed for context and information purposes, a detailed review of what is included in model scenarios is discussed later in this memo. The number of lanes per link is also displayed in this figure.

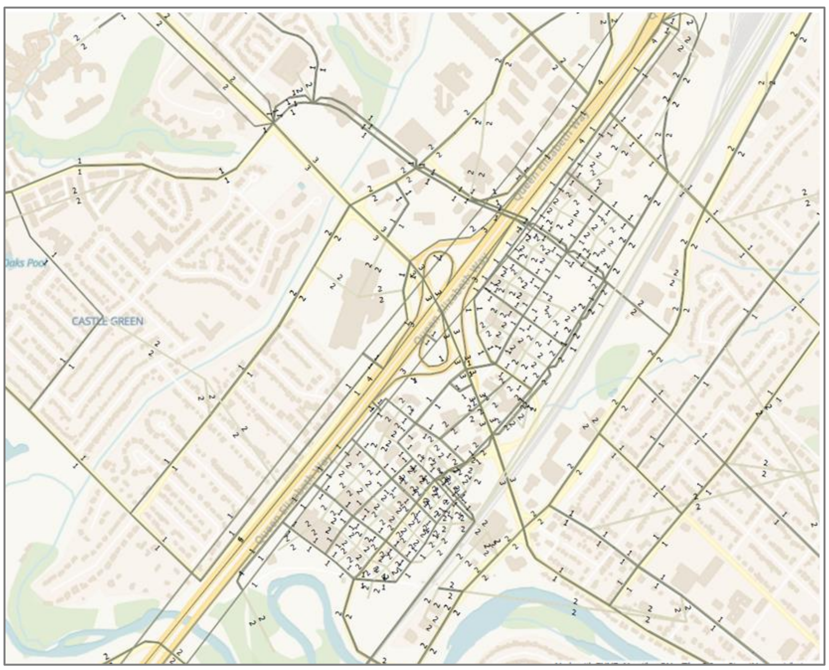



**Figure 2: Midtown Area Proposed Street Network**

Twenty-nine internal zones were added in Midtown to replace the five zones present in the Oakville subarea model. These zones are significantly smaller and will therefore give finer precision and information specifically within the Midtown area. The new internal zones are based on the Midtown OPA and have been numbered from Z1 to Z29, as shown below in Figure 3. These zones can be aggregated to correspond to zones in the Halton regional model / Oakville subarea model, which are indicated in Figure 3 as different colours (e.g. zones coloured purple correspond to the Halton Region zone 4329).

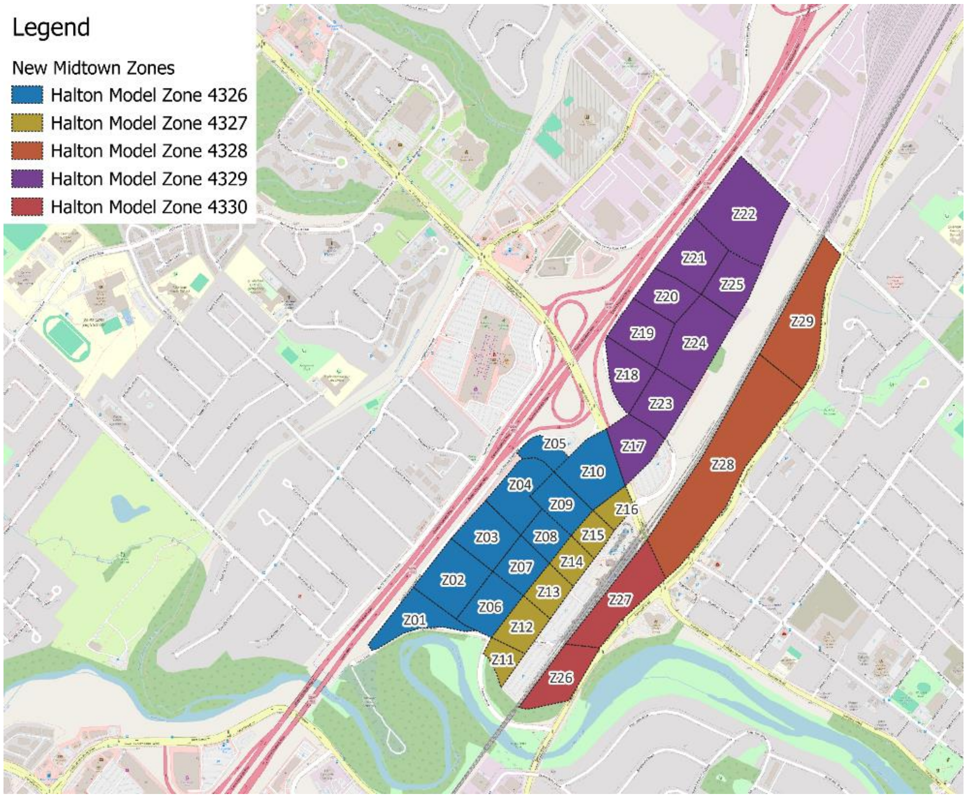



**Figure 3: Midtown Area New Zones**

# 3. Modelling

To forecast future demand in the Oakville Midtown area, we developed a basic origin-to-destination transportation modelling and forecasting tool, which is structured as shown in Figure 4 below. This relatively simple model structure represents a good compromise between accuracy and efficiency and makes significant use of existing models where possible. The diagram shows inputs, dependencies, modules, and gives a high-level overview of data flows.

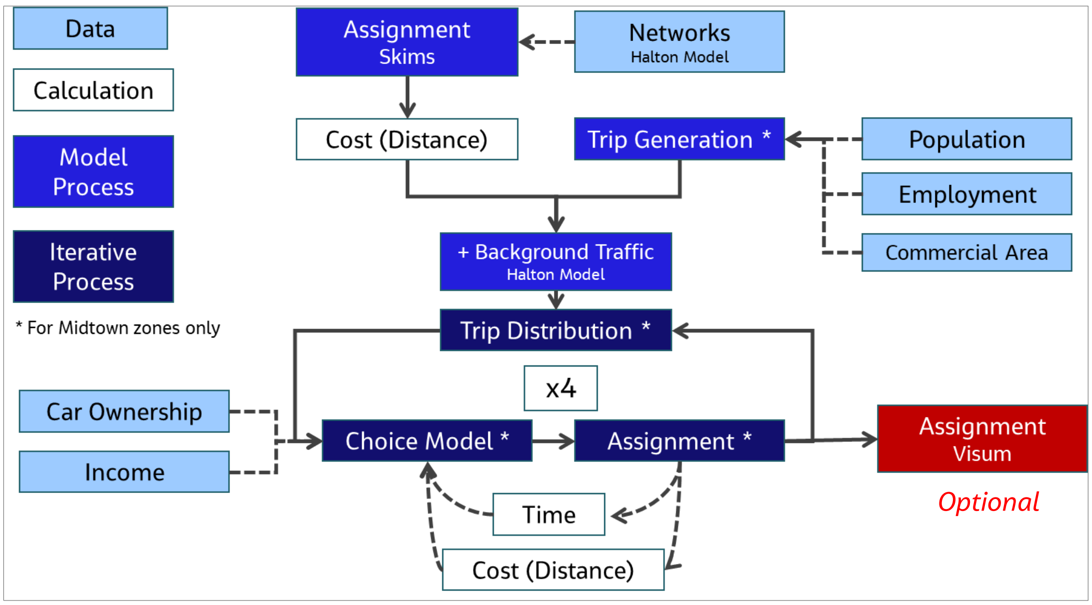



**Figure 4: Model Structure**

**Table 1: Oakville Midtown Comparable Areas**

| | Residents | Urban Design | Rapid Transit | Distance from Core |
|---|---|---|---|---|
| **Midtown (Oakville)** | 32,000 | Dense High Rise | Oakville Go | 37 km |
| **Midtown (Toronto)** | 61,000 | Very Dense High Rise | Line 1: Eglinton Station<br>Future: Line 5 Eglington Station | 7 km |
| **North York (Toronto)** | 50,000 | Dense High Rise | Line 1/4: Sheppard-Yonge Station | 27 km |
| **Mississauga City Centre/ Square One (Mississauga)** | 50,000 | Dense High Rise | MiWay (BRT)<br>Future: Hurontario Line Mississauga City Centre | 27 km |
| **Scarborough Centre (Toronto)** | ~100,000 (district) | Dense High Rise | Scarborough Centre (defunct)<br>Future: Line 3 Scarborough Centre | 27 km |
| **Coquitlam Centre (Metro Vancouver)** | 32,000 | Dense High Rise | Coquitlam Central Station/Lincoln Station | 27 km |

## 3.1 Trip Generation

Trip generation models in transportation planning are analytical tools used to estimate and predict the number of trips generated by a population within a specified geographic area. Specifically focusing on the land use of specific zones, these models assess various demographic elements such as household size, income, and other socio-economic variables to quantify the demand for travel.

For the Midtown subarea model, trip generation functions were developed for the AM (6am to 9am) and PM (4pm to 7pm) peaks and included residential, employment and commercial trips. Similar urban areas in the Greater Toronto Area (GTA) were used as reference for the estimation of the residential and employment trip generation rates. Commercial trip rates were extracted from the Institute of Transportation Engineers (ITE) Trip Generation Manual 10$^{th}$ Edition. Sections below describe the process of estimating trip generation rates.

### 3.1.1 Model Inputs

For the Midtown subarea model, trip generation is based on three inputs: population, employment, and commercial space by zone[1]. The Joint Best Planning Estimates (JBPE), which are forecasts of housing, population, and employment for  Halton Region, are used for the base scenario. These estimates were developed through a 'joint' planning exercise with Halton Region and local municipalities  in late 2023 and are the basis for the Halton Regional model and many other planning purposes across the Town. The JBPE may be considered an upper limit of population and employment growth by 2051, which is useful for planning for the purpose of this study only. All background transportation outside the Midtown zones also utilizes the JBPE estates for generating trips, using the Halton region model zone system.

For the finer Midtown area zones, values of population, employment, and commercial areas are based on the JBPE and distributed to Gross Development Blocks (GDB) based on the planned distribution of building and land uses in Midtown reflecting the approved Midtown Oakville Official Plan Amendment (OPA 70). The data from GDBs was converted into the Midtown subarea model zone system. Table 2 below shows the values by zone for the 2051 base scenario.

One alternative set of population and employment forecast inputs by zone was developed for scenario testing purposes. This sensitivity test was based on the Growth Analysis Study completed by Watson & Associates Economists[2] in November 2024. The Watson study was commissioned by the Town of Oakville to provide a refined understanding of long-term population, housing, and employment growth possibilities, with a particular focus on Midtown Oakville. While JBPE offered a region-wide framework for growth across Halton, this study responded to more recent demographic and policy shifts such as changes to immigration, evolving housing needs, provincial legislation like Bill 23 and 185, development pressures, and strategic priorities. Midtown is identified as a key growth node within the Town, and this report provides allocations for residential and employment growth in that area. Compared to the JBPE, the Watson report forecasts of housing, population, and employment are lower. The Watson sensitivity is only applied to the finer Midtown subarea model zones and does not affect background traffic. While the Watson report also includes some Town-wide estimates, these are not available by zone. It is noted that previous versions of the OPA are not applicable to the site as they are not in-force policy.

---

[1] Different from Halton Regional model, where the trip generation model is based on population and employment only, as Industrial, Commercial, and Institutional (ICI) area a subset of employment.

[2] Source: Growth Analysis Study, Town of Oakville (2024). Retrieved on October 20, 2025 from: https://www.oakville.ca/getmedia/4fc97c8e-6e53-4aed-ae46-62757c71fa69/planning-growth-analysis-study.pdf#page=98.10

Further, 2031 and 2041 versions for the Midtown subarea model zones were also developed which share similar distributions as 2051, but the total values are lower than the JBPE. These scenario inputs are described later in this memo.

**Table 2: Input for Trip Generation (population, employment, and commercial area for 2051 base, JBPE)**

| | 2051 Base Scenario (Based on JBPE) | | |
|---|---|---|---|
| Zone Number | Population | Employment | Commercial Area |
| 201 | 1,781 | 621 | 2,099 |
| 202 | 1,010 | 0 | 0 |
| 203 | 1,905 | 665 | 2,349 |
| 204 | 1,960 | 684 | 2,517 |
| 205 | 1,248 | 436 | 1,513 |
| 206 | 1,821 | 636 | 2,737 |
| 207 | 0 | 0 | 0 |
| 208 | 413 | 450 | 0 |
| 209 | 1,102 | 385 | 1,648 |
| 210 | 917 | 320 | 1,042 |
| 212 | 480 | 167 | 798 |
| 213 | 805 | 281 | 1,163 |
| 214 | 691 | 241 | 1,163 |
| 215 | 576 | 201 | 1,163 |
| 216 | 557 | 194 | 891 |
| 217 | 1,618 | 565 | 2,117 |
| 218 | 1,137 | 397 | 1,715 |
| 219 | 1,435 | 501 | 2,519 |
| 220 | 0 | 5,963 | 10,124 |
| 221 | 2,634 | 919 | 3,336 |
| 222 | 848 | 94 | 0 |
| 223 | 1,445 | 504 | 660 |
| 224 | 1,309 | 457 | 2,980 |
| 225 | 1189 | 415 | 2,676 |
| 226 | 2,556 | 892 | 4,635 |
| 227 | 896 | 1,267 | 6,404 |
| 228 | 1,158 | 404 | 1,460 |
| 229 | 645 | 225 | 1,597 |
| 230 | 331 | 116 | 583 |
| Total | **32,468** | **17,998** | **59,887** |

Data source: Derived from JBPE and distributed by zone based on 2051 planned buildings for Midtown by Gross Development Block, provide by Town of Oakville staff.

Figure 5 below indicates the same zonal data as Table 2 above including population (blue) and employment (yellow) by zone in the Midtown subarea model.

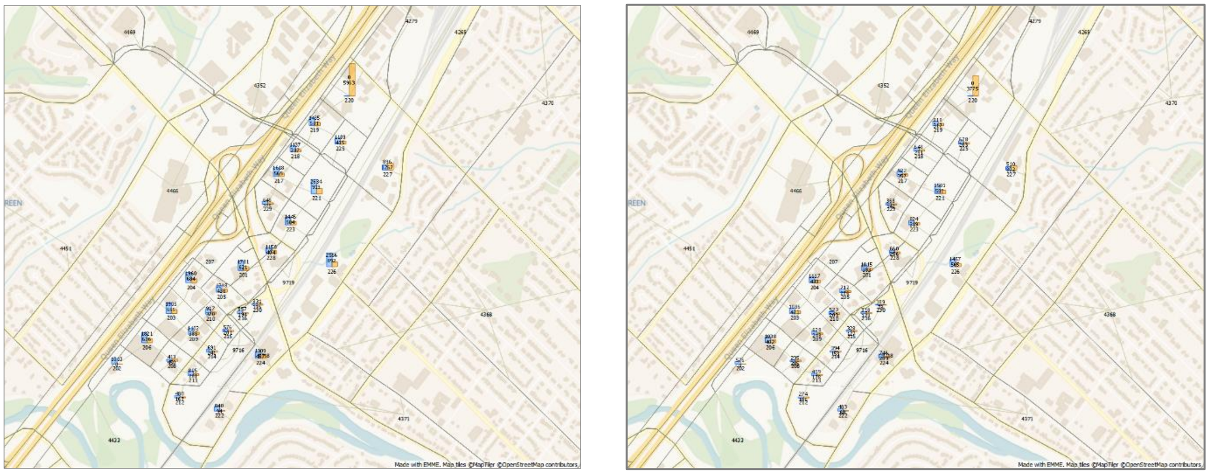


**Figure 5: Population and Employment**

Data source: Derived from JBPE and distributed by zone based on 2051 planned buildings for Midtown by Gross Development Block, provide by Town of Oakville staff.

