DOWNTOWN TORONTO CONGESTION STUDY

Final Report

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Prepared for: Toronto Region Board of Trade

225 King St W, Suite 1001
Toronto, ON M5V 3M2
parsons.com

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PARSONS

Study Background and Purpose

The Toronto Region Board of Trade (TRBOT) has retained Parsons to conduct the Downtown Toronto Congestion Study (referred to as the Study). The Study goals are to assess the **current state of traffic congestion** in downtown Toronto and explore its **root causes**. The report is structured to reflect these two main objectives; first, the current state analysis and findings are presented, followed by the root cause analysis.

Study Area and Focus

The study area consists of the City's Planning District 1, and all arterial roads and expressways within this area. As can be seen in **Figure 1**, this area covers the Downtown Toronto area.

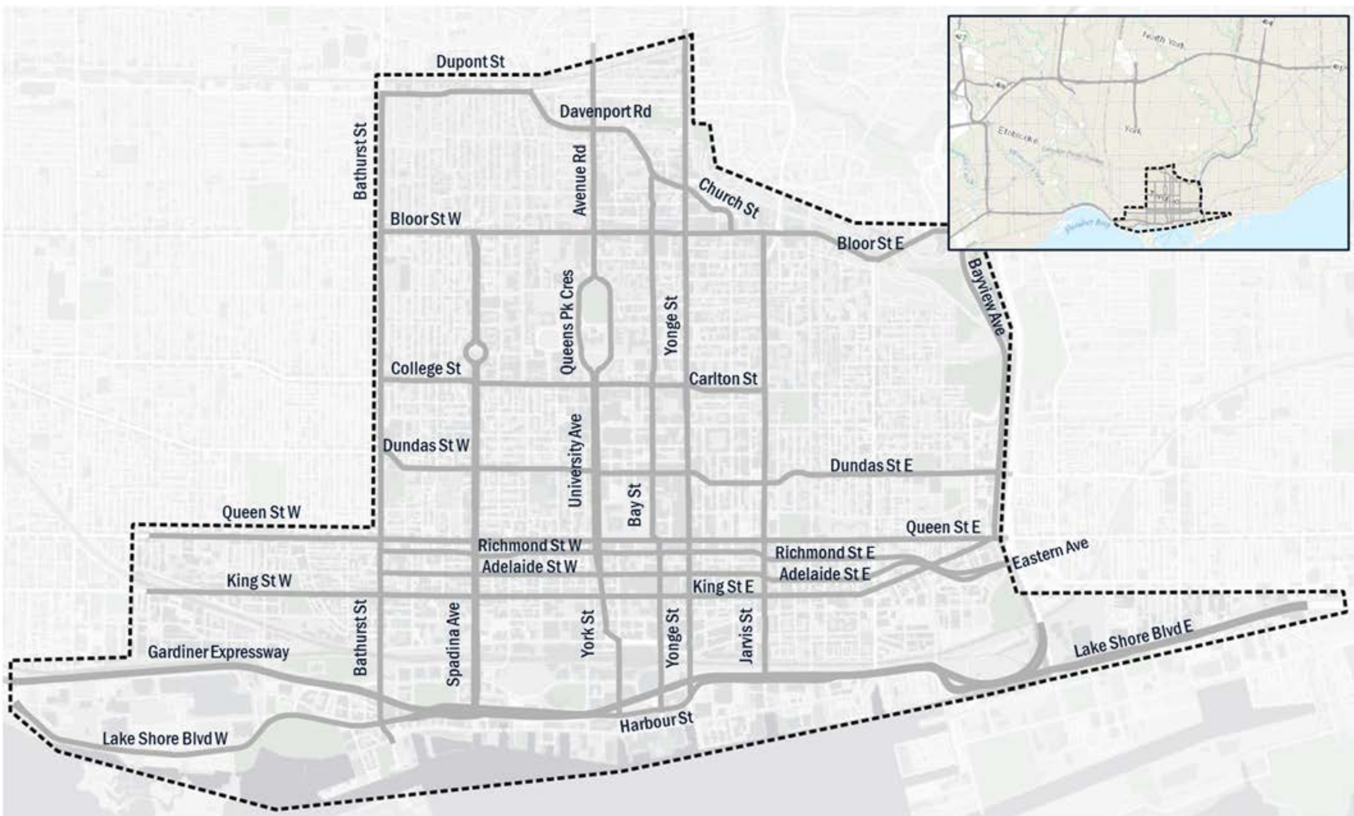


FIGURE 1 – MAP OF STUDY AREA IN DOWNTOWN TORONTO

Data Sources

The core of the analysis is based on travel time data collected by HERE Technologies, provided by the City of Toronto. HERE gathers traffic data from various sources, including connected devices (such as cell phones), personal navigation tools, and vehicle sensors. This data is aggregated from over 120 GPS providers and mapped to specific road segments, typically less than two kilometers in length.

In addition, StreetLight's vehicle volume data, specifically, Average Annual Daily Traffic (AADT) and Origin-Destination (OD) travel patterns complement the Current State Analysis. These metrics, derived from multiple data sources—such as Connected Vehicle Data (CVD), GPS Data, Commercial Truck Data, and Location-Based Services (LBS) Mobility Data—offer a comprehensive view of traffic patterns and travel behavior in the study area. Currently, StreetLight metrics are only available for 2019. An update in November 2024 by StreetLight Data will incorporate new data for 2023 and 2024, offering an opportunity to further enhance the temporal analysis.

Lastly, open-source data has been used to supplement the report and fill in the gaps where possible. Datasets heavily used include the Transportation Tomorrow Survey (TTS), Canadian Census data, and City of Toronto open data.

The sources, behavior, relationships, and reliability of datasets were thoroughly examined through data cleaning, wrangling, and validation processes to ensure accuracy and consistency for reporting and insights. The distributions and correlations among travel time, segment length, and speed align with typical patterns. Empirical analysis and statistical methods were utilized to establish thresholds for low sample sizes and remove outliers, optimizing data retention while minimizing their influence.

The dataset's granularity provides a comprehensive understanding of long-term travel and congestion patterns, effectively supporting the study objectives. While capturing day-to-day variability in travel times presents some challenges, the data remains robust and reliable for identifying significant trends and informing strategic decisions. Variations in speed data during congestion, construction, or low traffic volumes in urban areas were addressed by excluding unreliable data points. Consequently, these factors do not significantly diminish the dataset's overall utility, ensuring that the analysis remains accurate and actionable.

Definition of Congestion

Congestion is easily recognizable as streets filled with cars, trucks, and buses, and sidewalks bustling with pedestrians. Beyond the personal inconvenience it has on countless residents, congestion has broader societal and economic impacts, including increased air pollution, reduced productivity, and higher transportation costs.

At its core, congestion is understood as a state where the volume of vehicular, pedestrian, and cyclist traffic exceeds the capacity of a roadway, pathway, or transit system to handle demand at acceptable levels. This leads to reduced operational performance, resulting in longer travel times, delays, and behavioral shifts that diminish the efficiency of the transportation network.

Given the complexity of measuring congestion, this study adopts a data-driven approach tailored to the available sources, acknowledging that there is no single, universally accepted definition. Congestion is characterized through four key components in this study:

- **Severity:** The degree of congestion compared to desirable conditions. This is measured by TTI (defined further below).
- **Extent:** The proportion of the transportation network or number of travelers affected by congestion.
- **Duration:** The length of time congested conditions persist before returning to optimal traffic flow.
- **Variability:** The fluctuation of congestion at different times and days.

TTI represents the ratio of peak period travel time compared to the free flow travel time (when there is no traffic). This metric is used to measure congestion severity, which can then be used to assess the extent, duration, and variability.

$$Travel\ Time\ Index = \frac{Peak\ Period\ Travel\ Time}{Free\ Flow\ Travel\ Time}$$

Put in more simpler terms TTI measures the additional time a trip takes during peak periods compared to lighter traffic times. For instance, if an uncongested trip takes 30 minutes, a TTI of 1.5 means the same trip would take 45 minutes during peak congestion. Congestion severity levels are categorized by TTI as follows:

- **1.5 or less: Uncongested**
  - Traffic flows smoothly with little to no delays. Vehicles move at or near free-flow speeds, with no significant congestion.
  - **Example:** A trip that normally takes 30 minutes remains close to 30 minutes during peak periods.
- **1.5 - 2.0: Moderately Congested**
  - Traffic is moving, but delays are noticeable. Speeds are reduced, and travel times are moderately extended
  - **Example:** A 30-minute trip takes between 45 to 60 minutes during peak periods.

- **2.0 - 3.0: Severely Congested**
  - Traffic flow is heavily impeded, causing substantial delays. Vehicles move slowly with widespread congestion.
  - **Example:** A trip that normally takes 30 minutes takes between 60 to 90 minutes during peak periods.
- **3.0 or more: Critically Congested**
  - Traffic is near a standstill. Travel times are extremely prolonged, with stop-and-go conditions or gridlock.
  - **Example:** A 30-minute trip takes 90 minutes or more during peak congestion.

Goals of Current State Analysis

The Current State Analysis aims to answer the following key questions:

- **Where is the congestion?**
- **When does the congestion occur?**
- **How bad is the congestion?**

WHERE?

Identifying where congestion occurs is critical to understanding where congestion hotspots and critical bottlenecks occur, where to focus further analysis into root causes, and ultimately where to direct interventions and measures to alleviate congestion.

The HERE and Streetlight data covers all streets within the study area and is segmented into smaller blocks of approximately 100-200 meters. This segmentation provides highly detailed insights, enabling congestion identification at the block level allowing for a more precise understanding of congestion hotspots.

WHEN?

Identifying when congestion occurs, allows for an analysis of the peak periods when congestion is the worst. This is crucial to understanding the root causes and developing targeted interventions to alleviate congestion.

To answer this, the data has been analyzed across multiple time periods to capture varying travel patterns over the range of economic and social activities that occur in downtown. Key time periods and comparisons include:

- Comparisons between pre-COVID-19 pandemic and current conditions
- Weekday and weekend peak periods
- Daily variations

HERE travel time data was collected for 2019, 2023, and 2024 (up until the end of July). 2019 represents pre-COVID conditions, while 2023 and 2024 reflect post-COVID and current traffic states. This distinction is key to analyzing congestion, as the pandemic had drastic impacts on travel patterns. For all of the study years, hourly data was provided for both weekdays and weekends, averaged monthly. This detailed breakdown helps capture long-term travel trends and pinpoint daily congestion patterns, identifying the specific periods with the worst congestion.

HOW BAD?

Understanding the severity of congestion is crucial, as it provides a quantifiable way to assess its impact on the transportation system. This assessment helps identify critical periods, locations, and the broader implications for traffic flow in downtown Toronto.

Several congestion performance measures based on HERE data have been used to assess congestion severity, most notably the Travel Time Index (TTI), which measures the ratio of the peak period travel time to free flow travel time. Other measures include the percentage of roadway congested, number of congested hours per day, and average speed. These measures are detailed further in later sections of the report.

Goals of Root Cause Analysis

Simply put, the Root Cause Analysis seeks to answer the question, **why is there congestion?** This is critical to developing both short- and long-term remedial actions to combat congestion and improve our transportation system.

To understand the causes of congestion, our team has explored historical infrastructure trends within the City of Toronto and evaluated the changing high-level trip demand and travel patterns the city is experiencing. This was followed by an in-depth review of various potential contributors including:

- Construction
- Weather
- Special Events
- Cycling, Pedestrian, and Transit projects
- Traffic violations
- Right-of-way (ROW) impacts such as CafeTO

With these questions answered, the TRBOT can turn towards the **what** - that is, what can we do to alleviate congestion.

Current State Analysis

Study Area and Regional Travel Patterns

To understand the current congestion crisis, an understanding of the overall regional travel patterns helps shed light on the issues facing Toronto's transportation network. The City of Toronto is the epicenter of transportation within the Region: the Transportation Tomorrow Survey (TTS), the benchmark survey for transportation trends in the Greater Toronto Area and Hamilton Area (GTHA) and surrounding Regions, indicated that of all trips (all modes) made within the GTHA and adjacent regions in 2016, 32% were to Toronto, a share that rises to over 39% when looking at just work trips during the morning peak (6:00 AM to 9:00 AM). Looking more closely at downtown, Streetlight Data metrics has found that on weekdays in 2019, there were approximately 114,000 vehicle trips destined for Downtown during morning peak (7:00 AM to 10:00 AM).

39%

SHARE OF ALL MORNING COMMUTE TRIPS IN THE GTHA AND SURROUNDING REGIONS GOING TO TORONTO

These figures are dated before the pandemic, but despite a downturn in trips during the pandemic, more and more residents within the GTHA are now commuting to work. Census Canada data has revealed that the number of car commuters in the Toronto Census Metropolitan Area (CMA) in May 2023 surpassed 2016 levels, a remarkable rebound after the pandemic. This has been driven in part by the return to work; the share of employed Canadians who usually work from home has been declining, from 24.3% in 2021 to 20.1% in 2023.

The return to work is coupled with the substantial population increase the GTHA has experienced in recent years; from 2021 to 2023, the region added over 687,464 residents, an increase of 9.4%. Much of this growth has been bolstered by the regions surrounding Toronto; Durham, Peel, York, and Halton, which accounted for over 320,000 of the new residents. As traditional commuter regions, these regions contribute significantly to the travel demand to Toronto. Of the 114,000 vehicle trips destined for downtown discussed above, 20% came from Durham, Peel, York, and Halton. Despite this, the majority of downtown vehicle trips still originate in Toronto as illustrated in **Figure 2**. These patterns are mirrored in both the outbound weekday PM peak trips (rush hour) and inbound and outbound trips during the weekend peak.

Lastly, mode share plays an important role in regional travel patterns, and as expected, the majority of trips within the GTHA are done by vehicle; the 2016 TTS indicated that 73% percent of trips were made by vehicle. There are, however, substantial regional differences, the most prominent being Toronto compared to the surrounding regions as illustrated in **Table 1.**

TABLE 1 – 2016 AND 2021 GTA MODE SHARE BY MUNICIPALITY (SOURCE: STATISTICS CANADA CENSUS 2024)

	2016		2021	
	Car (as driver or passenger)	**Sustainable and Other (Transit or Active Transportation)**	**Car (as driver or passenger)**	**Sustainable and Other (Transit or Active Transportation)**
Toronto	50.4%	49.5%	61.0%	39.1%
Durham Region	84.4%	15.6%	89.1%	10.9%
York Region	83.7%	16.3%	88.8%	11.2%
Peel Region	81.1%	18.9%	85.0%	15.0%
Halton Region	84.5%	15.6%	88.8%	10.2%

Toronto's highly urbanized and dense form, rapid transit system, and better access to cycling infrastructure allows residents to utilize sustainable modes at a much higher share compared to the surrounding regions, where the more suburban form leads to larger car dependency.

It can also be seen that in 2021, the mode share of cars increased – this can be attributed to the pandemic; the more accurate picture of regional mode share is the 2016 figure. This is supported by recent Stats Canada and TTC Ridership figures; from 2021 to 2023 the proportion of commuters using transit in Toronto rose by 5%, while daily ridership rose by 102%. Despite the rebounding transit ridership, driving is still the predominant mode for trips made within the GTHA.

All of these factors, and many more to be investigated later in the **Root Cause Analysis**, have combined to create a regional and local transportation system that is struggling to adapt to the growing and changing demand. Downtown is a prime example of this shortfall, where congestion, bottlenecks, and unreliable trips times have led to Toronto being ranked as one of North America's most congested cities.

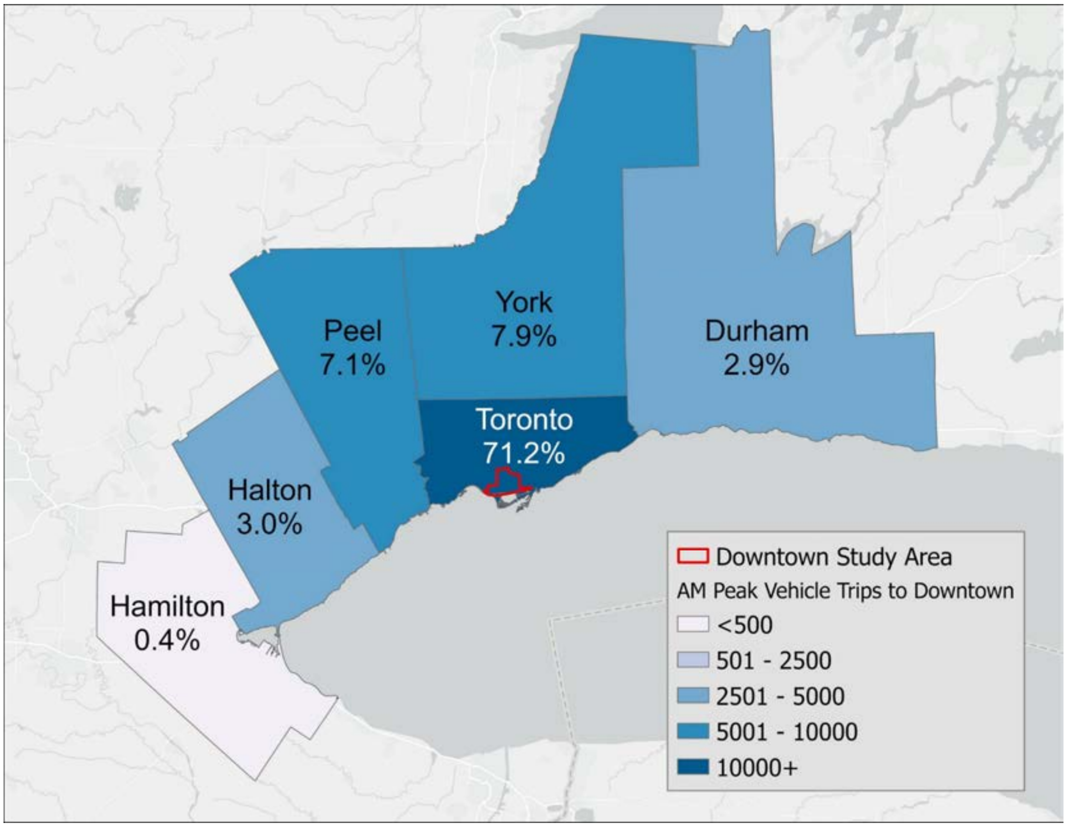


FIGURE 2 – 2019 SHARE OF AM PEAK PERIOD (7AM TO 10AM) VEHICLE TRIPS TO DOWNTOWN (SOURCE: STREETLIGHT DATA 2024)

Congestion Trends

This section evaluates the performance of the system as a whole, including all roads in the study area, for pre- and post-COVID periods. Various performance measures, including the Travel Time Index (TTI) and average speed, have been used to assess congestion trends. The analysis addresses questions such as how traffic has recovered post-COVID, how recovery patterns vary during specific peak periods, and how the system has performed overall post-COVID.

The findings indicate changes in traffic patterns between the pre- and post-COVID periods, including shifts in peak congestion times, increases in congested roads, and growing variability of congestion.

DOWNTOWN STUDY AREA CONGESTION TRENDS PRE- AND POST-COVID

Severity - As shown by the **Figure 3**, the TTI from January 2023 to July 2024 has either matched or exceeded pre-COVID 2019 levels across all peak periods, illustrating traffic recovery post-COVID. While the weekday AM peak period has shown only a marginal increase in congestion, the weekday PM peak and weekend mid-day peak have seen more significant uptick. For example, a trip that took 30 minutes during the weekday PM peak in 2019 now takes approximately 33 minutes post-COVID.

Extent - Congestion-prone areas have remained largely consistent before and after COVID, with significant congestion in the Financial District, Waterfront, and Yonge-Bloor areas, as shown in **Figure 8**. However, the proportion of roads experiencing severe and critical congestion in these areas has increased, as shown in **Figure 5**. This increase is most pronounced during the weekday PM and weekend mid-day peaks, where nearly one-fourth of the study area's roads experience severe or critical congestion.

Duration - Figure 4 shows that the duration of congestion has increased after COVID, with the system experiencing more hours of moderate congestion on both weekdays and weekends. **Figure 6**, which illustrates the 24-hour TTI trend, shows that the weekday PM peak remains the most congested period post-COVID. Additionally, the weekend mid-day peak has now surpassed the weekday AM peak in severity, indicating a shift in travel behavior and contributing to the widening gap between these periods.

Variability - Figure 7 presents the 24-hour speed profile for major arterials, excluding the Gardiner Expressway due to its distinct speed characteristics compared to other Downtown Toronto streets. The figure shows a decline in both average speeds and the 5th percentile speeds post-COVID. The 5th percentile speeds represent the slowest 5% of observed traffic speeds, indicating the most extreme congestion conditions, where traffic is significantly slowed or even gridlocked. This increased variability in lower-bound speeds indicates a growing severity and unpredictability of congestion since the pandemic, contributing to less reliable travel conditions. Furthermore, the increase in extreme congestion events, as indicated by lower speeds, has become more frequent and is causing road users to become increasingly frustrated, leading to a rise in complaints and an overall sense of unacceptability.

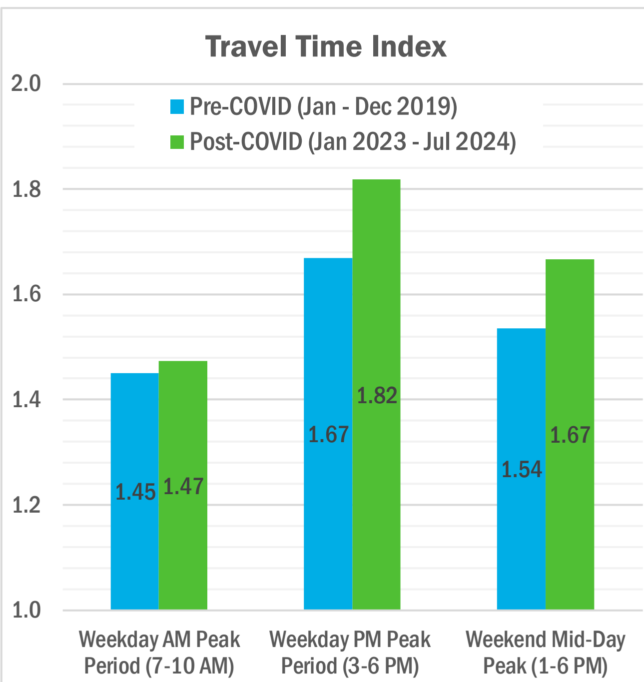


FIGURE 3 – TRAVEL TIME INDEX – DOWNTOWN TORONTO EXPRESSWAYS & MAJOR ARTERIALS (SOURCE: HERE TRAVEL TIME ANALYSIS)

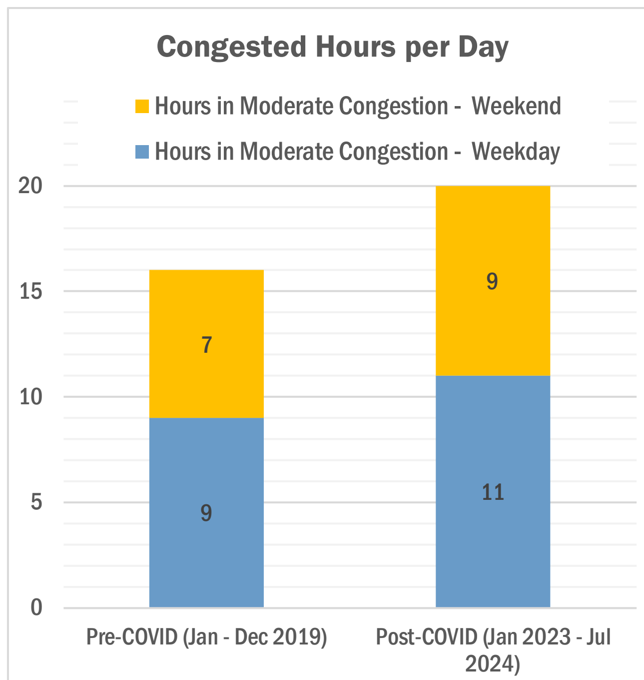


FIGURE 4 – CONGESTED HOURS PER DAY – DOWNTOWN TORONTO EXPRESSWAYS & MAJOR ARTERIALS (SOURCE: HERE TRAVEL TIME ANALYSIS)

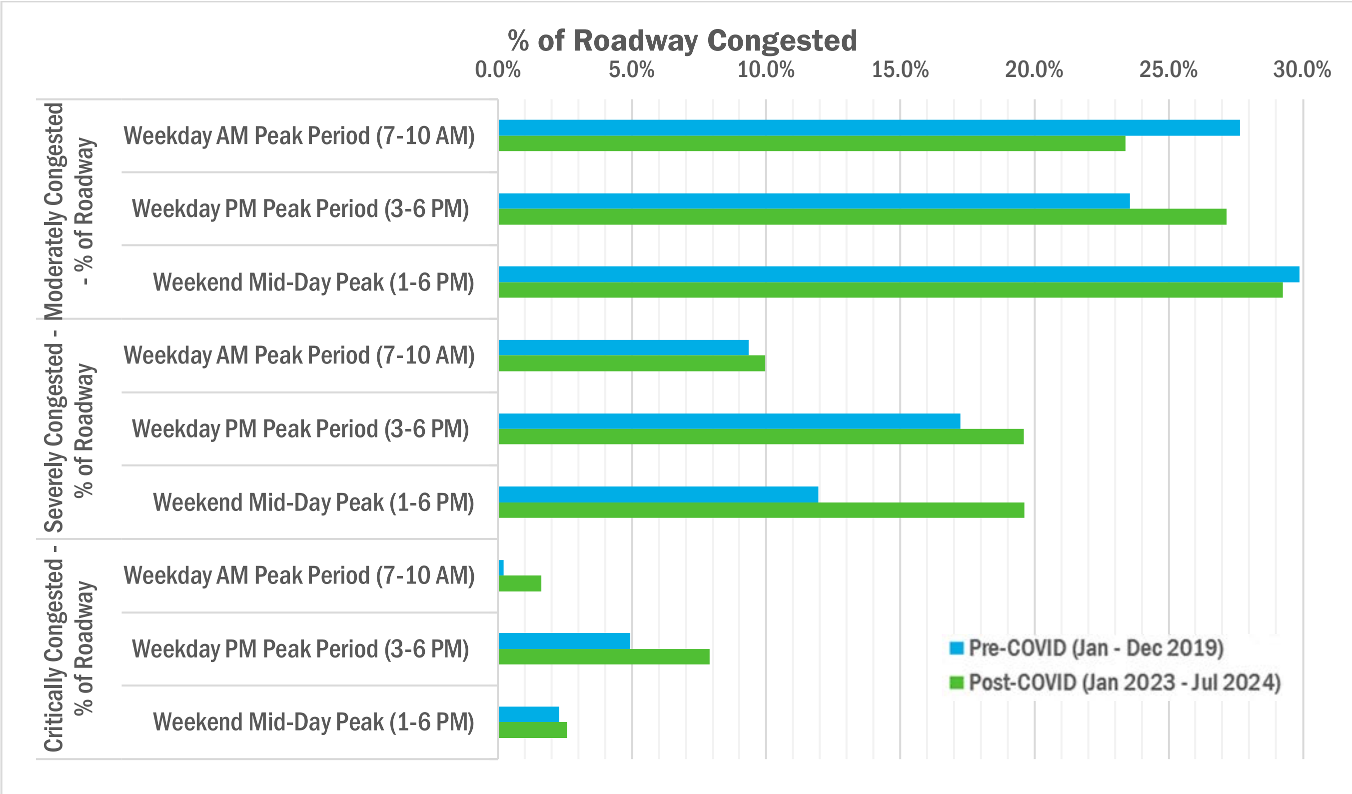


FIGURE 5 – PERCENTAGE OF ROADWAY CONGESTED – DOWNTOWN TORONTO EXPRESSWAYS & MAJOR ARTERIALS (SOURCE: HERE TRAVEL TIME ANALYSIS)

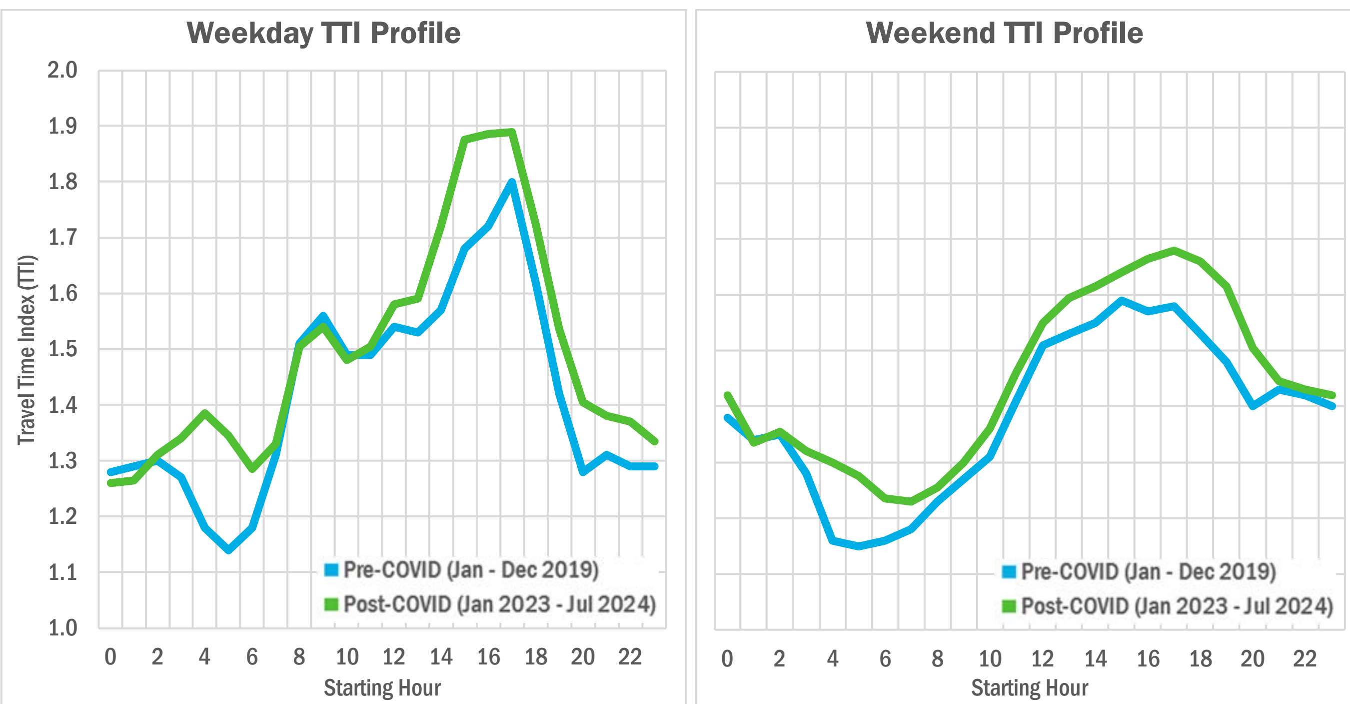


FIGURE 6 – TRAVEL TIME INDEX PROFILE – DOWNTOWN TORONTO EXPRESSWAYS & MAJOR ARTERIALS (SOURCE: HERE TRAVEL TIME ANALYSIS)

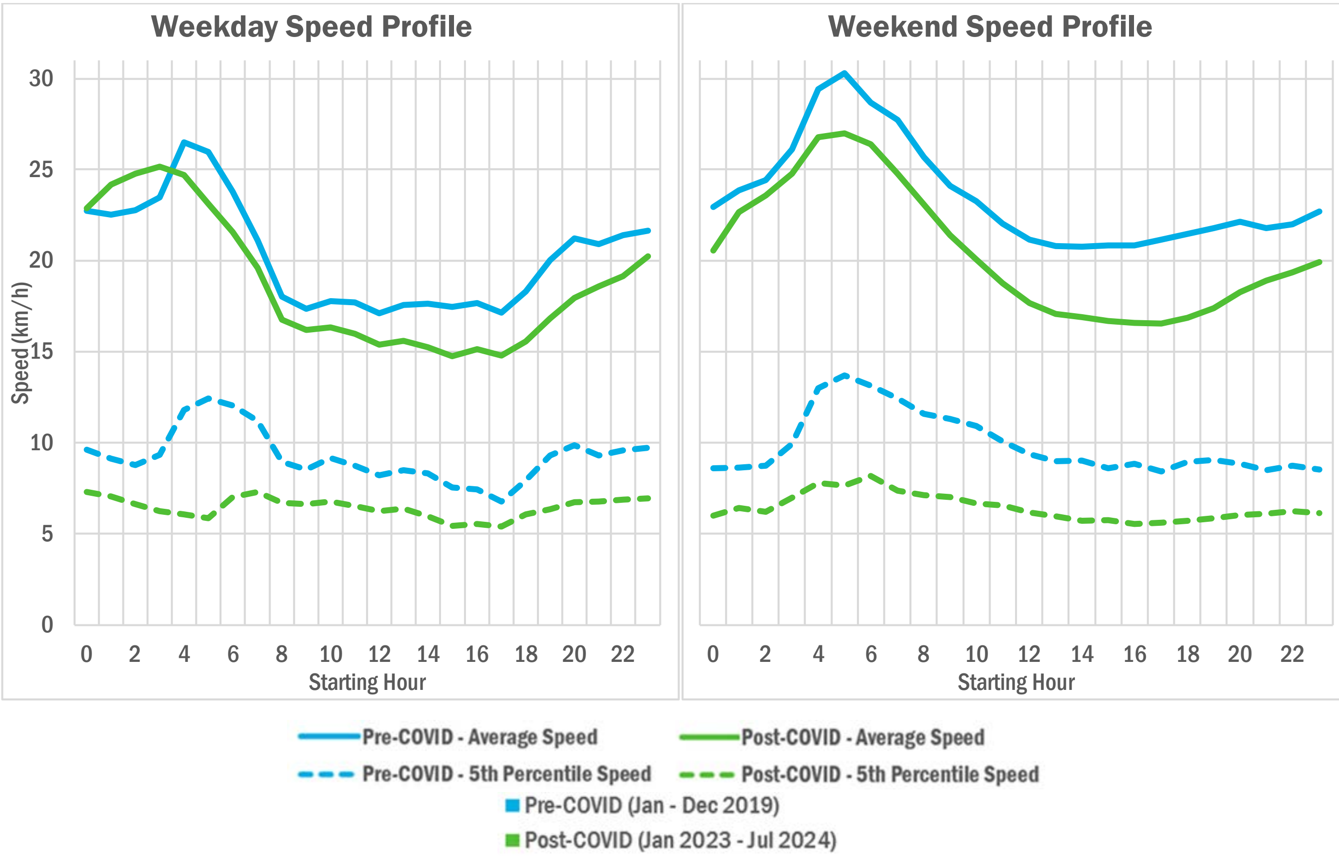


FIGURE 7 – SPEED PROFILE – DOWNTOWN TORONTO MAJOR ARTERIALS (SOURCE: HERE TRAVEL TIME ANALYSIS)

