MATTAMY HOMES CANADA

RESIDENTIAL DEVELOPMENT AT 26-38 HOUNSLOW AVENUE

TRANSPORTATION IMPACT STUDY

OCTOBER 12, 2023

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TRANSPORTATION IMPACT STUDY

MATTAMY HOMES CANADA

FINAL REPORT

PROJECT NO.: CA0006134.3420-CA-MATTAMY HOMES - 26-38 HOUNSLOW AVENUE
DATE: OCTOBER 2023

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October 12, 2023

Mattamy Homes Canada
7880 Keele Street, Suite 400
Vaughan, Ontario, L4K 4G7

Subject: Residential Development at 26-38 Hounslow Avenue - Traffic Impact Study

Dear Mr. Caden,

WSP Canada Inc. (WSP) is pleased to present the findings of our Transportation Impact Study (TIS) for the proposed residential development located at 26-38 Hounslow Avenue, in the City of Toronto.

Based on the enclosed study findings, it is expected that the proposed development can be readily accommodated by the study area transportation network. The proposed auto and bicycle parking arrangements will also adequately serve the needs of the subject development.

We thank you for the opportunity to undertake this study. Please do not hesitate to contact us if you have any questions or comments.

Sincerely,

WSP Canada Inc.

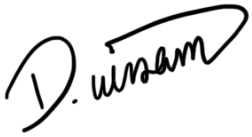
David Lukezic, M.Eng., LEL, RPP
Project Manager - Transportation

WSP ref.: CA0006134.3420-CA-MATTAMY HOMES - 26-38 HOUNSLOW AVENUE

SIGNATURES

PREPARED BY

Kian Azari, P.Eng.
Transportation Engineer



Dina Al-rubaye
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David Lukezic, M.Eng., LEL, RPP
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PRODUCTION TEAM

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TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