## 3.1.2 Comparator Areas

The Midtown Oakville area will be unlike anything else in the Town of Oakville or the Halton Region. Existing vehicular trip data available for the future site of Midtown Oakville from the 2016 Transportation Tomorrow Survey (TTS) was deemed inadequate for model calibration purposes, since existing development in Midtown is limited and land-use configuration significantly different from what is envisaged for the area in the future. To determine if the model is correctly calibrated, we look at other similar developed areas inside and outside of the GTA. In general, these areas can be characterized as being dense urban developments surrounded by far less dense suburban development. They're all centered on a rapid transit station. Many of these areas are developed on land formerly used as malls or strip malls. This type of development is becoming relatively more common in Canada, and the following places will be used as comparators. Midtown Oakville future residents forecast is based on Halton's Joint Best Planning Estimates (JBPEs), which allocates which allocate 32,468 people and 17,998 jobs in Midtown by 2051, broken down to a disaggregated zonal system.

## 3.1.3 Residential Trip Rates

Residential trip rates for Midtown were calculated based on the total number of existing residents living within each comparable area (2006 TTS zones of household), and the total number of trips to and from these areas. Attracted and produced residential trips across comparable urban areas were averaged to obtain trip rates for Midtown (see Figure 6).

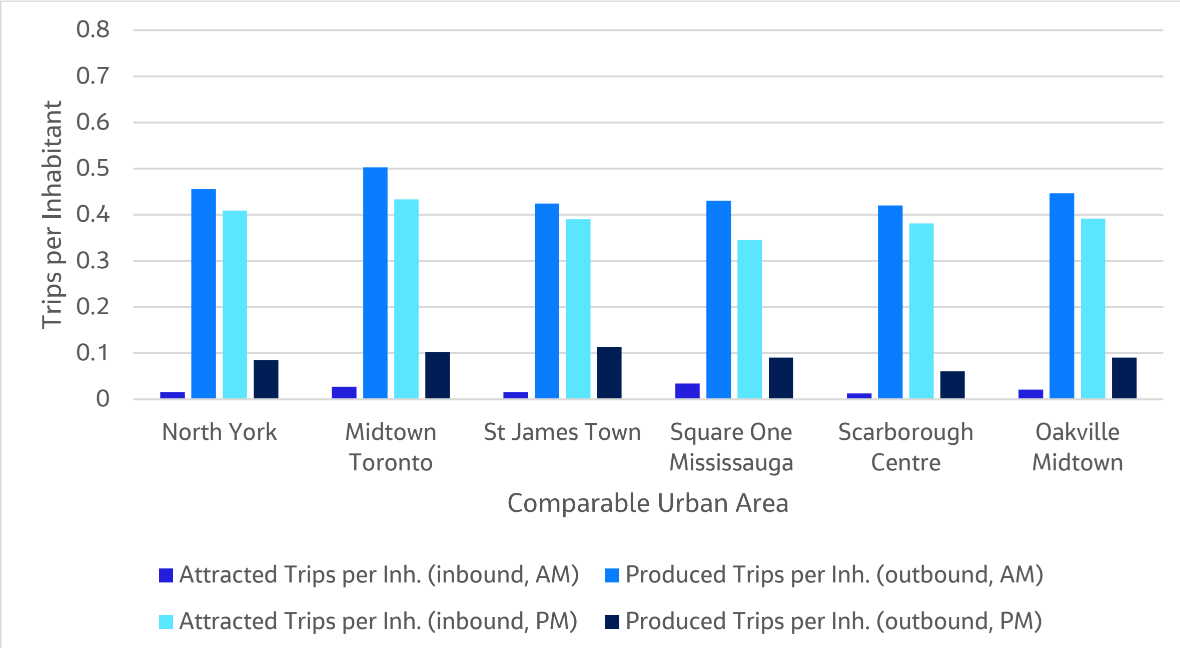



**Figure 6: Residential Trip Rates**

**Table 3: Residential Trip Rates Midtown Oakville**

| Residential Trip Rates | Attracted Trips per Sqm (inbound) | Produced Trips per Sqm (outbound) |
|---|---|---|
| AM Peak (6am to 9am) | 0.021 | 0.447 |
| PM Peak (4pm to 7pm) | 0.39 | 0.09 |

Data source: Residential trip attraction and production rates for comparable urban areas in the GTA from Transportation Tomorrow Survey (2016).

### 3.1.4 Employment Trip Rates

Employment trip generation rates for Midtown were calculated based on the total number of existing full-time employees working within each comparable area (2006 TTS zones of employment), and the total number of trips to and from these areas. Attracted and produced employment trips across comparable urban areas were averaged to obtain trip rates for Midtown (see Figure 7).

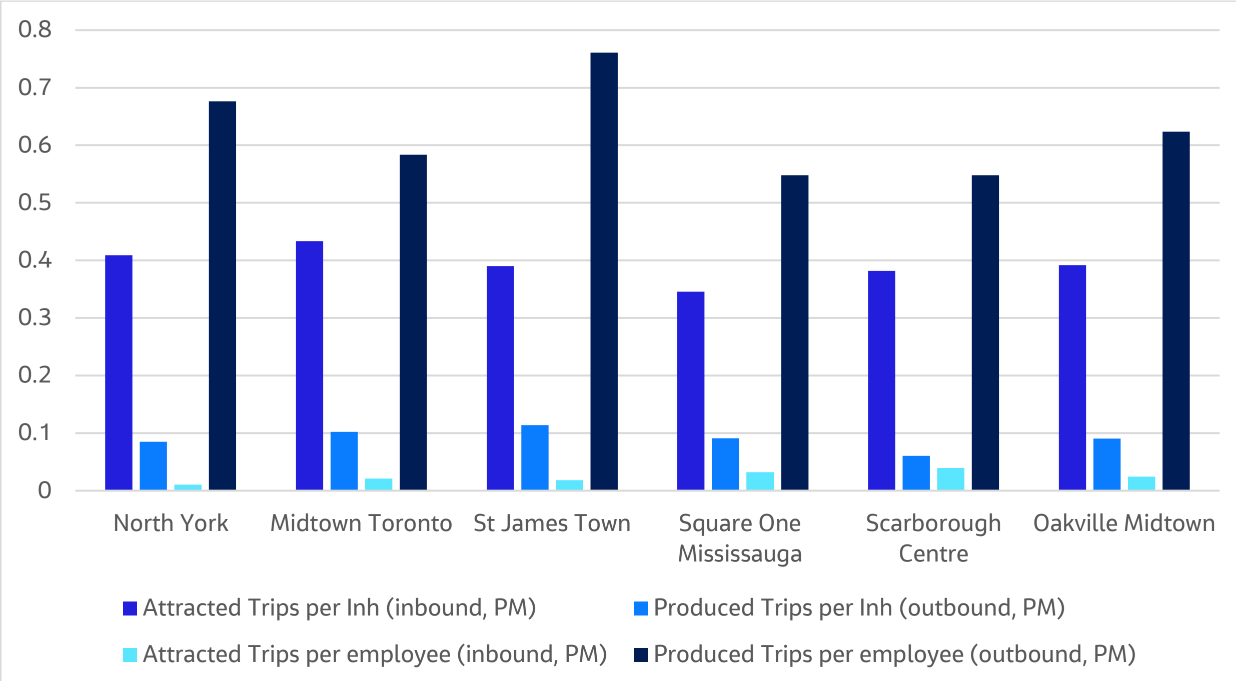



**Figure 7: Employment Trip Rates**

Data source: Residential trip attraction and production rates for comparable urban areas in the GTA from Transportation Tomorrow Survey (2016).

### 3.1.5 Commercial Trip Rates

Retail/commercial trip generation rates for Midtown were extracted from the ITE Trip Generation Manual 10th Edition Shopping Centre (820) Person Trip Rates. Commercial trip rates for Midtown are presented in Table 4.

**Table 4: Commercial Trip Rates Midtown Oakville**

| Commercial Trip Rates | Attracted Trips per Sqm (inbound) | Produced Trips per Sqm (outbound) |
|---|---|---|
| AM Peak (6am to 9am) | 0.029 | 0.025 |
| PM Peak (4pm to 7pm) | 0.042 | 0.042 |

Data source: Commercial trip attraction and production from the ITE Trip Generation Manual 10th Edition.

### 3.1.6 Trip Generation Formulas

The average trip generation rates estimated above were used to develop trip generation formulas for the Midtown subarea model. Summary of trip rates is presented in Table 5 and the subsequently developed trip generation equations are shown below.

**Table 5: Residential, Employment and Commercial Trip Rates Midtown Oakville**

| Residential Trip Rates | Attracted trips per inhabitant (inbound) | Produced trips per inhabitant (outbound) |
|---|---|---|
| AM Peak (6am to 9am) | 0.020 | 0.461 |
| Work Trip Rates | Attracted trips per employee (inbound) | Produced trips per employee (outbound) |
| AM Peak (6am to 9am) | 0.640 | 0.013 |
| Commercial Trip Rates | Attracted Trips per square metre (inbound) | Produced trips per square metre (outbound) |
| AM Peak (6am to 9am) | 0.029 | 0.025 |
| Residential Trip Rates | Attracted trips per inhabitant (inbound) | Produced trips per inhabitant (outbound) |
| PM Peak (4am to 7am) | 0.392 | 0.090 |
| Work Trip Rates | Attracted trips per employee (inbound) | Produced trips per employee (outbound) |
| AM Peak (4pm to 7pm) | 0.024 | 0.640 |
| Commercial Trip Rates | Attracted trips per square metre (inbound) | Produced Trips per square metre (outbound) |
| PM Peak (4pm to 7pm) | 0.042 | 0.042 |

### 3.1.6.1 Trip Generation Formula - AM Peak Hour

$$\boldsymbol{Attractions_{am}} = \boldsymbol{A_{am,j}} = \mathbf{0.020} \times Population_j + \mathbf{0.640} \times Employment_j * \mathbf{0.029} \times Commercial\ Area_j$$

$$\boldsymbol{Productions_{am}} = \boldsymbol{P_{am,i}} = \mathbf{0.461} \times Population_i + \mathbf{0.013} \times Employment_i * \mathbf{0.025} \times Commercial\ Area_i$$

### 3.1.6.2 Trip Generation Formula - PM Peak Hour

$$\boldsymbol{Attractions_{pm}} = \boldsymbol{A_{pm,j}} = \mathbf{0.392} \times Population_j + \mathbf{0.024} \times Employment_j * \mathbf{0.042} \times Commercial\ Area_j$$

$$\boldsymbol{Productions_{pm}} = \boldsymbol{P_{pm,i}} = \mathbf{0.090} \times Population_i + \mathbf{0.640} \times Employment_i * \mathbf{0.042} \times Commercial\ Area_i$$

Source: The table and formulas above are the derived trip generation formulas which are coded into the Midtown subarea model.

## 3.2 Trip Distribution

Trip distribution is accomplished by using a gravity model to “distribute” the productions and attractions as full origin-to-destination trips. A gravity model posits that the number of trips produced at an origin zone and attracted to a destination zone is related to the total trip productions and attractions. In other words, higher/denser areas of population and more attractive destinations lead to increased trip flows. To calculate the trip flow, two sub-calculations are needed, which are **Friction Factor** and **Balancing of Productions and Attractions**. **The trip flow ($T_{ij}$)** between zones *i* and *j* is given by:

$$T_{ij} = BF_i \cdot P_i \cdot BF_j \cdot A_j \cdot f(c_{ij})$$

**Friction Factor F($C_{ij}$).** As travel times increase, travelers become less likely to make longer trips. The friction factor captures this reluctance. Calibration involves adjusting this factor to match observed trip distributions. The following friction factor was used:

$$F(C_{ij}) = C_{ij}^{-\alpha} \cdot \exp(-\beta \cdot C_{ij})$$

**Variables**:

- BFi or BFj = Balancing factors
- $P_i$: Total trip productions at zone i
- $A_j$: Total trip attractions at zone j
- f($C_{ij}$): Calibration term (friction factor) accounting for the effort required to travel between zones (origin to destination)
- $\alpha = 0.05$
- $\beta = 0.2$
- $C_{ij}$ = Cost

**Balancing Productions and Attractions**. Ensuring that the total productions and attractions for the study area are balanced is crucial for an accurate model. The standard balancing method available in the Emme model was used to undertake the balancing.

### 3.2.1.1 Calibration and Validation

Before using the gravity model for future predictions, it must be calibrated based on observed data. Typically, a trip distribution model can be calibrated by observing travel length distributions. In the case of the Midtown subarea model, we compared the resulting trip distribution with those of comparable areas within the GTA and elsewhere, as previously discussed. Figure 8 below indicates the result of validation / calibration of the trip distribution model. To calibrate distribution models, typically trip length distributions (i.e. a histogram of trip lengths) are used. As indicated above, the modelled trip length histogram for the Midtown subarea model reasonably matches the comparable urban areas

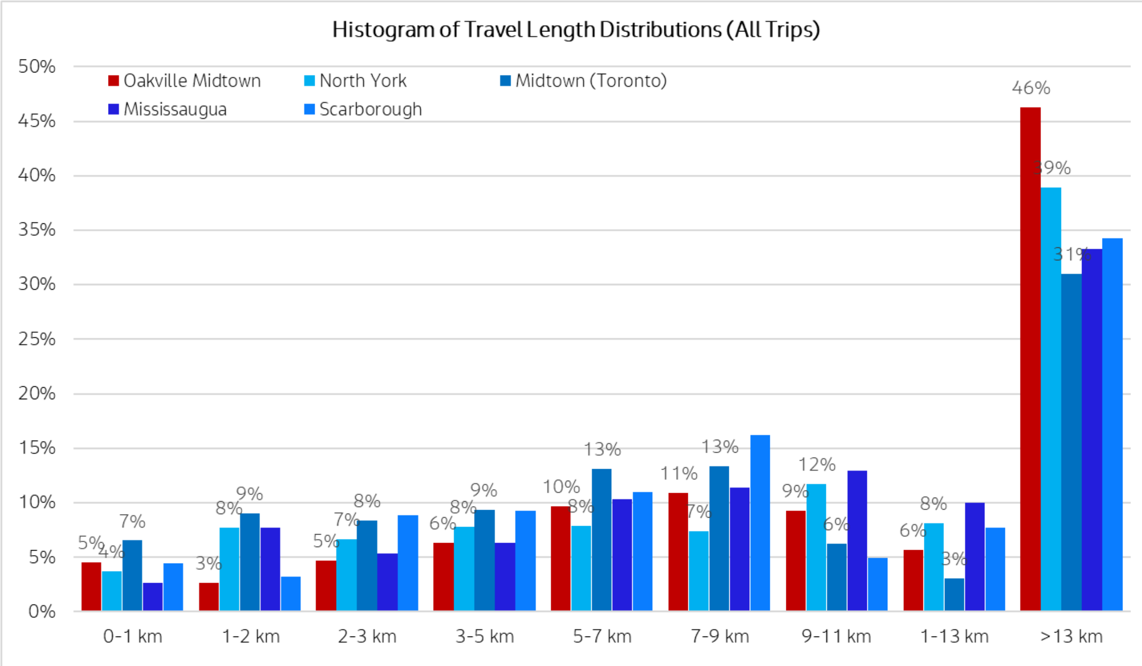



**Figure 8: Trip Length Distribution Comparison**

Data source: Transportation Tomorrow Survey (2016) for comparable urban areas.