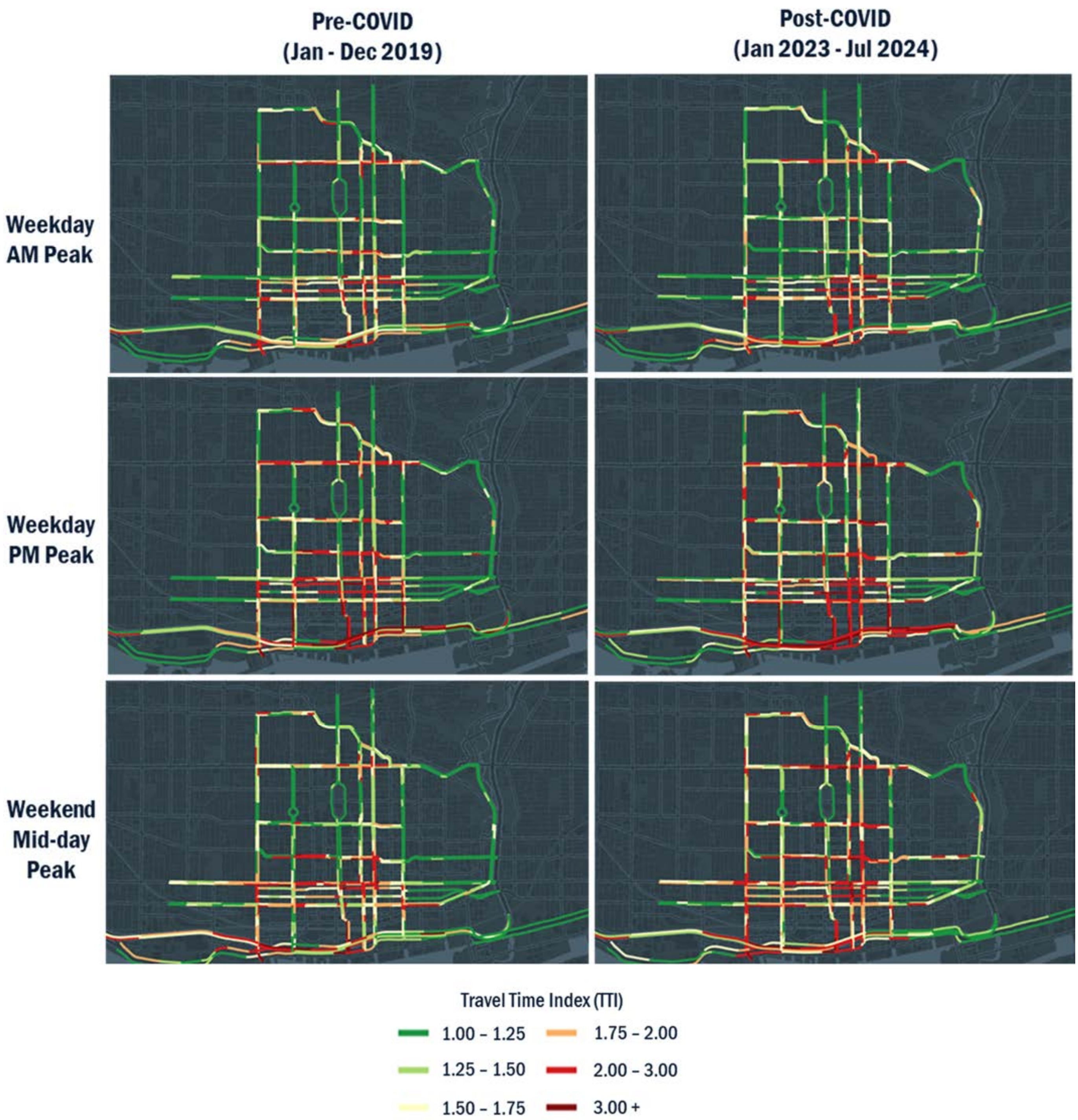


FIGURE 8 – PEAK PERIODS TRAVEL TIME INDEX – DOWNTOWN TORONTO (SOURCE: HERE TRAVEL TIME ANALYSIS)

Current State of Congestion

With a clearer understanding of system-wide congestion trends before and after COVID, a more detailed analysis of the current state of congestion has been undertaken. The analysis includes only the post-COVID periods of 2023 and 2024 and has identified the congested corridors and bottlenecks which have the most impact on the traffic flow and performance of the downtown road system.

METHODOLOGY FOR RANKING CORRIDORS

For this analysis, travel time data alongside a weighted impact score methodology has been used to rank corridors based on several key criteria:

1. **Importance (25%)**
   This considers each corridor's daily traffic volume and surface transit ridership. Roads with higher levels of people movement receive a higher priority, reflecting the broader impact of congestion on all users, including those in transit vehicles, automobiles and trucks.
2. **Severity (25%)**
   Congestion severity is measured using TTI during peak periods, specifically the weekday AM peak period (7-10 AM), weekday PM peak period (3-6 PM) and weekend mid-day peak period (1-6 PM). The peak periods were derived from system level analysis.
3. **Extent (25%)**
   This assesses how much of the corridor is affected by congestion. Corridors with longer stretches of persistent congestion are ranked higher as they influence a larger portion of the network.
4. **Duration (25%)**
   Duration of congestion reveals how long the congestion persists on the corridor before it returns to normal. Corridors experiencing prolonged congestion receive higher score due to their substantial impact on travel times and system reliability.

The weighted impact score totals up to 100 points, with each criterion contributing a maximum of 25 points. Importance is based on daily traffic volume and corridor surface transit ridership, with corridors carrying the most people receiving full points, while those with minimal traffic score zero. For severity, extent, and duration, corridors with the highest TTI, longest lengths of severely or critically congested segments, and most hours per day experiencing severe congestion score the highest, while those with the lowest values receive zero. This approach provides a well-rounded assessment for identifying the corridors most heavily impacted by congestion and which have the largest impact on the network as a whole.

TOP CONGESTED CORRIDORS

Figure 9 shows the result of the ranking, highlighting the top five congested corridors:

1. **Gardiner Expressway** is identified as the top congested corridor, reflecting its significant impact on downtown Toronto's transportation network. It scores double than that of other corridors, attributed to its high traffic volume, severe congestion, broad extent, and long duration of congestion.
2. **King St** ranks second, due to its high surface transit ridership and moderate to severe level of congestion. Even minor increases of congestion on this corridor can have a magnified impact due to its role in providing important surface transit connection between major destinations and economic hubs.
3. **Bloor St** is noted for having the most severe congestion in terms of severity, extent, and duration among the major arterials. Although it lacks regular daytime surface transit service, its traffic volume is comparably higher than other major arterials in downtown core.
4. **College St – Carlton St** faces similar challenges to King St, with significant streetcar ridership and high congestion severity. A number of locations see moderate to high congestions along the corridor.
5. **Queen St** features one of the most critical streetcar routes in downtown Toronto, with the second-highest surface transit ridership in the study area. While its congestion severity may not be the highest among arterials, the broad extent of congested areas means that both transit riders and drivers experience significantly longer travel times across various locations.

Detailed ranking of the results for each criterion can be found in **Figure 10, Figure 11, Figure 12,** and **Figure 13.** Discussion on specific bottleneck locations can be found in **Congestion Bottlenecks** section.

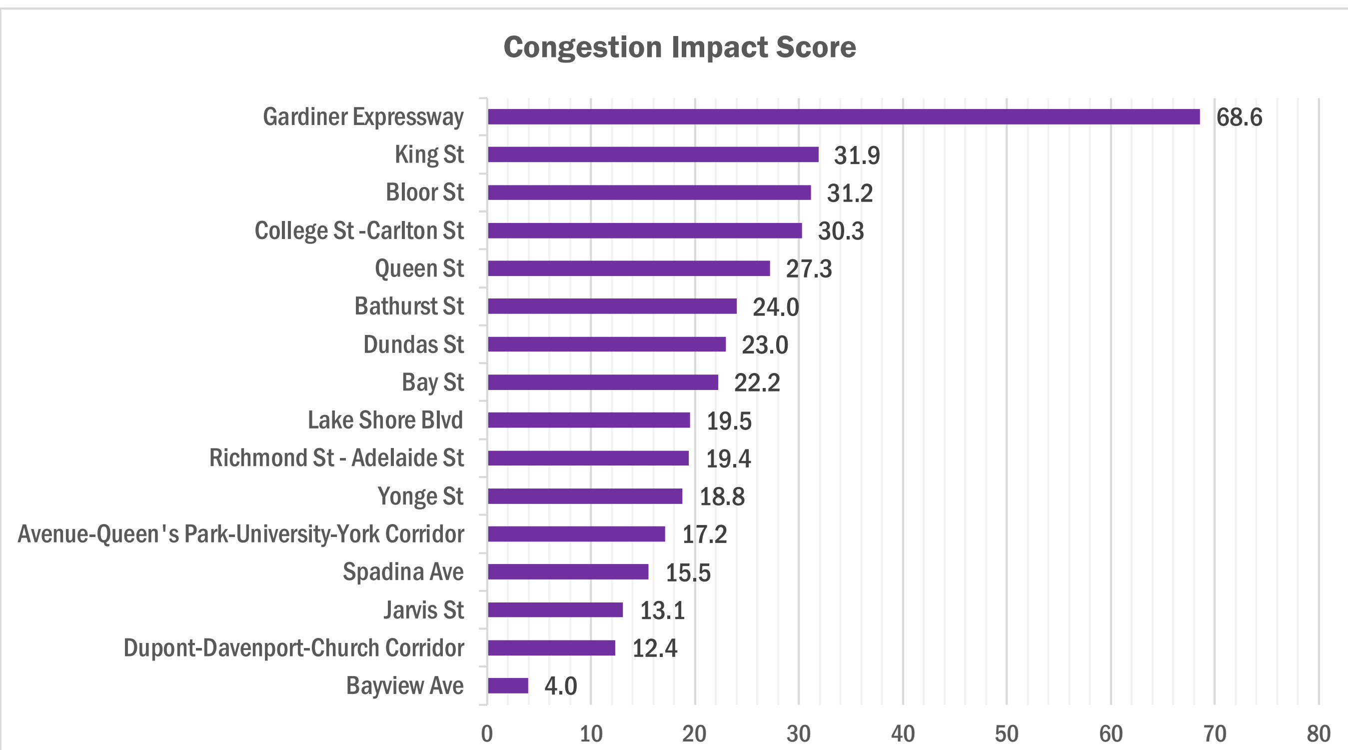


FIGURE 9 – CONGESTION IMPACT SCORE (SOURCE: BASED ON HERE TRAVEL TIME ANALYSIS AND OTHER SOURCES, JANUARY 2023 TO JULY 2024)

A closer look at of each aspect of congestion—importance, severity, extent, and duration provides a deeper understanding of the specific factors contributing to their ranking.

Importance

In terms of **Importance (Figure 10),** Gardiner Expressway stands out due to its heavy traffic volume, far exceeding other corridors. On major arterials like King St and Queen St, transit ridership accounts for the overwhelming majority of people movement, emphasizing the critical impact congestion has on public transit users. Major arterials without significant transit ridership, such as Bloor St and University Ave, either are subway corridors or rely on adjacent streets for transit services.

Severity

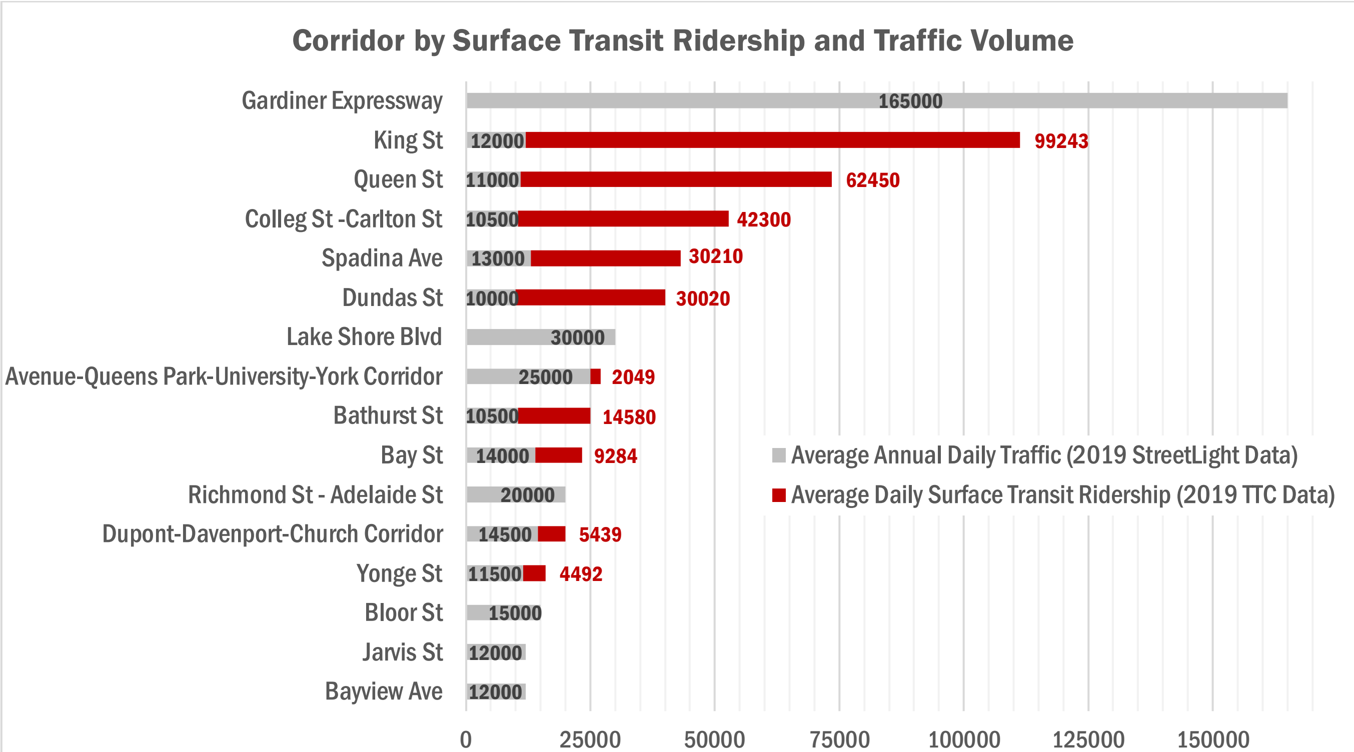
Congestion **Severity (Figure 11)**, measured by the TTI, is highest on the Gardiner Expressway, with Bloor St leading among major arterials. College St – Carlton St, Bay St, Bathurst St, Yonge St, and Dundas St also experience high congestion severity, particularly in areas served by frequent streetcar services.

Extent

With regards to **Extent (Figure 12)**, the Gardiner Expressway again ranks highest, reflecting its large stretches of congestion due to the nature of expressway traffic. Bloor St follows as the major arterial with the longest congestion stretches, while Lake Shore Blvd also ranks high as it serves as a secondary route to the Gardiner along the Waterfront. Other corridors such as Bathurst St and Queen St show comparable congestion lengths.

Duration

Finally, congestion **Duration (Figure 13)** speaks to the consistency and persistence of congestion, with the Gardiner Expressway experiencing the longest durations, especially on weekdays. College St – Carlton St also experiences long-lasting congestion, while Bathurst St and Dundas St see severe congestion primarily on weekends, due to their proximity to the Entertainment District and high-traffic areas like Yonge-Dundas Square. Jarvis St experiences severe congestion in the PM peak period, particularly for traffic heading toward the Gardiner Expressway, with TTI values regularly exceeding 2.0.



* 2019 data was used due to data unavailability. 2024 post-COVID traffic levels are comparable to pre-COVID, and TTC ridership has nearly returned to pre-COVID levels.

FIGURE 10 – CORRIDOR IMPORTANCE BY TRANSIT RIDERSHIP AND TRAFFIC VOLUME (SOURCE: 2019 STREETLIGHT AND TTC DATA)

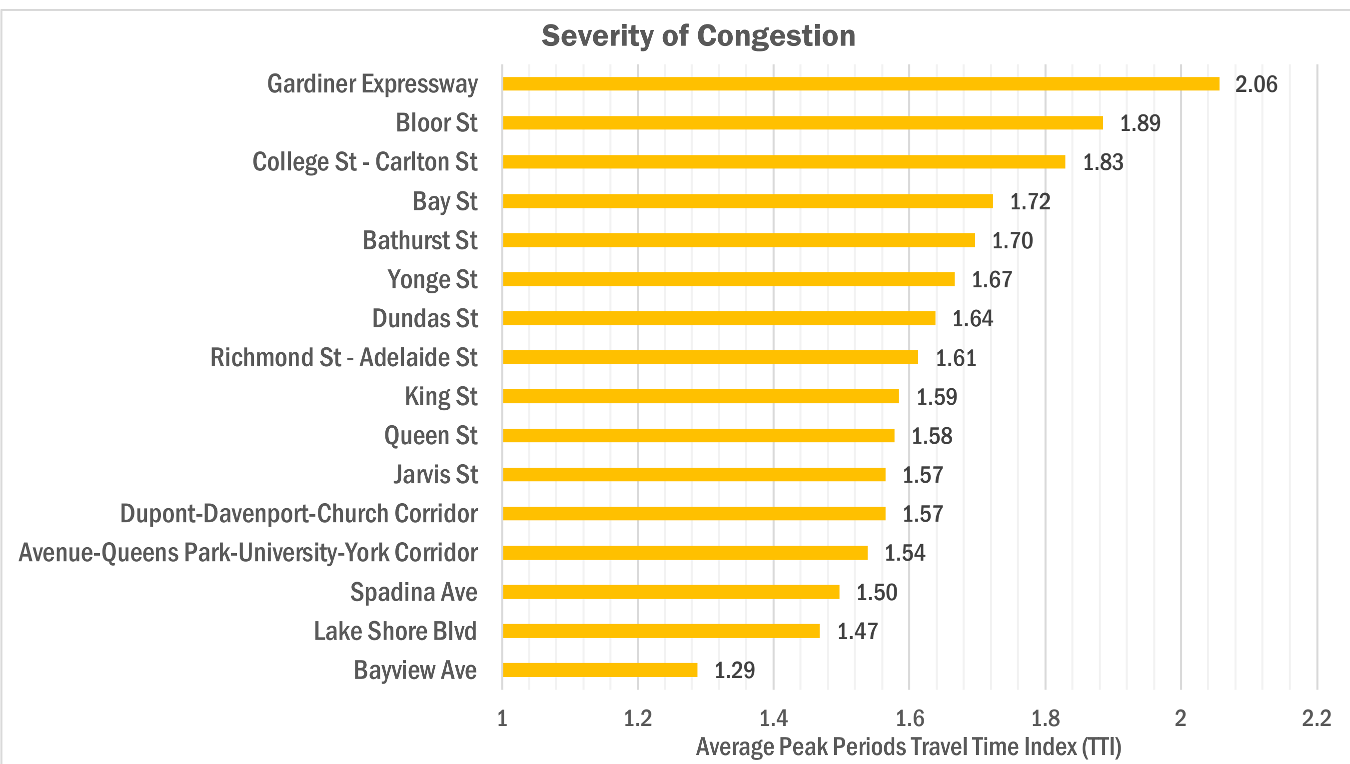


FIGURE 11 – SEVERITY OF CONGESTION (SOURCE: HERE TRAVEL TIME ANALYSIS, JANUARY 2023 TO JULY 2024)

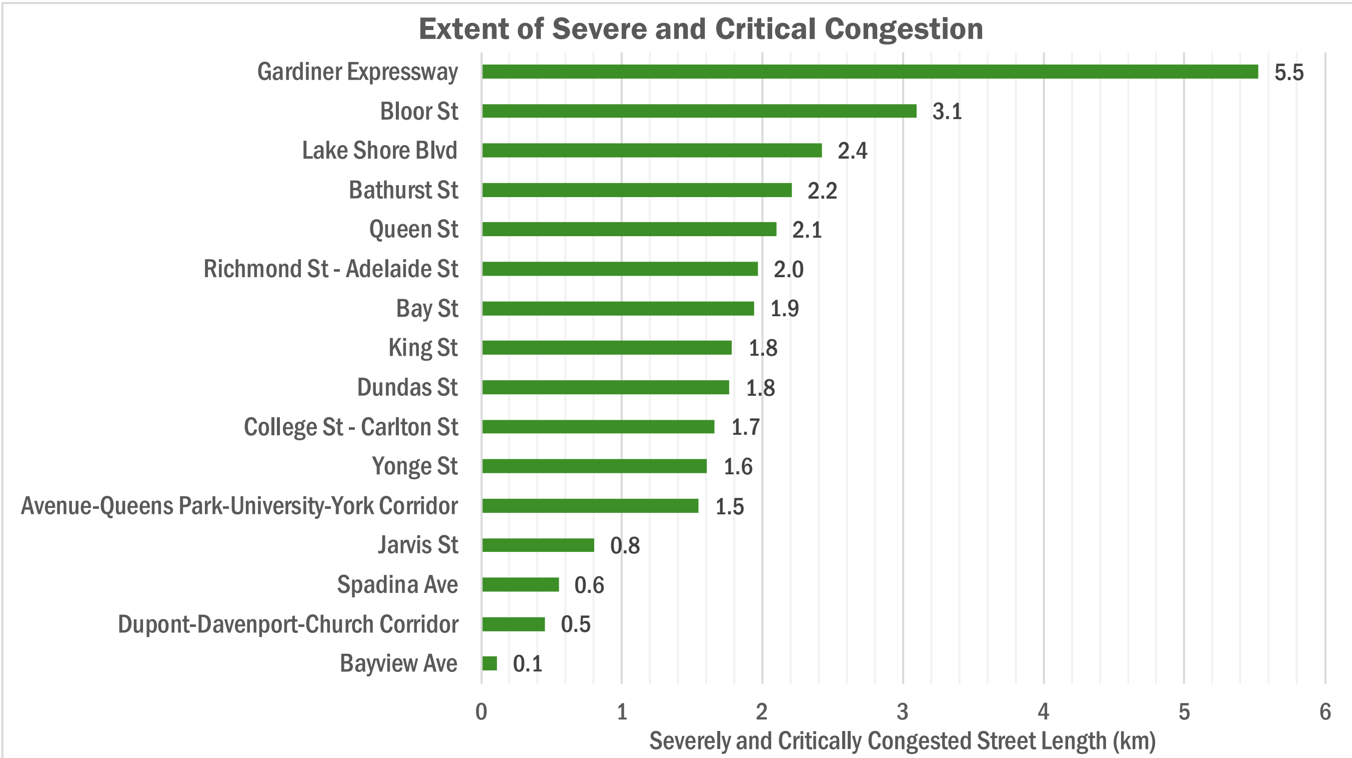
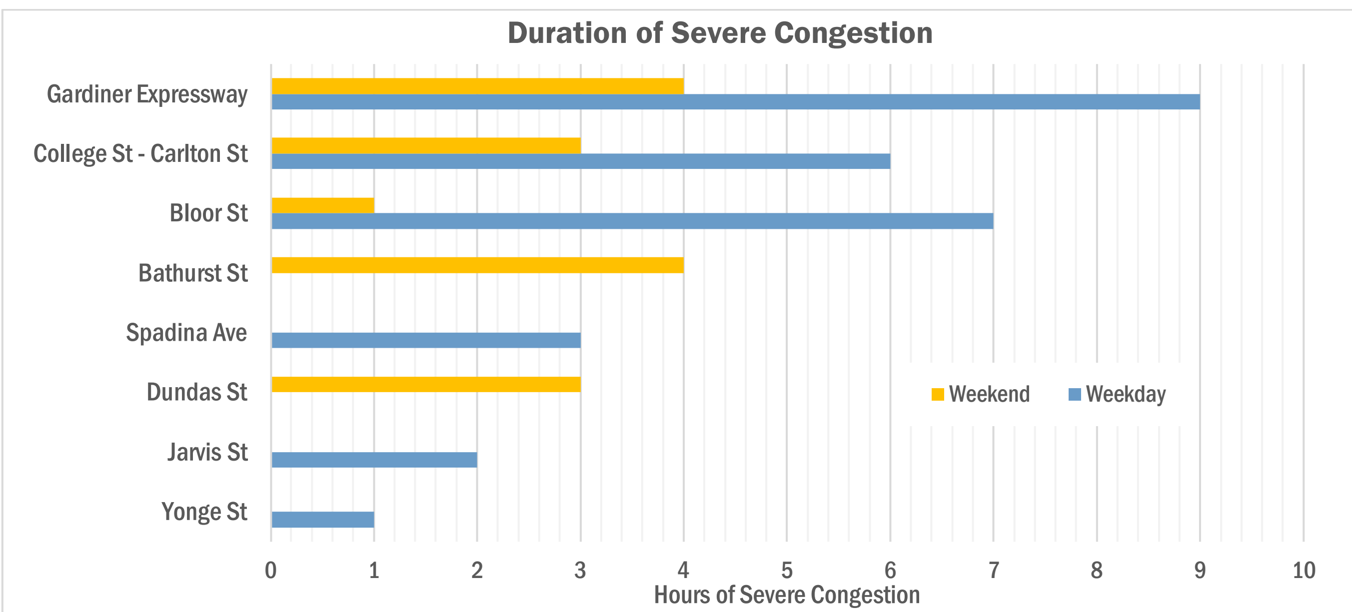


FIGURE 12 – EXTENT OF SEVERE AND CRITICAL CONGESTION (SOURCE: HERE TRAVEL TIME ANALYSIS, JANUARY 2023 TO JULY 2024)



*No corridor as a whole experiences critical congestion.

FIGURE 13 – DURATION OF SEVERE CONGESTION (SOURCE: HERE TRAVEL TIME ANALYSIS, JANUARY 2023 TO JULY 2024)

CONGESTION BOTTLENECKS

Building upon the ranking of the top congested corridors, this section identifies congestion bottleneck locations that experience significant congestion during peak travel times. Bottlenecks can be defined as specific road segments which experience severe and critical congestion. **Figure 14, Figure 15,** and **Figure 16** provide a visual representation of these bottlenecks across weekday and weekend peak periods.

Weekday AM Peak (7-10 AM) - Figure 14

The AM peak period experiences the least congestion among the three analyzed periods. However, notable bottlenecks are still observed in several key areas:

- Gardiner Expressway, Harbour St, and Lake Shore Blvd in both directions, particularly eastbound direction near the Harbourfront.
- Financial District streets including York St, Bay St, Yonge St, Richmond St, and Adelaide St.
- Queen St near Yonge St and Victoria St, where construction for the Ontario Line Queen Station has been ongoing since May 2023.
- Bloor St in the Annex and Bloor-Yonge areas.

Weekday PM Peak (3-6 PM) - Figure 15

The PM peak period sees the most congestion, with widespread bottlenecks affecting both expressways and arterial roads:

- Gardiner Expressway, Harbour St, and Lake Shore Blvd in both directions, stretching from Liberty Village to the Distillery District.
- Southbound Spadina Ave from Queen St to the Gardiner on-ramp, highlighting how Gardiner congestion causes gridlock throughout the downtown street network.
- Major north-south arterials such as York St, Bay St, Yonge St, and Jarvis St, particularly southbound, which are heavily impacted by congestion spilling over from the Gardiner.
- East-west arterials including Adelaide St, Richmond St, Queen St, and King St within the Financial District.
- Dundas St and College St – Carlton St near the Yonge Street Corridor.
- Bloor St along its full length, with particularly high congestion near Yonge-Bloor and Yorkville.
- Bathurst St at key intersections with other major arterials.

Weekend Mid-Day Peak (1-6 PM) - Figure 16

While the weekend mid-day peak experiences less congestion than the weekday PM peak, it displays distinct patterns compared to other peak periods. Significant bottlenecks include:

- Gardiner Expressway, Harbour St, and Lake Shore Blvd in both directions, especially westbound traffic from Liberty Village to the Distillery District.
- Bloor St through the Annex, Yorkville, and Yonge-Bloor areas.
- Queen St from Bathurst to Bay St, through the Queen West retail district and Financial District.
- Dundas St from Bathurst to Yonge St, affecting areas of Chinatown and Yonge-Dundas Square.
- Bathurst St, particularly near major intersections, with more congestion near the Fashion District.
- Jarvis St near St. Lawrence Market.
- Bay St and Yonge St within the Financial District.
- King St within the Entertainment District and Fashion District.