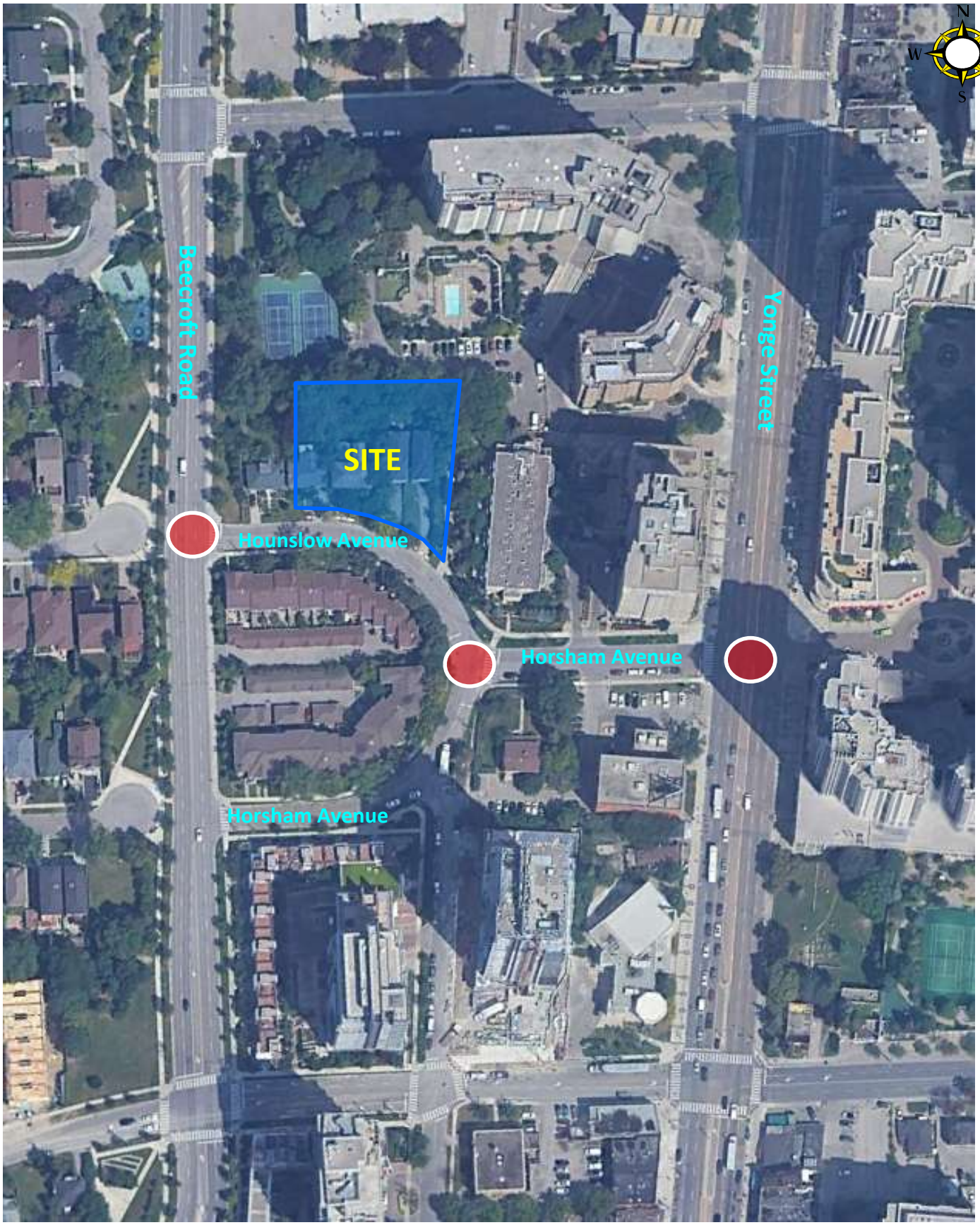
1 INTRODUCTION

WSP was retained by Hounslow Holdings Inc. to prepare this Transportation Impact Study in support of a proposed residential development to be located at 26-38 Hounslow Avenue in the City of Toronto. The site location and study area are shown in **Figure 1-1**.

The subject site is located on the north side of Hounslow Avenue, east of Beecroft Road and is currently occupied by four single detached dwellings. The existing land uses and driveways will be demolished to facilitate the redevelopment of the site.

By way of background, WSP completed a transportation impact study (TIS) for the proposed development dated April 2021 (herein referred to as the April 2021 TIS), and a Response to Comments letter in August 2021. The previous site plan from the 2021 report features a ten-storey residential tower consisted of 111 residential units. Since then, the site plans have been modified and the total number of units for the site has increased. The redevelopment of the site is proposed to include a 24-storey residential tower with a total of 305 residential units and a full-moves access via Hounslow Avenue. Parking is proposed on two underground levels, for a total of 80 parking spaces. The proposed ground floor plan is shown in **Figure 1-2**.

A Terms of Reference was circulated to the City of Toronto transportation staff prior to commencing the TIS and is provided in **Appendix A**. Our study approach and findings are documented herein.