## 3.3 Mode Choice

An existing multinomial logit choice model was applied to the Midtown subarea model. This model was originally developed for the Waterloo region. Multinomial logit choice models posit that a choice of which mode (in this case, car, transit, walking and cycling) are a function of a variety of inputs related to the full origin-to-destination trip. These inputs generally include time, but also in this case income (at the origin zone), car ownership (at the origin zone) employment density (at the origin zone), and population density (at the origin zone).

To measure choice, first the utility of each mode is calculated and compared. Utility is a unitless measurement of "satisfaction". Modes with relatively higher utilities for each given origin-to-destination pair would have a higher probability of being selected.

**Table 6: Logit Model Parameters**

| | Car (Driver) | Car (Passenger) | Transit | Walk | Bike |
|---|---|---|---|---|---|
| Intercept | - | -2.9 | -0.15 | 1.36 | -1.8 |
| Time | -0.03530 | -0.10018 | -0.02810 | -0.03960 | -0.1 |
| Income | - | - | -0.21328 | - | - |
| Car ownership | - | - | - | -0.6937 | - |
| Employment Density | - | - | - | -0.0035 | - |
| Population Density | - | - | - | -0.0035 | - |

### 3.3.1 Application of the Model

The model is applied according to the following equations:

$$U_{n_{ij}} = Intercept_n + \beta_{time_n} \cdot Time_{ij} + \beta_{other_n} \cdot Other_{ij}$$

$$logsum = e^{U_{car\ driver_{ij}}} + e^{U_{car\ pass_{ij}}} + e^{U_{transit_{ij}}} + e^{U_{walk_{ij}}} + e^{U_{bike_{ij}}}$$

$$P_{n_{ij}} = \frac{e^{U_{n_{ij}}}}{logsum_{ij}}$$

$$D_{n_{ij}} = D_{total_{ij}} \cdot P_{n_{ij}}$$

Where,

- $U_n$ = Utility of the mode *n*
- $P_n$ = Probability of choosing mode *n* for a specific O-D (i-j)
- $D_n$ = Demand for mode *n* for a specific O-D (i-j)
- $\beta_n$ = Coefficient (from model)

Further restrictions are placed on the model including not allowing any walk trips longer than 5km, or any bike trips longer than 10km. In these cases, the probability is automatically set to 0.

### 3.3.2 Calibration and Validation

The resulting mode shares were compared to the comparator areas and are shown below in Figure 9. Results show that the model predicts the mode shares within range of comparable areas. In the case of Midtown Oakville, a 60% mode share (for driver and passenger) is estimated. This is between the values found for North York and Midtown Toronto (37-38%) and those of Scarborough, Mississauga City Centre, and Coquitlam City Centre (46-55%). North York and Midtown Toronto are certainly more urban than Mississauga, Coquitlam, and Scarborough Centre, all of which are similar suburban redevelopments centered around shopping malls and rapid transit. The resultant mode share of Midtown subarea model is compared to comparable urban areas; the Midtown subarea model base scenario closely matches these comparable areas, indicating that the calibration is reasonable. Assumed mode split is also discussed in Section 6.1.1 of the Transportation Plan.

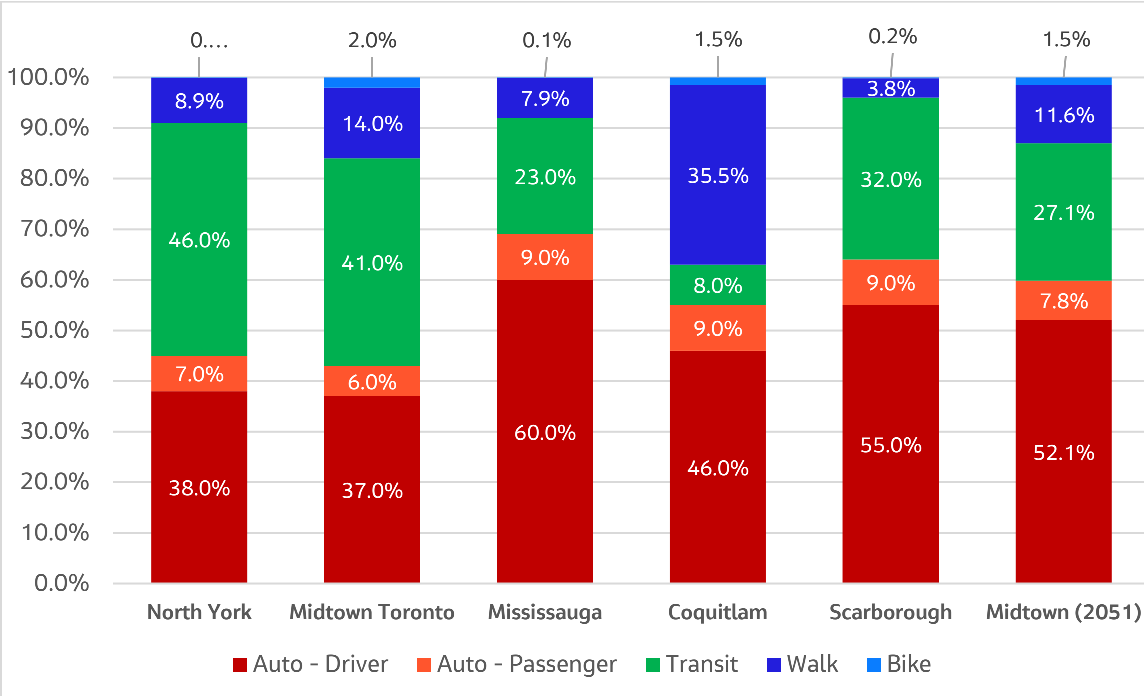



**Figure 9: Mode Shares (All Trips)[3]**

The figure above shows that the distribution of trips by mode is sensible. In the AM Peak, the destinations of many trips are concentrated in the area in the northeast of Midtown, which is the main identified office space area for Midtown, which is to be expected.

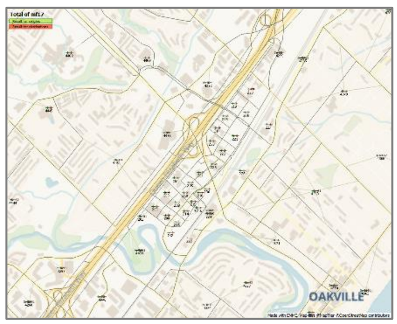
[3] Data source / information: Transportation Tomorrow Survey (North York, Mississauga, Scarborough, Midtown Toronto). Coquitlam data is from 2023, the high walk percentage and relatively low transit could be due to generally less trips overall post -pandemic (Coquitlam is home to many persons who would have previously commuted to Vancouver every day).


**Auto Driver**


**Auto Passenger**


**Transit**


**Walk**




**Bike**

**Figure 10: Trips and Locations (2051 AM Peak for all Oakville at the Same Scale)**

## 3.4 Assignment

The assignment procedure is the fourth and final stage in a 4-stage transportation model, responsible for distributing trips generated and distributed to specific routes within the transportation network. This stage aims to determine the number of vehicles using each link in the network, helping in evaluating the network's performance and identifying potential bottlenecks or congestion points. By assigning trips to specific routes, the model can identify the most efficient use of the transportation network and inform decisions about infrastructure improvements or traffic management strategies.

In this modelling tool, assignments for traffic and transit are undertaken using the standard Emme SOLA (equilibrium) assignment, with some changes, noted below.

### 3.4.1 Transport Vehicle Speeds

In the assignments, vehicle speeds are defined by the following functions. These functions were developed from the Halton Region model and GGHM. Not all vehicle travel time formulas are shown below, but the majority use the following equations. Walking and cycling used fixed speeds of 5 km/hr and 12 km/hr respectively while transit and automobile speeds do vary by route/road type, refer to Table 7 below.

**Table 7: Transport Mode Assumptions**

| Mode | Function | Travel Time Formulas | Unit |
|---|---|---|---|
| **Walking** | N/A | Fixed speed: length/5*60 | mins |
| **Cycling** | N/A | Fixed speed: length/12*60 | mins |
| **Car:**<br>**Local / Collector Roads** | fd30-fd43 | (length*60/speed limit) *<br>(1+4*((volume)/(lanes*capacity))^4) | mins |
| **Cars: Highways** | fd11 | (length*60/speed limit) *<br>(1+6*((volume)/(lanes*capacity))^6) | mins |
| **Transit** | ft0 | Uses average speed, which varies by line.<br>15 – 77 km/hr. Weighted average = 28 km/hr | km/hr |

### 3.4.2 Other Assumptions

Other various assumptions required for the assignment stage are shown in Table 8 below. In the below table, vehicles are defined in terms of Passenger Car Units (PCU), or equivalents of a standard car (e.g. a motorcycle in less than 1 PCU and a heavy truck is more than 1 PCU).

**Table 8: Other Assumptions**

| Item | Value | Unit | Data Source |
|---|---|---|---|
| **Car Passenger Car Units (PCU)** | 1.0 | None | ITE Manual |
| **Light Truck PCU** | 1.5 | None | ITE Manual |
| **Medium Truck PCU** | 2.5 | None | ITE Manual |
| **Heavy Truck PCU** | 3.5 | None | ITE Manual |
| **Bus PCU** | 3.0 | None | ITE Manual |
| **Motorcycle PCU** | 0.5 | None | ITE Manual |
| **Car Avenue. Occupancy** | 1.14 | | TTS 2016 survey data |

### 3.4.3 Travel Time Benefits

Travel time benefits, for cars and transit users, were calculated by applying the Rule of Half (RoH) socioeconomic theory to calculate consumer surplus. The following formula was used:

$$C.S.(RoH) = \frac{1}{2}(D_{new} - D_{BAU}) * (TT_{new} - TT_{BAU}) + (D_{BAU}) * (TT_{new} - TT_{BAU})$$

Where,

- C.S. = Consumer surplus, or travel time benefits
- D = O-D demand matrix (new or Business as Usual (BAU)), for respective mode (car or transit)
- TT = O-D travel time matrix, for respective mode (car or transit)

### 3.4.4 Calibration and Validation

This model's assignment is reused from the existing Halton Regional model and is generally assumed to be calibrated. However, 2024 counts from a variety of points in the Midtown area were available. These counts are limited in utility, as they are from a variety of time periods, data sources, and seasons. A 2024 version of the model was created by interpolating between 2016 (Base) and 2031, with the 85% COVID reduction applied, these values are shown below in Figure 11 and Table 9. Actual values (from traffic counts) are compared with modelled models; the results are reasonably close indicating a good calibration of the model.

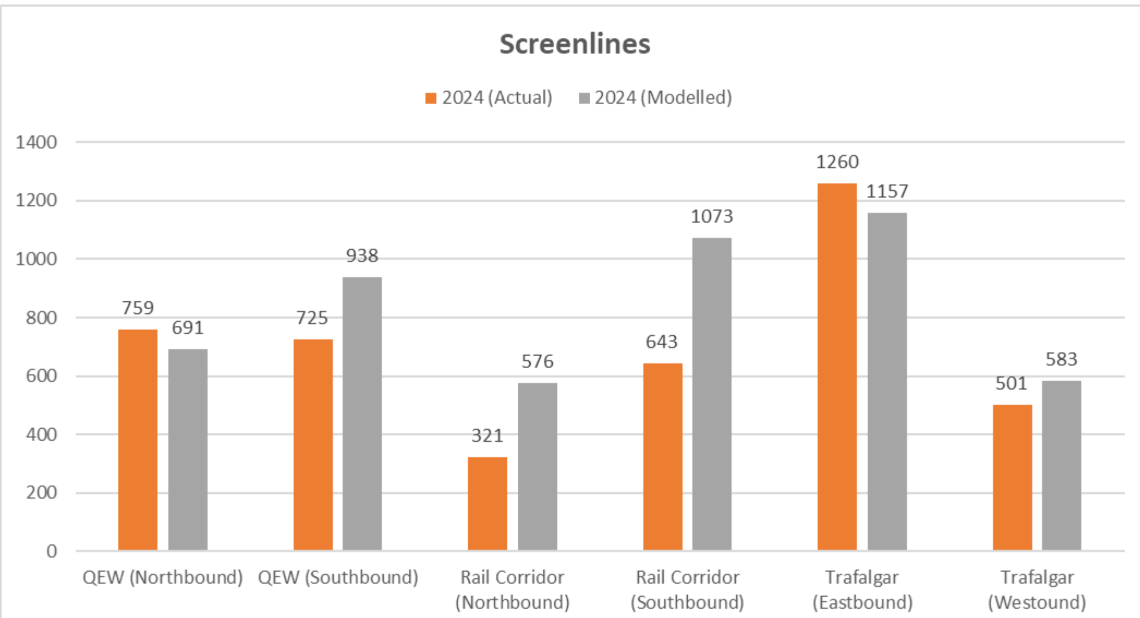



**Figure 11: Screenline Results**

Data source: Model results and traffic counts (from Town of Oakville website)

The screenline values are shown below in Table 9. In addition to the actual (counts) and modelled results, the differences by link and the Geoffrey E. Havers (GEH) values are presented. GEH values are a standard method for determining if a calibration is reasonable. A lower GEH value indicates a better (closer) match and therefore better calibration. GEH values under 5 are considered good and under 10 are considered reasonable. GEH values for screenline totals range from 4-12 while the majority of GEH for individual counts are less than 10, indicating a reasonable calibration.