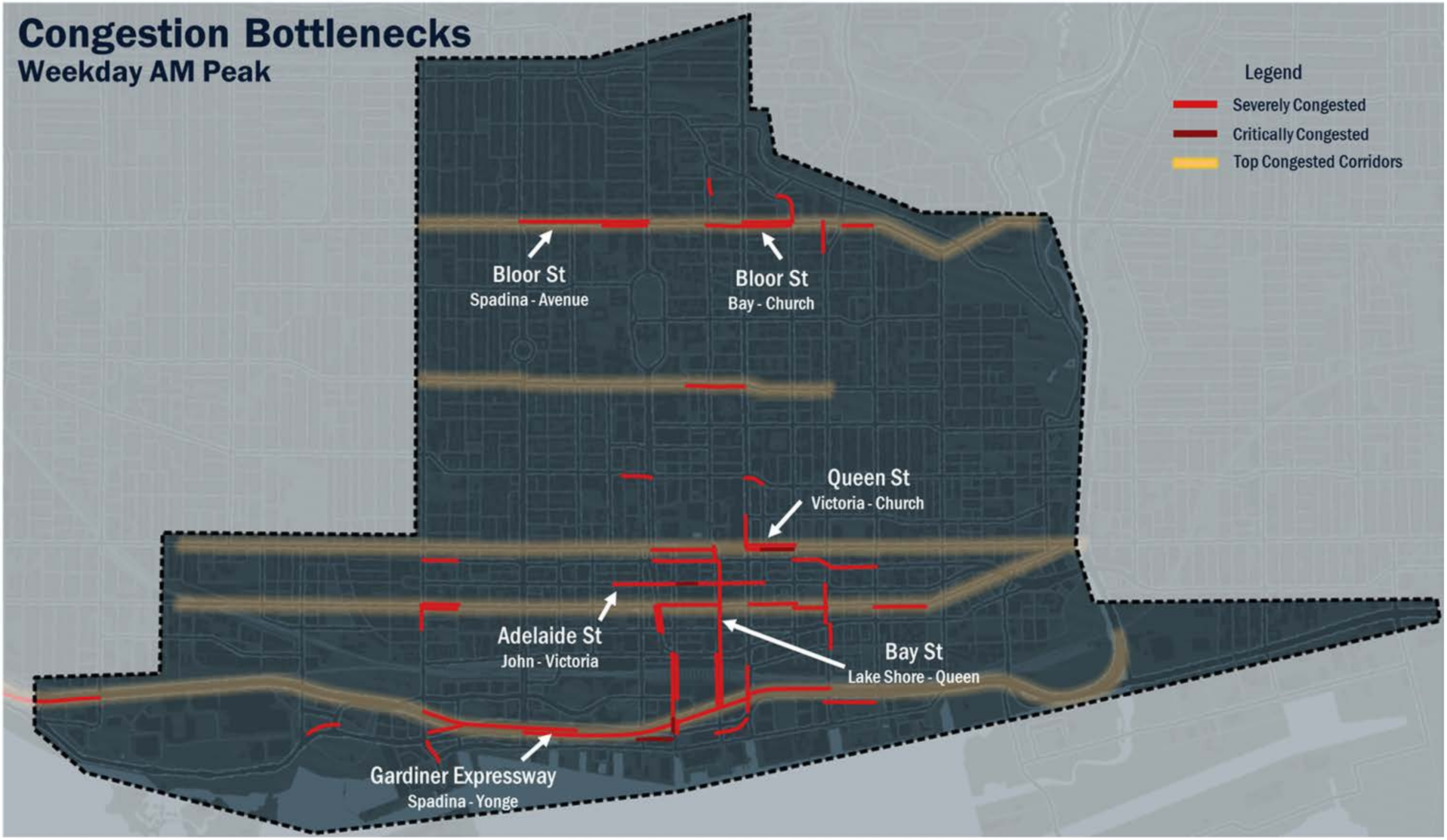


FIGURE 14 – CONGESTION BOTTLENECKS – WEEKDAY AM PEAK (SOURCE: HERE TRAVEL TIME ANALYSIS, JANUARY 2023 TO JULY 2024)

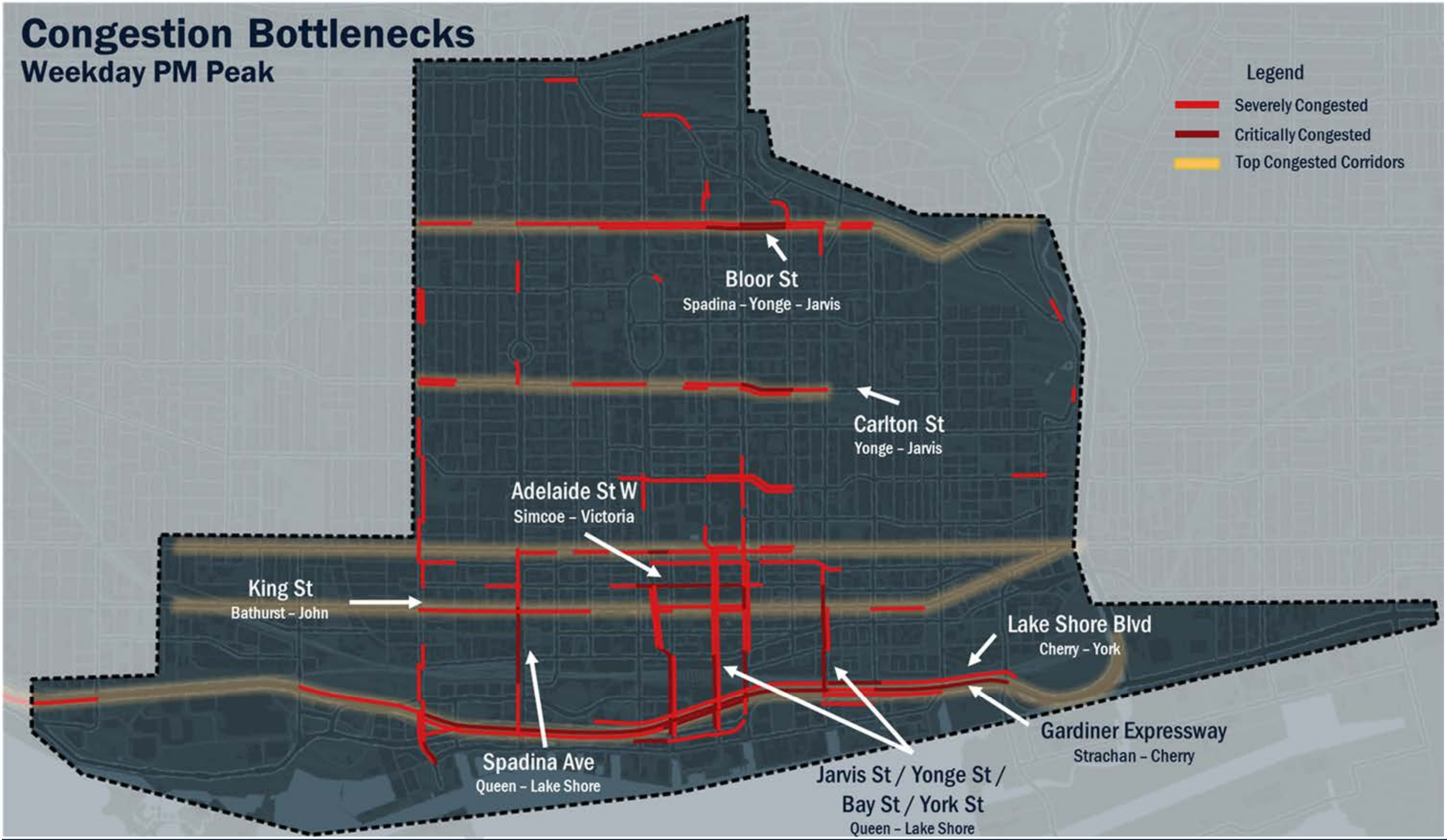


FIGURE 15 – CONGESTION BOTTLENECKS – WEEKDAY PM PEAK (SOURCE: HERE TRAVEL TIME ANALYSIS, JANUARY 2023 TO JULY 2024)

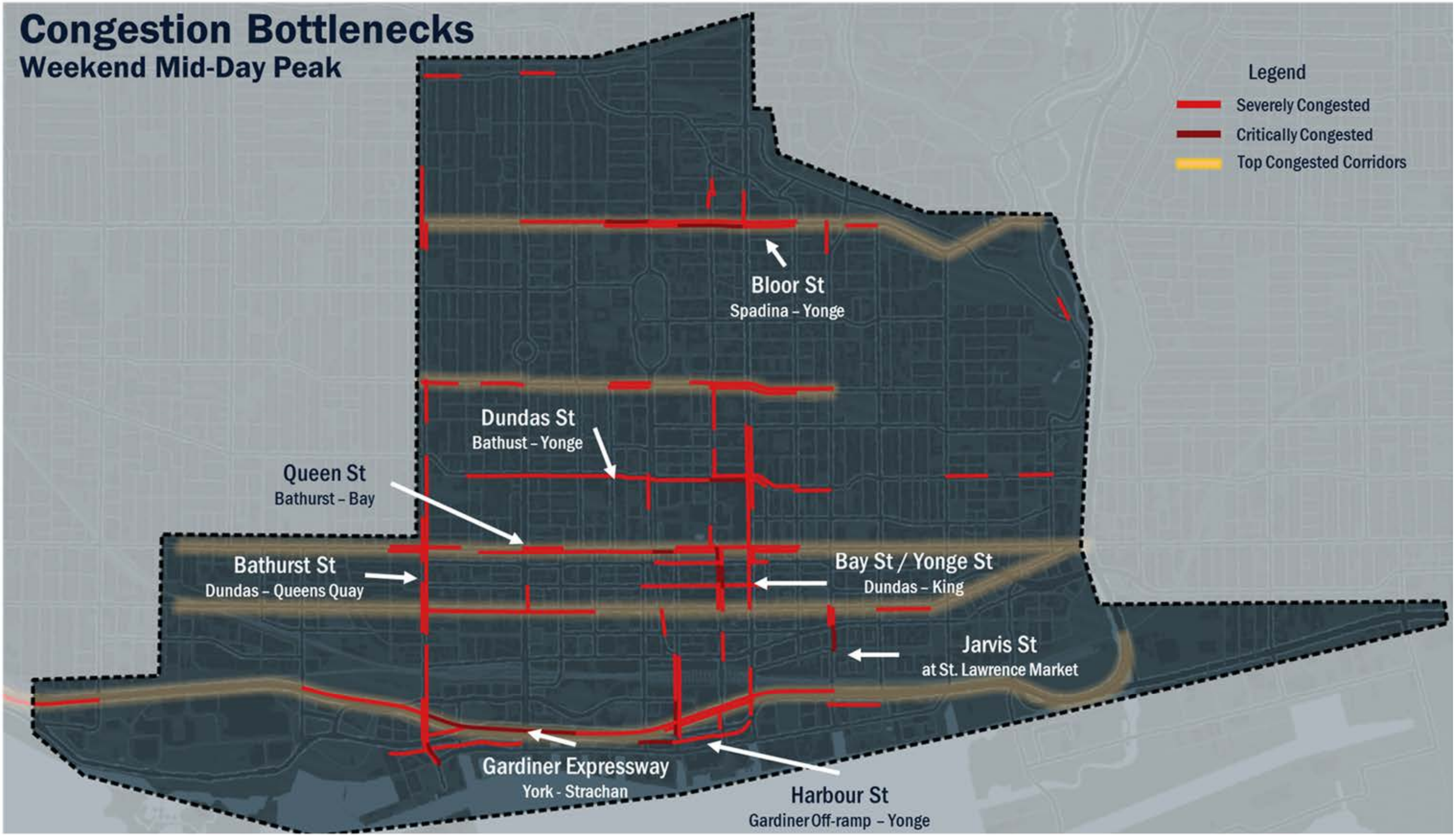


FIGURE 16 – CONGESTION BOTTLENECKS – WEEKEND MID-DAY PEAK (SOURCE: HERE TRAVEL TIME ANALYSIS, JANUARY 2023 TO JULY 2024)

Root Cause Analysis

Historical Infrastructure Trends

Toronto's transportation system is unique in that, unlike many North American cities, it never developed an extensive downtown highway network. The decision to halt projects like the Spadina Expressway and Crosstown Expressway in the 1970s preserved neighborhoods and fostered more sustainable urban development, but also led to long-term capacity constraints. Furthermore, much of the GTAs highway network was completed over half a century ago; Highway 400, 401, and 403, the Don Valley Parkway, the Gardiner Expressway, the Queen Elizabeth Way (QEW), and Allen Rd were all completed by 1968.

Although more highways do not necessarily lead to less traffic (often it will actually lead to more), and many other downtown highways constructed in the highway boom of the 1960s and 70s have been removed in recent decades (i.e. the Inner Loop in Rochester, NY, Bonaventure Expressway in Montreal, Harbour Drive in Portland, OR), Toronto's highway network effectively reached its current capacity by the 1970s, when the metropolitan areas population was less than half of what it is today. Furthermore, the age of this infrastructure has led to the need for major investments to maintain proper operation, causing further impacts on roadway capacity during construction and rehabilitation.

Moreover, investment in alternative modes of transportation has historically lagged. Rapid transit subway construction, which boomed in the mid-20th century, slowed significantly after the completion of the Bloor-Danforth line. Plans for further expansion were repeatedly delayed or scaled back; from 1953 to 1985, 60.4 km of rapid transit was constructed in Toronto; from 1985 to 2017 only 16.1 km was completed. This is illustrated in **Figure 17** which displays Toronto's rapid transit construction and total system length over time. This lack of expansion has left Toronto with a rapid transit system that trails behind other international peer cities as exemplified in **Figure 18** and **Figure 19**. It should be noted that this analysis only includes light rail rapid transit, and not commuter or heavy rail systems, such as GO Transit.

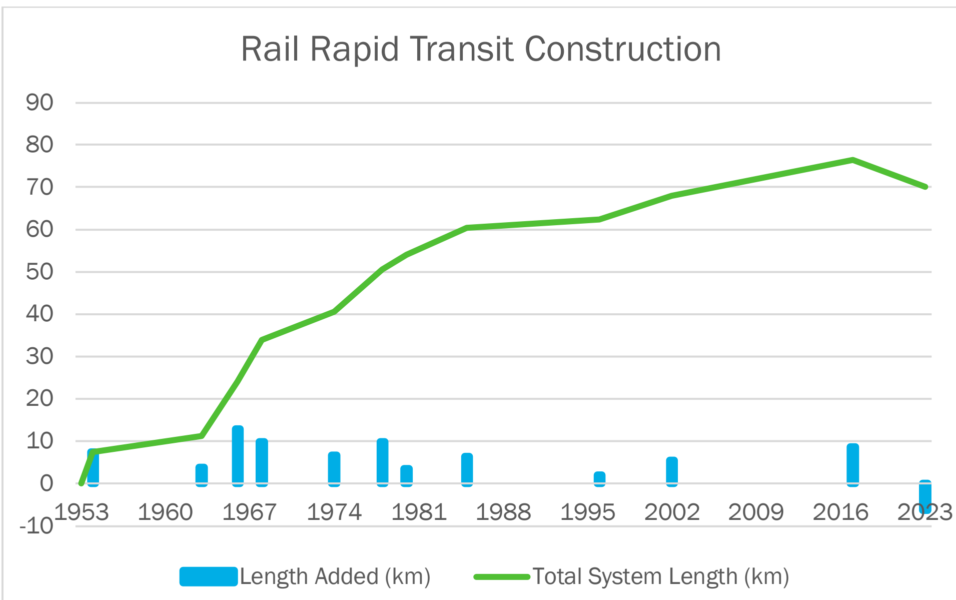


FIGURE 17 – TORONTO'S RAPID TRANSIT CONSTRUCTION OVER 1953-2023 (SOURCE: BASED ON VARIOUS SOURCES INCLUDING TTC AND PROVINCE OF ONTARIO)

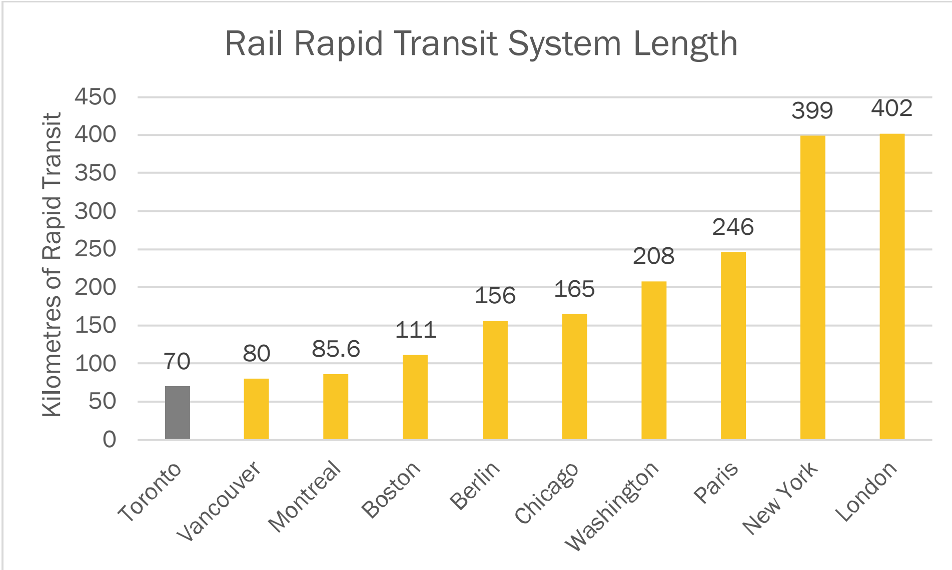


FIGURE 18 – COMPARISON OF VARIOUS CITY'S RAPID TRANSIT SYSTEM LENGTH (SOURCE: CALCULATION BASED ON VARIOUS SOURCES)

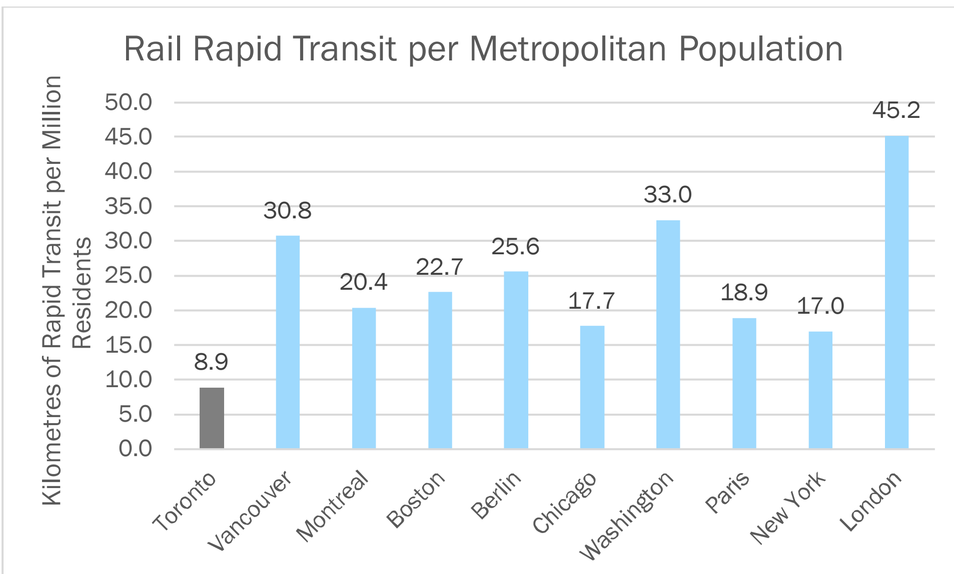


FIGURE 19 – COMPARISON OF VARIOUS CITY'S CURENT RAPID TRANSIT LENGTH PER MILLION METROPOLITAN AREA RESIDENTS (SOURCE: CALCULATION BASED ON VARIOUS SOURCES INCLUDING STATISTICS CANADA)

There are currently several major new rapid transit lines and extensions underway in the GTA; the Eglinton Crosstown LRT, Ontario Line, Finch West LRT, and Hurontario LRT are all currently under construction. When these projects as well as other planned extensions are completed, the GTA's rapid transit system will reach a length of 151 km; doubling the current length. Despite this, Toronto will still fall short in terms of rapid transit length per metropolitan population as illustrated in **Figure 20**. It should be noted that this projection applies a 1% annual population growth to each city's current metropolitan population to project an approximate 2035 population. Furthermore, it only includes underway and planned rapid transit expansion projects.

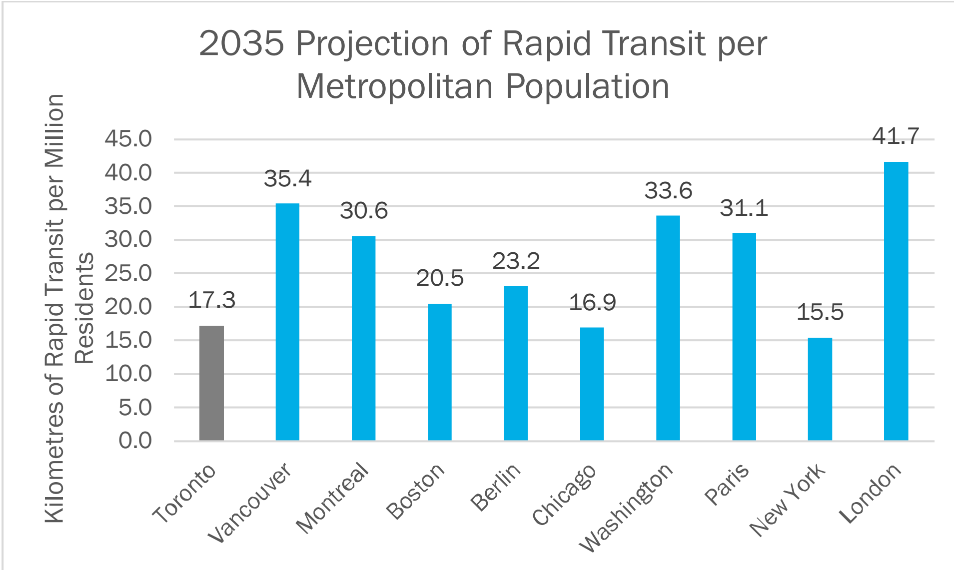
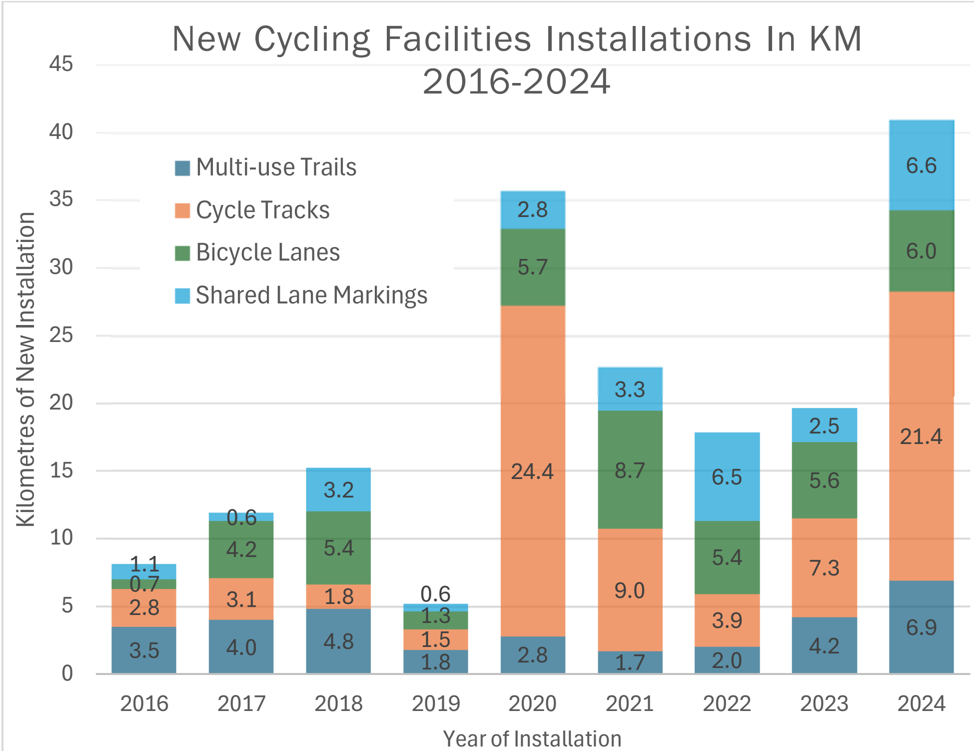


FIGURE 20 – COMPARISON OF VARIOUS CITY'S PROJECTED 2035 RAPID TRANSIT LENGHTH PER MILLION METROPOLITAN RESIDENTS (SOURCE: CALCULATION BASED ON VARIOUS SOURCES INCLUDING TTC, METROLINX, AND STATISTICS CANADA)

Cycling infrastructure and other sustainable transportation options have also developed slowly, with significant improvements only coming in recent years. **Figure 21** displays the number of new cycling projects in Toronto by year, illustrating how significant progress has only been recently made. The City of Toronto's recent investments in cycling infrastructure have been extremely effective in improving cycling connectivity throughout the City, specifically in downtown; 2016 was the first year in which walking and cycling was the top mode for trips made by downtown residents. Although City-wide impacts have been less substantial, the share of walking and cycling trips City-wide and to downtown had been increasing since 2011 – a pattern that most likely would have continued if it were not for the Pandemic.

However, this ongoing modal shift is competing with the substantial population growth and added travel demand that Toronto and the GTHA is experiencing. While congestion is influenced by both local and regional demand, enhancing cycling infrastructure offers significant benefits. It promotes healthier lifestyles, reduces environmental impact, and can alleviate some traffic congestion. However, it's important to recognize that cycling alone cannot completely solve congestion issues, and a multifaceted approach is necessary. This combination of delayed investment in transit and cycling has contributed to a transportation system that has not added substantial people moving capacity or promoted a modal shift until very recently.



* The 2024 lengths include projects that are either completed or expected to be completed by the end of 2024.

FIGURE 21 – NEW CYCLING INSTALLATIONS (KM) COMPLETED FROM 2016 TO 2024 (SOURCE: CITY OF TORONTO)

Travel Demand and Patterns

Similar to the discussion in **Study Area and Regional Travel Patterns**, this section explores the regional trends that have led to growing demand on Toronto's transportation system, with a particular focus on downtown as a whole – a deeper look at particular corridors will be examined later.

IMPACTS OF THE PANDEMIC

As discussed previously the COVID-19 pandemic had drastic impacts on travel patterns; the lockdowns and subsequent shift to remote working led to substantially less travel demand. This also led to a modal shift where vehicles gained modal share, most likely due to the fact that those who remained commuting did so by car, and transit ridership dramatically decreased in part due to health concerns. However, we are experiencing a return to pre-pandemic conditions as pandemic impacts subside; people have been returning to work and car commuting has already surpassed 2016 levels in the Toronto CMA. Transit ridership is nearing pre-pandemic levels, however the recovery has been slower than car commuting, as TTC ridership is still below 2019 levels. Furthermore, given the large population increase Toronto has experienced since the pandemic, 2019 transit ridership levels do not provide a clear benchmark.

The pandemic-induced changes in travel patterns have led to an increase in trips during off-peak periods and weekends, as people are no longer tied to the morning and evening rush hours for work. With the flexibility of working from home, people can also run personal errands and go grocery shopping during regular business days. These changes could have a significant impact on downtown areas with mixed-use land characteristics.

TRAVEL DEMAND

Historical travel demand figures from the TTS have been analyzed to assess downtown travel patterns. As shown in **Figure 22**, total downtown trips have steadily been increasing since 1986. This accounts for all trips, including, vehicles, walking, cycling, transit etc. that are to or within Planning District 1. The data is limited to AM as this was the only available period provided by the TTS data. Additionally, 2016 was the most recent TTS report, however recent data suggests the current trip demand has exceeded that of 2016.

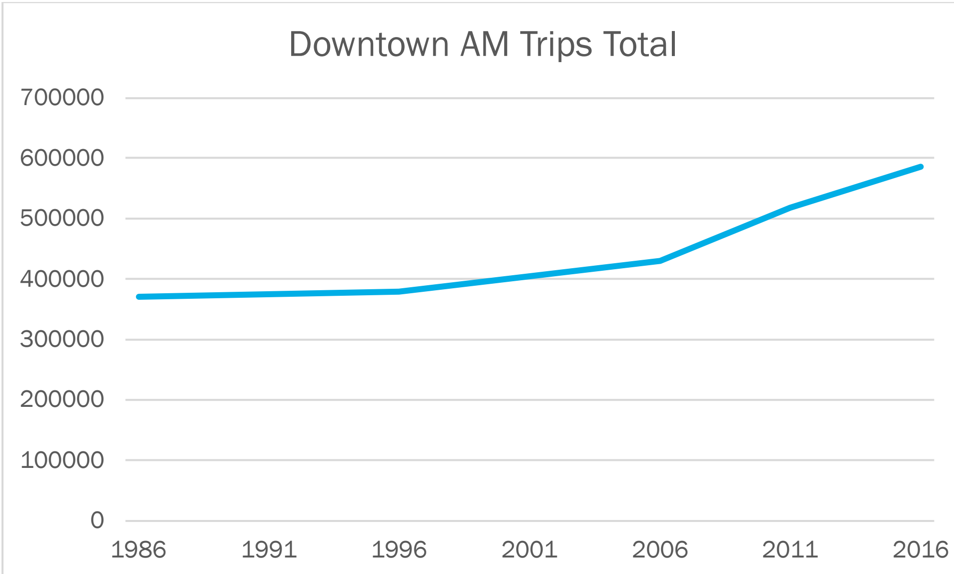


FIGURE 22 – TOTAL AM DOWNTOWN TORONTO TRIPS FROM 1986 TO 2016 (SOURCE: TRANSPORTATION TOMORROW SURVEY 2016)

VEHICLE TRIP DEMAND

The AM vehicle trips made to and by residents of Planning District 1 is illustrated in **Figure 23.** These trips are further broken down by work trips and discretionary trips (all trips excluding work or school related) in **Figure 24** and **Figure** 24**25**, respectively.

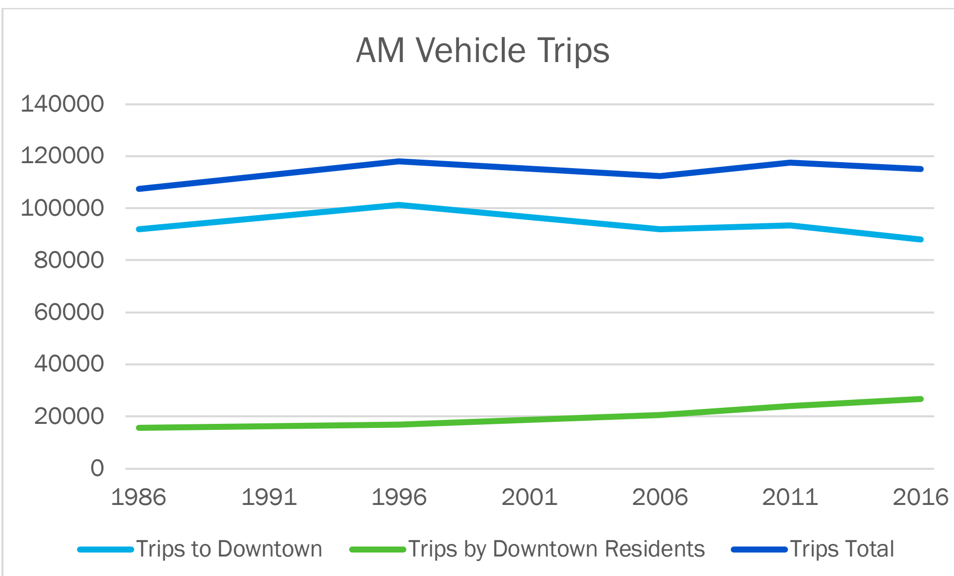


FIGURE 23 – TOTAL DOWNTOWN AM VEHICLE TRIPS FROM 1986 TO 2016 (SOURCE: TRANSPORTATION TOMORROW SURVEY 2016)

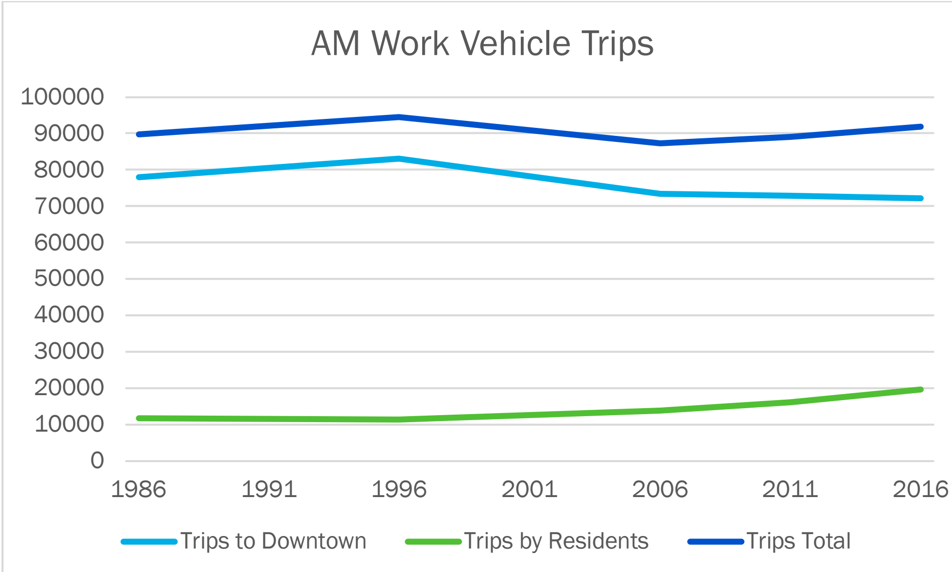


FIGURE 24 – TOTAL DOWNTOWN AM WORK VEHICLE TRIPS FROM 1986 TO 2016 (SOURCE: TRANSPORTATION TOMORROW SURVEY 2016)

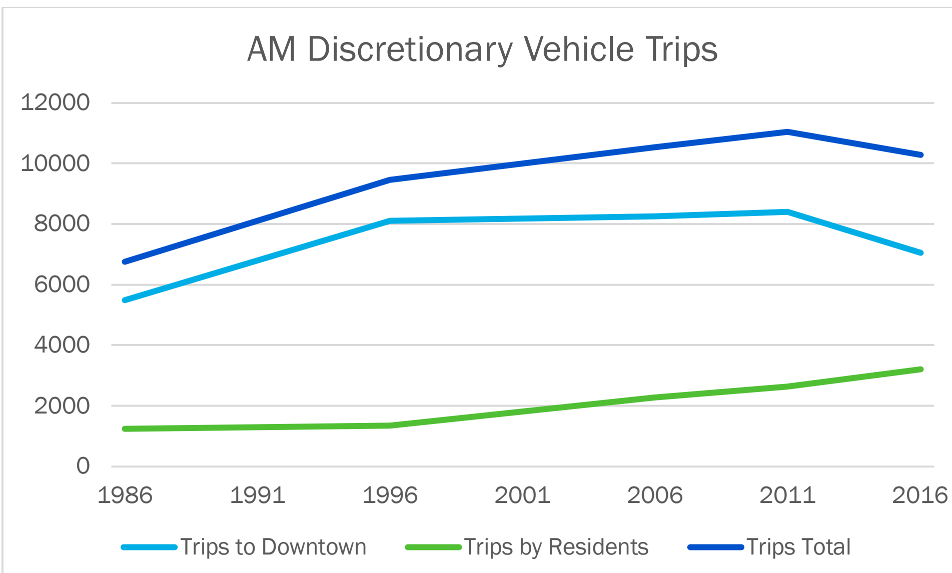


FIGURE 25 – TOTAL DOWNTOWN AM DISCRETIONARY VEHICLE TRIPS FROM 1986 TO 2016 (SOURCE: TRANSPORTATION TOMORROW SURVEY 2016)

The total downtown vehicle trips between 1986 and 2016 increased, however this increase is minimal, and the peak volume of total vehicle trips was in 1996. The figures also show that vehicle trips to downtown from outside areas peaked in 1996 and has been decreasing since. This pattern has been counterbalanced by the substantial increase in vehicle trips by downtown residents; between 1986 and 2016 vehicle trips by downtown residents nearly doubled. Another notable trend is the increase in discretionary trips, both to downtown and by downtown residents. As downtown has evolved from an employment centre into a destination and place to live, the discretionary trips have risen.

It is important to note that although the downtown trips has remained relatively consistent between 1986 to 2016, this dataset lacks more recent information to evaluate current downtown demand. However, recent Census Canada found that by May 2023, car commuting in the Toronto CMA had surpassed 2016 levels, demonstrating that regional trips have increased substantially from 2016. This along with the recent dramatic population growth in recent years suggests there could be more demand on the downtown system. Furthermore, it is critical to note that congestion is not a linear pattern and slight fluctuations in demand/capacity can have outsized impacts on travel times, especially in a system that has operated at near or over capacity at peak periods for several decades.

DEMOGRAPHIC TRENDS

The growth in downtown resident vehicle travel described above can be attributed to the substantial population growth of downtown. **Figure 26** displays the rapid growth in population households, and the resulting household vehicles in downtown between 1986 and 2021, derived from TTS and Census data.