**Table 9: Screenline Results**

| | Dir. | Segment | 2024 (Actual) | 2024 (Modelled) | Diff. | GEH[1] |
|---|---|---|---|---|---|---|
| **QEW** | NB | Trafalgar Road | 759 | 691 | -67 | **2.5** |

| | Dir. | Segment | 2024 (Actual) | 2024 (Modelled) | Diff. | GEH[1] |
|---|---|---|---|---|---|---|
| | SB | Trafalgar Road | 725 | 938 | 213 | **7.4** |
| **Rail Corridor** | NB | Cross Avenue | 10 | 7 | -3 | 1.1 |
| | | Trafalgar Road | 179 | 490 | 311 | 17.0 |
| | | Chartwell Road | 131 | 79 | -52 | 5.1 |
| | | **Total** | **321** | **576** | **256** | **12.1** |
| **Rail Corridor** | SB | Cross Avenue | 10 | 14 | 4 | 1.0 |
| | | Trafalgar Road | 583 | 769 | 187 | 7.2 |
| | | Chartwell Road | 50 | 290 | 240 | 18.4 |
| | | **Total** | **643** | **1073** | **430** | **14.7** |
| **Trafalgar** | EB | Argus Road | 20 | 343 | 323 | 24.0 |
| | | Cross Avenue | 545 | 322 | -223 | 10.7 |
| | | Cornwall Road | 695 | 492 | -203 | 8.3 |
| | | **Total** | **1260** | **1157** | **-103** | **3.0** |
| **Trafalgar** | WB | Argus Road | 74 | 94 | 20 | 2.2 |
| | | Cross Avenue | 74 | 117 | 43 | 4.4 |
| | | Cornwall Road | 353 | 371 | 18 | 1.0 |
| | | **Total** | **501** | **583** | **82** | **4.0** |

[1] Geoffrey E. Havers Statistic $GEH = \sqrt{\frac{2(M-C)^2}{M+C}}$

Additional locations within Midtown were also used, and the results are shown below in Table 10. As the majority of GEH are less than 10, results indicate a reasonable calibration / validation.

**Table 10: Individual Locations (Counts)**

| | Direction | 2024 Count | 2024 Modelled | Difference | GEH |
|---|---|---|---|---|---|
| Trafalgar Road and Leighland Avenue / Iroquois Shore Road | NB | 1026 | 809 | -217 | 7.1 |
| | SB | 1076 | 587 | -489 | 17.0 |
| Trafalgar Road and Cross Avenue / South Service Road | NB | 674 | 604 | -70 | 2.8 |
| | SB | 1100 | 1087 | -13 | 0.4 |
| Trafalgar Road and Cornwall Road | NB | 179 | 490 | 311 | 17.0 |
| | SB | 583 | 769 | 187 | 7.2 |
| | EB | 257 | 224 | -33 | 2.1 |
| | WB | 353 | 355 | 2 | 0.1 |

| | | | | | |
|---|---|---|---|---|---|
| Cornwall Road & Chartwell Road | NB | 131 | 79 | -52 | 5.1 |
| | SB | 50 | 82 | 32 | 3.9 |
| | EB | 296 | 196 | -100 | 6.4 |
| | WB | 222 | 60 | -163 | 13.7 |
| | | | | **GEH (<10)** | **75%** |
| | | | | **GEH (<5)** | **42%** |

# 4. Scenario Testing Overview

Several scenarios were tested using the model for different purposes. These can be broadly grouped into three categories, preliminary network testing, transportation plan solutions, and phasing/sensitivity.

## 4.1 Preliminary Road Network Elements Testing

Several network elements were brought forward from 2014 Midtown EA and Midtown Official Plan Amendment. Initial tests were completed for the 2051 horizon to understand the impacts/benefits of each network elements (i.e. the new North-South Road from Cross Avenue to White Oaks Boulevard/Trafalgar Road). The goal was to confirm the needs for each network element and investigate the need for other additional crossings.

It should be noted that at this stage, due to the concurrency of work between the Midtown Implementation Program and the Townwide Transportation Master Plan, the base model being utilized did not yet include the widening of Cornwall Road from 4 to 6 lanes as it was one of the scenarios tested in coordination with the broader Oakville Townwide Transportation Master Plan. The initial base model also included the connection of the North-South Road from Cross Avenue to Cornwall Road, though multiple iterations of with and without the rail crossing were tested. While these elements were updated for the Business-as-Usual Model, this initial base model was used for the purposes of these preliminary network tests which still helped provide the same level of understanding of the impacts/benefits of each network element.

## 4.2 Transportation Plan Network Solutions

To understand the network impacts of the proposed solutions in the Midtown Transportation Plan, each solution was modeled and compared against the Business-as-Usual scenario. Modal split parameters were adjusted for the Road Priority and Active Transportation and Transit Priority solutions to better reflect a potential future with policies/infrastructure which further support those uses.

## 4.3 Phasing and Sensitivity to Growth

Interim horizon years of 2031 and 2041 aligned with Town-wide Transportation Master Plan modelling work were also completed with the preferred road network. The goal was to understand any underutilized road links and help define a phasing strategy to accommodate Midtown's growth through the years. It was also noted from the Growth Analysis Study (Watson 2024) produced in support of the Midtown OPA, forecasted growth in Midtown may significantly differ from the Joint Best-Planning-Estimates (JBPE). While the JBPE's were used to better align with Town and Region-wide studies at the time of the review in 2023, which all collectively work with the same estimates, a sensitivity test of the Watson Forecast for 2051 was completed in 2024 to understand the potential impacts of reduced growth.

The following table illustrates all the scenarios that were tested as part of the modelling for this project.

**Table 11: Scenarios and Elements**

| Assessment | Scenario elements |
|---|---|
| Business As Usual (BAU)<br>***Scenario 2051a*** | Business As Usual:<br>▪ Carried forward from 2014 EA<br>- Royal Windsor Interchange Upgrades and Associated Links<br>- Cross Avenue Realignment and Widening<br>- North South Road – Cross Avenue to White Oaks Boulevard/Trafalgar Road with transit lanes<br>- All bus routes (where possible) along NS Road<br>▪ Network volumes from Halton Region Integrated Master Plan (IMP) Model<br>▪ 15% covid adjustment factor per Oakville TMP<br>▪ Chartwell Road Improvements (2 lane Chartwell Road same as existing)<br>▪ Speers Road/Cornwall Road 6 Lanes across study area per Town-Wide TMP Recommendations<br>▪ Cross Avenue – 4 general purpose lanes and 2 transit priority lanes<br>▪ Local road network from OPA |
| **Preliminary Road Network Elements Test** | |
| North-South Road Test<br>***Scenario 2051b*** | BAU Without N-S Road<br>▪ Removed NS Road north of South Service Road, and south of Cross Avenue<br>▪ Trafalgar Road General Purpose (GP) lanes[4] decreased from 3 to 2 pd between Iroquois and White Oaks Boulevard to accommodate transit lanes |
| West Connection – New Crossing to Kerr Street Via Cross Avenue<br>***Scenario 2051c*** | BAU with new 2 lane road connection to Kerr Street Via Cross Avenue |
| West Connection – Widening of Speers Road/Cornwall Road<br>***Scenario 2051d*** | BAU with widening of Speers Road/Cornwall Road from 4 to 6 lanes between Cross Avenue and Kerr Street |
| Exclude RWD Interchange<br>***Scenario 2051e*** | BAU without RWD interchange<br>▪ Exclude the proposed RWD interchange |
| Chartwell Scenarios - Crossing Via Chartwell Road Only<br>***Scenario 2051h*** | BAU with widened Chartwell Road to 4 lanes |
| Chartwell Scenarios - Closure of Chartwell Road | BAU with North-South Crossing of rail only and disconnection of Chartwell Road across rail tracks |

[4] General Purpose lanes refer to standard (non-restricted) travel lines.

| Assessment | Scenario elements |
|---|---|
| ***Scenario 2051i*** | |
| Chartwell Scenarios - Closure of Chartwell Road and North-South Road<br>***Scenario 2051j*** | BAU with no crossing of rail tracks at Chartwell or North-South Road |
| **Transportation Plan Network Solutions** | |
| Road Priority<br>***Scenario 2051g*** | BAU with additional road improvements<br>▪ Adjust modal split parameters to be more car oriented<br>▪ Crossing rail tracks via both Chartwell Road and North-South Road<br>▪ Crossing of 16 Mile creek via Cross Avenue |
| Transit and Active Transportation Priority<br>***Scenario 2051f*** | BAU with priority for transit and active transportation<br>▪ Adjust modal split parameters to be more transit/AT oriented<br>▪ Cross Avenue reduced to 2 lanes general purpose and 2 lanes of transit priority<br>▪ No new crossing of rail tracks, Chartwell to remain as is |
| Mix Priority<br>***Scenario 2051k*** | BAU with mix of improvements<br>▪ Segmentation of Cross Avenue<br>- 4 general purpose lanes between Speers Road/Cornwall Road and Argus Road<br>- 4 general purpose + 1 transit priority EB lane from Argus Road to Trafalgar Road<br>- 2 general purpose + 2 transit priority lanes from Trafalgar Road to North-South Road |
| **Phasing and Sensitivity to Growth** | |
| 2031 Interim Horizon | Mixed Priority (Preferred Solution) |
| 2041 Interim Horizon | Mixed Priority (Preferred Solution) |
| 2051 Population and Employment as Per OPA | Mixed Priority (Preferred Solution) with adjusted growth in Midtown for 2051<br>▪ Population and employment forecasts are per the OPA 70 supplementary Watson Report, which total to 18,500 people and 11,400 jobs. |

## 4.4 Key Findings

Results for both AM and PM peak hours for each scenario tested are shown in Section 5, however some general findings of the overall network assessment of the above scenarios include:

- The Midtown area is fairly congested particularly with major arterials into and out of Midtown including Trafalgar Road, Cross Avenue, and Cornwall Road;
- Proposed improvements have a meaningful impact on adding capacity and helping relieve existing congestion particularly along Trafalgar Road and the Trafalgar Road/QEW interchange;
- Improvements such as the North-South Road and Royal Windsor Drive interchange will help to ease capacity restrictions on Trafalgar Road and elsewhere in the Midtown area. However, due to general expected growth, vehicular capacity on Trafalgar Road (especially across the QEW) will be constrained in the future.
- The local and collector road system will function well within the Midtown area as once completed the extensive grid network will provide high route choice and connectivity; and,
- Congestion is primarily driven by a mix of existing traffic and growth beyond the Midtown area, sensitivity testing shows that Midtown's growth itself has limited impact on the congestion of major arterials.

Scenario testing results provide a base for the evaluation of alternative solutions presented in Section 6 of the Midtown Oakville Transportation Plan.

# 5. Scenario Testing Results

Several scenarios were developed to test infrastructure improvements / changes or transit route changes for a variety of proposed changes. Note that the main “base” scenario is the Business as Usual (BAU) scenario, which is not a “do nothing” scenario. The BAU represents a future scenario which includes anticipated regional road improvements including the North-South Road.

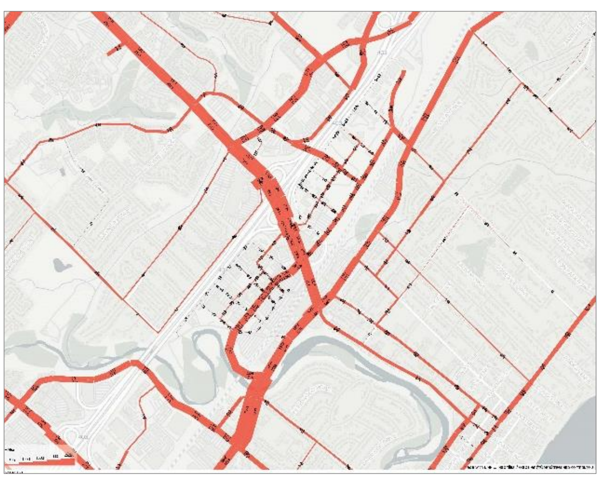
In all future scenarios, elevated Volume over Capacity (v/c) ratios can be noted throughout midtown and Oakville, especially on major arterials. In general, this is due to the Town road network being generally built, and with the impacts of new traffic demand due to population and employment growth in the Town, as well as background traffic growth, A small portion of this additional traffic is due to Midtown. The increase in traffic and resulting congestion is in line with other municipalities in the GTHA.

The results presented below are summaries of modelling results which are presented for information / validation purposes in this memo. Detailed discussions of the implications of modelled results including policy recommendations, infrastructure recommendations, phasing of infrastructure, infrastructure alternatives and benefits are discussed in the main Transportation Plan, Active Transportation, and Transit Assessment Reports.

## 5.1 Business-as-Usual

### 5.1.1 Scenario 2051a: Business-as-Usual (with North-South Road)

The results of the traffic (car) assignment are shown below in Figure 12 while the volume/capacity (V/C) ratios are shown in Figure 13, and finally transit volumes in Figure 14. Results are analyzed in Section 6.1.2.1 and Section 6.2 of the Midtown Oakville Transportation Plan.



**AM Peak**

**PM Peak**

**Figure 12: Traffic Volumes (2051a BAU)**

**AM Peak** **PM Peak**

**Figure 13: V/C Ratios (2051a BAU)**

**AM Peak** **PM Peak**

**Figure 14: Transit Volumes (2051a BAU)**

In Table 12 below, the mode shares for the AM Peak and PM peak periods are shown. The total car mode share is predicted to be in the range of 57% - 60%, which is in the range of other similar regions.

**Table 12: Mode Shares (2051a BAU)**

| | AM Peak | | PM Peak | |
|---|---|---|---|---|
| Mode | Value | Share | Value | Share |
| Car driver | 5,726 | 51% | 5,709 | 47% |
| Car passenger | 1,004 | 9% | 1,165 | 10% |
| Transit | 3,014 | 27% | 3,425 | 28% |
| Walk | 1,358 | 12% | 1,536 | 13% |
| Bike | 150 | 1% | 189 | 2% |
| Total | **11,261** | **100%** | **12,024** | **100%** |

#### 5.1.1.1 Summary of Results

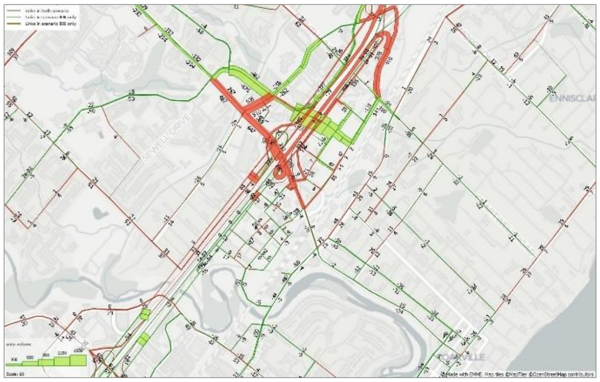
- Pockets of significant congestion can be found on Trafalgar Road especially between Leighland and Argus-Davis Road (over the QEW).
- Congestion also occurs at other pinch points including the Speers Road/Cross Avenue bridge over 16-mi Creek, and the proposed new North-South Road, to the east of Trafalgar Road.
- Transit is concentrated, generally, on the dedicated transit lanes along Cross Avenue and the new North-South Road.
- Volumes of up to 2,600 passengers per hour per direction (PPHPD) can be seen in this section.

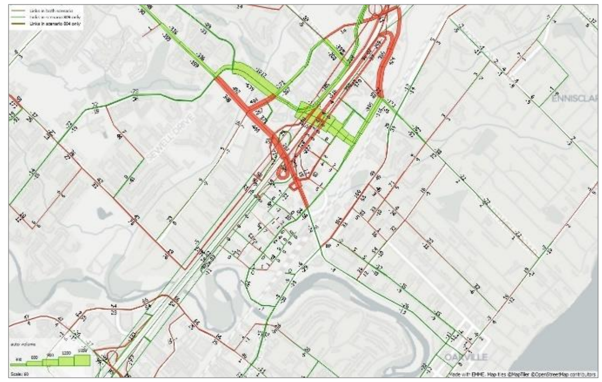
## 5.2 Preliminary Road Network Elements Testing

### 5.2.1 Scenario 2051b: Without North-South Road

In this scenario, the base network is the same as 2051a, however the North-South Road is not included. Results of a comparison between these scenarios are presented below, where green indicates less volume, and red indicates more volume. As expected, significantly more traffic will use Trafalgar Road in the scenario where the North-South Road crossing of QEW is not available, which is forecasted to be more than 1,000 vehicles in the peak direction during the peak hour.

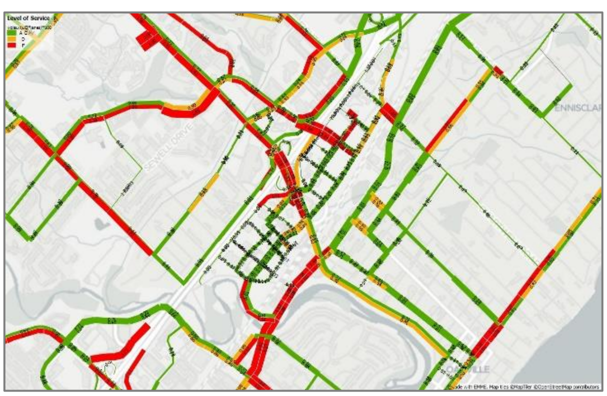
Results show a significant increase in volumes and congestion on Trafalgar Road, and therefore increased travel times. These results are analyzed in Section 6.1.2.1 and Section 6.2 of the Midtown Oakville Transportation Plan.

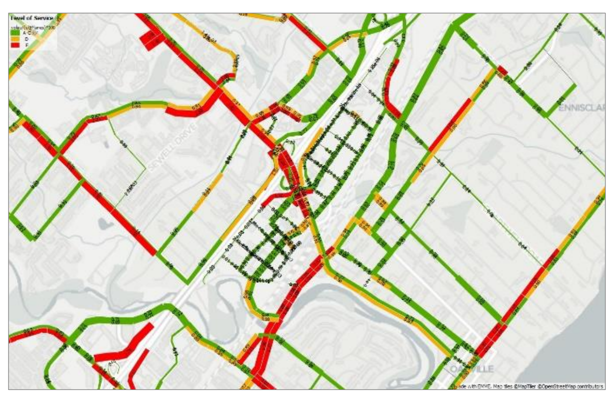




**AM Peak (Traffic Volume Comparison)** **PM Peak (Traffic Volume Comparison)**

**AM Peak (Transit Volume Comparison)** **PM Peak (Transit Volume Comparison)**





**V/C Ratio AM Peak (2051a)** **V/C Ratio AM Peak (2051b)**

**Figure 15: Comparison of Traffic, Transit Volumes and V/C ratios (2051a BAU vs 2051b)**

### 5.2.1.1 Summary of Results

- The result of not having the North-South crossing of the QEW results in 500-1,000 vehicles using Trafalgar Road in the AM peak hour, instead of the North-South crossing. Additionally, transit vehicles would be required to use Trafalgar Road, which would use General Purpose (GP) lanes as it is not possible to build dedicated lanes on Trafalgar Road in this area.

- The volume over capacity (V/C) ratio increases by up to 29% at the peak point.
- Travel speeds could decrease 20% -30% on Trafalgar Road to 12 km/hour (SB in AM Peak) or 13 km/hour (NB in PM Peak).
- Transit bus speeds (over QEW) could decrease by ~50% (to 12 km/hour).

### 5.2.2 West Connection-Related Scenarios

#### 5.2.2.1 Scenario 2051c: New Crossing to Kerr Street via Cross Avenue

In this scenario, an additional crossing of the 16-mile creek from Cross Avenue to Kerr Street has been added to provide more capacity for connections east-west within Oakville. The following images indicate that the introduction of a new crossing of 16-Mile Creek could potentially result in several benefits to the overall traffic network. The new crossing would be well-used and would attract approximately **2,000 cars** per direction per hour in peak hours. Results are also analyzed in Section 6.1.2.2 and Section 6.2 of the Midtown Oakville Transportation Plan.

**Scenario 2051a - BAU** **Scenario 2051c – New Crossing of 16mi Creek**

**Figure 16: Comparison of V/C Ratios (2051a Base vs 2051c – New Crossing of 16mi Creek) AM Peak**

**AM Peak – New Crossing of 16mi Creek**

**PM Peak – New Crossing of 16mi Creek**

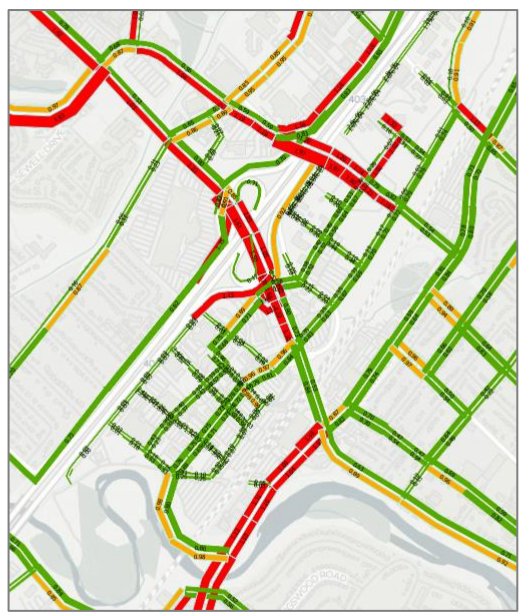
**Figure 17: Traffic Volume Comparison (2051a BAU vs 2051b – New Crossing of 16mi Creek)**

### 5.2.2.2 Scenario 2051d: Widening of Speers Road/Cornwall Road

As a potential alternative to building a new crossing over 16-mile creek, it is possible to widen the existing crossing of 16-mile creek, on Speers Road/Cornwall Road. In this scenario, the width was widened by one lane per direction.

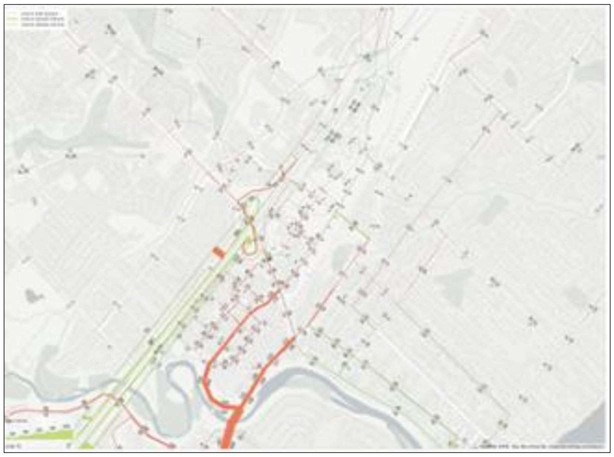
Results show that the newly widened road would attract significantly more traffic but that overall, the V/C reduces on the crossing link by about 27%, in the short term. Compared to Scenario 2051c, the V/C ratio on the Speers Road/Cornwall Road crossing of 16mi creek is reduced slightly less. Results are analyzed in Section 6.1.2.2 and Section 6.2 of the Midtown Oakville Transportation Plan.

**2051a - BAU**

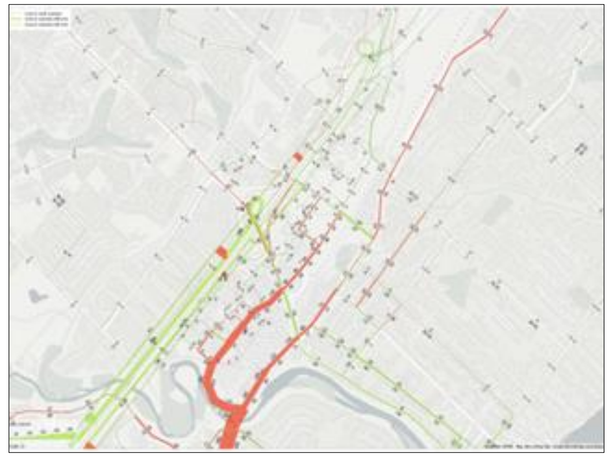


**2051d – Widening of Speers Road/Cornwall Road**

**Figure 18: V/C Ratios (Comparison of Base vs Widening of Speers Road/Cornwall Road)**



**AM Peak (2051d vs 2051a)**



**PM Peak (2051d vs 2051a)**

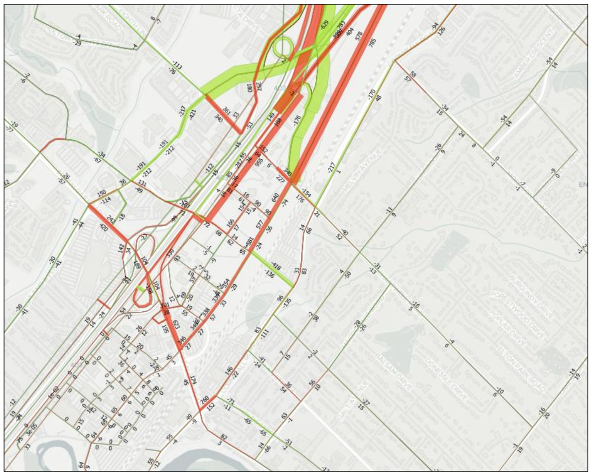
**Figure 19: Comparison of Traffic on Network (Scenario vs Base)**

#### 5.2.2.3 Summary of Results (for 2051c and 2051d)

- The V/C ratio on Speers Road/Cornwall Road crossing of 16mi creek is reduced by about 27%;
  - The auto speed would by increase significantly by 48-58% (from 9-10 km/hr in the base to 13-16 km/hr with a new crossing).
- Widening of Speers Road/Cornwall Road is slightly less effective than scenario 2051c (new crossing) at reducing congestion on the existing crossing at Speers Road/Cornwall Road;
- This analysis does not account for the significant cost which would be required from building a new connection;
- Results indicate short term changes only, and do not reflect the long-term changes to travel patterns that may occur when additional capacity is introduced in a road network; and,
- As with Scenario 2051c, in Scenario 2051d some traffic is attracted from the QEW due to the additional capacity, as through traffic. Overall, congestion increases across Cornwall Road, as more vehicles are using this road due to increased capacity.

### 5.2.3 Scenario 2051e: Exclude Royal Windsor Drive (RWD) Interchange

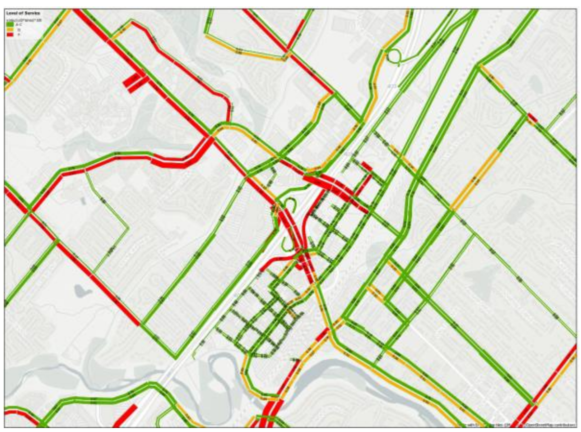
In this scenario, the Royal Windsor Drive (RWD) Interchange improvements, which are estimated to be in place by 2051, are removed to understand their impact. By removing the RWD interchange, in the AM Peak impacts are mostly local to the RWD area, with slightly more traffic on Trafalgar Road, and on local streets. However, in the PM peak, the impacts are more significant, with impacts seen on the local road network, and additionally on Trafalgar Road. Results are analyzed in Section 6.1.2.3 and Section 6.2 of the Midtown Oakville Transportation Plan.



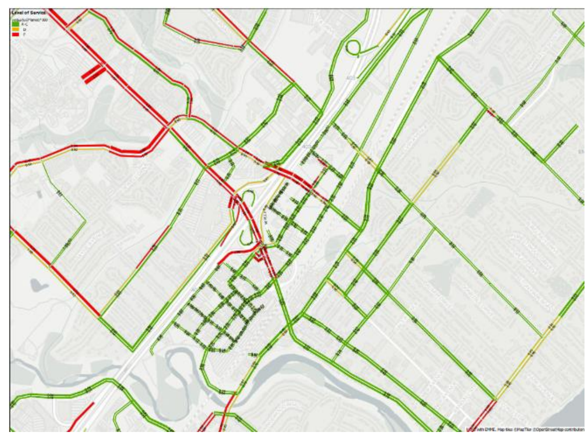
**2051e vs Base (AM Peak)**

**2051e vs Base (PM Peak)**

**Figure 20: Traffic Comparisons – 2051e (No RWD Interchange vs Base)**



**V/C Ratio Base (AM Peak)**



**V/C Ratio 2051e (AM Peak)**

**Figure 21: Traffic Comparisons – 2051e (No RWD Interchange vs Base)**

### 5.2.3.1 Summary of Results

- The removal of the interchange will significantly increase traffic volumes on the existing Trafalgar Road interchange, increasing volumes and V/C ratios;
  - Traffic on Trafalgar Road could be increased by up to 950 vehicles per direction, in the PM peak hour. Traffic on the new N-S link would also increase; and,
    - This will result in slower travel times and increased congestion.
- In general, the model does not indicate that the interchange is being used by vehicles to bypass the busy QEW highway.
- Results indicate short-term changes only, and do not reflect the long-term changes to travel patterns that may occur when additional capacity is introduced in a road network.

### 5.2.4 Chartwell Road-Related Scenarios

Results presented below are further discussed in Section 4.1.4 and Section 6.2 of the Midtown Oakville Transportation Plan.

#### 5.2.4.1 Scenario 2051h: Crossing Via Chartwell Road Only

In this scenario, the North-South Road south of Cross Avenue to Cornwall Road is not included. Chartwell Road is widened to 2 lanes per direction.

**AM Peak**

**PM Peak**

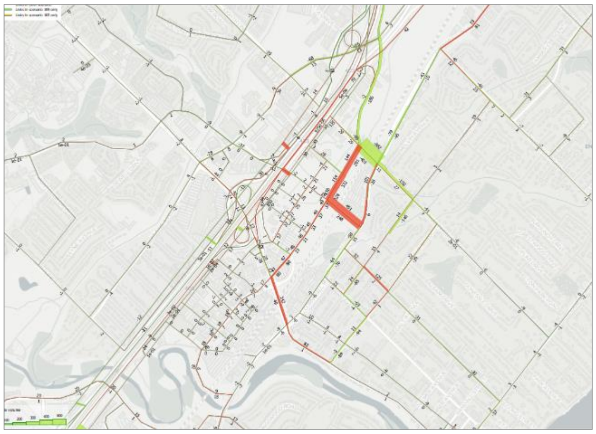
**Figure 22: Traffic Comparisons – 2051h (No-North-South South of Cross Avenue vs Base)**

##### 5.2.4.1.1 Summary of Results

- Majority of approximately 1,100 vehicles in the peak hour using the N-S road between Cross Avenue and Cornwall Road switch to using Chartwell Road, where the average speed would be reduced by about 17% (in the peak direction, southbound); and,
- Traffic on Trafalgar Road would also increase slightly.