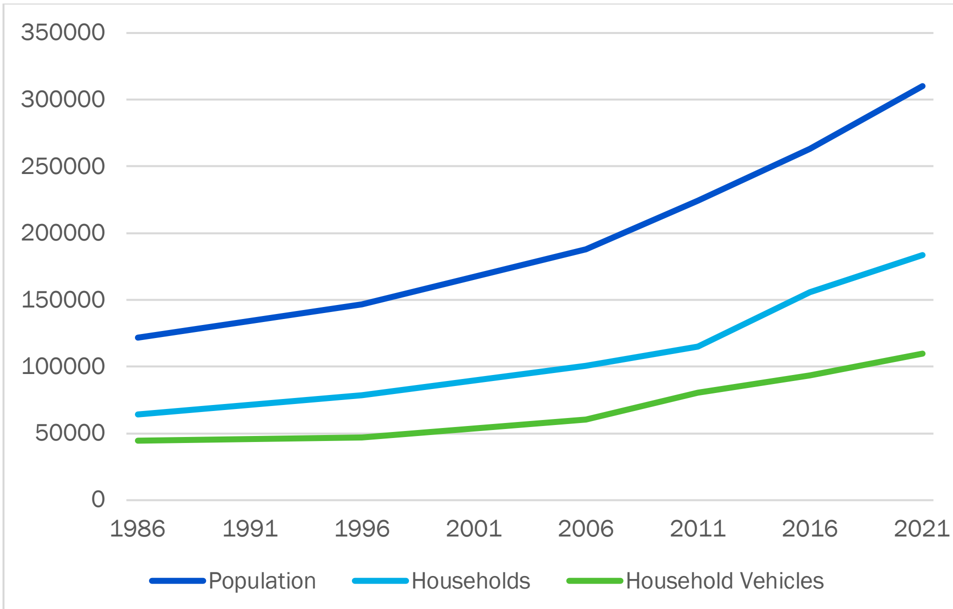


FIGURE 26 – DOWNTOWN POPULATION, HOUSEHOLDS, AND HOUSEHOLD VEHICLES FROM 1986 TO 2016 (SOURCE: TRANSPORTATION TOMORROW SURVEY 2016)

This growth is not surprising as downtown has seen unprecedented condominium development in recent decades, as displayed in **Figure 27**. Of the 186,100 condominium units registered in Toronto from 2002-2018, 77,656 were located in the Downtown and Central Waterfront areas, representing about 58% of the total, in an area that makes up less than 5% of Toronto's land area, and 11% of its population.

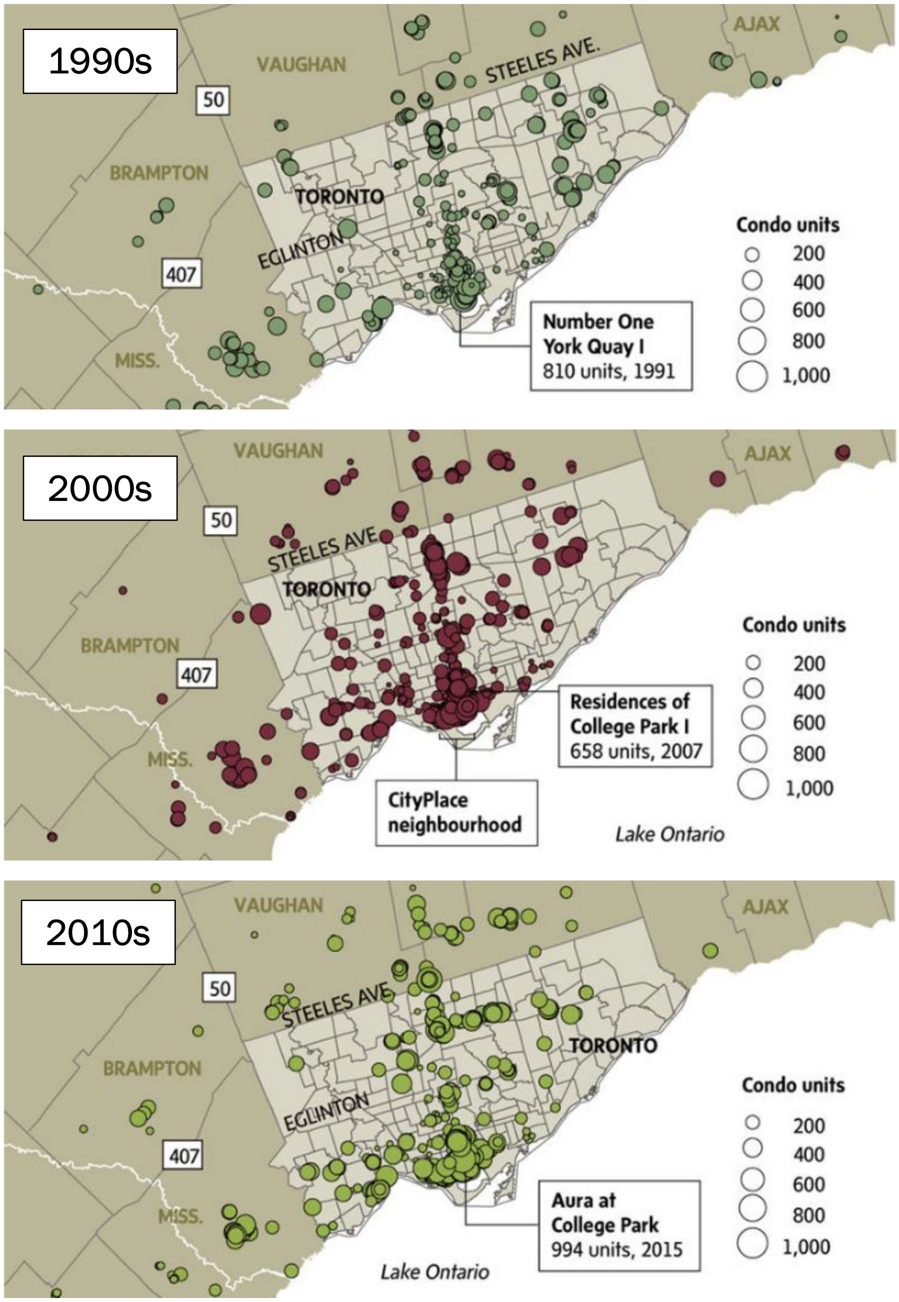


FIGURE 27 – TORONTO CONDOMINIUM GROWTH FROM 1990S TO 2010S (SOURCE: GLOBE AND MAIL AND URBANATION 2017)

It should be noted that downtown residents own and use vehicles at substantially lower rates than Toronto as a whole; in 2016 downtown households had on average 0.6 vehicles and 23% of all trips were by vehicle, while Toronto on average had one vehicle per household and 46% of trips were made by vehicle. Mode share will be discussed further in following sections.

In addition to the substantial growth seen in downtown, the GTHA on the whole has been experiencing considerable population growth. As shown in **Figure 28**, the GTHA population has grown by over a million residents since 2011, and much of the growth has been in the regions surrounding Toronto; from 2016 to 2023 Durham, York, Peel, Hamilton and Halton added 635,312 residents. However, Toronto has also been experiencing a recent boom in population, as the city added over 125,000 residents between July 2022 to July 2023.

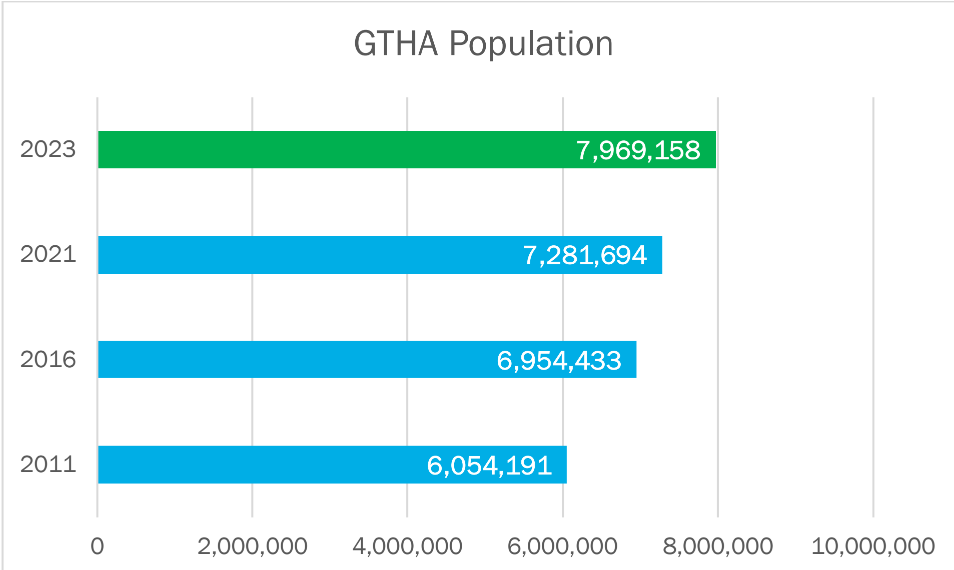


FIGURE 28 – GTHA POPULATION 2011 - 2021 (SOURCE: STATISTICS CANADA 2024)

Further adding to the stress being put on Toronto's transportation network is the recent job growth post-COVID, as the City has been steadily adding jobs since the initial drop due to the pandemic. This trend has been seen more drastically downtown; in between 2020 to 2023, downtown added over 85,000 jobs. In fact, downtown now has more jobs than pre-COVID, as 2023 was the first time downtown contained over 600,000 jobs, as illustrated in **Figure 29**.

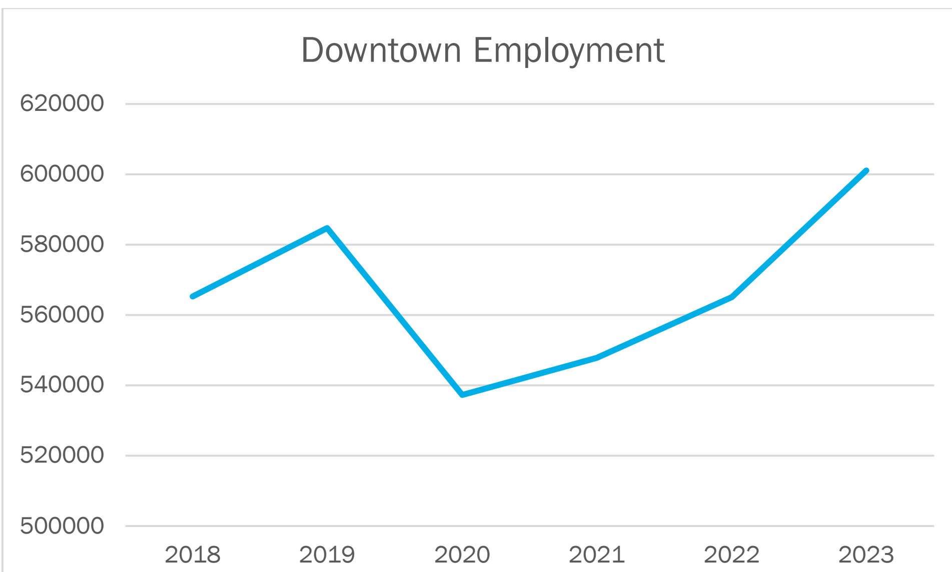


FIGURE 29 – DOWNTOWN JOBS 2018 - 2023 (SOURCE: CITY OF TORONTO 2024)

MODE SHARE

The mode share of AM trips made by residents of Planning District 1 is illustrated in **Figure 30**. The most notable trend is the substantial increase in walking and cycling, which has overtaken both driving and transit as the predominant mode of travel.

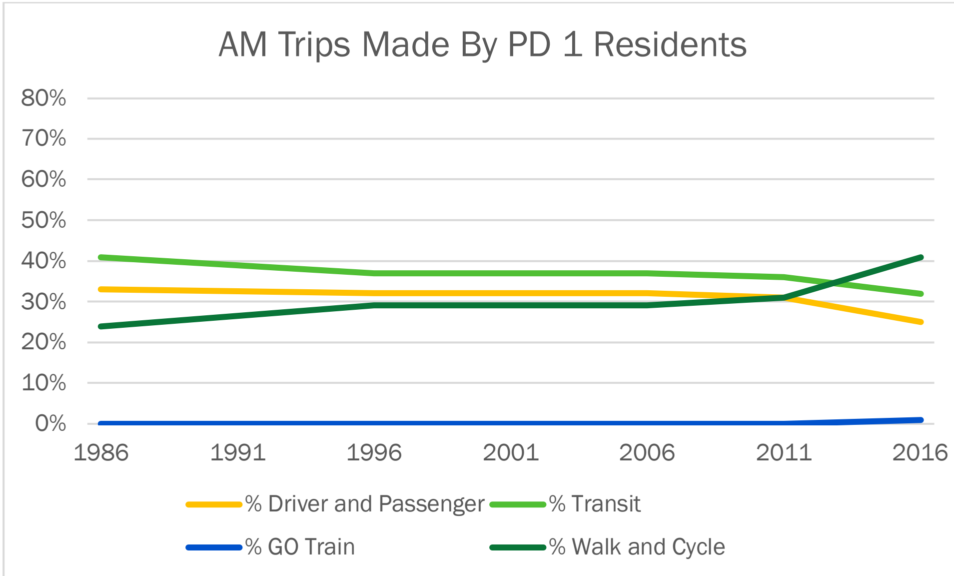


FIGURE 30 – MODE SHARE OF AM TRIPS MADE BY DOWNTOWN RESIDENTS FROM 1986 TO 2016 (SOURCE: TRANSPORTATION TOMORROW SURVEY 2016)

The mode share of AM trips made to Planning District 1 is illustrated in **Figure 31**. There has been a substantial decrease in driving since 1996, as transit, the GO Train, and walking and cycling have all increased in share. Transit has remained the dominant mode of travel to downtown, recovering after a steady decrease between 1986 to 1996.

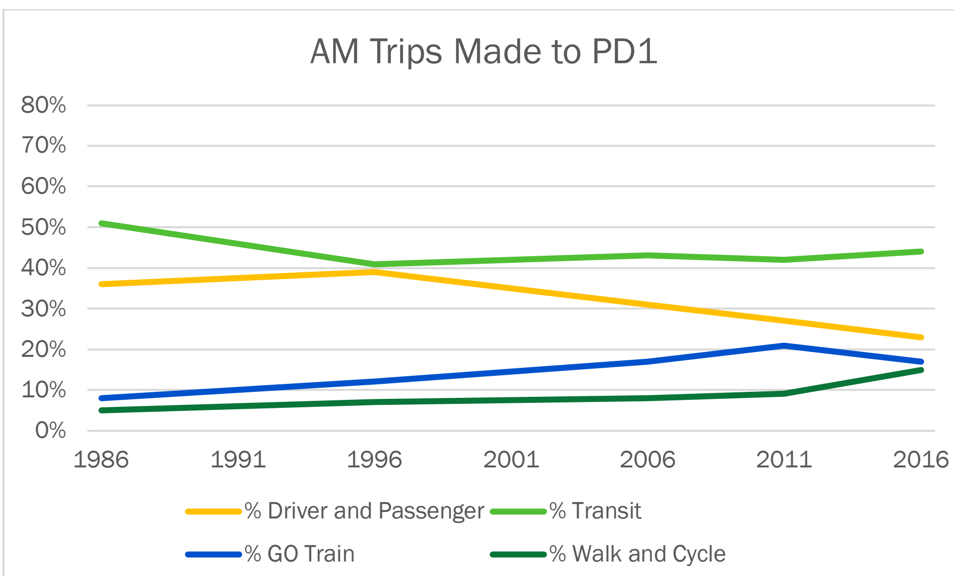


FIGURE 31 – MODE SHARE OF TRIPS MADE TO DOWNTOWN FROM 1986 TO 2016 (SOURCE: TRANSPORTATION TOMORROW SURVEY 2016)

It is a positive development to see active transportation (walk and cycle) and transit overtaking vehicles, and this has been key to mitigating congestion in recent years as regional trip demand has increased substantially.

Despite this, congestion has gotten worse in recent years – as will be discussed, this can attributed to several potential reasons including an increase in regional population, decreases in capacity, and/or a modal shift due to the pandemic.

As noted before, Toronto's downtown mode share is much less car-dependent and more dynamic than the broader City and the larger GTHA, as illustrated in **Figure 32** and **Figure 33**, respectively. As the GTHA population increases, so does the population of suburban and commuter neighbourhoods, which also brings more vehicles and consequentially more vehicle demand, as these areas own and utilize vehicles at a much higher rate than Torontonians and downtown residents.

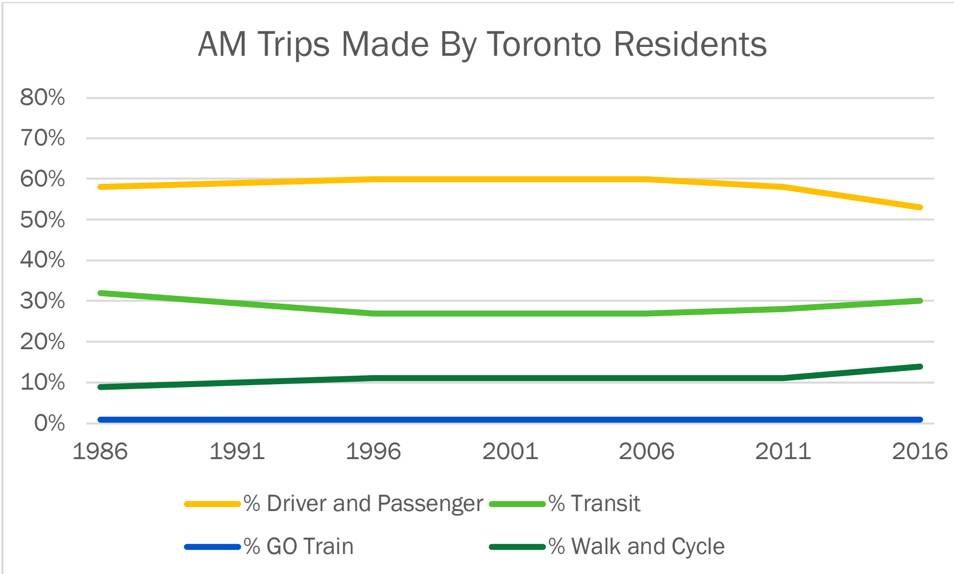


FIGURE 32 – MODE SHARE OF AM TRIPS MADE BY TORONTO RESIDENTS FROM 1986 TO 2016 (SOURCE: TRANSPORTATION TOMORROW SURVEY 2016)

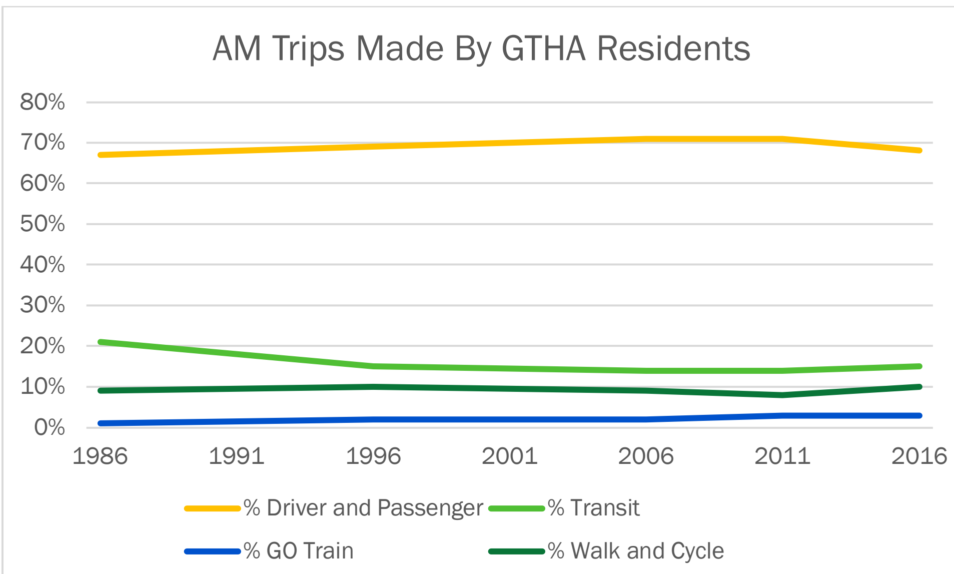


FIGURE 33 – MODE SHARE OF TRIPS MADE BY GTHA RESIDENTS FROM 1986 TO 2016 (SOURCE: TRANSPORTATION TOMORROW SURVEY 2016)

ORIGIN-DESTINATION PATTERNS

With an understanding of demand established, an analysis of where the demand originates from is key to understanding potential congestion drivers. Building from the high-level origin-destination patterns discussed earlier, a more granular assessment has been completed using StreetLight to identify where vehicle trips are traveling to and from Downtown Toronto. The figures presented below display the following (all data is from 2019 Weekdays):

- **Figure 34** – The origin vehicle volumes of AM trips (7:00 to 10:00 AM) that are destined for downtown Toronto. The geographical boundaries are Census Dissemination Areas.

- **Figure 35** – The origin vehicle volumes normalized to land area of AM trips (7:00 to 10:00 AM) that are destined for downtown Toronto. The geographical boundaries are Census Dissemination Areas.
- **Figure 36** – The destination vehicle volumes AM trips (7:00 to 10:00 AM) destined for downtown Toronto.
- **Figure 37** – The destination vehicle volumes of PM trips (3:00 to 6:00 PM) that are originating from downtown Toronto. The geographical boundaries are Census Dissemination Areas.
- **Figure 38** – The destination vehicle volumes normalized to land area of PM trips (3:00 to 6:00 PM) that are originating from downtown Toronto. The geographical boundaries are Census Dissemination Areas.
- **Figure 39** – The origin vehicle volumes of PM trips (3:00 to 6:00 PM) that are originating in downtown Toronto. The geographical boundaries are Census Dissemination Areas.

These figures essentially represent where all of the trips to downtown in the morning are coming from **(Figure 34 and Figure 35)**, and where they are going to within downtown **(Figure 36)**, followed by where all the afternoon trips leaving downtown are going to **(Figure 37 and Figure 38)** and where they leave from within downtown **(Figure 39)**.

It should be noted that the geographical boundaries used are dissemination areas, which are designed to all represent approximately equal populations – hence larger parcels are less densely populated and often represent more industrial areas.

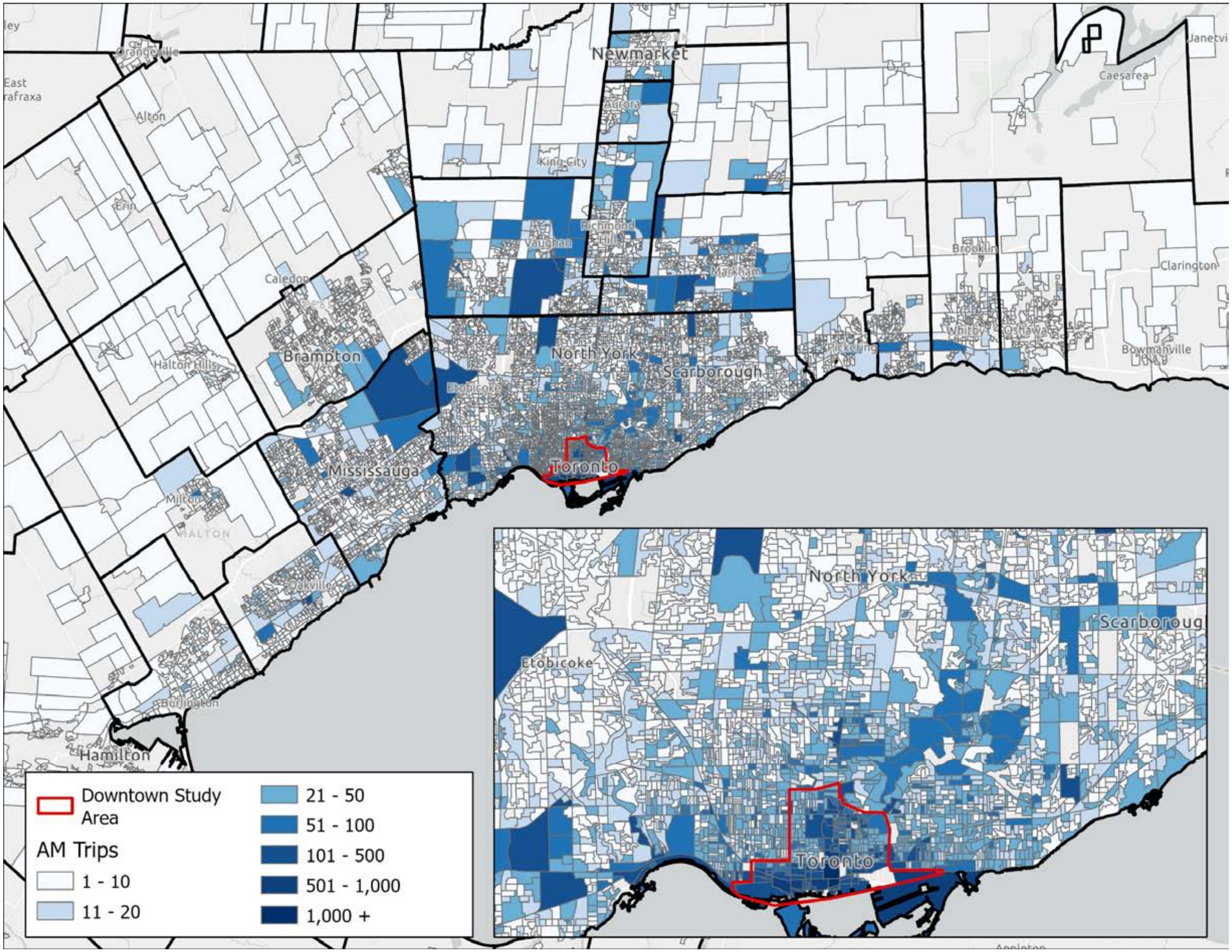


FIGURE 34 – 2019 ORIGIN VOLUME OF AM TRIPS DESTINED FOR DOWNTOWN TORONTO (SOURCE: STREETLIGHT DATA 2024)

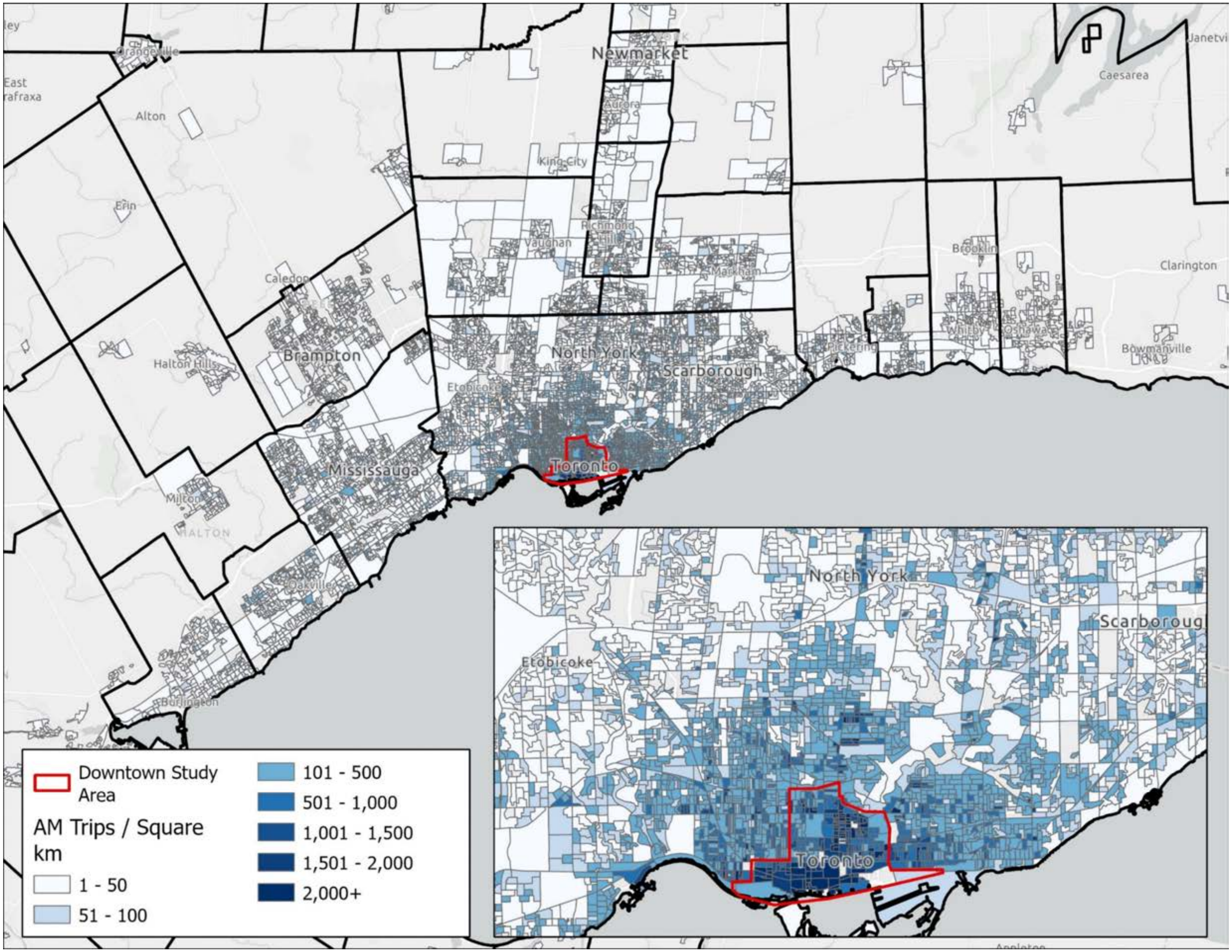


FIGURE 35 – 2019 ORIGIN DENSITY OF AM TRIPS DESTINED FOR DOWNTOWN TORONTO (SOURCE: STREETLIGHT DATA 2024)

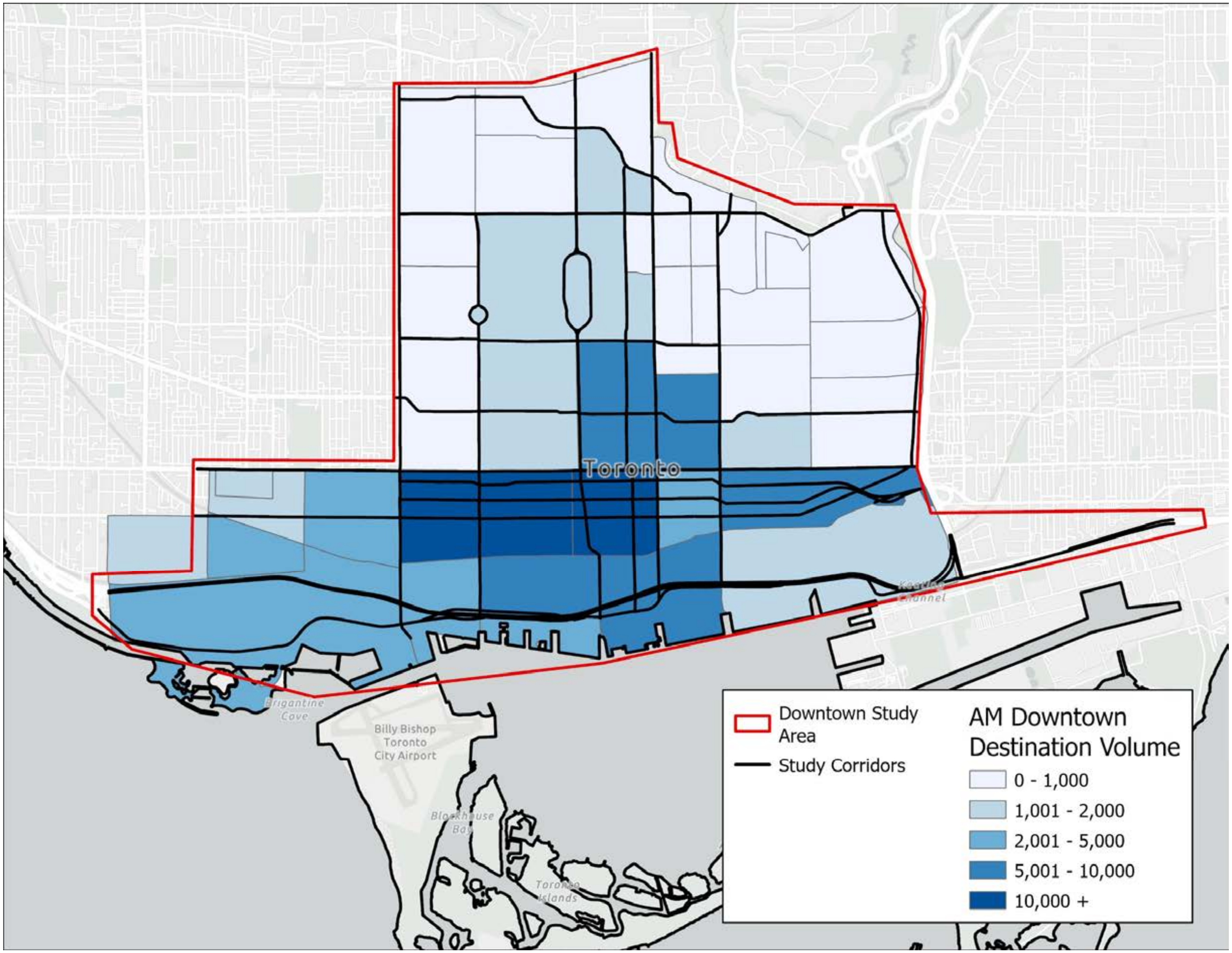


FIGURE 36 – 2019 DESTINATION VOLUME OF AM TRIPS TO DOWNTWON TORONTO (SOURCE: STREETLIGHT DATA 2024)