#### 5.2.4.2 Scenario 2051i: Closure of Chartwell Road

In this scenario, Chartwell Road between Cross Avenue and Cornwall Road, is closed. North-South Road between Cross Avenue and Cornwall Road exists.



AM Peak

PM Peak

**Figure 23: Traffic Comparisons – 2051i (No Chartwell Road South of Cross Avenue vs Base)**

### 5.2.4.2.1 Summary of Results

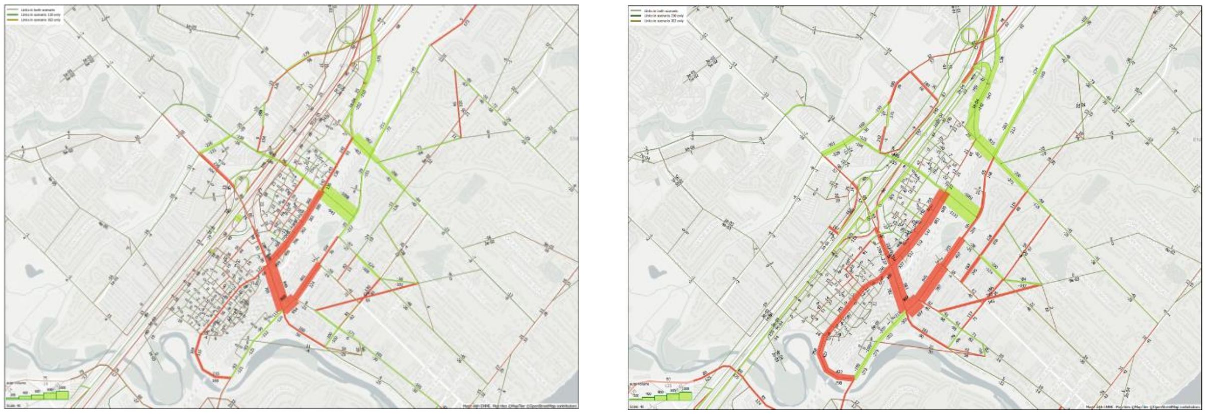
- The majority of the approximately 700 - 900 vehicles in the peak hour using the Chartwell Road between Cross Avenue and Cornwall Road switch to using the North-South, where the average speed would be reduced by about 11-30% (in the peak direction, southbound);
- In the northbound direction, the effects are less pronounced; and,
- Overall, the effects of this scenario (*2051i*) are less disruptive than scenario *2051h*;
- For reference, Table 13 below is a summary of the volumes on specific important links e.g. Chartwell Road, the North-South Road, and Trafalgar Road.

**Table 13: Summary of Volumes, V/C Ratios and Speeds (2051a, h, and i)**

| Road Name | Volume 2051a | Volume 2051h | Volume 2051i | V/C 2051a | V/C 2051h | V/C 2051i | Speed (km/h) 2051a | Speed (km/h) 2051h | Speed (km/h) 2051i |
|---|---|---|---|---|---|---|---|---|---|
| Chartwell Road SB | 312 | 1,197 | - | 0.42 | 0.70 | - | 48.54 | 40.12 | - |
| Chartwell Road NB | 925 | 1,986 | - | 1.23 | 1.17 | - | 17.05 | 18.70 | - |
| North-South Road SB | 1,129 | - | 1,299 | 0.66 | - | 0.76 | 41.86 | - | 37.28 |
| North-South Road NB | 1,136 | - | 1,579 | 0.67 | - | 0.93 | 41.68 | - | 28.66 |
| Trafalgar Road SB | 2,352 | 2,522 | 2,383 | 0.92 | 0.99 | 0.93 | 28.18 | 24.77 | 27.55 |
| Trafalgar Road NB | 1,437 | 1,485 | 1,638 | 0.56 | 0.58 | 0.64 | 44.95 | 44.34 | 42.12 |
| Cross Avenue SB | 1,713 | 1,744 | 1,719 | 1.01 | 1.03 | 1.01 | 27.64 | 26.75 | 27.47 |
| Cross Avenue NB | 1,331 | 1,326 | 1,349 | 0.78 | 0.78 | 0.79 | 41.01 | 41.23 | 40.37 |
| Kerr Street SB | 1,593 | 1,602 | 1,584 | 0.94 | 0.94 | 0.93 | 27.96 | 27.70 | 28.26 |
| Kerr Street NB | 1,585 | 1,599 | 1,601 | 0.93 | 0.94 | 0.94 | 28.20 | 27.77 | 27.71 |

#### 5.2.4.3 Scenario 2051j: Closure of Chartwell Road and North-South Road

In this scenario, both the North-South Road and Chartwell Road crossings of the rail corridor have been removed from the model. This scenario represents a situation where the North-South Road is not yet completed across the rail corridor Chartwell Road is closed instead of grade-separating it.



**AM Peak** **PM Peak**

**Figure 24: Traffic Comparisons – 2051j (No-North-South Road or Chartwell Road South of Cross Avenue vs Base)**

**AM Peak** **PM Peak**

**Figure 25: V/C Comparisons – 2051j (No-North-South Road or Chartwell Road South of Cross Avenue vs Base)**

### 5.2.4.3.1 Summary of Results

- In this relatively extreme scenario, modelled results indicate that Trafalgar Road would be significantly impacted;
  - Traffic on Trafalgar Road (South of Cross Avenue) would increase by around 950 vehicles in the AM Peak;
  - The V/C ratio would increase to 1.1, further congesting the corridor;
  - Auto (and transit) speeds would be reduced to around 35 – 40%, down to 20 – 30 km/hr from 35 – 45 km/hr; and,
- Cross Avenue would also be affected, as vehicles seek to use it to access Trafalgar Road.

## 5.3 Sensitivity Testing-Related Scenarios

Modal priority sensitivity scenarios were developed to reflect the network solutions per the Midtown Transportation Plan and provide a range of possible results. The scenarios represent possibilities with either more or less aggressive policies that would increase the transit mode share and correspondingly decrease the car mode share from between 51% (Transit/AT Priority) to 76% (Car Priority) in the AM peak. In the figure below 2051f is a scenario which represents a hypothetical future where transit is more heavily used by Midtown residents while 2051g is a scenario which represents a hypothetical future where cars are more heavily used by Midtown residents.

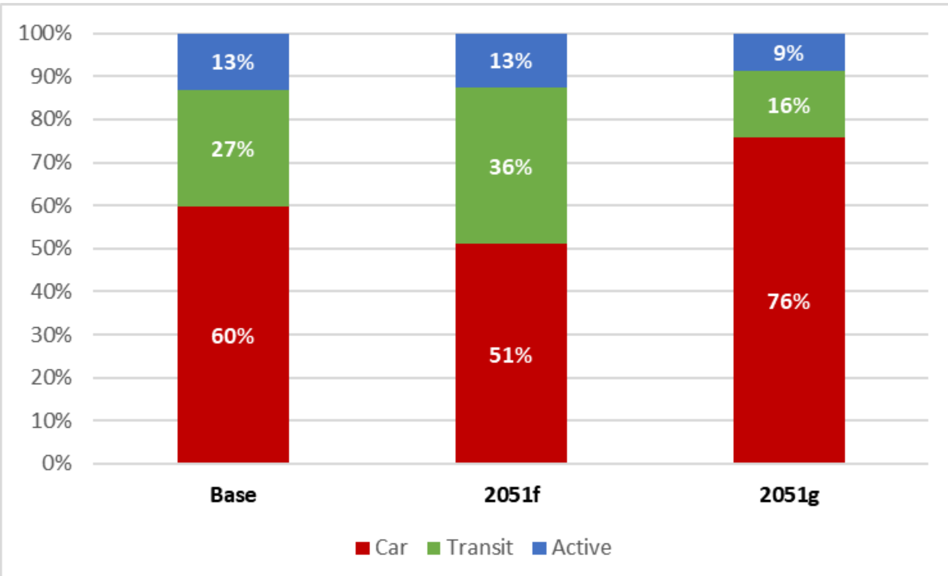



**Figure 26: Proposed Mode Shares (Sensitivities)**

### 5.3.1 Scenario 2051g: Road Priority

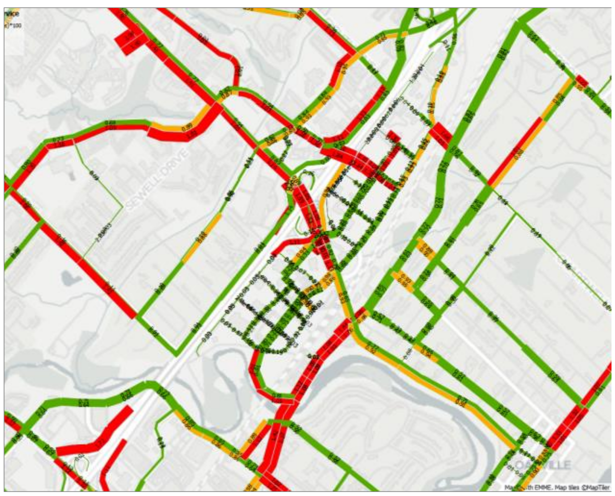
Mode share results are shown below in Table 14 and Table 17. Traffic volumes and v/c ratios comparison between this scenario and the BAU are presented in Figure 27 and Figure 28.

**Table 14: Mode Shares Change (2051g) – AM Peak**

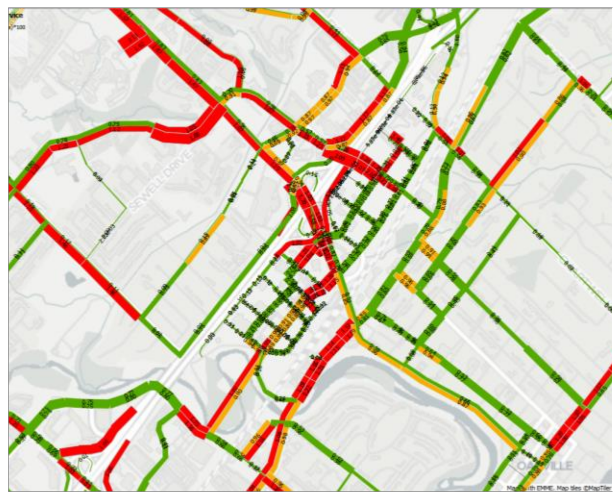
| | Base | | 2051g | | |
|---|---|---|---|---|---|
| AM Peak | Value | Share | Value | Share | Change |
| Car driver | 5726 | 51% | 7837 | 70% | 2111 |
| Car passenger | 1004 | 9% | 654 | 6% | -349 |
| Transit | 3014 | 27% | 1754 | 16% | -1261 |
| Walk | 1358 | 12% | 924 | 8% | -433 |
| Bike | 160 | 1% | 95 | 1% | -65 |

**Table 15: Mode Shares Change (2051g) – PM Peak**

| | Base | | 2051g | | |
|---|---|---|---|---|---|
| **PM Peak** | **Value** | **Share** | **Value** | **Share** | **Change** |
| **Car driver** | 5709 | 47% | 8182 | 68% | 2473 |
| **Car passenger** | 1165 | 10% | 768 | 6% | -397 |
| **Transit** | 3425 | 28% | 1891 | 16% | -1534 |
| **Walk** | 1536 | 13% | 1072 | 9% | -464 |
| **Bike** | 189 | 2% | 113 | 1% | -76 |



**Base Scenario (AM Peak)**

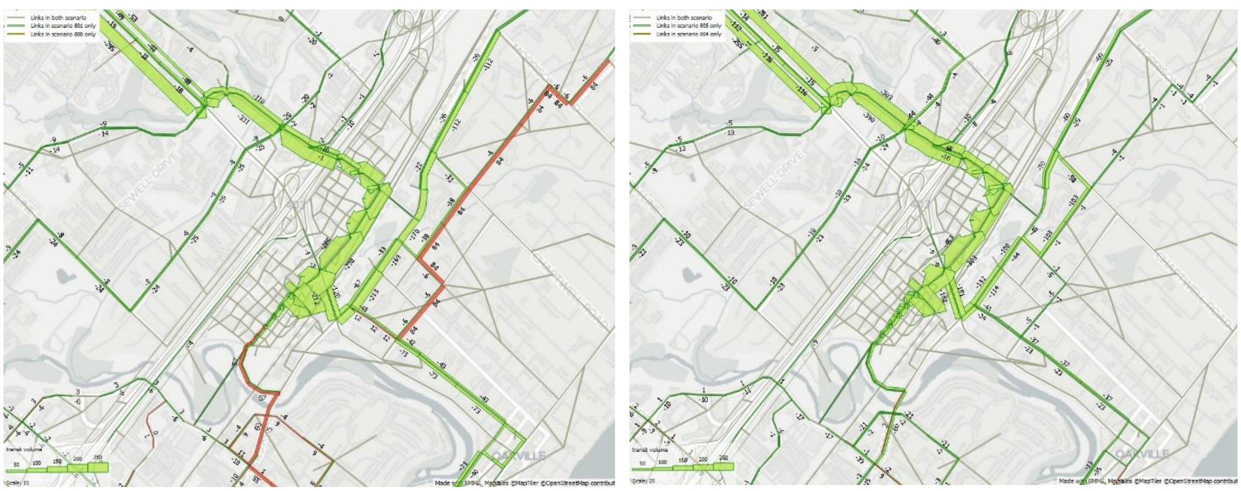


**2051g (AM Peak)**

**Figure 27: V/C ratio comparison – 2051g (Less Aggressive Transit Policies)**

**AM Peak** **PM Peak**

**Figure 28: Traffic Volume Comparison - 2051g Road Priority vs 2051a BAU**



**AM Peak** **PM Peak**

**Figure 29: Transit Volume Comparison – 2051g Road Priority vs 2051a BAU**

The figures above indicate modelled network results for sensitivity scenario 2051g.

#### 5.3.1.1 Summary of Results

- In this scenario, the transit mode share is decreased to 16% of the total demand in the AM peak, while the total car mode share (drivers and passengers) is increased to 76% (from 60%), or 16 percentage points;
- Policies aimed at Midtown only do not affect wider traffic, which is contributing to congestion in the Midtown area; and,
- Pinch points remain congested (Trafalgar Road, Speers Road/Cornwall Road).

### 5.3.2 Scenario 2051f: Transit/AT Priority

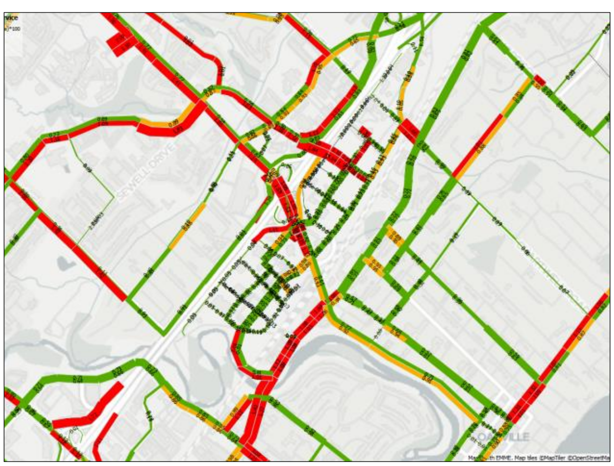
Results for mode shares are shown below in Table 16 and Table 17. V/C ratio comparisons are shown below in Figure 30 for the AM Peak only. Comparisons with the base scenario are shown in Figure 31 and Figure 32 for traffic and transit, respectively.

**Table 16: Mode Shares Change (2051f) – AM Peak**

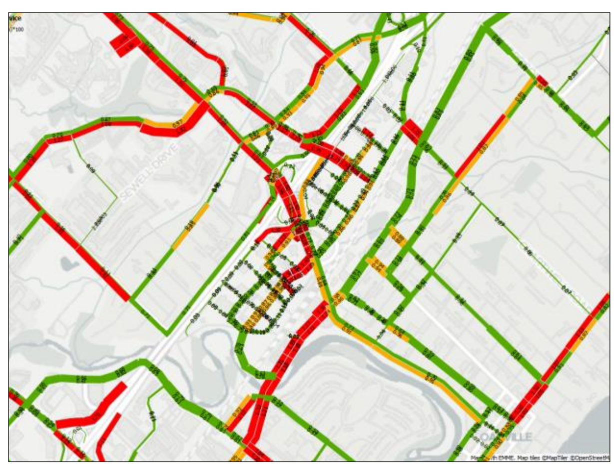
| | Base | | 2051f | | |
|---|---|---|---|---|---|
| AM Peak | Value | Share | Value | Share | Change |
| Car driver | 5726 | 51% | 4694 | 42% | -1032 |
| Car passenger | 1003 | 9% | 1061 | 9% | 58 |
| Transit | 3014 | 27% | 4038 | 36% | 1024 |
| Walk | 1357 | 12% | 1245 | 11% | -112 |
| Bike | 159 | 1% | 224 | 2% | 65 |

**Table 17: Mode Shares Change (2051f) – PM Peak**

| | Base | | 2051f | | |
|---|---|---|---|---|---|
| PM Peak | Value | Share | Value | Share | Change |
| Car driver | 5709 | 47% | 4426 | 37% | -1283 |
| Car passenger | 1165 | 10% | 1204 | 10% | 39 |
| Transit | 3425 | 28% | 4745 | 39% | 1320 |
| Walk | 1536 | 13% | 1387 | 12% | -149 |
| Bike | 189 | 2% | 260 | 2% | 71 |



**Base Scenario (AM Peak)**

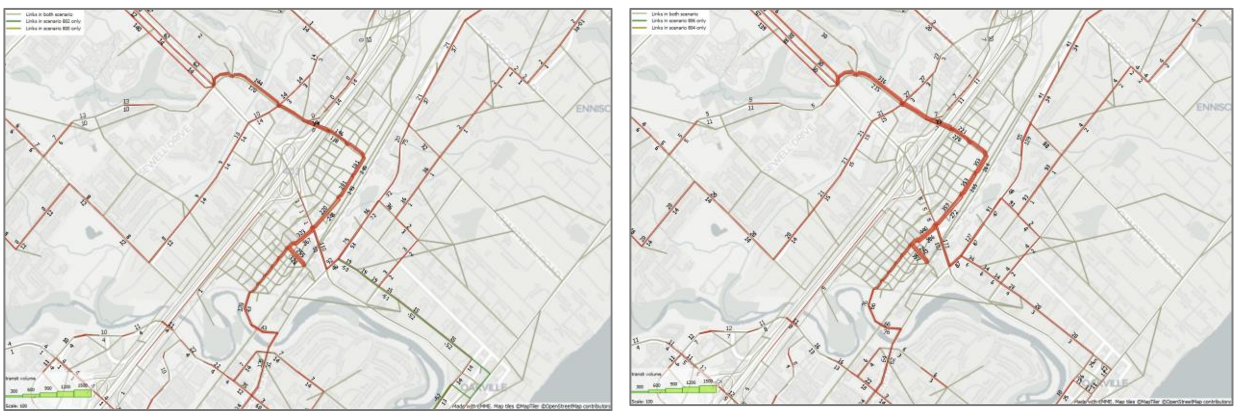


**2051f (AM Peak)**

**Figure 30: V/C Ratio Comparison – 2051f (Aggressive Transit Policies)**

AM Peak PM Peak

**Figure 31: Traffic Volume Comparison - 2051f (Aggressive Transit Policies)**



AM Peak PM Peak

**Figure 32: Transit Volume Comparison - 2051f (Aggressive Transit Policies)**

#### 5.3.2.1 Summary of Results

- In this scenario, the transit mode share is increased to 36% of the total demand in the AM peak, while the total car mode share (drivers and passengers) is decreased to 51% (from 60%), or 9 percentage points;
- Policies will result in a generalized decrease in traffic volume and improved V/C ratios across the network; and,
- Pinch points remain congested (Trafalgar Road, Speers Road/Cornwall Road).

### 5.3.3 Scenario 2051k: Mixed Priority

Results are shown below in Table 18 and Table 21. Traffic and transit volumes as well as v/c ratios comparison between this scenario and the BAU are presented in Figure 33, Figure 34, and Figure 35.

**Table 18: Mode Shares Change (2051k) – AM Peak**

| | Base | | 2051k | | |
|---|---|---|---|---|---|
| AM Peak | Value | Share | Value | Share | Change |
| Car driver | 5726 | 51% | 5724 | 51% | -2 |
| Car passenger | 1004 | 9% | 1001 | 9% | -3 |
| Transit | 3014 | 27% | 3010 | 27% | -4 |
| Walk | 1358 | 12% | 1364 | 12% | 6 |
| Bike | 160 | 1% | 160 | 1% | 0 |

**Table 19: Mode Shares Change (2051k) – PM Peak**

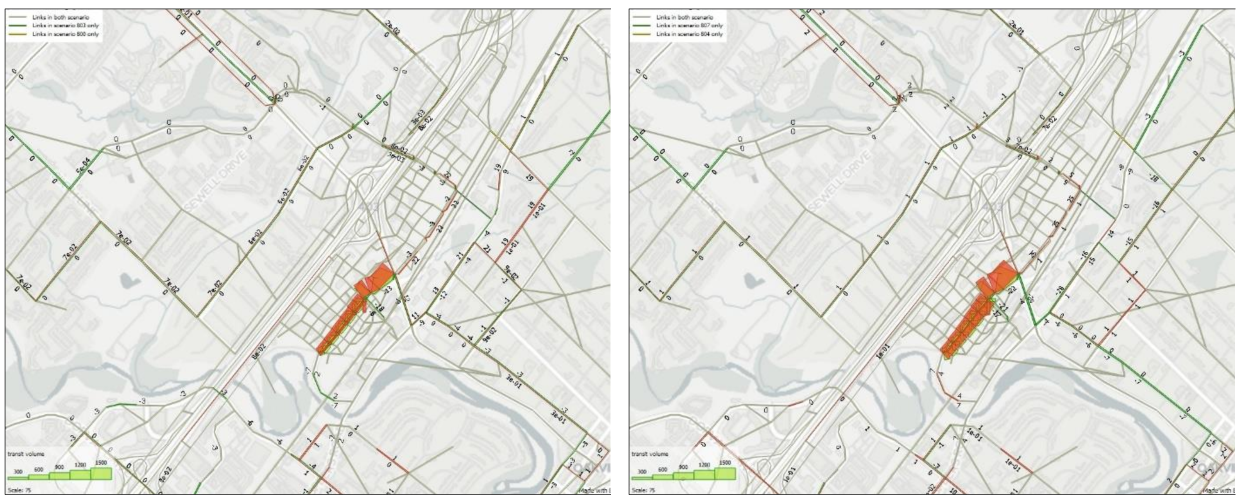
| | Base | | 2051k | | |
|---|---|---|---|---|---|
| PM Peak | Value | Share | Value | Share | Change |
| Car driver | 5709 | 47% | 5706 | 47% | -3 |
| Car passenger | 1165 | 10% | 1164 | 10% | -1 |
| Transit | 3425 | 28% | 3418 | 28% | -7 |
| Walk | 1536 | 13% | 1543 | 13% | 7 |
| Bike | 189 | 2% | 189 | 2% | 0 |

**Base Scenario (AM Peak)** **Mix Priority (AM Peak)**

**Figure 33: V/C Ratio Comparison**

AM Peak PM Peak

**Figure 34: Traffic Volume Comparison – 2051k Mix Priority vs 2051a Base**



AM Peak PM Peak

**Figure 35: Transit Volume Comparison – 2051k Mix Priority vs 2051a Base**

The figures above indicate modelled network results for sensitivity scenario 2051k.

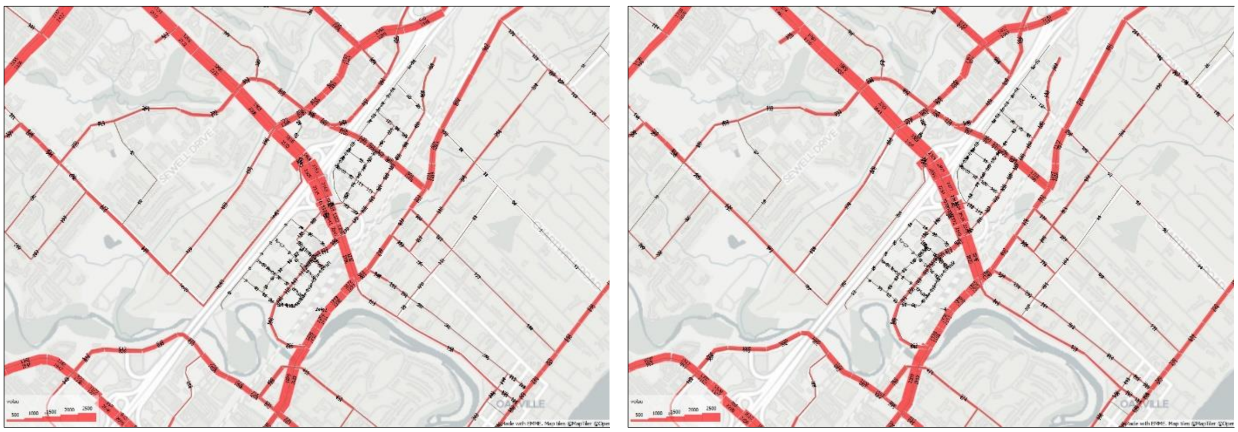
### 5.3.3.1 Summary of Results

- In this scenario, the transit and car (drivers and passengers) mode share remain almost unchanged with 27% and 51% of the total demand in the AM peak, respectively;
- Decrease in traffic volume along Cross Avenue and Trafalgar Road. Increase in traffic volume along North South Road, partially due to the closure of the Chartwell Road crossing of the railway; and,
- Pinch points remain congested (Trafalgar Road, Speers Road/Cornwall Road).

## 5.4 Phasing Related Results

### 5.4.1 2031 Interim Horizon

The results of the traffic (car) assignment are shown below in Figure 36 while the volume/capacity (V/C) ratios are shown in Figure 37, and finally transit volumes in Figure 38.

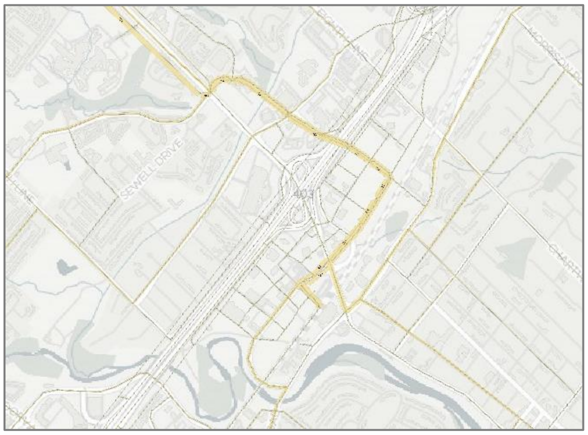


**AM Peak** **PM Peak**

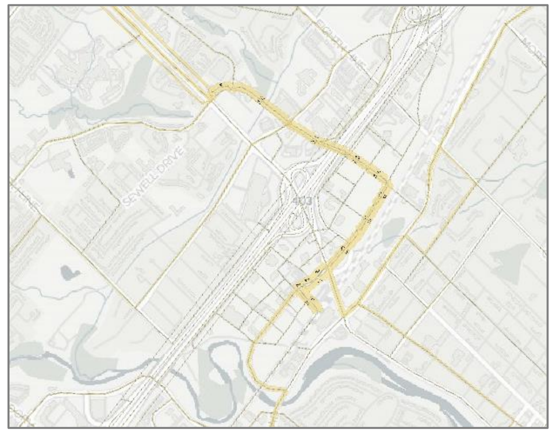
**Figure 36: Traffic Volumes**

**AM Peak** **PM Peak**

**Figure 37: V/C Ratios**



**AM Peak**



**PM Peak**

**Figure 38: Transit Volumes**

The figures above indicate modelled network results for 2031 base.

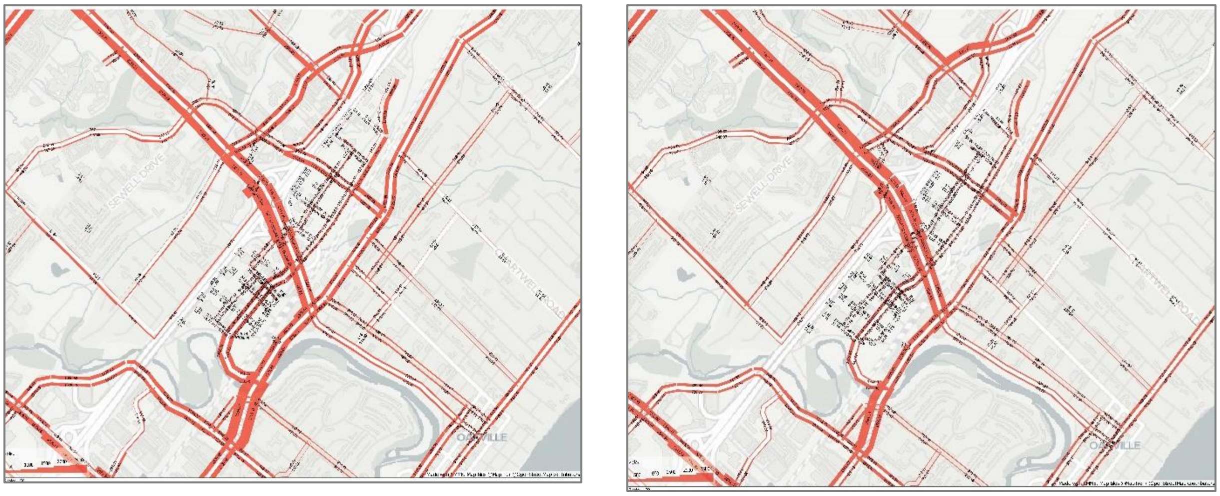
In Table 20 below, the mode shares for the AM Peak and PM peak periods are shown.