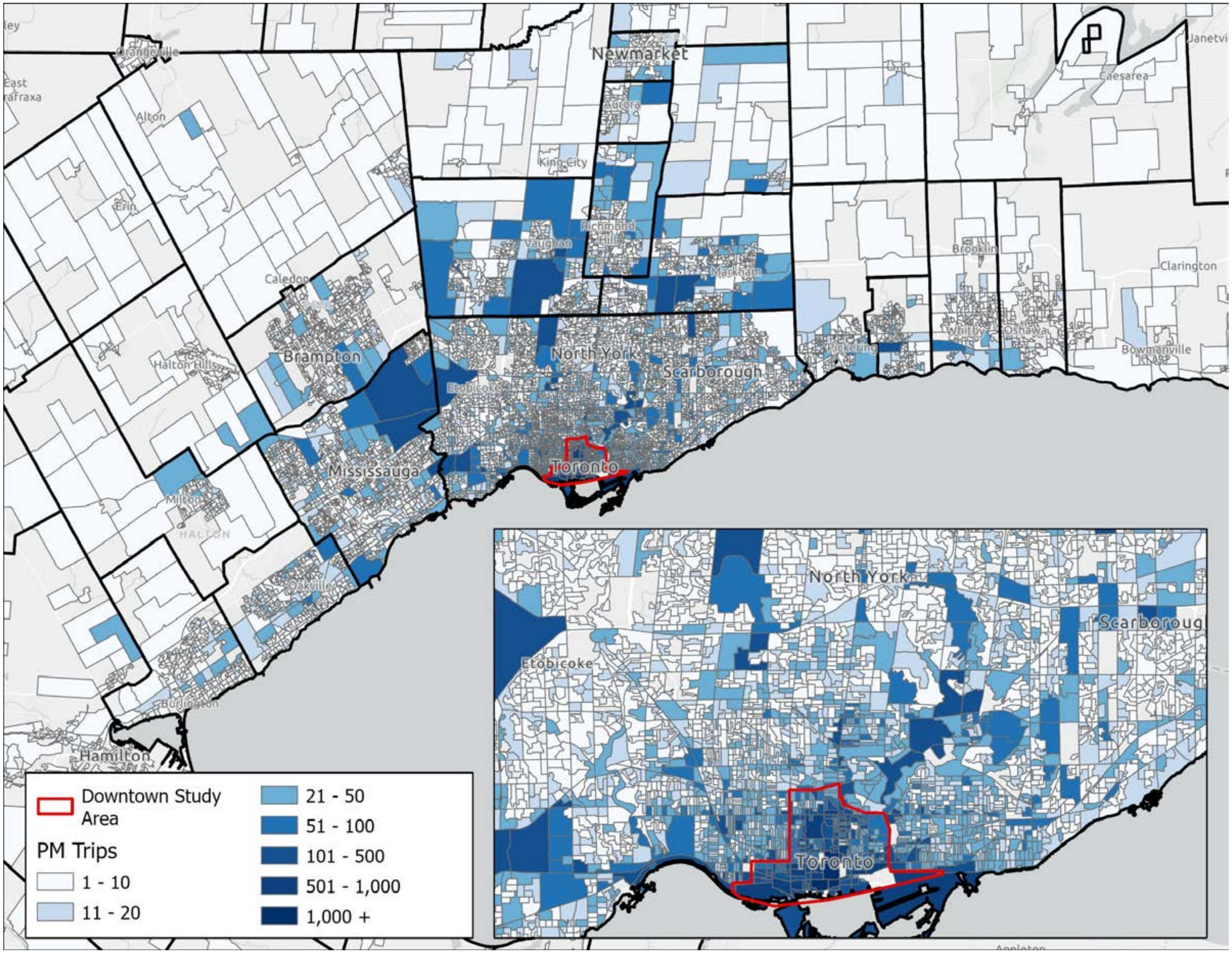


FIGURE 37 – 2019 DESTINATION VOLUME OF PM TRIPS ORIGINATING IN DOWNTOWN TORONTO (SOURCE: STREETLIGHT DATA 2024)

PARSONS

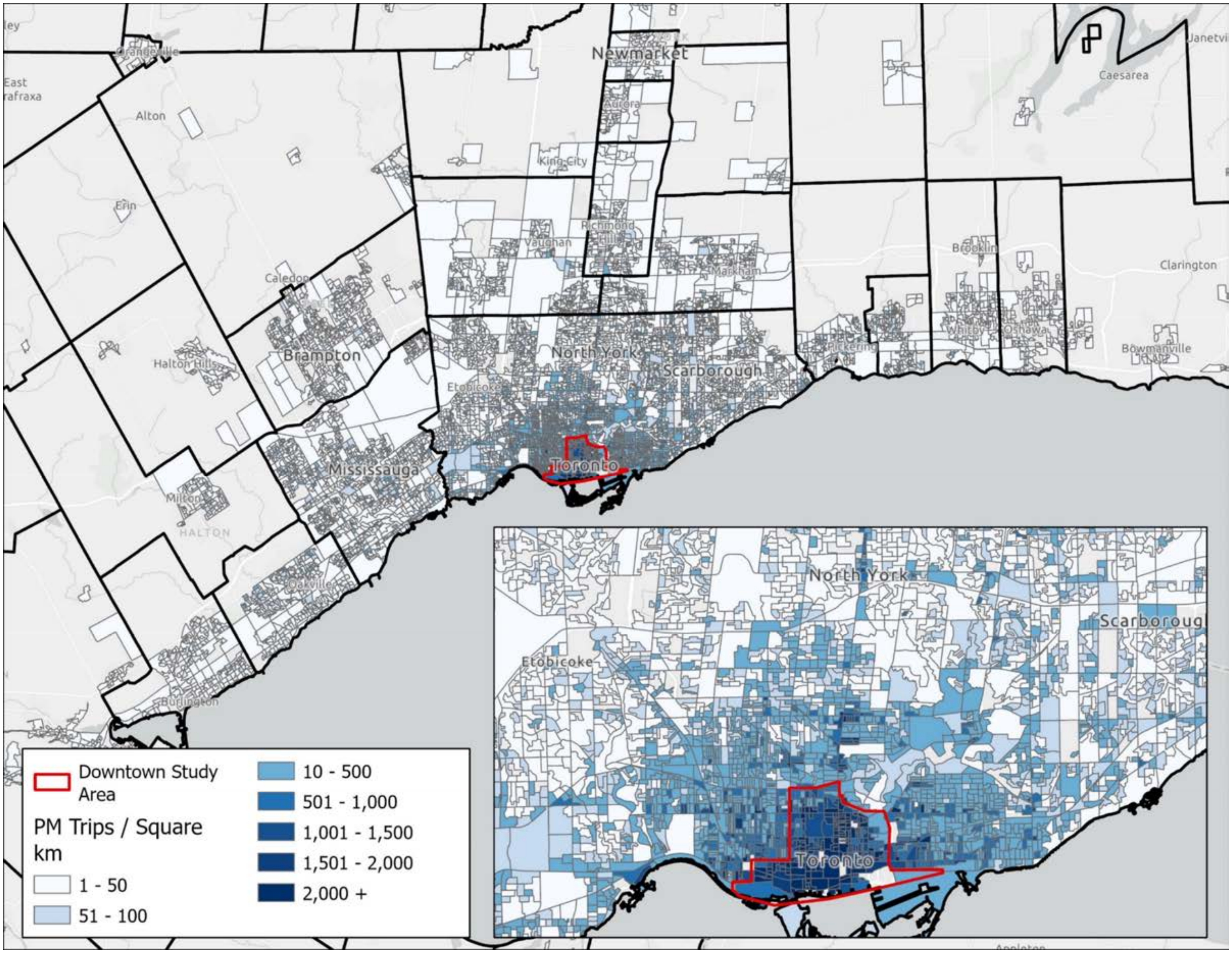


FIGURE 38 – 2019 DESTINATION DENSITY OF PM TRIPS ORIGINATING IN DOWNTOWN TORONTO (SOURCE: STREETLIGHT DATA 2024)

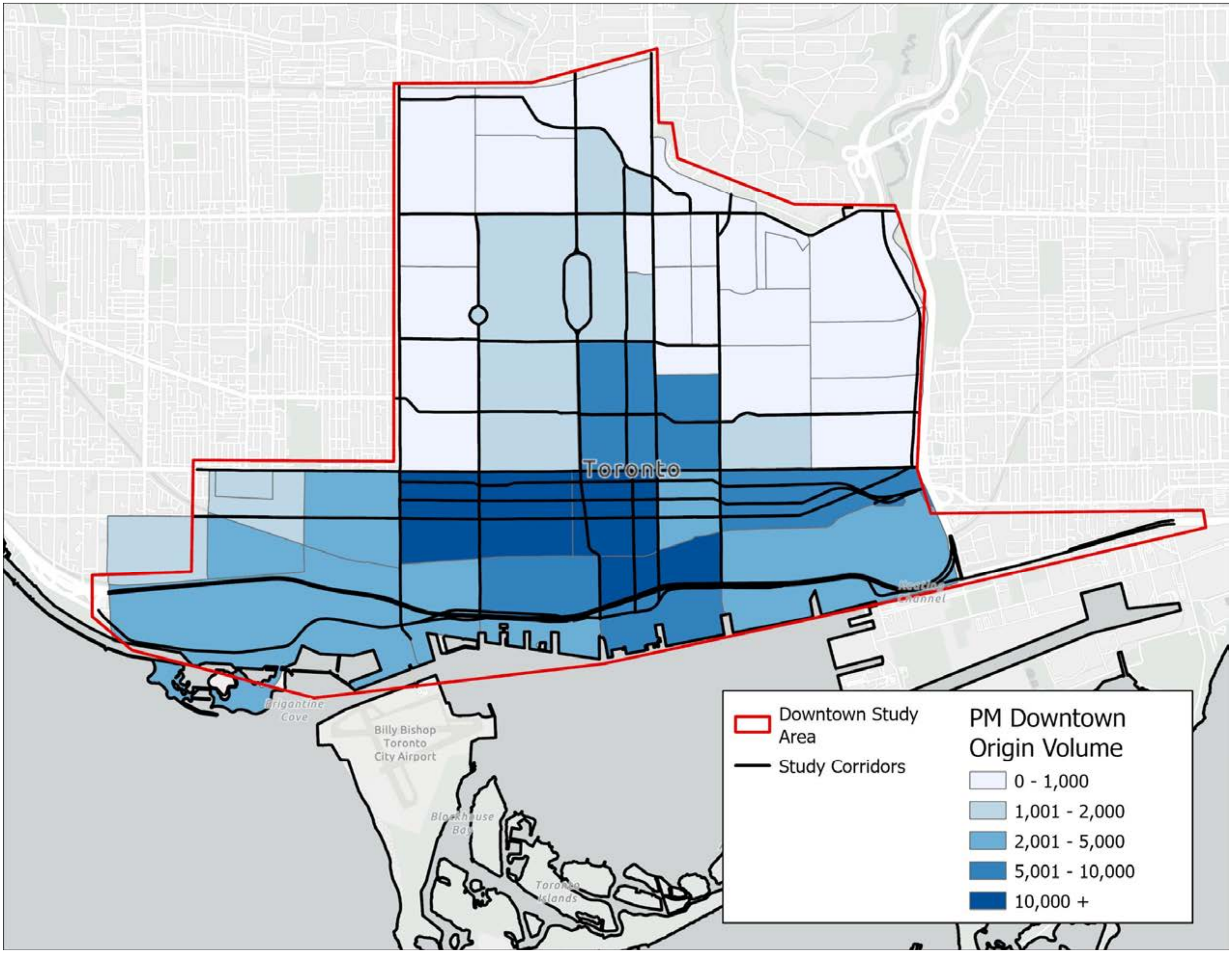


FIGURE 39 – 2019 ORIGIN VOLUME OF PM TRIPS ORIGINATING FROM TORONTO (SOURCE: STREETLIGHT DATA 2024)

The origin-destination patterns provide a couple of valuable insights:

- There is a high density and volume of trips within downtown
- There is a high volume of trips to and from industrial areas or major trip generators, the most notable being:
    - Pearson International Airport in Mississauga
    - Large industrial areas in Toronto, Mississauga, Vaughan, and Markham
- The density of trips to and from downtown is generally highest within and close to downtown, and gradually decreases with distance from downtown
- Within downtown the highest morning demand is to the central business and entertainment areas.

These patterns align with expected travel patterns. While an in-depth analysis of recent changes is pending the availability of updated StreetLight Data in November, the existing data adequately supports our current analysis.

High-level historical origin-destination patterns from the TTS were assessed, revealing that the share of trips to Toronto from the surrounding municipalities had remained constant from 1996 to 2016, as displayed in **Figure 40**.

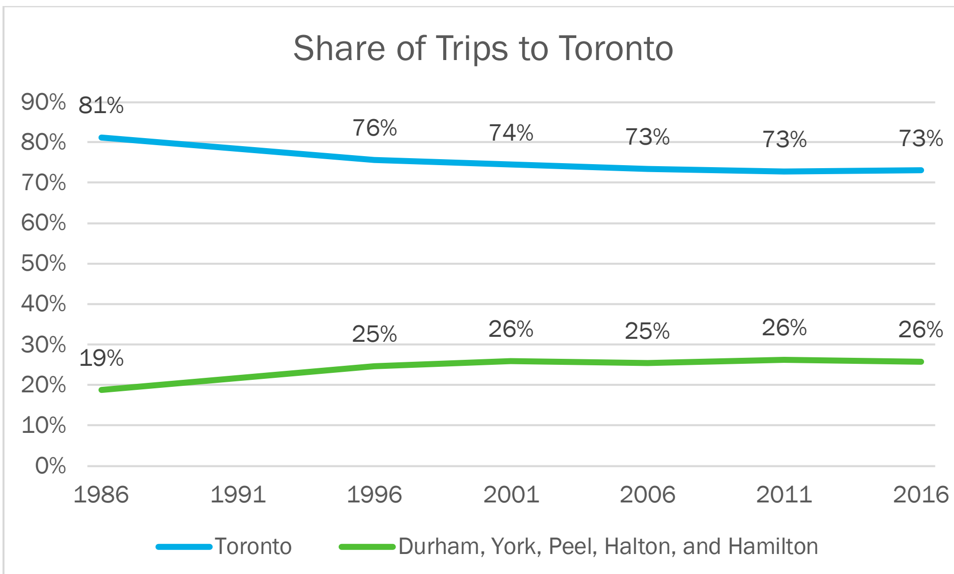


FIGURE 40 – ORIGIN OF AM TRIPS DESTINED FOR TORONTO FROM 1986 TO 2016 (SOURCE: TRANSPORTATION TOMORROW SURVEY 2016)

TRANSIT RIDERSHIP

Transit ridership was hit hard during the pandemic; TTC ridership dropped by 64% between 2021 and 2019, an unprecedented impact. Ridership has been steadily rebounding in recent years; however, it has lagged behind the vehicle demand rebound. As discussed earlier the modal shift to walking, cycling, and transit has been critical to battling the increasing regional travel demand, and this balance has been impacted by the changes in transit ridership. **Figure 41** below displayed TTC ridership since 2019, displaying the substantial impacts of the pandemic.

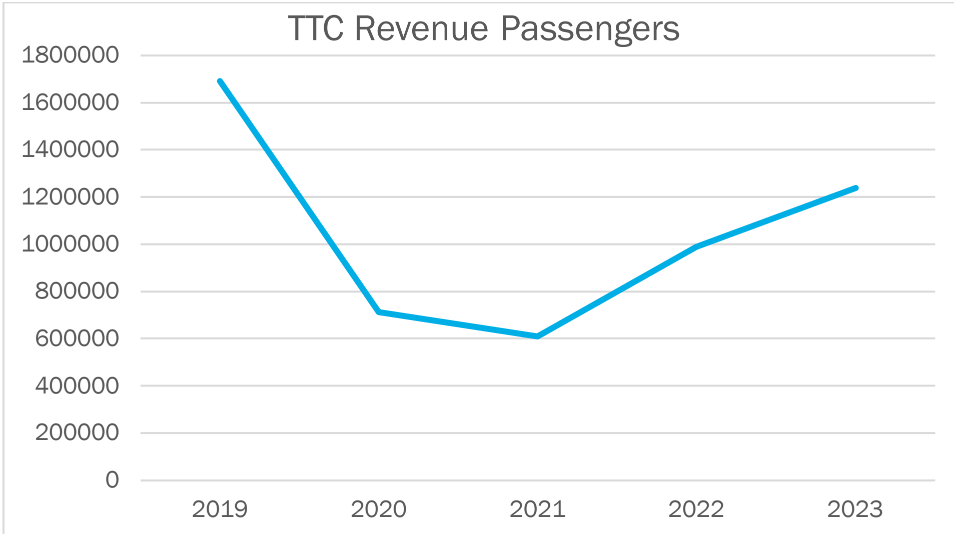


FIGURE 41 – TTC REVENUE PASSENGERS FROM 2019 TO 2023 (SOURCE: TTC 2024)

PARKING

In 2021 the City of Toronto removed parking minimums for new developments, allowing developments to be built without parking. This change was aimed at encouraging alternative modes of transportation, supporting land- and cost-efficient development, providing equitable parking, and streamlining applications. The impacts of this change will be better seen in coming years as new developments with less parking come online, however it does raise concerns over cruising as vehicles drive around searching for parking. Cruising is a known transportation problem and some studies in other cities have suggested it can account for up to 45% of traffic, however it is difficult to quantify, and no Toronto studies exist to support this.

Looking at the high-level parking supply, Green P parking, the City of Toronto's publicly accessible parking, has remained consistent in recent years, with no major changes to on-street and off-street parking as illustrated in **Figure 42**. This assessment doesn't include privately supplied parking, which does contribute a significant volume of parking capacity. Generally speaking, parking suppliers try to align their supply with demand through assessing utilization; the consistent supply of Green P parking over the recent years suggests no major shift in parking demand trends. Furthermore, no large decrease in supply was experienced which could cause excess parking demand and cruising.

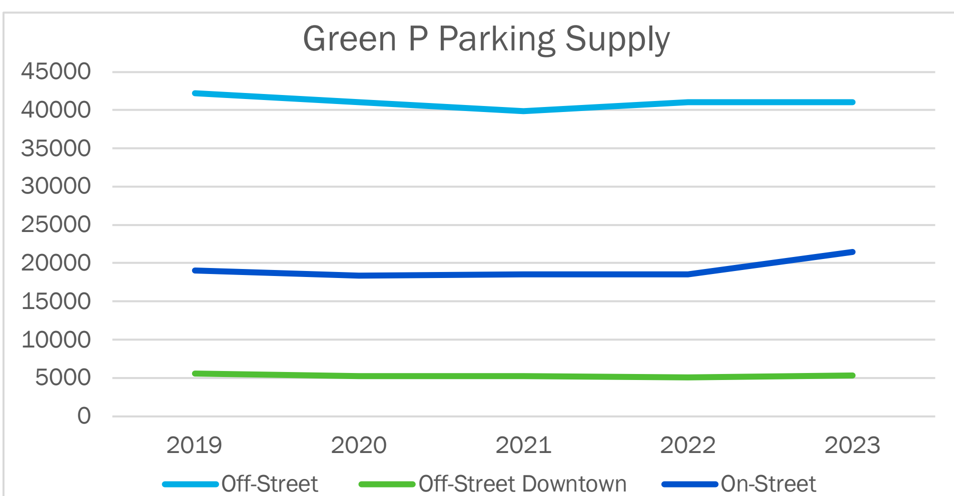


FIGURE 42 – GREEN P PARKING SUPPLY FROM 2019 TO 2023 (SOURCE: TORONTO PARKING AUTHORITY 2019, 2020, 2021, 2022, 2023)

RECENT AND EMERGENT TRANSPORTATION DISRUPTORS

Recent technological advancements have had substantial impacts on people's lifestyles and their travel behaviors. The rise of ride-hailing services such as Uber and Lyft has resulted in an increasing share of ride-hailing traffic. Meanwhile, the growing popularity of e-commerce and deliveries has led to increasing demand for curbside use. Although the impacts of these disruptors are difficult to assess, it is crucial to consider them as they have transformed the city's transportation landscape.

Ride-Hailing

The City of Toronto has been assessing the impacts of ride-hailing on travel patterns, finding that ride-hailing trips had increased by 180% between 2016 to 2019, and by February of 2020 accounted for approximately 8-14% of downtown traffic. These trips are highly concentrated in downtown and most occur on Friday and Saturday nights. However, the assessment determined that despite a growing share of ride-hailing traffic, this has not led to any observable increase in travel times and congestion. The report did note that although there was no change in downtown travel times, ride-hailing trips are less-efficient than other modes of transportation as they require constant circulation between trips, and every additional trip may generate congestion.

Academic research on this topic has led to mixed results with some studies suggesting ride-hailing leads to greater congestion, and others that, it relieves congestion. These studies are highly contextual and given the complex nature of transportation systems and congestion, it is difficult to draw generalized conclusions.

Curbside Management

Curbside activity is any use of road curbside space, including pick-up and drop-off (PUDO), parking, deliveries, goods movement loading, emergency services, and even business uses such as patios and food trucks. As multiple modes of transport, ride-hailing and e-commerce have become more prevalent in recent years, there is an increasing demand for curbside space among competing uses.

Curbside activity has been linked to congestion as the ease of e-commerce deliveries and ride-hailing has created new demand for trips, while the use of curbside space can block through travel causing delays and reducing roadway capacity. Furthermore, the increased conflict due to higher curbside activity can lead to collisions and other accidents, further causing congestion. Despite this, it is tough to quantify the impacts of the increasing demand for curbside space, and no data exists to link it to rising congestion in Toronto.

The City of Toronto has responded to the increasing demand for curbside space by developing the Curbside Management Strategy which was endorsed by Council in 2017. The strategy recommended several policies and implementation tactics, focusing largely on allocating space for specific activities and vehicles, and improving the City's communication, monitoring, and enforcement of curbside space.

System Capacity Constraints

This section examines the key capacity constraints affecting Downtown Toronto's transportation network, highlighting system-level challenges and their impacts on mobility and congestion.

EVOLVING TRANSPORTATION PLANNING CONTEXT

Streets are often the most vital yet underutilized public spaces in cities. Beyond facilitating movement of people and goods, they contribute significantly to the public life of cities and communities. In the city of Toronto, both new and existing streets are being designed with a complete streets approach. This strategy aims to balance various uses within the right-of-way, ensuring that streets cater to all users, including pedestrians, cyclists, transit riders, and motorists, while supporting economic and environmental functions.

The complete streets approach recognizes streets as multifunctional assets:

- **Street for Movement of People**: Prioritizing the mobility of all users—pedestrians, cyclists, transit riders, and motorists across all ages, physical abilities, income and social status.
- **Street as Destinations:** Streets are an economic asset and destination as much as a functional element for traffic throughfare. Well-designed streets enhance business revenues and property values.
- **Street as Critical Infrastructure:** Streets provide space for utilities, stormwater management, trees, landscaping, and green infrastructure, in addition to other public amenities like seating, wayfinding, and public art.

This broader vision contrasts with conventional measures of street performance that emphasize vehicle throughput and speed, focusing instead on creating efficient, inclusive, and resilient urban spaces.

One of the primary challenges in implementing the complete streets approach is the limited street width in dense urban areas. As shown in **Figure 43**, many downtown Toronto streets have a right-of-way of only 20 metres. This space often is accommodating multiple uses, including travel lanes, sidewalks, cycling facilities, utilities, street landscapes etc. Meeting these competing needs within constrained spaces requires strategic trade-offs.

To maximize the performance of limited street space, City of Toronto prioritizes shifting trips toward more efficient transportation modes such as transit, cycling, and walking. As shown in **Figure 44**, private automobile is the least efficient use of street space compared to transit and active transportation.

Prioritizing more efficient transportation modes—such as cycling, walking, and transit—within these constrained spaces often necessitates reallocating road space from private vehicles. **While this trade-off may reduce private vehicle capacity, it ensures the street network can handle higher volumes of people more efficiently.**

FIGURE 43 – RIGHT-OF-WAY WIDTHS OF DOWNTOWN TORONTO STREETS (SOURCE: CITY OF TORONTO)

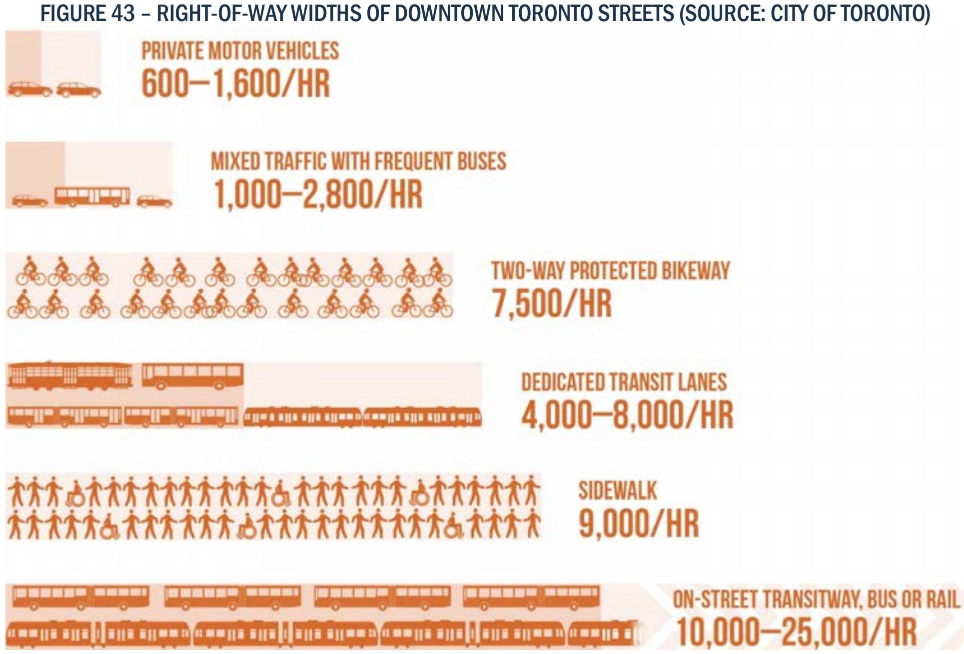


FIGURE 44 – CAPACITY OF A SINGLE TRAFFIC LANE BY MODE (SOURCE: NACTO TRANSIT STREET DESIGN GUIDE)

CYCLING, PEDESTRIAN AND TRANSIT PRIORITY PROJECTS

The City of Toronto has implemented numerous cycling, pedestrian, and transit priority projects in downtown Toronto to promote sustainable transportation modes. While these initiatives align with the broader objective of reducing reliance on private vehicles, they introduce trade-offs that can impact level of traffic congestion.

The effect of cycling projects on traffic varies depending on the local context factors such as on-street parking, loading zones, turning restrictions, and the availability of auxiliary lanes determine the extent to which these projects affect traffic operations. **Figure 45** illustrates the installation and upgrade of higher-order cycling facilities (e.g., bike lanes, cycle tracks) completed between 2019 and 2024. Typically, upgrade projects involve converting temporary quick-build facilities into permanent infrastructure during state-of-good-repair road reconstruction. Unlike new installation projects, these upgrades may not lead to further lane reductions or require significant rebalancing of street uses. Below are examples of key cycling projects and their impacts on overall mobility and congestion patterns, based on before and after studies conducted by the City of Toronto, and supplemented by HERE Travel Time data for additional verifications:

College Street Upgrade - Manning Ave to Bay St

- **Description:** This project reconstructed sections of College Street from 2023 to 2024, replacing painted bike lanes with raised cycle tracks. Additional improvements included enhanced streetcar stop accessibility, parking adjustments, and streetcar track renewal.
- **Benefit and Impact:** The analysis compares peak period travel times between the first half of 2019 and the first half of 2024. Along the section between Spadina Ave and Bay St, the corridor retained four travel lanes, resulting in minimal changes to peak-hour traffic flow. Travel times in this segment showed negligible variation, with average decreases ranging from -5% to -1%. Between Manning Ave and Spadina Ave, all four lanes remained available during peak periods, with curbside parking restricted to off-peak hours. As a result, the upgraded cycling infrastructure had minimal impact on traffic, with travel time changes ranging from -4% to 5% depending on direction and period, maintaining comparable levels of capacity.

ActiveTO Midtown Yonge Complete Street – Bloor St to Davisville Ave

- **Description:** This project involved the installation of a quick-build protected bikeway, alongside on-street patios, road safety improvements, and traffic-calming measures. Pilot installation was completed in 2021 and made permanent in 2023.
- **Benefit and Impact:**
  - **Cycling Volumes:** 57% -180% growth in daily cycling volumes at various sites on Yonge St within the pilot area averaged over the last four count periods from May - October 2022 compared to before the pilot (May 2021), while controlling for seasonality and weather.
  - **Transit Operations:** During subway service disruptions, Line 1 shuttle buses on Yonge St experienced an average travel time increase of 60 to 120 seconds. Operational adjustments mitigated variability, resulting in a customer experience comparable to pre-pilot conditions by the end of 2022.
  - **Auto Travel Time:** Northbound travel times increased by 0.3 minutes during the AM peak, 1.1 minutes midday, and 0.8 minutes during the PM peak in Fall 2022 compared to Fall 2019. Following signal timing adjustments, northbound travel times stabilized during AM peak and midday periods, improving by 0.3 minutes in the PM peak and 0.2 minutes on weekends.
  - **Overall Travel Times:** Over time, travel times stabilized, remaining slightly higher than pre-installation levels towards the end of 2022, indicating effective mitigation through operational adjustments.

Bloor Street West – Shaw St to Avenue Rd

- **Description:** This project involved the installation of a quick-build protected bikeway in 2016, alongside on-street patios, road safety improvements, and traffic-calming measures. The temporary facility is upgraded to permanent facility through state-of-good road construction in 2019.

- **Benefit and Impact:**
  - **Cycling Volumes:** Average cyclist volumes on Bloor St W between Shaw St and Bay St increased by approximately 49 per cent, from 3,300 riders per day in June 2016 to approximately 4,900 riders per day in June 2017.
  - **Safety Improvements:** The total number of conflicts between all road users decreased by 44%.
  - **Traffic Volume Reduction:** Between June 2016 and July 2017, motor vehicle traffic volumes decreased by 16%, with some traffic diverting to nearby Dupont and Harbord Streets. Despite this redistribution, the combined vehicle volume across all three corridors dropped by a modest 3%.
  - **Auto Travel Time:** Immediately after installation, average travel times between Bay St and Ossington Ave increased by approximately 4 minutes eastbound during the morning peak and 8.5 minutes westbound during the afternoon peak. Following signal timing adjustments, these increases were reduced by half, decreasing the eastbound increase to approximately 2 minutes and the westbound to just over 4 minutes. Following the installation of changes in June 2016, average travel times between Bay St and Ossington Ave increased. During the morning peak, eastbound travel times rose by approximately 4 minutes, while westbound travel times during the afternoon peak increased by 8.5 minutes. However, by June 2017, signal timing adjustments mitigated these impacts by half, reducing the eastbound increase to 2 minutes and the westbound increase to just over 4 minutes.

King Street Transit Priority Corridor

In addition to expanding higher-order cycling infrastructure, transit priority projects were introduced in Toronto to improve transit operations and reliability. A notable example is the King Street Transit Priority Corridor, which exemplifies how reallocating street space for public transit can enhance overall mobility:

- **Description:** This project restricted through-traffic for private vehicles along King St between Bathurst St and Jarvis St to prioritize streetcars. The aim was to improve transit operations on Toronto's busiest surface route while enhancing public spaces and supporting local businesses.
- **Benefit and Impact:**
  - **Corridor Capacity:** From November 2017 (before pilot) to December 2018 (when the pilot became permanent), the number of people moving east-west through the downtown core increased by 3% during morning and afternoon commutes.
  - **Impact to Automobiles:** The impact on auto travel times was minimal, with average motorist delays in December 2018 on nearby streets varying by less than one minute compared to pre-pilot conditions in November 2017. Motor vehicle volumes on King Street decreased, with some traffic dispersing to adjacent streets.

FIGURE 45 – CYCLING INFRASTRUCTURE INSTALLATION AND UPGRADES SINCE 2019 (SOURCE: CITY OF TORONTO OPEN DATA)

VISION ZERO ROAD SAFETY PLAN

The City Council's adoption of the Vision Zero Road Safety Plan marks a commitment to eliminating traffic-related fatalities and serious injuries on Toronto's streets. Since its launch in 2017, the City's investment in and implementation of the plan have shown promising results, with a consistent decline in fatalities and serious injuries. The current iteration of the plan builds on the original, focusing on key actions that have proven most effective, including a holistic speed management strategy, road design improvements, proactively addressing high-risk mid-block crossings and turning collisions at signalized intersections, and an education and engagement plan.

As Vision Zero solutions are planned and implemented, there are instances where these efforts may conflict with other priorities, such as reducing congestion and minimizing delays for motorists. **Figure 46** illustrates the location of specific safety measures. Their potential impacts on auto travel times is also discussed:

Installation of New Traffic Signals

- **Details:** 30 new traffic signals have been installed in the study area since 2019.
- **Impact:** Adding new traffic signals may lead to slight increases in delays for motorists.
- **Mitigation:** These signals are carefully coordinated with existing ones to minimize cumulative delays along corridors. Although the number of stops may increase, the total additional delay is often negligible.