**Table 20: Mode Shares (2031 Interim Horizon)**

| | AM Peak | | PM Peak | |
|---|---|---|---|---|
| Mode | Value | Share | Value | Share |
| Car driver | 2206 | 50% | 2189 | 48% |
| Car passenger | 513 | 12% | 550 | 12% |
| Transit | 1095 | 25% | 1163 | 26% |
| Walk | 510 | 12% | 575 | 13% |
| Bike | 61 | 1% | 70 | 2% |
| Total | 4385 | 100% | 4548 | 100% |

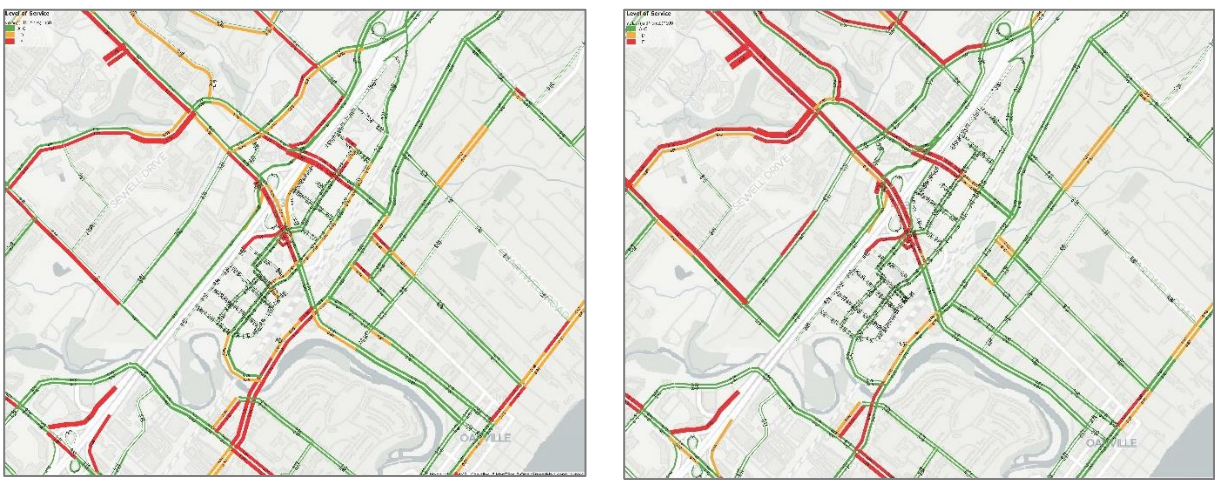
## 5.4.2 2041 Interim Horizon

The results of the traffic (car) assignment are shown below in Figure 39 while the volume/capacity (V/C) ratios are shown in Figure 40, and finally transit volumes in Figure 41.



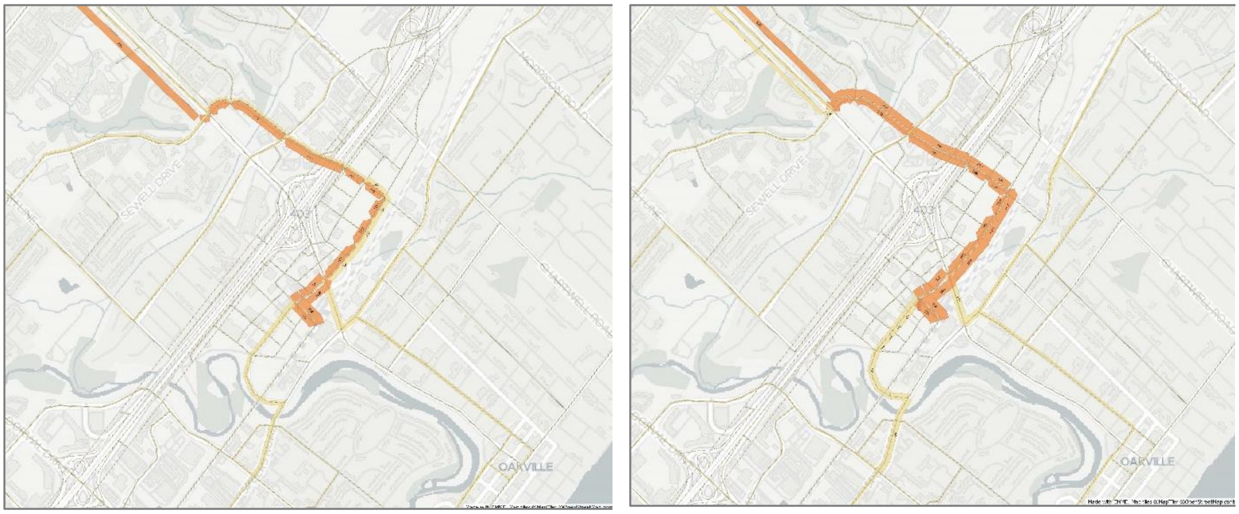

**AM Peak** **PM Peak**

**Figure 39: Traffic Volumes**




**AM Peak** **PM Peak**

**Figure 40: V/C Ratios**




**AM Peak** **PM Peak**

**Figure 41: Transit Volumes**

In Table 21 below, the mode shares for the 2041 AM Peak and PM peak periods are shown.

**Table 21: Mode Shares (2041 Interim Horizon)**

| | AM Peak | | PM Peak | |
|---|---|---|---|---|
| Mode | Value | Share | Value | Share |
| Car driver | 4356 | 52% | 4388.249 | 48% |
| Car passenger | 786 | 9% | 927.5481 | 10% |
| Transit | 2229 | 26% | 2506.723 | 28% |
| Walk | 966 | 11% | 1118.207 | 12% |
| Bike | 116 | 1% | 138.167 | 2% |
| Total | **8453** | **100%** | **9079** | **100%** |

#### 5.4.2.1 Summary of Results (for 2031 and 2041)

In general, results from the 2031 and 2041 results are similar to the 2051 base with reductions in overall demand. For a summary detailed of the results of these scenarios, which affects phasing, refer to the main Midtown Transportation Plan report.

## 5.5 2051 Population and Employment as Per Official Plan Amendment (OPA)

In this scenario, population growth in Midtown is not as much as currently anticipated in the Joint Best Planning Estimates (JBPE). Instead, this scenario is based on the population and employment forecasts as per the Official Plan Amendment (OPA) 70 Supplementary Watson Report, which total to 18,500 people and 11,400 jobs which is a reduction of 44% and 37%, respectively, these values are shown in Table 22 below. Results from this sensitivity scenario are shown below, traffic volumes in Figure 42 and v/c comparison in Figure 43. Refer to Section 3.2.1 for a detailed explanation of the differences between these population forecasts.

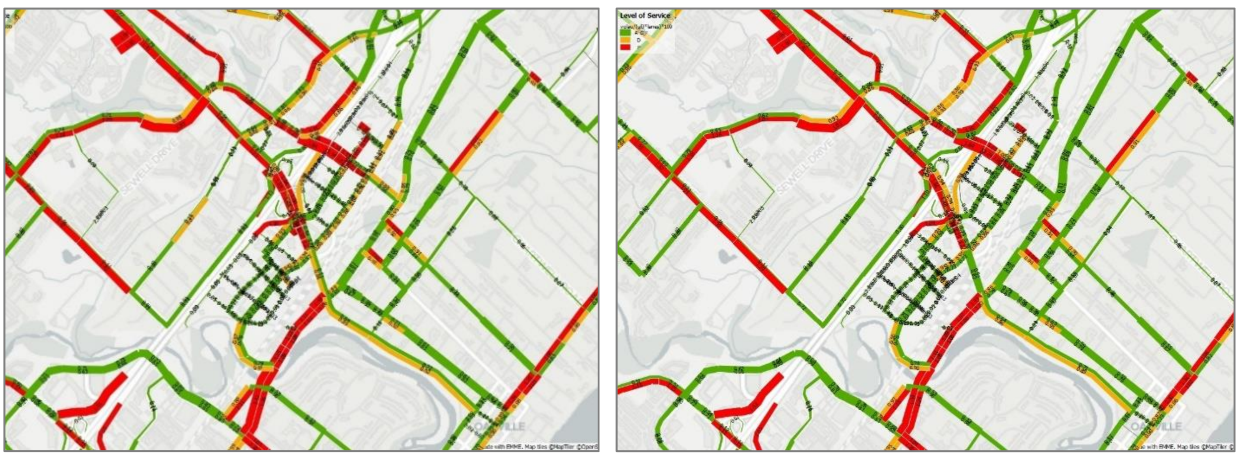
**Table 22: Population & Employment Forecast**

| | JBPE | | | | | | Watson | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2031 | | 2041 | | 2051 | | 2031 | | 2041 | | 2051 | |
| Zone | Pop | Emp | Pop | Emp | Pop | Emp | Pop | Emp | Pop | Emp | Pop | Emp |
| 201 | 755 | 256 | 1324 | 467 | 1,781 | 621 | 104 | 201 | 416 | 228 | 1,015 | 394 |
| 202 | 428 | 0 | 751 | 0 | 1010 | 0 | 59 | 0 | 236 | 0 | 576 | 0 |
| 203 | 807 | 274 | 1,416 | 500 | 1,905 | 665 | 111 | 215 | 445 | 243 | 1,085 | 421 |
| 204 | 830 | 281 | 1,457 | 514 | 1,960 | 684 | 115 | 221 | 458 | 251 | 1,117 | 433 |
| 205 | 529 | 179 | 928 | 327 | 1,248 | 436 | 73 | 141 | 292 | 160 | 711 | 276 |
| 206 | 772 | 262 | 1,354 | 478 | 1,821 | 636 | 107 | 205 | 425 | 233 | 1,038 | 403 |
| 207 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 208 | 175 | 185 | 307 | 338 | 413 | 450 | 24 | 145 | 96 | 165 | 235 | 285 |
| 209 | 467 | 158 | 820 | 289 | 1,102 | 385 | 65 | 124 | 258 | 141 | 628 | 244 |
| 210 | 389 | 132 | 682 | 241 | 917 | 320 | 54 | 103 | 214 | 117 | 523 | 203 |
| 212 | 203 | 69 | 357 | 126 | 480 | 167 | 28 | 54 | 112 | 61 | 273 | 106 |
| 213 | 341 | 116 | 599 | 211 | 805 | 281 | 47 | 91 | 188 | 103 | 459 | 178 |
| 214 | 293 | 99 | 513 | 181 | 691 | 241 | 40 | 78 | 161 | 88 | 393 | 153 |
| 215 | 244 | 83 | 428 | 151 | 576 | 201 | 34 | 65 | 134 | 74 | 328 | 127 |
| 216 | 236 | 80 | 414 | 146 | 557 | 194 | 33 | 63 | 130 | 71 | 317 | 123 |
| 217 | 686 | 232 | 1,203 | 424 | 1,618 | 565 | 95 | 182 | 378 | 207 | 922 | 358 |
| 218 | 482 | 163 | 845 | 298 | 1,137 | 397 | 67 | 128 | 266 | 145 | 648 | 251 |
| 219 | 608 | 206 | 1,067 | 376 | 1,435 | 501 | 84 | 162 | 335 | 183 | 818 | 317 |
| 220 | 0 | 2,454 | 0 | 4,483 | 0 | 5,963 | 0 | 1,925 | 0 | 2,185 | 0 | 3,777 |

| | JBPE | | | | | | Watson | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2031 | | 2041 | | 2051 | | 2031 | | 2041 | | 2051 | |
| Zone | Pop | Emp | Pop | Emp | Pop | Emp | Pop | Emp | Pop | Emp | Pop | Emp |
| 221 | 1,116 | 378 | 1958 | 691 | 2,634 | 919 | 154 | 297 | 615 | 337 | 1501 | 582 |
| 222 | 359 | 39 | 631 | 71 | 848 | 94 | 50 | 30 | 198 | 34 | 483 | 60 |
| 223 | 612 | 207 | 1074 | 379 | 1,445 | 504 | 85 | 163 | 338 | 185 | 823 | 319 |
| 224 | 555 | 188 | 974 | 343 | 1,309 | 457 | 77 | 147 | 306 | 167 | 746 | 289 |
| 225 | 504 | 171 | 884 | 312 | 1,189 | 415 | 70 | 134 | 278 | 152 | 677 | 263 |
| 226 | 1,083 | 367 | 1,901 | 671 | 2,556 | 892 | 150 | 288 | 597 | 327 | 1456 | 565 |
| 227 | 379 | 521 | 666 | 952 | 896 | 1267 | 52 | 409 | 209 | 464 | 510 | 802 |
| 228 | 491 | 166 | 861 | 304 | 1,158 | 404 | 68 | 130 | 271 | 148 | 660 | 256 |
| 229 | 273 | 93 | 480 | 169 | 645 | 225 | 38 | 73 | 151 | 82 | 367 | 143 |
| 230 | 140 | 48 | 246 | 87 | 331 | 116 | 19 | 37 | 77 | 42 | 189 | 73 |
| **Total** | 13,756 | 7,407 | 24,142 | 13,531 | 32,468 | 17,998 | 1,900 | 5,810 | 7,584 | 6,593 | 18,500 | 11,400 |

**AM Peak** **PM Peak**

**Figure 42: Traffic Comparisons – Mix Priority – JBPE vs. OPA**



**Mix Priority AM Peak (JBPE)** **Mix Priority AM Peak (OPA)**

**Figure 43: V/C Comparisons**

## 5.5.1 Summary of Results

Compared to the JBPE (base) scenario, in this scenario traffic in and around midtown would be generally reduced. However, effects are relatively minor overall.

- On Trafalgar Road, traffic reduction would be less than 250 vehicles per hour per direction in the AM peak.
- This change in population and employment would make little difference to congestion on the major corridor as the vast majority is caused by background (non-Midtown) traffic. Trafalgar Road remains congested, especially over the QEW in both directions.

# 6. Conclusions

The purpose of this memo is to summarize and document the development of the Midtown subarea model. This model was developed based on the Halton regional model and Oakville subarea model. These base models were modified by adding additional zones in the Midtown development area and by adding additional / finer grained road and transit network. In addition, trips to, from, and within the new zones in the Midtown area were generated and distributed throughout the network.

The model was validated and calibrated using a variety of data sources including the Transportation Tomorrow Survey for the Greater Toronto Area (GTA). Validation focused on the forecasted base scenario with comparison made to similar urban areas (i.e. relatively dense areas in the GTA centered on rapid transit stations or malls). In addition, the 2024 base scenario assignment was validated against on-street traffic counts (and screenline) in the Midtown area. The Midtown subarea model validated reasonably against the above-described traffic counts and data from comparable urban areas.

Base and testing scenarios networks were developed for the horizon year of 2051 and interim 2031 and 2041 years. Final horizon (2051) scenarios were generally used to plan for the final recommended infrastructure and improvements while interim years were used to determine the phasing of these improvements.

By making use of existing models with additional detail, the developed Midtown subarea transportation model represents a good compromise between accuracy and efficiency. Results from the model were used to test a variety of policy and infrastructure recommendations. The results of this testing scenarios are presented at a high level in this memo. Policy implications, infrastructure improvements including phasing of improvements for the Midtown area are discussed in detail in the main Midtown Oakville Transportation Plan and accompanying Transit Assessment and Active Transportation reports.