Safety-Focused Improvement to Signal Timing

- **Leading Pedestrian Interval (LPI)**
  - **Details:** Provides pedestrians with a five-second head start before vehicles can turn, reducing conflicts between turning vehicles and pedestrians.
  - **Impact:** As of 2024, 212 out of 375 intersections (57%) in the study area are equipped with LPIs. This feature significantly enhances pedestrian safety with marginal delays to vehicle traffic.
- **Protected Turning Movement**
  - **Details:** Replacing permissive left turns with protected signals at some intersections.
  - **Impact:** Increases delays for turning vehicles but enhances safety by fully separating conflicting vehicle, pedestrian and cyclist movements.

Speed Limit Reductions

- **Details:** The majority of downtown Toronto corridors now have speed limits of 40km/h, reduced from 50km/h.
- **Impact:** Adding new traffic signals may lead to slight increases in delays for motorists. Studies show that travel times are more affected by congestion, roadway design, and geometry than by posted speed limits. In moderate congestion conditions, smoother traffic flow at lower speeds can reduce the need for large gaps between vehicles, improving efficiency. Since urban traffic rarely travels at the posted speed limit, speed reductions typically have minimal impact on overall travel times.

Other Traffic Engineering Improvements

- **Details:** Safety improvements, such as tighter turning radii, lane narrowing, and turn restrictions are applied to improve safety of road users at high-risk locations.
- **Impact:** These changes have little effect on travel times and are often limited to side streets. Major arterials with heavy traffic are unaffected by these adjustments.

While these safety measures may cause some localized delays, their primary aim is to enhance safety for all road users, particularly our most vulnerable. The Vision Zero Plan prioritizes the safety of these users across seven emphasis areas through extensive, proactive, targeted, and data-driven initiatives. Although Vision Zero initiatives can introduce minor traffic disruptions, the substantial safety benefits they provide outweigh these delays, resulting in a safer and more resilient transportation network.

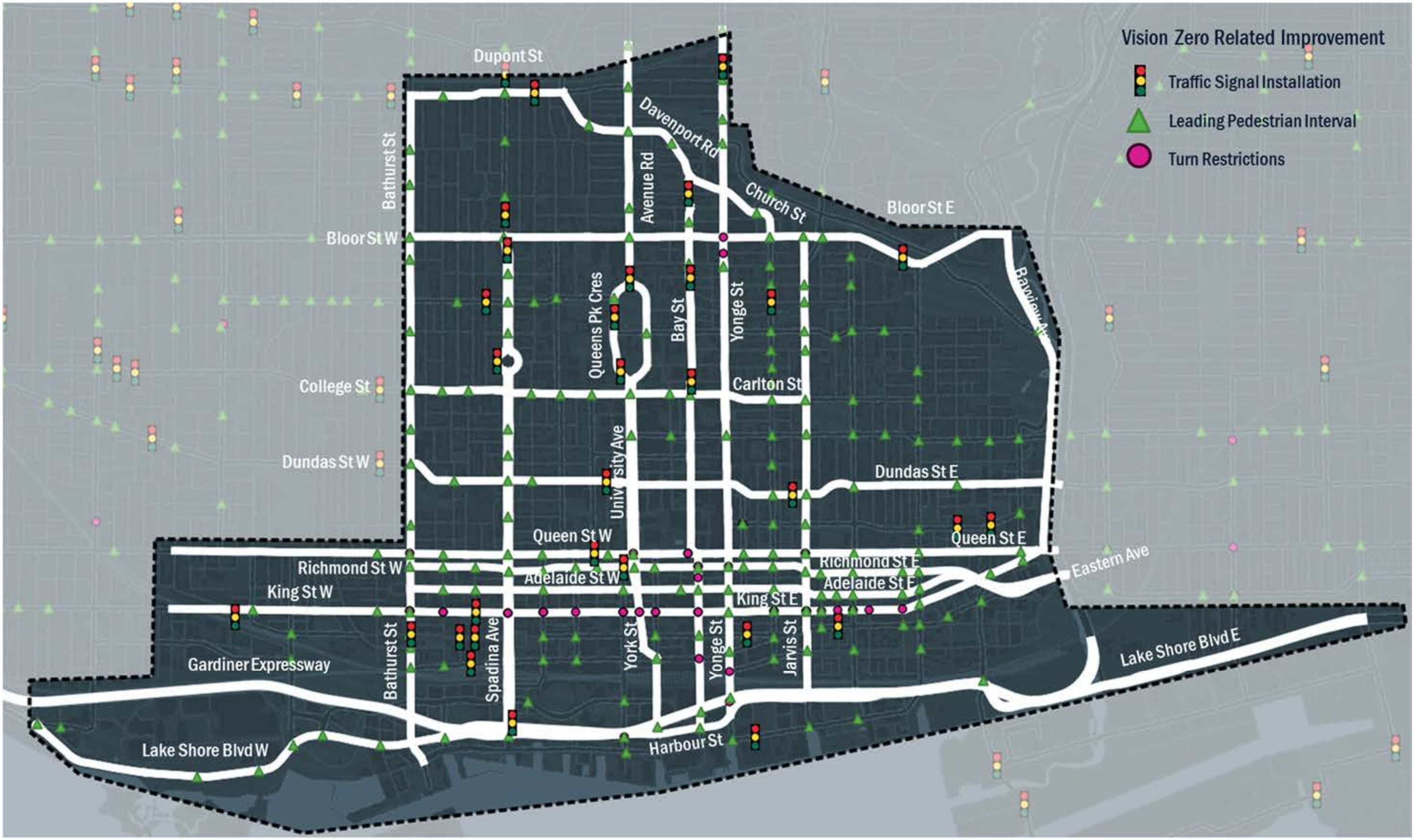


FIGURE 46 – VISION ZERO RELATED IMPROVEMENT SINCE 2019 (SOURCE: CITY OF TORONTO OPEN DATA)

CONSTRUCTION

Building a better city and improving the transportation system requires ongoing construction. However, these projects inevitably disrupt road capacity, contributing to congestion. Downtown Toronto faces daily disruptions from both long-term and short-term construction, driven by public and private sector initiatives—including transit infrastructure, water systems, utilities, and private developments. These activities, along with the reallocation of road space for transit and active transportation, place unprecedented strain on the City's right-of-way.

Figure 49, Figure 50 and Figure 51, illustrate the extent of ongoing and planned construction projects in Downtown Toronto. These include major infrastructure projects by the City of Toronto, TTC, Metrolinx, Waterfront Toronto, and works by third-party utilities and developers. Many projects occur on major arterials, creating challenges for traffic management. The sheer volume of work highlights the complexity of coordinating construction activities across multiple stakeholders.

Third-Party Utility Work (55% of Total Work Zones)

- **Description**: A significant portion of work zones on city roads is owned by third-party utility, hydro and telecommunications projects. These projects include underground and overhead infrastructure upgrades, installations, often through daylighting, boreholes, and test pits.
- **Toronto Hydro Share**: Toronto Hydro accounts for 42% of the total work zones, far exceeding other providers.
- **Impact**: While utility work involves frequent right-of-way occupations, these projects are typically shorter in duration and extent. With that said, short-term utility work can commence with very short notice, leading to unexpected delays for drivers and issues with travel time reliability. Unlike long-term projects, these short-term disruptions are less likely to be communicated widely in advance, limiting commuters' ability to plan alternative routes or adjust their travel times.

City-Led Construction (33% of Total Work Zones)

- **Description**: Led by Transportation Services and Toronto Water, these projects include road resurfacing, reconstruction, cycling facility installation, sidewalk installation, bridge rehabilitation, watermain, storm and sewer upgrades,
- **Impact**: These projects require a mix of short-term intermittent closures (often overnight or on weekends) and longer-term lane closures throughout the construction period, which typically lasts under a year. Long-term construction work is generally well-communicated to the community beforehand, allowing people to plan alternative detour routes and budget additional travel time to ensure timely arrival at their destinations.

TTC Construction Projects (7% of Total Work Zones)

- **Description**: TTC's projects that result in disruption to street right-of-way include streetcar track replacements, and overhead electrical work on streetcar routes and subway station upgrades.
- **Impact**: Streetcar track replacements and electrical upgrades usually result in several months of lane closures or full street closures. Subway station upgrades (e.g., Museum Station Easier Access, Bloor-Yonge Capacity Improvements) may involve years of lane closures on major arterials. These long-term projects, while disruptive, are often communicated in advance, enabling commuters to adjust their travel plans accordingly.

Metrolinx Projects (2% of Total Work Zones)

- **Description**: Metrolinx's transit expansion initiatives, including the Ontario Line, GO Expansion, and Union Station upgrades, involve large-scale capital infrastructure work.
- **Impact**: Although Metrolinx projects account for only 2% of total work zone lengths, their impact can be significant. Some projects, like Ontario Line Queen Station construction, require full road closures on parts of Queen Street and long-term lane closures near other station excavation sites on major arterials. These disruptions are extensive and long-lasting due to the scale and complexity of the work. As with other long-term projects, these projects typically have comprehensive traffic management plan and are typically communicated well in advance to the public.

Private Development Projects (2% of Total Work Zones)

- **Description**: These projects support residential and commercial developments and include staging scaffolds, covered walkways, crane hoists, concrete pumping, and roof hoists.
- **Impact**: Developers occupy the right-of-way for extended periods, with individual closures typically limited to 40–50 meters. However, these work zones often occur near major intersections, transit corridors, or cycling facilities, increasing their impact on traffic flow.

Not every construction project results in full road or lane closures. Any activity occupying the right-of-way, regardless of scale, is recorded in the City's infrastructure database. The degree of disruption depends on the length and complexity of the work zone, the number of lanes affected, and the duration of closures.

To better understand the impact of construction on congestion, the database will be analyzed at the segment, block, and street level. This analysis will identify how specific projects align with top congested bottlenecks and assess the cumulative effect of construction on traffic flow in key areas.

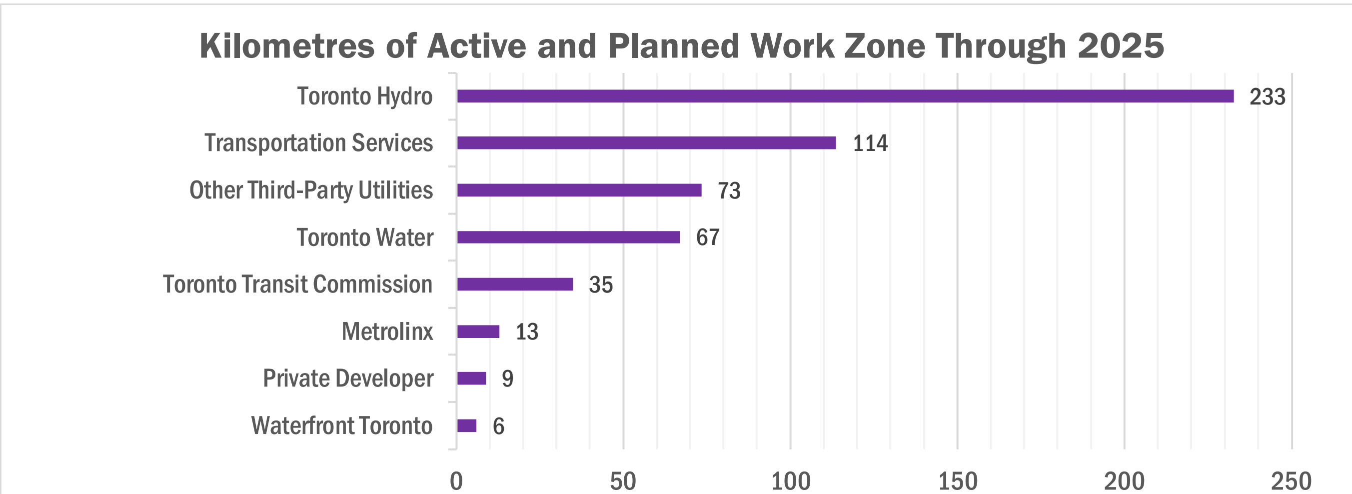


FIGURE 47 – LENGTH OF ACTIVE AND FUTURE WORK ZONES THROUGH 2025 (SOURCE: CITY OF TORONTO INFRASTRUCTURE VIEWER)

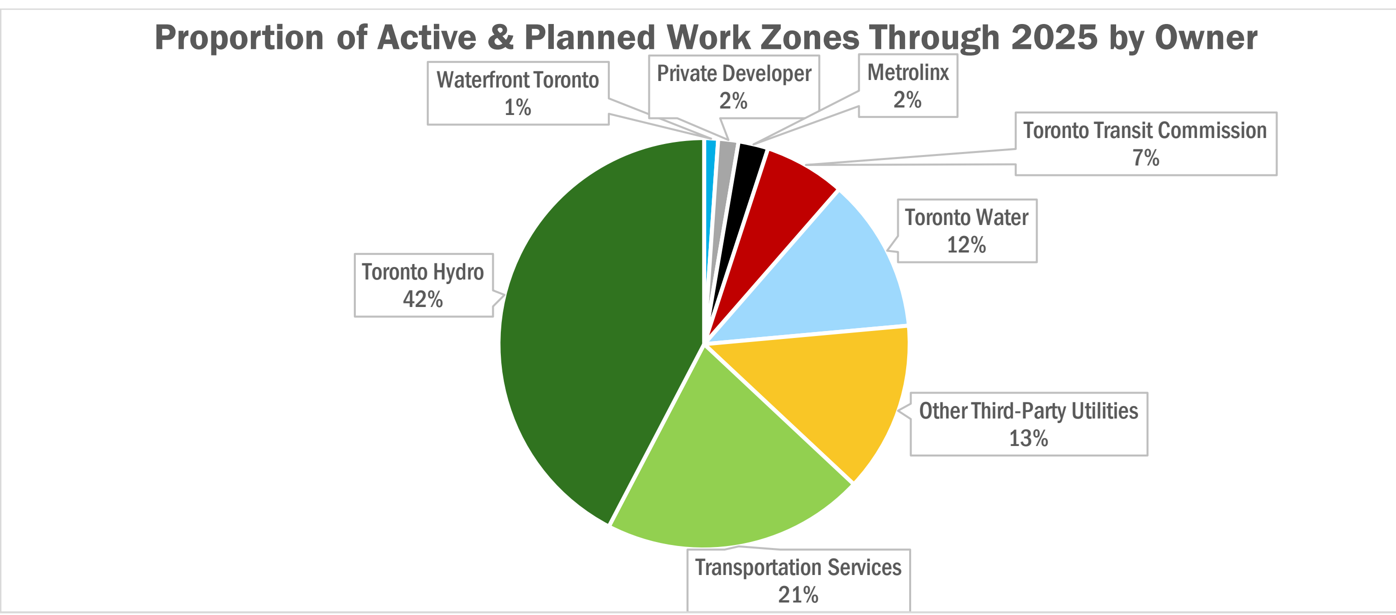


FIGURE 48 – PROPORTION OF ACTIVE AND FUTURE WORK ZONES BY OWNER THROUGH 2025 (SOURCE: CITY OF TORONTO INFRASTRUCTURE VIEWER)

FIGURE 49 – MAP OF ACTIVE AND INFRASTRUCTURE PROJECTS THROUGH 2025 (SOURCE: CITY OF TORONTO INFRASTRUCTURE VIEWER)

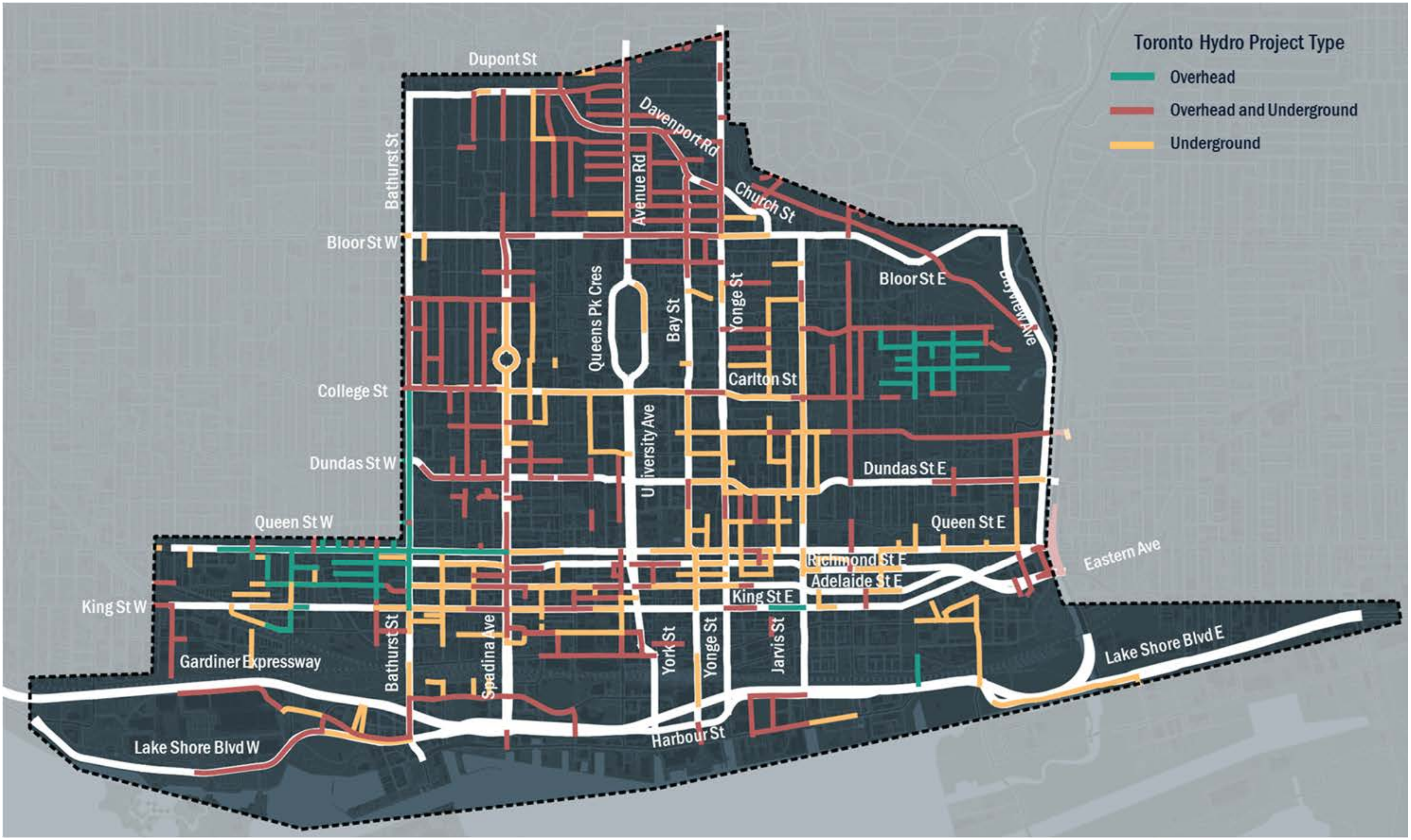


FIGURE 50 – MAP OF ACTIVE AND FUTURE TORONTO HYDRO PROJECTS THROUGH 2025 (SOURCE: CITY OF TORONTO INFRASTRUCTURE VIEWER)

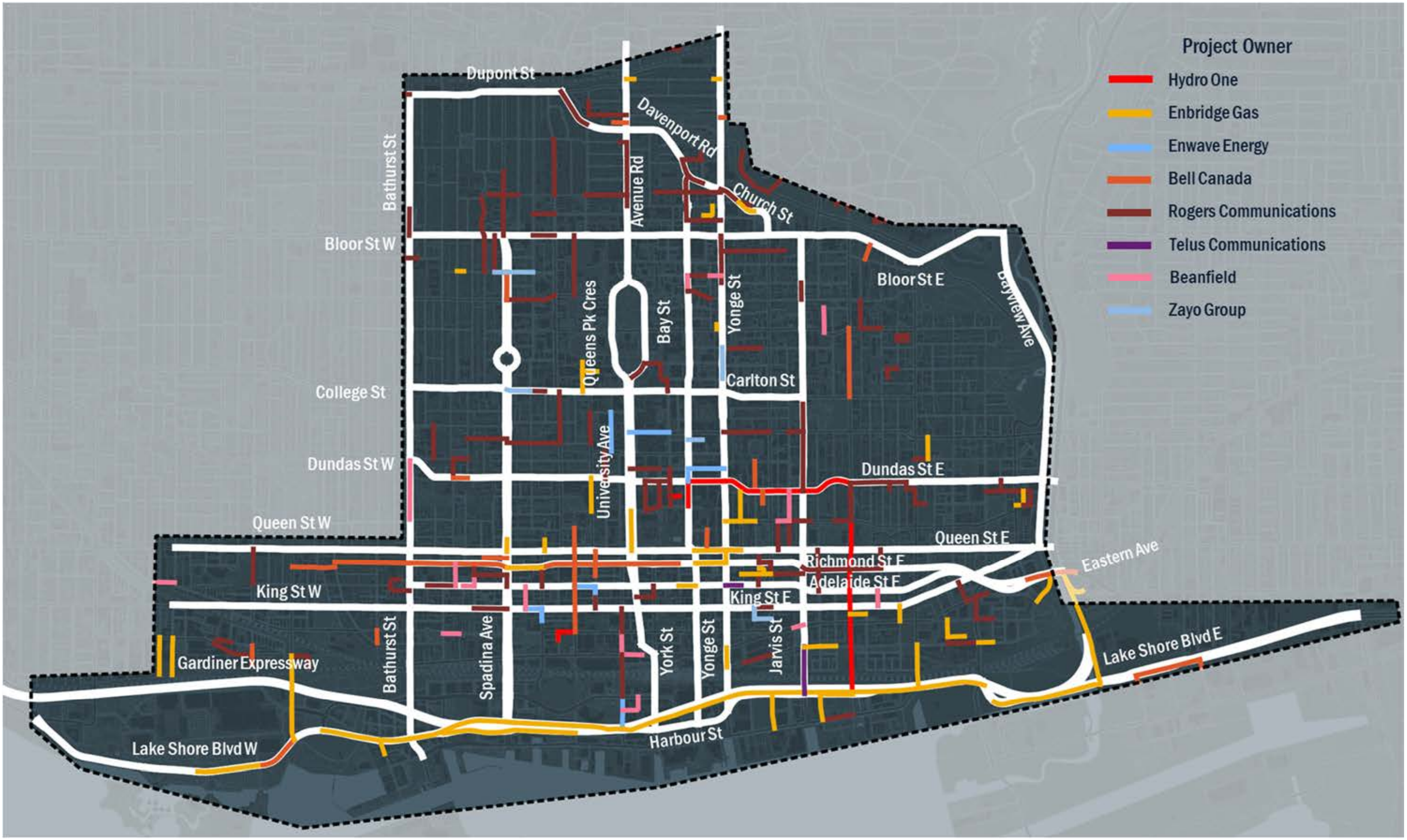


FIGURE 51 – MAP OF ACTIVE AND FUTURE UTILITIES PROJECTS THROUGH 2025 (SOURCE: CITY OF TORONTO INFRASTRUCTURE VIEWER)

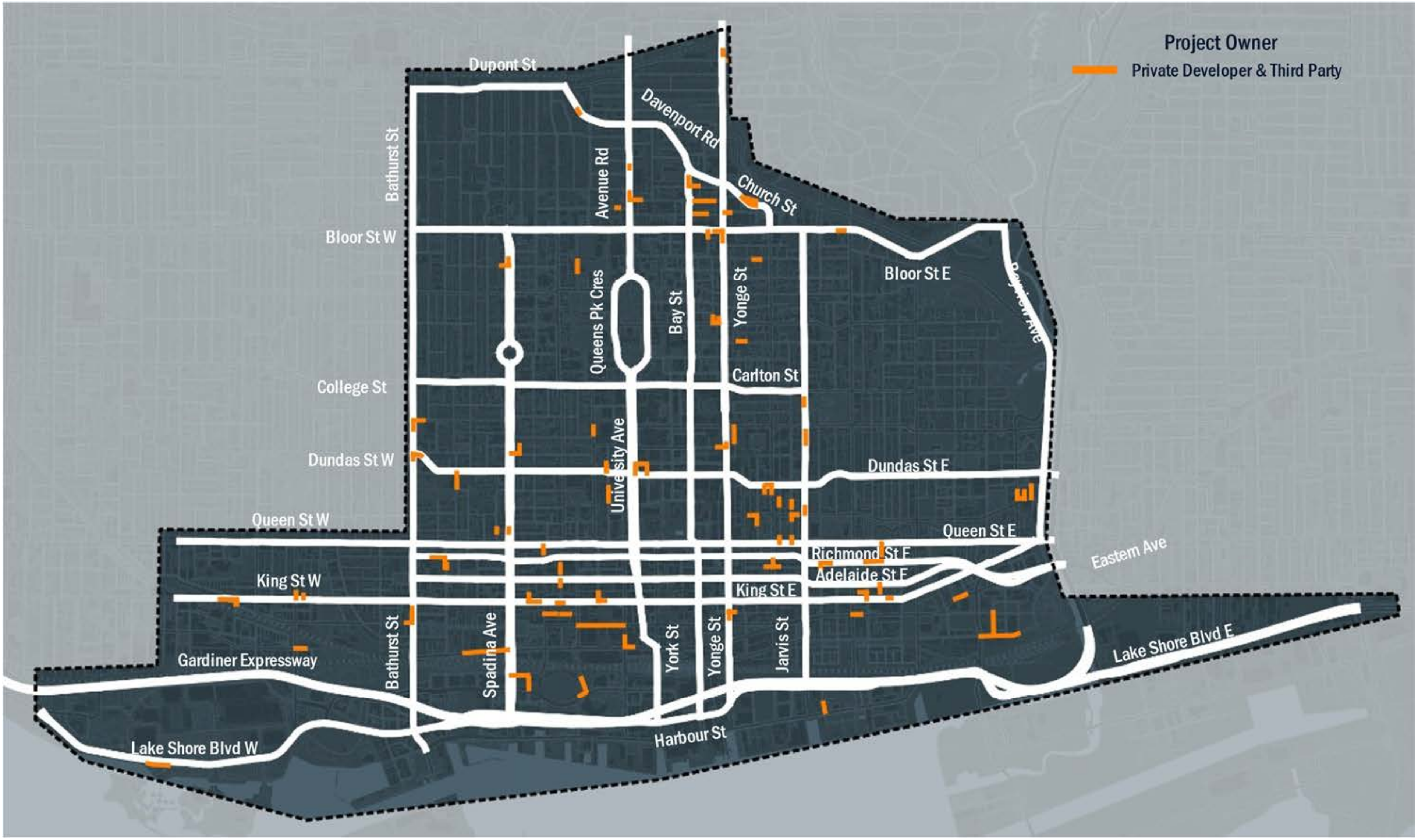


FIGURE 52 – MAP OF ACTIVE AND FUTURE PRIVATE DEVELOPMENT ROAD OCCUPATIONS THROUGH 2025 (SOURCE: CITY OF TORONTO INFRASTRUCTURE VIEWER)

NON-RECURRING CONGESTION

Non-recurring congestion refers to temporary or unusual disruptions in the transportation network that cause unexpected delays and increased travel times. Unlike recurring congestion, which is predictable and often accounted for in planning and data analysis, non-recurring congestion arises from factors such as special events, transit service disruptions, traffic violations, extreme weather conditions, and unforeseen incidents. Understanding these factors is crucial for developing strategies to mitigate their impact on Toronto's transportation network.

CaféTO

The CaféTO program offers licensed eating and drinking establishments in Toronto the opportunity to expand their outdoor dining spaces through sidewalk, curb lane cafés, or patios on private property. This initiative aims to enhance the vibrancy of public spaces, support local businesses, and promote a lively street life, especially during the warmer months.

Curb Lane café expansions are installed from **May to October** each year, occupying portions of the curb travel lanes, transforming them into outdoor dining areas.

Figure 53 illustrates the locations with high concentrations of curb lane cafés during the summer of 2024:

- **Queen St W (Ossington Ave to Spadina Ave):** A number of locations where multiple cafés operate concurrently, intensifying the impact on street capacity and traffic flow.
- **Yonge St (MacPherson Ave to St Clair Ave):** Cafés installed alongside Yonge Street cycle tracks, integrating dining spaces with existing cycling infrastructure and parking spaces.
- **King St (Bathurst St to Spadina Ave):** Another key area with a significant number of curb lane cafés, centered around Portland St.

While the CaféTO program enriches Toronto's public spaces and supports local businesses by expanding outdoor dining, it reallocates curb lanes from vehicles to cafés. This reduction can lead to minor traffic delays and bottlenecks at intersections and mid-block of corridors, especially during peak hours.

To balance these benefits with efficient traffic flow, the City conducts traffic impact evaluations and implements effective management measures. These strategies mitigate congestion, ensuring that street capacity is maintained while outdoor dining continues to enhance the urban environment.

FIGURE 53 – ACTIVE CURBLANE CAFÉTO INSTALLATION IN SUMMER 2024 (SOURCE: CITY OF TORONTO OPEN DATA)

Special Events

Special events—including sports games, concerts, festivals, marathons, and parades—significantly contribute to non-recurring congestion in Toronto by attracting large crowds and increasing travel demand. These events not only bring thousands of attendees to major venues such as Scotiabank Arena, Rogers Centre, Budweiser Stage, and Exhibition Place but also constrain the capacity of existing infrastructure through occasional street closures. The influx of attendees leads to traffic surges that places additional pressure to existing bottlenecks across downtown.

The Gardiner Expressway and Lake Shore Boulevard are particularly vulnerable due to their proximity to event venues. Events at these locations impact these major east-west routes, affecting both road traffic and public transit operations. On days with multiple events—such as back-to-back sports games and concerts—the compounded effect extends congestion periods beyond individual events.

North-south arterials such as Spadina Avenue, York Street, Bay Street, Yonge Street, and Jarvis Street often experience congestion spilling over from the Gardiner Expressway and Lake Shore Boulevard. Bay Street faces additional pressure as it serves pick-up and drop-off traffic for Scotiabank Arena.

Other major arterials are frequently used for events like street parades and marathons. Full closure of these streets can result in widespread congestion and travel disruptions, as traffic is diverted to alternate routes, creating bottlenecks in surrounding areas.

Sporting events like Maple Leafs, Raptors, and Blue Jays games occur year-round, with hockey and basketball peaking in winter and baseball in summer. These events typically take place during weekday evenings or weekends, resulting in traffic surges outside traditional peak periods. Marathons, parades, and festivals often require full or partial road closures during weekends or holidays, further impacting traffic patterns.

The capacity constraints during special events limit the road network's ability to absorb additional traffic, increasing travel times—especially in the downtown core, where recurring congestion is already severe. This interaction between event-driven disruptions and existing congestion emphasizes the importance of coordinated planning to manage non-recurring congestion effectively.

To mitigate the impact of special events on congestion, coordinated planning is essential. Aligning construction projects schedules and event traffic planning can help minimize overlapping disruptions. Providing timely information to the public about road closures and alternate routes enhances travel reliability and allows commuters to plan accordingly. Implementing real-time traffic management strategies, such as dynamic signal timing adjustments and active traffic monitoring, can alleviate congestion during events.

Incidents Affecting Traffic Flow

Unexpected events, including traffic collisions and public demonstrations, can cause sudden and significant disruptions to traffic and TTC operations. These incidents are unpredictable and require swift, tailored responses to manage congestion and maintain traffic flow effectively.

Traffic incidents, such as collisions, vehicle breakdowns, and spills, can lead to unexpected lane closures or slowdowns, resulting in sudden congestion. In 2023, Toronto experienced 298 KSI (Killed or Seriously Injured) collisions, causing major disruptions almost daily across the network. A significant proportion of these fatalities involve vulnerable road users (VRUs), with 40-50 VRUs killed each year, many in downtown Toronto. These incidents are particularly disruptive during peak hours or in high-traffic areas.

Mitigation strategies for traffic collisions involve rapid incident response and clearance. Deploying quick clearance teams and utilizing intelligent transportation systems (ITS) for real-time incident detection are essential for reducing the duration of disruptions. Additionally, public information systems can inform drivers of incidents ahead, allowing them to proactively choose alternative routes. While the City's RESCU team has developed response plans for expected events, ongoing performance monitoring, evaluation, and continuous improvement are recommended to ensure their effectiveness.

Similarly, spontaneous protests or marches that occupy roadways can lead to widespread traffic disruptions. Often, these events are not reported to the City in advance, complicating planning and management efforts. To mitigate the impact of such demonstrations and protests, it is crucial to collaborate with Toronto Police Services (TPS) to develop rapid response plans. These plans include strategies for traffic rerouting and effective communication with the public to manage congestion during these events. Acknowledging existing efforts, it is recommended to implement performance monitoring and evaluation to enhance the effectiveness of these response plans continually.

Traffic Violation

Traffic violations, particularly during rush hours, contribute to congestion by disrupting traffic flow and causing unexpected delays. Common violations include illegal stopping, loading, and parking in no-stopping zones during peak periods.

Illegal stopping and parking reduce available road capacity, creating bottlenecks. These obstructions impede the movement of buses and streetcars, leading to delays in public transit services. Other violations such as "Blocking the Box" disrupt intersection operations, causing gridlock and increasing the risk of collisions.

Figure 54 illustrates the hotspot location for rush hour stopping and standing violations, based on parking tickets data from 2019 to 2023.

- Queen St W between Bathurst St/Spadina Ave/Beverley St
- King St W between Shaw St and Bathurst St
- College St-Carlton St between Bay St and Yonge St
- Queen St E west of Jarvis St
- Avenue Rd between Bloor St and Davenport Rd

Increased enforcement of traffic regulations during peak periods can deter violations. Educational campaigns can inform drivers about the consequences of traffic violations. Infrastructure improvements, such as clear signage and road markings, can reduce unintentional violations.

FIGURE 54 – RUSH HOUR NO STOPPING AND STANDING TICKETS ISSUED BETWEEN 2019 AND 2023 (SOURCE: CITY OF TORONTO OPEN DATA)

TTC Diversions and Service Disruptions

Temporary disruptions to Toronto Transit Commission (TTC) subway and streetcar services impact both transit users and the road network by shifting demand from transit to auto-based modes. Subway closures often require large fleets of shuttle buses, straining key corridors like Yonge Street and Bloor Street. These diversions increase travel times and create bottlenecks as buses compete with private vehicles on already congested roads.

Construction projects along major transit routes—such as King Street, Queen Street, and College-Carlton Street—force temporary streetcar and bus diversions, reducing transit reliability and public confidence. These disruptions risk driving long-term shifts away from transit use, as commuters increasingly rely on other modes of transportation, potentially exacerbating congestion.

Providing timely advance notice of both planned and unplanned service disruptions allows commuters to adjust their routes or choose alternative modes of transportation. To further mitigate the impact on travelers, enhancing shuttle and replacement services with increased capacity and frequency is essential. Additionally, transparent communication about expected delays and service changes helps maintain public trust and encourages continued use of transit services.

Extreme Weather Events

Extreme weather events, such as winter storms and flooding, contribute to non-recurring congestion by reducing road capacity and disrupting traffic flow. There is a growing trend of extreme weather events in Toronto, driven by climate change. Climate risk assessments conducted by the City of Toronto have identified extreme heat and heavy precipitation as critical risks for transportation infrastructure, exacerbating the impacts on traffic and congestion.

Heavy snowfall slows vehicle speeds, increases stopping distances, and creates hazardous driving conditions, leading to significant delays on key routes. These conditions also impact TTC operations, with buses and streetcars experiencing delays or cancellations, further straining surface roads as travel demand increases.

Flooding is another common issue, particularly in low-lying areas such as sections of the Don Valley Parkway (DVP) and Lake Shore Boulevard. During severe weather events, sections of these roads may become impassable, forcing lane closures and causing congestion to spill over onto surrounding routes. Such events increase the risk of collisions and breakdowns, extending delays and slowing recovery efforts.

Enhanced weather monitoring and timely dissemination of weather advisories enable proactive management of traffic during extreme conditions. Preparedness measures, such as efficient snow removal operations and flood mitigation infrastructure, can reduce the severity of disruptions. Public communication campaigns can encourage the use of public transit or advise against non-essential travel during severe weather.

Congestion Bottlenecks and Critical Corridors

Addressing congestion requires a comprehensive understanding of both localized issues and systemic factors that affect the movement of road users. This section identifies the root causes of congestion at key locations, acknowledging that traffic congestions result from multiple, interrelated factors. Each factor is systematically examined to uncover immediate and underlying causes. Given the complexity of transportation systems, this analysis focuses on the factors that have the greatest impact, while considering the broader system-level dynamics at play. The following methods are used to provide a thorough and structured assessment of root causes:

Travel Time and Speed Trends

- Analyze travel time and speed data trends to quantify delays and assess the severity, extent and duration of congestion at each bottleneck.

Analysis of Historical Traffic Volume Trends

- Review intersection and segment traffic volumes across all modes (automobile, transit, cycling, and pedestrian) to identify traffic volume patterns, mode share changes and potential capacity constraints over time.

Review of Key Changes and Events

- Investigate significant events (e.g., construction projects, infrastructure upgrades, policy changes) that correlates with shifts in traffic behavior to pinpoint the corresponding root cause event.

Where possible, our findings are connected to potential actions—ranging from quick solutions to long-term strategies—that align with broader policy and operational goals.

BLOOR-YONGE AREA

Overview of Congestion Trend

Bloor St is a key arterial road in Downtown Toronto, connecting major commercial, residential, and cultural hubs. The Bloor-Yonge intersection, in particular, is one of the busiest intersections in Toronto, with some of the highest pedestrian, transit ridership, and cycling volumes in Toronto. Accommodating substantial vehicular, pedestrian, and cycling traffic, Bloor St experiences severe congestion in terms of intensity, extent, and duration among the major arterials, making it a critical area for congestion analysis. This section identifies the root causes of congestion along Bloor Street and reviews potential solutions to enhance mobility and reduce delays for all road users.

Figure 55 illustrates the extent and severity of congestion along Bloor St, highlighting key areas of concern:

- **Persistent Congestion Before and After COVID-19:** The Bloor-Yonge intersection has experienced recurring congestion both before and after the COVID-19 pandemic, with increased severity in the post-pandemic period.
- **Critical Hotspots in 2023 and 2024:** Notable eastbound congestion from Avenue Rd to Church St, centered around the Yonge-Bloor intersection.
- **Construction Leading to New Hotspots in 2024:** The recently concluded Bloor St W reconstruction introduced a new temporary westbound congestion hotspot between Avenue Rd and Spadina Ave.

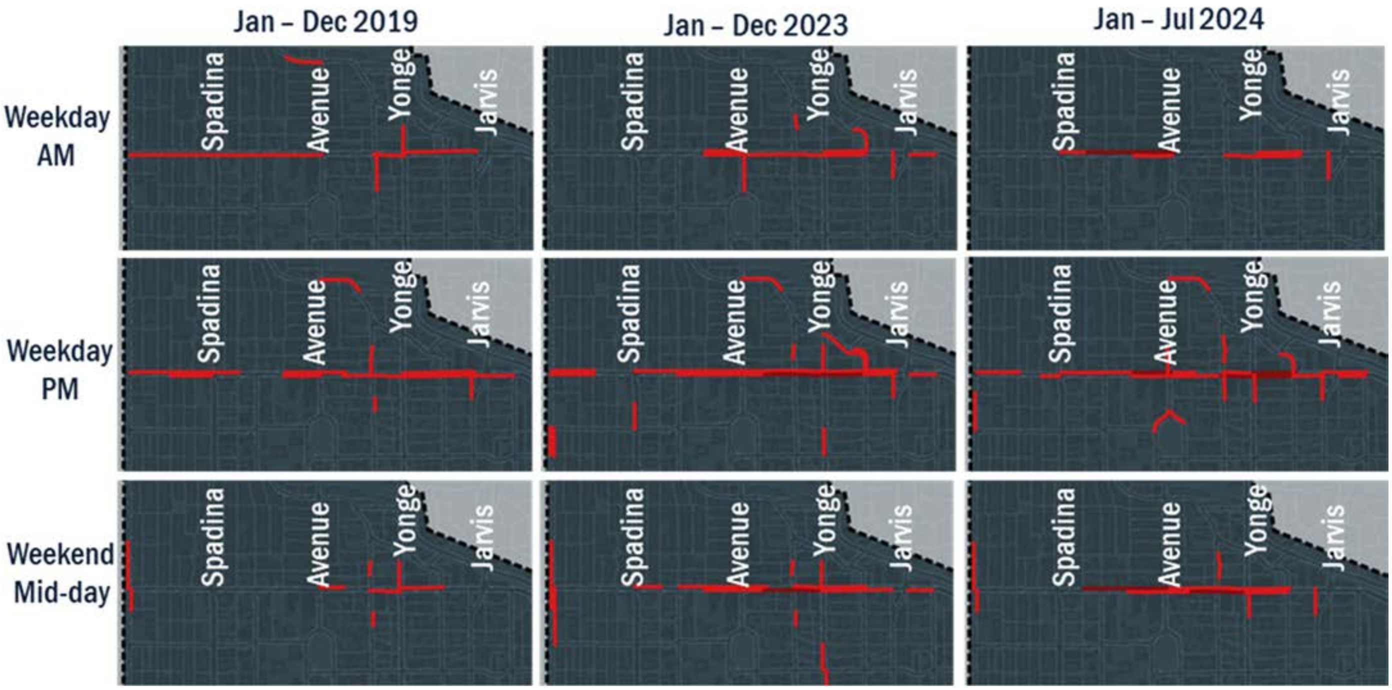


FIGURE 55 – EXTENT OF SEVERE AND CRITICAL CONGESTION ALONG BLOOR STREET (SOURCE: HERE TRAVEL TIME ANALYSIS)

Understanding the root causes of congestion on Bloor St is essential for developing effective mitigation strategies. **Table 2** summarizes the specific root causes leading to severe vehicular congestion on Bloor St within the study area.

TABLE 2 – ROOT CAUSE OF CURRENT STATE CONGESTION ON BLOOR ST

Root Cause Category	Milestone Events	Description	Relative Traffic Impact
Complete Street Initiatives and Vision Zero Safety Plan	- Bloor St Cycle Tracks (Avenue Rd to Castle Frank Rd) (2020) - Bloor St Bike Lane (Shaw St to Avenue Rd) (2016) - Various Pedestrian Safety and Priority Measures (pedestrian scramble, LPIs)	Reprioritization of street space from private vehicles to active transportation modes, along with enhanced safety improvements, reducing vehicular capacity.	High – Removal of two traffic lanes and limited signal timing adjustments
Construction	- Bloor St West Reconstruction – Avenue Rd to Spadina Ave (July 2023 – Oct 2024) - Glen Road Pedestrian Bridge & Tunnel Replacement (Oct 2021 - Ongoing) - TTC Bloor-Yonge Station Capacity Improvements (Jan 2024 – Ongoing) - Toronto Hydro Bloor St Upgrades – Avenue Rd to Yonge St (2024)	Ongoing and past construction projects result in lane and street closures, increasing congestion.	High – Short-term and long-term lane/street closures
Development Staging	- 1 Bloor St W (Nov 2020 – Jan 2026) - 387–403 Bloor St E (Mar 2019 – Jan 2023)	Temporary detours and access restrictions as a result of construction staging for residential developments.	Medium – Long-term curb-lane occupation affecting movement of all road users

Analysis on Complete Street Initiatives and Vision Zero Safety Plan

The introduction of cycling infrastructure on Bloor St in 2020 required the removal of one vehicle lane in each direction between Avenue Rd and Sherbourne St. This trade-off to improve overall people-moving capacity directly decreased capacity for automobiles, contributing to congestion during peak periods.

To assess the impact of these complete street initiatives, changes in cycling volumes, traffic volumes, and auto travel times are examined using the HERE Travel Time data and City of Toronto Open Data (8-hour Intersection Volume).

The implementation of cycling infrastructure has led to **substantial increases in cycling volumes** along Bloor St, indicating a successful shift towards active transportation modes. These significant increases in cycling volumes and mode shares demonstrate that the infrastructure improvements are driving a long-term shift toward cycling across all seasons. The Bloor-Yonge comparison spans fall and summer, indicating rise in cycling volumes during favorable weather periods. The Bedford-Bloor winter-to-winter comparison also shows sustained growth, highlighting increased cycling volume even in colder conditions.

Concurrently, there has been a **notable decrease in motor vehicle volumes** along Bloor St, suggesting a modal shift and potential traffic redistribution resulting from the complete street initiatives. Some vehicular traffic has diverted to nearby corridors, such as Davenport Rd and Wellesley St. The overall reduction in vehicle volumes along Bloor St indicates that the complete street initiatives may have influenced drivers to choose alternative routes or shift to other modes of transportation.

TABLE 3 – CYCLING AND VEHICLE VOLUME ON BLOOR ST (SOURCE: CITY OF TORONTO OPEN DATA)

Location	Date	Cycling Volume	Cycling Mode Share	Vehicle Volume	Vehicle Mode Share
Bloor St at Yonge St	November 15, 2018 (Fall)	594	2%	14,876	41%
	June 22, 2023 (Summer)	2,481	8%	9,291	29%
	Percentage Change	318%	6%	-38%	-12%
Bedford Rd at Bloor St	January 1, 2018 (Winter)	479	2%	10,868	49%
	February 28, 2024 (Winter)	1,055	6%	8,757	49%
	Percentage Change	120%	4%	-21%	0%

The changes in street configuration, signal timings and current construction road occupation have impacted auto travel times along Bloor St. **Table 4** and **Table 5** show the changes of actual travel time and travel time index changes between Avenue Rd and Sherbourne St from 2019 to 2024. Between 2019 and 2023, travel time indexes **increased by up to 67%** and **14%** in the eastbound and westbound directions respectively during peak periods. The slight decreases in 2024 suggest adaptations of travel behaviour that have improved travel times.

TABLE 4 – AUTO TRAVEL TIME ON BLOOR ST BETWEEN AVENUE RD AND SHERBOURNE ST (SOURCE: HERE TRAVEL TIME ANALYSIS)

Direction & Period	2019	2023	2024	Change (2019–2023)	Change (2023–2024)
Avenue to Sherbourne - Eastbound Travel Time (minutes)					
Weekday AM Peak (7-10 AM)	5.5	7.9	7.6	2.4 (43.6%)	-0.3 (-3.8%)
Weekday PM Peak (3-6 PM)	6.8	11.0	10.5	4.2 (61.8%)	-0.5 (-4.5%)
Weekend Mid-Day Peak (1-6 PM)	5.7	10.2	9.7	4.5 (78.9%)	-0.5 (-4.9%)
Avenue to Sherbourne - West Travel Time (minutes)					
Weekday AM Peak (7-10 AM)	6.5	7.4	7.1	0.9 (13.8%)	-0.3 (-4.1%)
Weekday PM Peak (3-6 PM)	7.4	9.9	9.4	2.5 (33.8%)	-0.5 (-5.1%)
Weekend Mid-Day Peak (1-6 PM)	6.2	9.2	8.5	3.0 (48.4%)	-0.7 (-7.6%)

TABLE 5 – AUTO TRAVEL TIME INDEX ON BLOOR ST BETWEEN AVENUE RD AND SHERBOURNE ST (SOURCE: HERE TRAVEL TIME ANALYSIS)

Direction & Period	2019	2023	2024	Change (2019–2023)	Change (2023–2024)
Avenue to Sherbourne - Eastbound Travel Time Index					
Weekday AM Peak (7-10 AM)	1.8	2.3	1.9	23%	-15%
Weekday PM Peak (3-6 PM)	2.3	2.8	2.9	19%	4%
Weekend Mid-Day Peak (1-6 PM)	1.6	2.7	2.5	67%	-6%
Avenue to Sherbourne - Westbound Travel Time Index					
Weekday AM Peak (7-10 AM)	2.0	1.8	1.8	-9%	1%
Weekday PM Peak (3-6 PM)	2.1	2.4	2.4	10%	2%
Weekend Mid-Day Peak (1-6 PM)	1.8	2.1	2.3	14%	9%

GARDINER EXPRESSWAY, LAKE SHORE BLVD AND OTHER IMPACTED STREETS

Gardiner Expressway is a critical east-west expressway connecting Downtown Toronto to the broader highway system within the Greater Toronto Area. The section between Jameson Ave and Spadina Ave carries over 150,000 vehicles on an average day, reflecting its significant role in the city's transportation network. Analysis has identified the Gardiner as the **most congested corridor**, with congestion impact scores double those of other routes due to high traffic volumes, severe congestion levels, extended queuing, and prolonged congestion durations.

The westbound (WB) section between Jarvis St and Strachan Ave is a chronic bottleneck, with significant travel time increases, particularly during weekday PM peaks. This congestion also affects major north-south arterials like Spadina Ave, York St, Bay St, Yonge St, and Jarvis St, leading to gridlock across the downtown street network.

Additionally, Harbour St in the eastbound direction from the Gardiner off-ramp to Bay St is another persistent bottleneck, mirroring the congestion issues faced in the WB direction.

The eastbound (EB) section also faced a temporary bottleneck in 2023 following the removal of the Logan Avenue off-ramp. The EB Jarvis Street off-ramp became the last exit to Lake Shore Blvd before the Bloor Street off-ramp, leading to increased traffic diversion and severe congestion. This bottleneck was subsequently alleviated through traffic operations improvements at the Jarvis off-ramp and driver adaptation to the new road configuration.

Figure 56 and Figure 57 illustrate the extent and severity of congestion in the area neighboring Gardiner Expressway Bloor St, highlighting several areas of concern:

- **Persistent and Increasing Post-COVID Congestion:** Congestion on the Gardiner, Lake Shore Blvd, Harbour St, and other north-south arterials has worsened since the COVID-19 pandemic.
- **Impact of Construction Since April 2024:** The ongoing Gardiner Section 2 (GS2) rehabilitation project has significantly increased WB travel times between Don Valley Parkway and Strachan Ave:
  - Typical Overnight Free-Flow Travel Times: 5–7 minutes.
  - 2019 PM Peak: 15–21 minutes.
  - 2023 PM Peak: 17.5–24.5 minutes.
  - 2024 PM Peak (Post-GS2): 25–35 minutes.
- **Slight Improvement Since June 2024:** In June and July 2024, slight travel time improvements were observed due to:
  - Real-time traffic monitoring and additional congestion management measures.
  - Retiming over 60 traffic signals to adapt to changing travel patterns from King St to Lake Shore Blvd, between Dufferin and Strachan.
  - Extending east-west green signal timings along Lake Shore Blvd and increasing left-turn movement at Lake Shore and British Columbia.

  - Deploying variable message signs to guide motorists.
- **Eastbound Congestion Patterns**: The EB section experiences less congestion east of Jameson Ave, as EB traffic is metered west of Jameson Ave, improving travel times into downtown compared to pre-construction conditions.

FIGURE 56 – EXTENT OF SEVERE AND CRITICAL CONGESTION NEAR GARDINER EXPRESSWAY DURING WEEKDAY PM PEAK PERIOD (SOURCE: HERE TRAVEL TIME ANALYSIS AND CITY OF TORONTO)

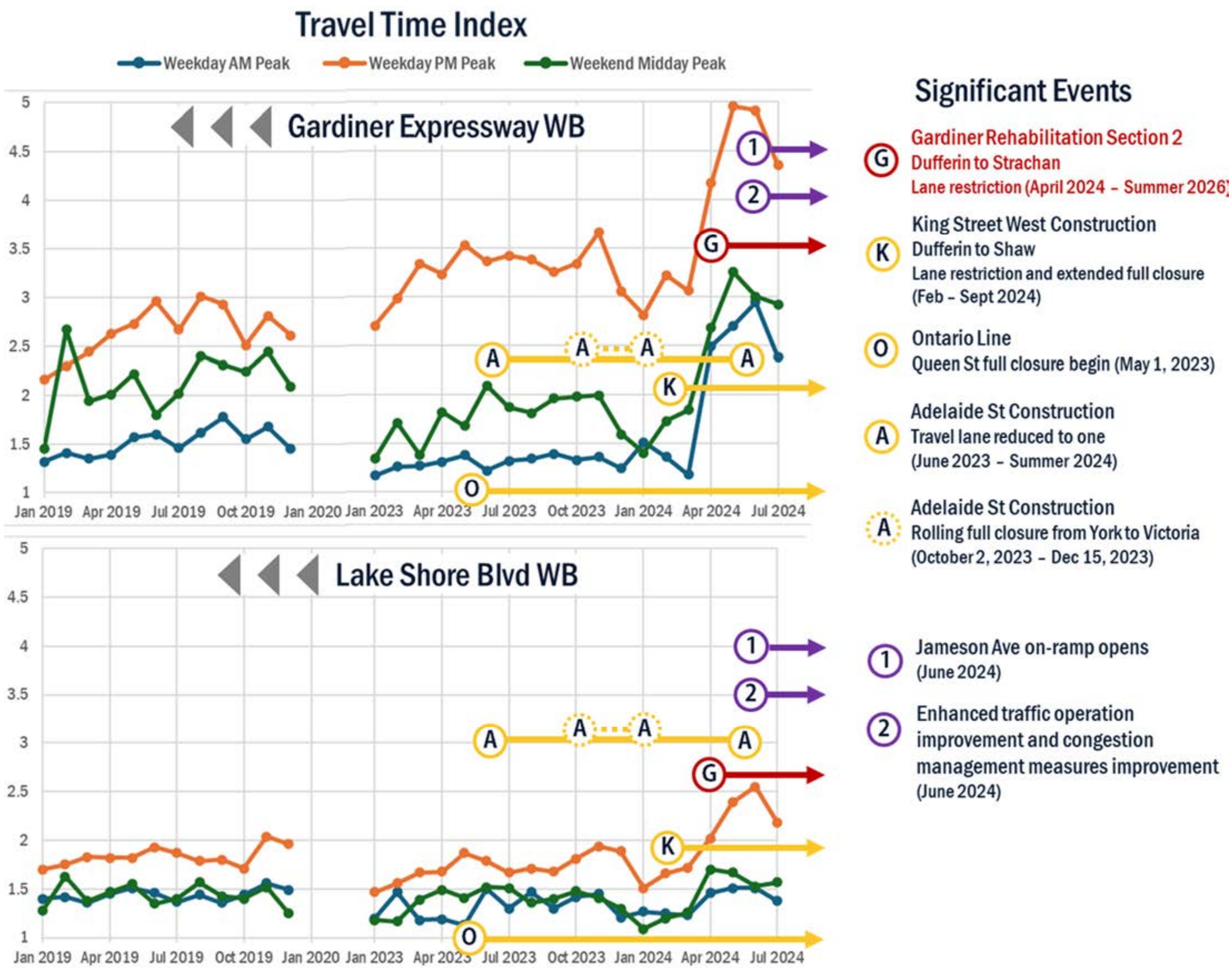


FIGURE 57 – WESTBOUND GARDINER AND LAKE SHORE BLVD TRAVEL TIME TREND AND SIGNIFICANT EVENTS (SOURCE: CITY OF TORONTO INFRASTRUCTURE VIEWER)

Understanding the root causes of congestion on the Gardiner Expressway is essential for developing effective mitigation strategies. **Table 6** summarizes the primary factors contributing to current congestion levels.

TABLE 6 – ROOT CAUSE OF CURRENT STATE CONGESTION FOR GARDINER EXPRESSWAY

Root Cause Category	Root Cause Factor/ Milestone Events	Description	Relative Traffic Impact
Traffic Operations	- Inherent operational challenges at highway on-ramps - Uncontrolled merging and weaving interactions	Significant merging traffic at key on-ramps impacts mainline flow. The interaction of merging and weaving traffic creates capacity deficiencies, leading to bottlenecks that affect the entire downtown road network.	High – Operational limitations causing bottlenecks

Root Cause Category	Root Cause Factor/ Milestone Events	Description	Relative Traffic Impact
Construction	- Gardiner Rehabilitation Section 2: Dufferin Street to Strachan Avenue - Other adjacent construction projects	Ongoing construction projects result in the closure of two traffic lanes between Dufferin Street and Strachan Avenue, increasing congestion. Additional nearby construction further reduces network capacity to accommodate diverted traffic from the Gardiner Expressway.	High – Long-term lane closures and limited traffic diversion opportunities
Demand Growth	- Changes in commuting patterns and mode choices post-COVID	While transit ridership remains below pre-COVID levels, traffic volumes have matched or exceeded pre-pandemic figures. This shift results the number of vehicles on the road, contributing to higher congestion levels.	Medium – Increase vehicular demand

Traffic Operations Challenges

Expressways are designed as uninterrupted flow facilities, meaning traffic flow is not regulated by traffic control devices like signals or stop signs. Instead, the flow of traffic is dependent on driver behavior, such as yielding, to navigate merging and weaving areas safely. However, these interactions can significantly impact highway operations, particularly when both mainline and ramp traffic volumes are high.

Figure 58 shows the key operational challenges near Gardiner Expressway:

- **Significant Merging Traffic:** The WB Gardiner Expressway has three critical on-ramps in Downtown Toronto at **Jarvis Street, York Street, and Spadina Avenue,** each serving a substantial volume of entering traffic. The influx of vehicles from on-ramps into the mainline flow requires merging, which can disrupt traffic and reduce overall capacity.
- **Weaving Sections:** Between the **York Street on-ramp** and the **Spadina Avenue off-ramp,** there is a short weaving section of approximately **250 meters.** Vehicles entering from York Street must cross lanes to continue westbound, while vehicles exiting at Spadina Avenue must also change lanes. This complex interaction creates a significant bottleneck due to limited space for safe lane changes. This issue is also present on **Harbour St,** between Lower Simcoe St and York St where the Gardiner off-ramp traffic and Lake Shore Blvd traffic navigate the short area (120m) to turn on to York St or continue onto Harbour St.

These key operational challenges pose significant impact to traffic flow:

- **Capacity Deficiencies:** The merging and weaving areas exceed their capacity during peak periods, leading to congestion that can quickly propagate upstream.
- **Spillover Effects:** Congestion on the expressway spills back onto arterial roads, affecting on-ramp queues and causing gridlock on surface streets like Spadina Ave, York St, and others.
- **Safety Concerns:** High number of merging and weaving increase the risk of collisions, creating more potential for non-recurring congestions disrupting the already restrained traffic flow.

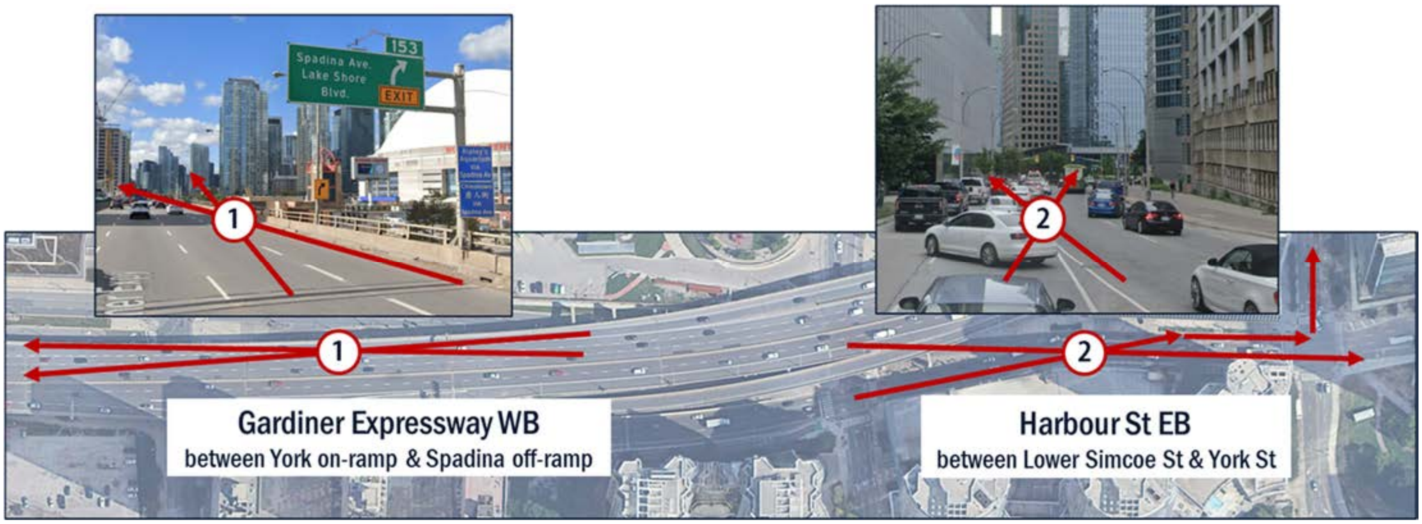


FIGURE 58 – TRAFFIC OPERATIONS CHALLENGES – GARDINER EXPRESSWAY CORRIDOR

Construction

In addition to existing long-term capacity constraints and inherent operational limitations, construction activities have significantly contributed to congestion on the Gardiner Expressway.

Gardiner Expressway Rehabilitation Section 2 (GS2): Dufferin Street to Strachan Avenue

- **Scope of Work:** The GS2 project involves extensive replacing 700 metres of concrete deck and girders, rehabilitating the associated substructure and installing new street lighting. The traffic restriction areas extends from West of Jameson Ave to East of Strachan Ave, resulting in long-term closure of two traffic lanes in this section.
- **Duration:** Long-term lane closure began April 2024 and is expected to be completed in the summer of 2026 before FIFA world cup.

Effects of GS2 Construction

- **Reduced Capacity:** Closure of lanes directly decreases the expressway's capacity, leading to longer queues and increased travel times.
- **Traffic Diversion:** Drivers seek alternative routes to avoid construction zones, increasing traffic volumes on parallel corridors like **Lake Shore Blvd, King St West, and Queen St West.**

Compound Effect of Neighboring Construction Work Zones

As shown in **Figure 57** and **Figure 59**, there are multiple concurrent construction projects near the Gardiner Expressway that limits the transportation network's ability to absorb diverted trips from the Gardiner Expressway. These include:

- King Street West Construction – Dufferin to Shaw (Jan 2024 – Nov 2024)
- King Street West Construction – Shaw to Bathurst (Q2 2025 – Q4 2026)
- TTC Overhead Electrical Upgrades on Fleet St
- Metrolinx Ontario Line and GO Expansion projects
- Various Toronto Water, utilities and development projects

In addition to the traffic impact, construction on transit corridors affects the reliability of surface transit services, leading to a potential shift from public transit to private vehicles and adding to road congestion.

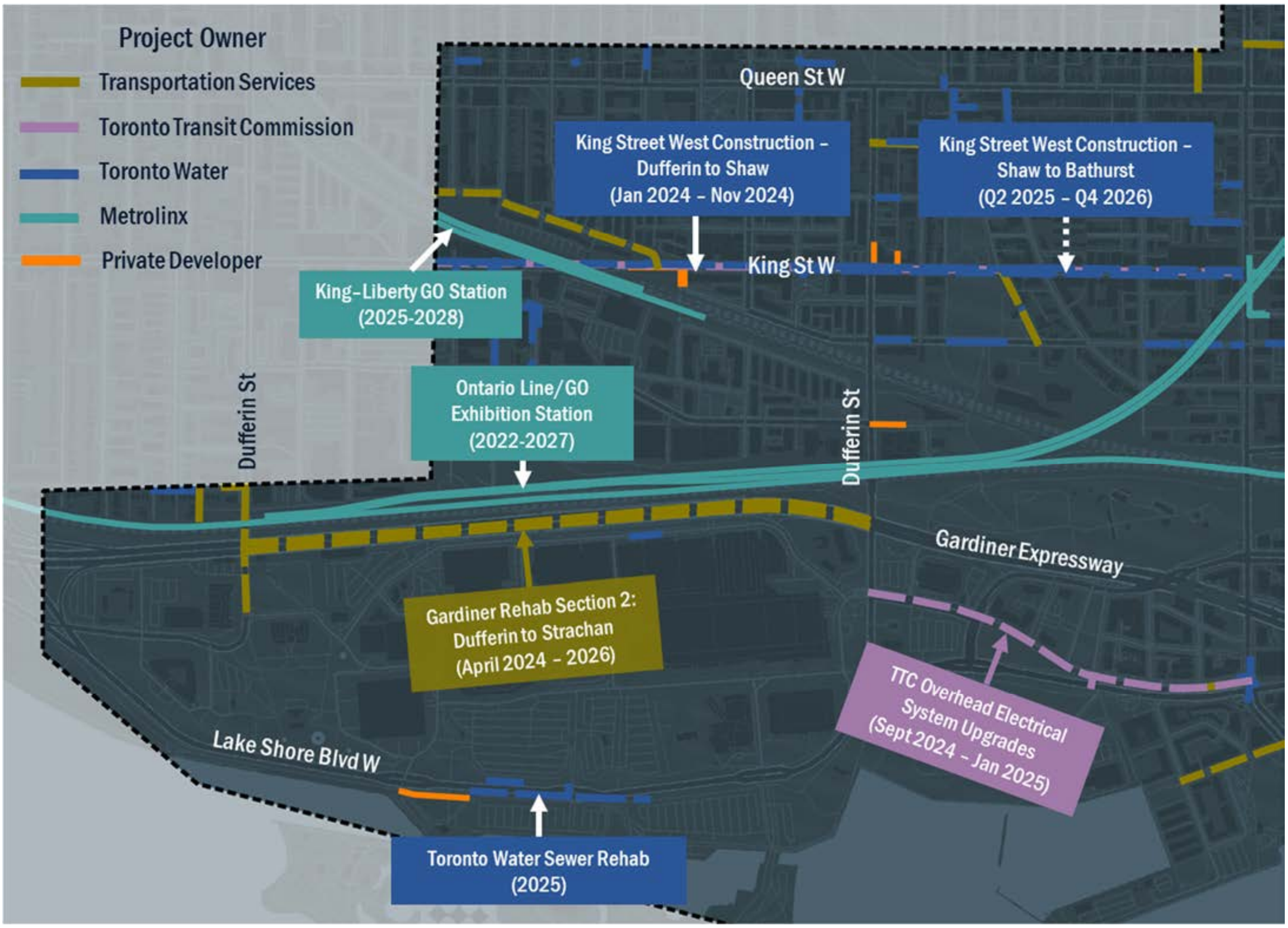


FIGURE 59 – ONGOING AND FUTURE CONSTRUCTION WORK ZONES NEAR GARDINER SECTION 2 WORK ZONE (SOURCE: CITY OF TORONTO INFRASTRUCTURE VIEWER)

KING ST

King St is a critical east-west arterial in Downtown Toronto, serving as a major connector between significant cultural, commercial, and residential hubs. It supports the largest concentration of jobs in Canada and is a key destination for culture, heritage, entertainment, and retail activities. On an average day, King St accommodates close to **100,000 transit riders,** reflecting its vital role in the city's surface transit network.

To enhance the efficiency of transit services along this corridor, the **King Street Transit Pilot** was launched on November 12, 2017. Over the course of a year, the pilot demonstrated its ability to move people more efficiently without compromising the broader transportation network. As a result, on April 16, 2019, City Council made King St a **permanent Transit Priority Corridor**. The corridor features various complete street elements, including raised streetcar platforms, curb lane cafés, street furniture, bike-share stations, and commercial delivery zones.

Despite these improvements, King St remains the second most impacted corridor in terms of overall congestion impact score for 2023 and 2024. This high ranking is attributed to its substantial surface transit ridership and moderate to severe congestion levels. While both streetcars and buses are affected by traffic congestion, streetcars are generally more susceptible to delays due to their fixed tracks and inability to maneuver around obstacles. This increased susceptibility means that even minor congestion increases can have a magnified impact, given King St's critical role in connecting major destinations and economic hubs.

Overview of Congestion Trend

It should be noted that the congestion analysis for King St incorporates both **HERE travel time data** and findings from the City of Toronto's analysis of **Transit Travel Time on King St.** HERE collects location-based data from mobile phones and apps, which includes information from transit riders using smartphones. As a result, the blended travel time analysis reflects the congestion experienced by both transit riders and vehicles, providing a comprehensive mobility picture of this corridor. This approach is particularly relevant for King St, where the overwhelming majority of movement is by transit riders.

Following the implementation of the King Street Transit Priority Corridor, travel times remained consistent and predictable, comparable to pre-pandemic levels. The corridor effectively managed transit operations and maintained reliability for transit riders.

Starting from **May 2023**, there was a significant increase in travel times and a decline in travel time reliability. This change coincided with various construction-related operational challenges, including:

- **Full Closure of Queen Street for Ontario Line Construction (May 1, 2023):** The closure of Queen St between Bay St and Victoria St led to increased traffic volumes on adjacent streets, including King Street, as vehicles sought alternative routes.
- **Reduced Traffic Lanes on Adelaide Street (June 2023 – Summer 2024):** Lane reductions due to infrastructure upgrades further limited east-west capacity in the downtown core.
- **Full Closure of Adelaide Street at Key Intersections (October 2, 2023 – December 15, 2023):** Rolling closure of intersections and sections of Adelaide St in the Q4 of 2023 at York, Victoria, Bay, and Yonge Streets exacerbated congestion on King St.

The increased traffic volumes and construction activities led to significant operational challenges for streetcars on King Street. As shown by Travel Time Index (TTI) Trends in **Figure 60**:

- Average travel time for both eastbound and westbound directions increased significantly starting around April 2023, peaking between October 2023 and January 2024. Sharp increase in variation of travel time is also observed.
- The slowest travel times were observed in the fall of 2023 during PM peak periods, exceeding 2019 levels by nearly 100%.

In response to the significant increase of travel time, City of Toronto undertook several immediate measures:

- **Deployment of Traffic Agents (December 2023):** In response to rising congestion and operational issues, traffic agents were deployed to key intersections on King Street to manage traffic flow and reduce violations.
- **Enhanced Signage and Signal Improvements (April 2024):** Additional measures included upgrading signage and optimizing signal timings to improve compliance and transit efficiency.
- **Return to Consistent Travel Times:** Starting in early 2024, transit travel times returned to levels consistent with those observed prior to the pandemic, demonstrating the effectiveness of the mitigation strategies.

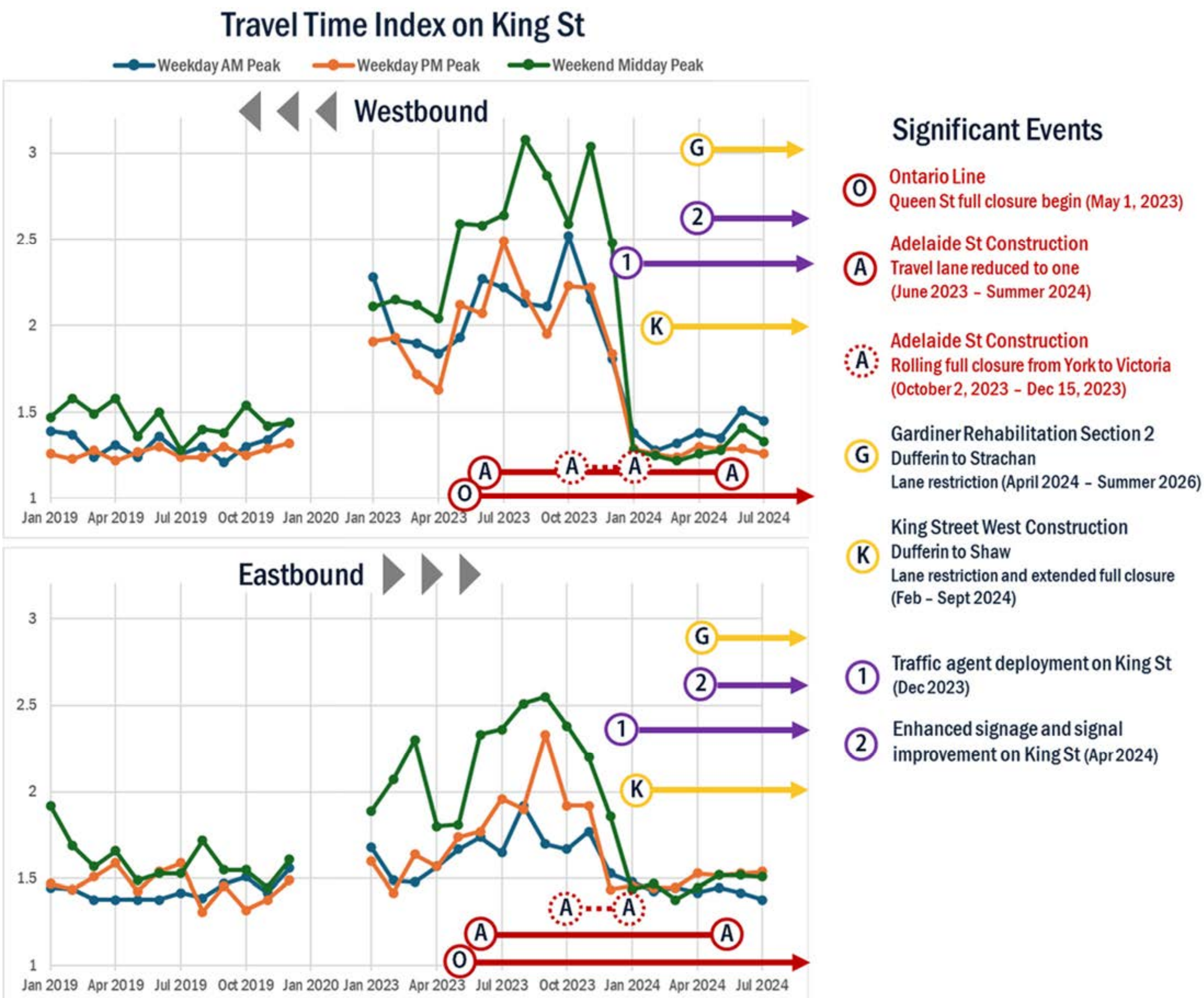


FIGURE 60 – KING ST TRAVEL TIME TREND AND SIGNIFICANT EVENTS (SOURCE: HERE TRAVEL TIME ANALYSIS AND CITY OF TORONTO)

The congestion challenges faced by King St in the latter half of 2023 resulted from a compounded effect of several root causes, as summarized in **Table 7**.

TABLE 7 – ROOT CAUSE OF 2023 CONGESTION FOR KING ST

Root Cause Category	Milestone Events	Description	Relative Traffic Impact
Construction	- Queen St Full Closure (May 2023) - Adelaide St Closures (June 2023 – Summer 2024)	Lane and street closures on adjacent streets induced diversion traffic onto King St, a transit priority corridor with limited capacity for private vehicles.	High – Significant increase in traffic volumes on King St due to diversion, leading to operational challenges for transit services.
Traffic Violations	- Increased violations due to lack of enforcement during construction periods	Vehicles contravening movement prohibitions on King St, including illegal through movements and blocking intersections, impeded streetcar operations.	High – Increased violations led to significant delays for streetcars, with travel times increasing from an average of 16 minutes to up to 65 minutes per trip.
Travel Pattern, Demand and Mode Shift	- Special Events and Festivals	Elevated traffic volumes due to seasonal activities and events (i.e. TIFF) increased demand on King St, intensifying congestion levels during peak periods.	Medium – Added demand compounded existing congestion issues, particularly when combined with construction diversions and traffic violations.
	- Return to office work - Preference for private vehicles over transit	Changes in commuting patterns with more individuals returning to workplaces and opting for private vehicles increased traffic volumes on downtown streets. While transit ridership remains below pre-COVID levels, traffic volumes have matched or exceeded pre-pandemic figures. This shift results the number of vehicles on the road, contributing to higher congestion levels.	Medium – Increased vehicular traffic added strain to King St, especially during peak commuting hours.
Curbside Uses	- Conversion of curb lane to other uses through King St Pilot - Expansion of Curbside Patios through CaféTO Program	Reallocation of curb lanes for cafés and other uses reduced available road space for vehicles, potentially magnifying congestion effects during peak periods and construction impacts.	Low – While not a primary cause of congestion, curb lane uses can exacerbate congestion when combined with increased traffic volumes and operational challenges.

EAST-WEST STREETCAR CORRIDORS: COLLEGE ST-CARLTON ST, QUEEN ST, AND DUNDAS ST

Carlton–College St, Queen St, and Dundas St corridors are critical components of Downtown Toronto's public transit and street network, facilitating the movement of tens of thousands of people daily. These corridors were ranked 4th, 5th, and 7th most impacted in terms of overall congestion impact score for 2023 and 2024. They have been selected for analysis considering their high transit ridership and the congestion challenges that impact both transit riders and vehicular traffic. Similar to King St, the streetcars operating along these corridors are particularly susceptible to delays because of their fixed tracks and inability to maneuver around obstacles. This increased susceptibility means that even minor increases in congestion can have a magnified impact, given the corridors' critical roles in connecting major cultural, commercial, and economic hubs.

Queen St

- **Daily Road Users:** About 62,500 transit riders and 11,000 vehicles.
- **Significance:** One of Toronto's most critical streetcar routes with the second-highest surface transit ridership in the study area.
- **Congestion Impact:** Extensive congested areas lead to longer travel times for both transit riders and drivers.

Carlton–College St

- **Daily Road Users:** About 42,000 transit riders and 10,500 vehicles.
- **Key Bottlenecks:** Congestion at major intersections and areas with high pedestrian activity.
- **Challenges:** Similar to other streetcar corridors St, facing moderate congestion severity in extended sections of the corridors that last for a long time, especially during weekend.

Dundas St

- **Daily Road Users:** About 30,000 transit riders and 10,000 vehicles.
- **Key Bottlenecks:** Congestion at major intersections and high-pedestrian areas like Yonge–Dundas Square and Chinatown.
- **Congestion Impact:** Severe congestion primarily on weekends due to proximity to major retail and entertainment districts.

Overview of Congestion Trend

In early 2023, travel times on these corridors began to rebound as traffic volumes recovered post-COVID, along with seasonal increases during the summer months. As shown in **Figure 61**, several major infrastructure projects commenced in mid-2023, significantly impacting travel times:

- **College St Infrastructure Improvement Projects**
  - Led to increased travel times and variability due to lane closures and intermittent full closures between Manning Ave and Bay St.
- **Ontario Line Construction**
  - Full closure of Queen St between Bay St and Victoria St caused traffic diversions onto Dundas St, increasing congestion, especially eastbound.
- **Adelaide St Construction**
  - Eastbound traffic reduced to one lane, with rolling full closures at key intersections from October to December 2023.
  - Exacerbated congestion on parallel corridors like Dundas St and Carlton–College St.
- **Bloor St Infrastructure Improvements**
  - Added to congestion as work progressed through summer 2023, impacting travel times on adjacent corridors.

These activities led to significant increases and variability in travel times during the summer when travel demand is highest. Travel times began improving in early 2024 as some construction phases concluded, drivers adapted to long-term closures, and there were fewer short-term full closures of adjacent streets. By summer 2024, while travel times moderately increased due to seasonal traffic, overall congestion was more manageable compared to the previous year.

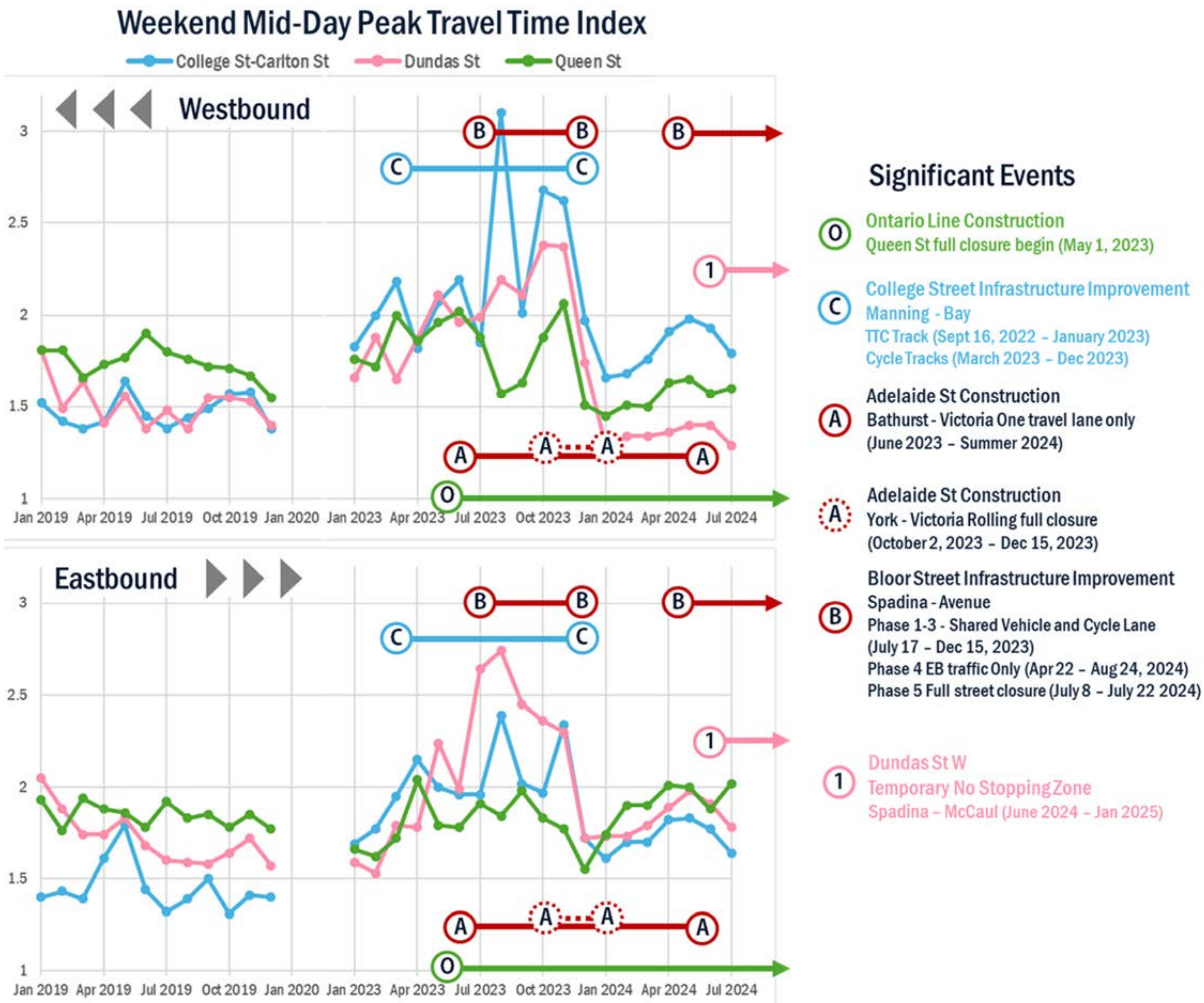


FIGURE 61 – STREETCAR CORRIDOR TRAVEL TIME TREND AND SIGNIFICANT EVENTS (SOURCE: HERE TRAVEL TIME ANALYSIS AND CITY OF TORONTO)

Table 8 highlights the root cause factors contributing to current state congestion, emphasizing those that present actionable opportunities for intervention from now onwards.

TABLE 8 – ROOT CAUSE OF CURRENT STATE CONGESTION ON STREETCAR CORRIDORS

Corridor	Relevant Street Sections	Root Causes Description	Relative Traffic Impact
Queen St	University Ave - Victoria St	Ontario Line Construction: Full street closure has significantly changed travel pattern, leading to significant traffic diversion to adjacent corridors.	High

Corridor	Relevant Street Sections	Root Causes Description	Relative Traffic Impact
	Bathurst St - Bay St	Curbside Activities & Parking: High retail activity leads to frequent loading/unloading and parking maneuvers, especially in the Queen West retail districts.	Medium
	Atlantic Ave - Spadina Ave	CaféTO Installations: Curb lane cafés reduce curb lane availability	Medium
	Bathurst St - Bay St	Streetcar On-Street Boarding: Significant on-street streetcar boarding and alighting activity at major intersections can lead to high dwell time and delay for all road users.	Medium
Carlton-College St	Yonge St	High Pedestrian, Transit, and Traffic Volumes on Yonge St: Significant streetcar boarding and alighting at major intersections increases dwell time and delays for all users, while heavy pedestrian volumes further slow turning traffic.	High
	East of Bay St	Off-Peak Parking: Occupies curb lanes east of Bay St, reducing capacity during off-peak hours.	Medium
	Yonge St	CaféTO Installations: Curb lane cafés reduce westbound lanes, impacting traffic flow.	Medium
	Major Intersections, especially at University Ave, Bay St, and Yonge St	Streetcar On-Street Boarding: Significant on-street streetcar boarding and alighting activity at major intersections can lead to high dwell time and delay for all road users.	Medium
	Entire Corridor	Signal Timing Challenges: Limited signal optimization opportunity at major intersections due to high demand in all directions and constraints from Transit Signal Priority (TSP).	Medium
Dundas St	Chinatown and Yonge-Dundas Square	Curbside Uses & Events: Frequent events and high curbside activity cause disruptions and increased congestion.	Medium
	Bathurst St - McCaul St	Off-Peak Parking: Parking west of McCaul St reduces road capacity during off-peak times.	Medium
	Major Intersections, especially at Bathurst St, Spadina Ave, and Yonge St	Signal Timing Challenges: Limited signal optimization opportunity at major intersections due to high demand across all directions and modes, along with Transit Signal Priority (TSP) constraints.	Medium
	Major Intersections	Streetcar On-Street Boarding: Significant on-street streetcar boarding and alighting activity at major intersections can lead to high dwell time and delay for all road users.	Medium

Summary and Recommendations

Summary and Recommendations

Toronto's congestion crisis has reached a tipping point, necessitating immediate action. Despite its robust transportation system, Toronto is experiencing unprecedented levels of congestion, particularly in the downtown core, resulting in an estimated $11 billion annual loss in productivity and affecting businesses, commuters, and the overall quality of life for Toronto's residents. The Toronto Region Board of Trade (TRBOT) initiated a Task Force of senior business leaders, guided by a CEOs' Governing Council, to identify and champion practical, high-impact solutions to tackle the issue. As part of this task force effort, this study assessed the current state of traffic congestion in downtown Toronto and explored its root causes.

The study identified congestion hotspots driven by increasing travel demand, long-term capacity constraints, and short-term disruptions such as road restrictions, infrastructure projects, and special events. The analysis not only offered a detailed understanding of the current state and root causes of congestion but also examined how ongoing challenges such as major investments in transportation infrastructure, rapid population growth, and evolving land-use policies impact mobility over time.

The study's findings are presented in the following sections, followed by recommendations for potential strategies that the TRBOT can consider in the next steps of the Congestion Task Force efforts.

Current State Analysis

Post-COVID Traffic Recovery and Shifting Travel Patterns

Traffic levels have recovered to pre-COVID levels, with congestion in 2023 and 2024 even exceeding the levels seen in 2019. The weekday PM peak remains the most congested period, but the weekend mid-day peak has now surpassed the weekday AM peak in severity, reflecting changes in travel behavior, including an increase in leisure and non-commuting trips.

Congestion on the Rise

The severity, extent and duration of congestion have all increased post-COVID. The number of congested hours and the share of roads experiencing severe and critical congestion have recovered or exceeded 2019 levels. Although bottleneck locations in key areas like the Financial District, Waterfront, and Yonge-Bloor have remained consistent, the intensity of these congestion events has increased.

Key Corridors and Bottlenecks

The analysis identified the Gardiner Expressway, King St, Bloor St, College-Carlton St, and Queen St as the top five most congested corridors in downtown Toronto. The Gardiner, in particular, stands out due to its overwhelming impact on the broader transportation network, contributing to congestion spillover onto adjacent north-south arterials like Spadina Ave, York St, Bay St, Yonge St, and Jarvis St.

Bottlenecks were observed in several key areas:

- **Financial District** streets, including York, Bay, Yonge, Richmond, and Adelaide St, which experience regular congestion across all peak periods.
- **Harbourfront** streets like Lake Shore Blvd and Harbour St, which, alongside the Gardiner, are vital east-west routes that also suffer from severe congestion, particularly near major sports and entertainment venues and key intersections.
- **Bloor St**, especially around Yonge-Bloor, Yorkville, and the Annex.
- **Other east-west streetcar corridors** like College St - Carlton St, Dundas St, Queen St, and King St, particularly at major intersections and areas with heavy retail and pedestrian activity.

These bottlenecks are most prominent during weekday PM peaks but extend into the weekend, especially along key corridors leading to the downtown core.

Root Cause Analysis

INFRASTRUCTURE TRENDS, TRAVEL DEMAND AND PATTERNS

The infrastructure trend and demand analysis have several key takeaways:

- **Growing Travel Demand:** Travel demand to downtown has been steadily increasing over the last several decades, while Toronto's transit and cycling development has historically lagged behind, only recently experiencing considerable investments.
- **Vehicle Trip Demand:** Total vehicle trips to downtown had remained relatively consistent between 1986 to 2016, as such Toronto's transportation system has been "calibrated" to accommodate this demand - any considerable change to this demand and capacity could have non-linear impacts to the system's operations. Recent Canadian Census data has shown that Toronto's car commuting has surpassed 2016 levels, suggesting additional trip demand could be placed on downtown.
- **Population and Job Growth:** Downtown Toronto has been experiencing rapid population and job growth in recent years leading to more vehicle trips by downtown residents. The City of Toronto has cited this as a contributing factor to recent congestion.
- **Discretionary Trips:** Discretionary downtown trips have been increasing in recent years as Toronto has become home to more people and more of a destination leading to more discretionary vehicle trips to and within downtown.
- **Modal Shift:** The modal share of driving to downtown has been decreasing in recent decades– this modal shift has been effective in counterbalancing the rise in regional travel demand.
- **Regional Travel Patterns**: The vast majority of vehicle trips to downtown originate within Toronto – the share of trips from the surrounding GTHA municipalities had remained consistent between 1996 to 2016 – any considerable shift in this pattern could have substantial impacts to downtown vehicle trip demand, as the surrounding municipalities rely heavily on vehicles.
- **Transit Ridership Rebound:** Transit ridership experienced an unprecedented drop during the pandemic and has rebounded slower than vehicle trip demand.

SYSTEM CAPACITY CONSTRAINTS

Impact of Construction

Construction is identified as the top root cause of congestion across all major corridors in downtown Toronto. The significant amount of construction taking place in Downtown Toronto have created various challenges:

- **Long-Term Projects:** Typically communicated well in advance, allowing commuters to adjust their travel plans by selecting alternative routes or modifying schedules.
- **Short-Term Disruptions:** Often not widely communicated, limiting commuters' ability to plan accordingly and potentially exacerbating congestion.
- **Concurrent Projects on Parallel Corridors and Consecutive Projects on Different Parts of Corridors:** These projects can occur simultaneously or sequentially, limiting the transportation network's ability to accommodate existing demand.

These construction activities can significantly reduce road capacity, alter traffic patterns, and create bottlenecks, leading to increased travel times and decreased reliability of the transportation network.

Complete Street Initiatives and Safety Programs

Complete street projects in Toronto have successfully increased the share of sustainable transportation modes, enhancing mobility for transit riders, cyclists, and pedestrians. Key points about these projects include:

- **Reallocating Road Space:** Shifting space toward more efficient modes often requires reducing private vehicle capacity in constrained right-of-way, to enable streets to move more people safely and efficiently.
- **Long-Term Mode Shifts vs. Short-Term Congestion:** Transitioning to higher usage of active transportation modes takes time. During this period, vehicle traffic may not decrease proportionally, leading to congestion as road space

is reallocated but vehicle demand remains high. If immediate traffic concerns are not addressed alongside long-term initiatives, public support may wane due to perceived increases in congestion without immediate benefits.

- **Balancing Goals:** Essential to balance future mobility objectives with short-term solutions to build community support. This will strengthen the case for continued street space transformation through buy-in from the public, business and decision-makers.

Other Non-Recurring Factors

Various non-recurring factors also contribute to congestion:

- **CaféTO Program:** The reallocation of curb lane space for outdoor dining reduces vehicular capacity in certain areas. This can lead to localized congestion, particularly in high-traffic corridors where lane reductions impact flow.
- **Special Events**: Events such as festivals, parades, and sporting events temporarily limit road capacity and increase travel times. In the downtown core, where congestion is already severe, these events can exacerbate traffic delays.
- **Unpredictable Road Disruptions:** Traffic collisions, vehicle breakdowns, and spills cause unexpected lane closures or slowdowns, resulting in sudden congestion, especially during peak hours or in high-traffic areas. Spontaneous protests or marches occupying roadways can also lead to widespread traffic disruptions without prior notice.
- **Traffic Violations:** Violations like illegal parking, blocking intersections, unauthorized use of transit lanes, and disobeying traffic signals disrupt traffic flow and reduce road capacity, contributing to congestion.
- **Transit Service Disruptions:** Temporary disruptions to Toronto Transit Commission (TTC) subway and streetcar services impact both transit users and the road network. Service interruptions can shift demand from transit to private vehicles, increasing traffic volumes on already congested roads. Additionally, the deployment of shuttle buses during subway closures strains key corridors as buses compete with private vehicles for limited road space.
- **Severe Weather Events:** Extreme weather events such as heavy snowfall, ice storms, and flooding impair road conditions, reduce vehicle speeds, and increase the likelihood of accidents, all of which contribute to increased congestion.

CONGESTION BOTTLENECKS AND CRITICAL CORRIDORS

A common factor contributing to bottlenecks and congestion in critical corridors is the complex interaction between construction activities, reduced vehicular capacity, operational limitations, and increasing travel demand. Concurrently scheduled construction on parallel corridors and consecutive construction on different parts of corridors pose significant challenges for traffic management, undermining the reliability of the transportation system. **Key examples include:**

- **Bloor-Yonge:** Congestion results from reduced capacity due to construction activities, development staging, and complete street initiatives. Consecutive construction projects on different parts of the corridor have prolonged disruptions, leading to persistent congestion.
- **Gardiner Expressway**: High traffic volumes, operational limitations, ongoing construction activities, and changing travel behaviors contribute to congestion. Concurrent construction on adjacent routes intensifies congestion, as alternative routes become limited.
- **King Street:** Experienced significant congestion in late 2023 due to extensive construction, increased traffic violations, seasonal demand surges, and changes in commuting patterns post-pandemic. Simultaneous construction on parallel corridors exacerbated the situation, impacting transit travel times and overall network efficiency.
- **Other East-West Streetcar Corridors**: Congestion on key streetcar corridors—including Queen St, Carlton St–College St, and Dundas St—results from construction activities, high pedestrian volumes, curbside activities, and operational limitations of streetcar operations. Concurrent construction projects lead to lane reductions and change of traffic patterns, while the lack of dedicated transit infrastructure increases dwell times and reduces transit reliability.

Recommendations

To effectively address congestion in Downtown Toronto, a comprehensive approach that integrates operational improvements and policy initiatives is necessary. **Table 9** provides a high-level overview of these potential strategies that can target system-wide issues, specific corridors, and critical bottlenecks. This overview will assist TRBOT in identifying and prioritizing key focus areas in the next steps as part of the Congestion Task Force initiative and efforts.

TABLE 9 – SUMMARY OF CONGESTION MANAGEMENT STRATEGIES

Potential Strategy	Description of Potential Strategy	Applicable Locations
Traffic Management and Intelligent Transportation System		
Integrated Corridor Traffic Management	Coordinate traffic management strategy across adjacent corridors to handle traffic diversion during construction and other major traffic events.	Areas adjacent to the major arterials experiencing construction and other traffic events
Real-Time Traffic Monitoring	Implement systems to monitor traffic conditions in real-time to enhance incident response and traffic management.	System-wide
Traveler Information Systems	Provide real-time updates via message signs, mobile apps, and other platforms to inform drivers of traffic conditions and incidents.	System-wide
Ramp Metering	Regulate vehicle flow on expressway mainline or on-ramps to reduce merging conflicts and improve overall traffic flow.	Gardiner Expressway
Variable Speed Limits	Use variable speed limit system to smooth traffic flow approaching congested sections to increase overall traffic flow.	Gardiner Expressway
Traffic Signal Improvements		
Adaptive Signal Control	Implement systems that adjust signal timings based on real-time traffic conditions to improve flow and reduce delays.	Major arterials and congested intersections
Signal Timing Optimization	Regularly update and coordinate signal timings to reduce delays, emissions, and improve safety.	All major arterials
Transit Priority Measures		
Dedicated Transit Lanes	Establish exclusive lanes for streetcars and buses to reduce overall person-delays caused by mixed traffic and curbside activities.	Streetcar corridors (Queen St, Carlton–College St, Dundas St, Bathurst St)
Transit Priority Corridors	Implement corridors prioritizing transit movement, similar to King St, to enhance reliability and efficiency of streetcar services.	Streetcar corridors (Queen St, Carlton–College St, Dundas St)
Transit Signal Priority (TSP)	Expand systems allowing streetcars to request extended green times at intersections, reducing delays caused by signal stops.	All transit corridors
Turn Restrictions	Expand turn restrictions at locations with high turning traffic impacting transit flow on priority transit corridors.	Specific intersections along transit corridors
Transit Stop Platform Upgrades	Construct new dedicated boarding platforms or curb extensions to speed up boarding, reduce dwell times, and enhance passenger safety.	All streetcar corridors
Construction Coordination		

Potential Strategy	Description of Potential Strategy	Applicable Locations
Construction Coordination	Coordinate construction schedules to minimize overlapping impacts and reduce cumulative disruptions on major arterials.	All construction zones
Enhanced Traffic Management in Development Applications	Enforce higher standards for traffic management during construction for development applications, considering all road users.	All development staging areas
Provide Detour Routes and Protect Overall System Capacity	Offer well-planned detours and clear signage to maximize the use of available capacity near work zones.	Near construction zones
Curbside Management		
Extended Parking Restrictions	Implement no parking/loading/stopping zones, especially in high-impact areas during peak and off-peak periods, to preserve capacity for all modes.	Corridors with curbside parking experiencing congestion
CaféTO Program Monitoring	Continuous monitoring of curb lane café installations to balance street vibrancy with transportation efficiency during peak periods.	Queen St W, Carlton–College St, Dundas St W, King St W
Enforcement Measures		
Enhanced Enforcement at Intersection	Increase use of traffic agents and police to deter illegal movements, intersection blocking and facilitate flow of traffic.	Key congested corridors (Arterial neighboring Gardiner Expressway, Bloor St and etc.)
Enhanced Enforcement on Major Arterials	Enhance enforcement of rush hour stopping/parking, stopping/parking on cycling facilities and transit lane usage.	Key congested corridors (Arterial neighboring Gardiner Expressway, Bloor St and etc.)
Automated Enforcement Systems	Utilize technologies like cameras to detect and penalize traffic violations without requiring constant physical presence.	System-wide
Major Event and Traffic Event Management		
Event Management Plans	Develop specific traffic management plans for events impacting these corridors to mitigate congestion and maintain transit reliability.	Major event venues and impacted corridors
Traffic Management for Major Events	Coordinate with event organizers to schedule activities during less disruptive times and manage logistics effectively.	System-wide
Rapid Incident Response	Develop rapid response plans for unpredictable events like traffic collisions, protests, and public demonstrations. Utilize intelligent transportation systems (ITS) and collaborate with Toronto Police Services (TPS) to ensure swift incident detection, clearance, and effective communication with the public.	System-wide, high-traffic areas
Policy and Planning Measures		
System Capacity Expansion through High Capacity Modes	Enhance capacity through transit improvements and complete streets projects in key corridors. Implement dedicated transit lanes, improve transit services, and redesign streets to accommodate all users efficiently and safely. This in turn also promote shift to non-automobile modes as a demand management strategy.	Priority surface transit and major arterial corridors

Potential Strategy	Description of Potential Strategy	Applicable Locations
Integrated Transportation Planning	Align infrastructure improvements with public transit, active transportation improvements, and land-use planning for long-term sustainability.	System-wide
Mobility Pricing	Explore the implementation of mobility pricing program, such as congestion charges, to manage demand and reduce traffic congestion. Consider equity implications to ensure fair access for all users.	System-wide
Vehicle-Related Levy	Implement levies such as municipal vehicle registration taxes, parking levies, or adjustments to gas taxes to discourage private vehicle use and fund transportation improvements.	System-wide
Active Transportation and Micromobility	Promote active transportation and micromobility options by enhancing infrastructure for walking, cycling, and other non-motorized modes. Expand bike lanes, improve sidewalks, and support bike-sharing programs, cargo bikes, and other micromobility initiatives as outlined in the City's Micromobility Strategy adopted in May 2024.	System-wide

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