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- Study Intersection

Figure 1-1

Site Location

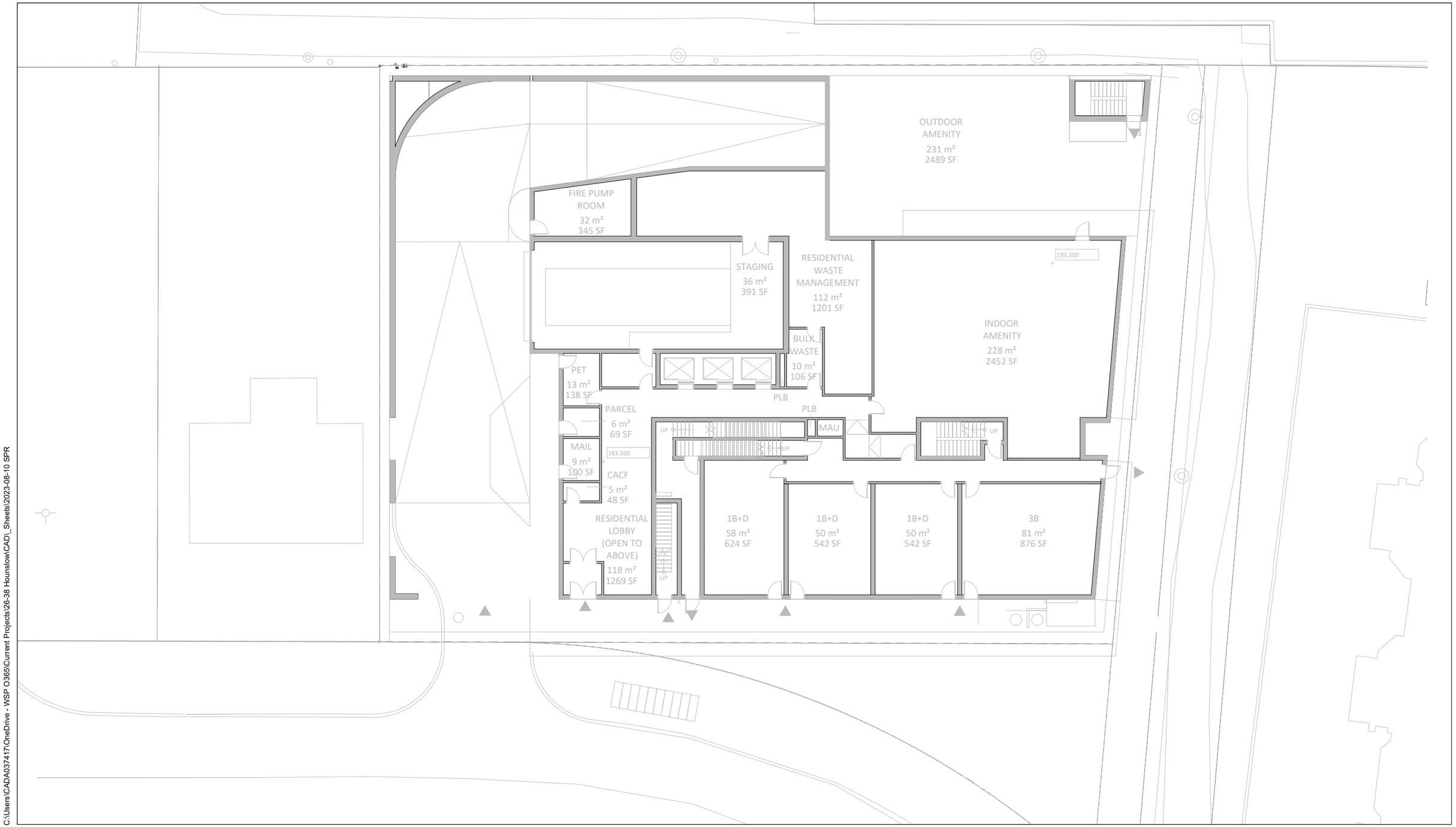

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Figure 1-2
Site Plan
26-38 Hounslow Avenue Transportation Impact Study

2 EXISTING TRANSPORTATION CONDITIONS

This section of the assessment describes the existing road network and traffic conditions within the study area.

2.1 BOUNDARY ROADWAYS

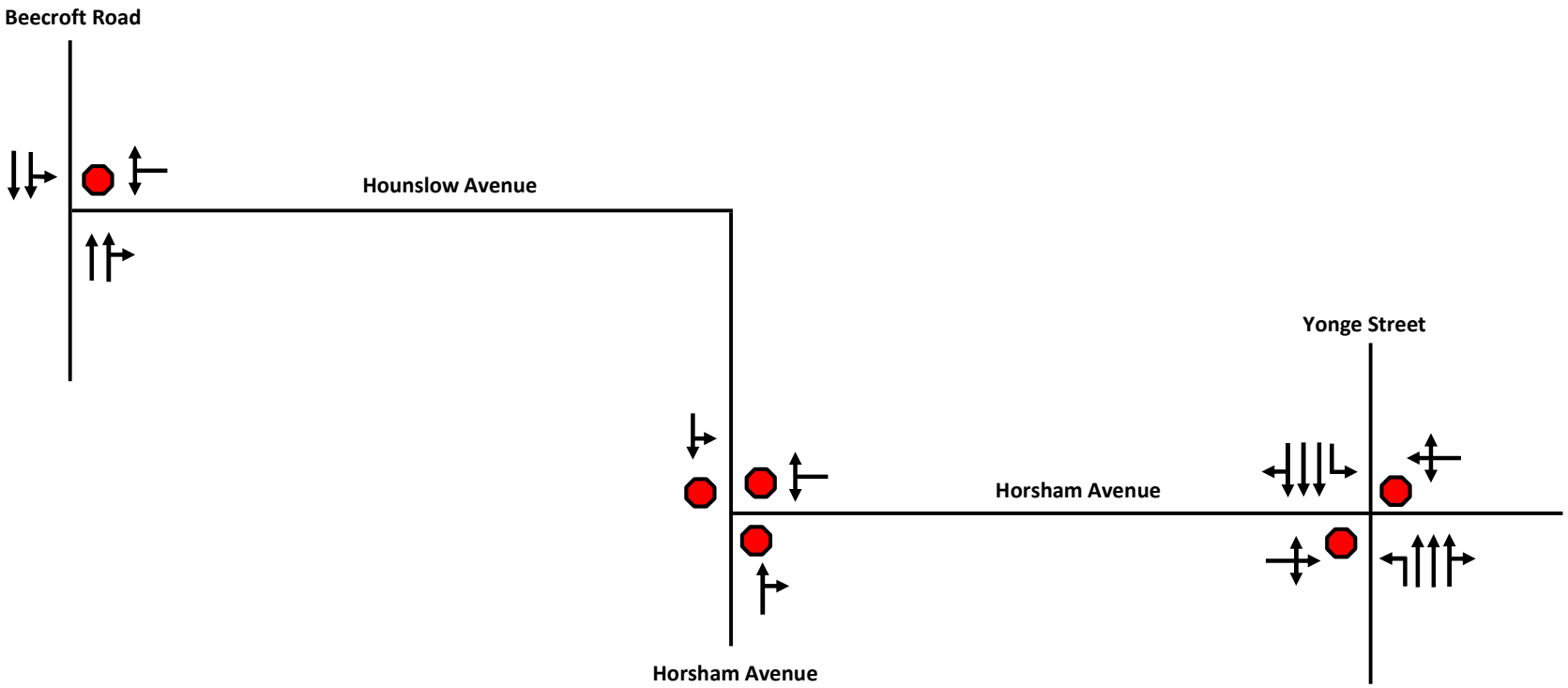
The following roadways make up the boundary road network that surrounds the subject site:

- **Yonge Street** is a north-south, seven lane roadway (including one centre two-way left-turn lane (CTWLTL)) that is classified as a Major Arterial per the City's Road Classification Map. This roadway has a speed limit of 60 km/h, with parking permitted on both sides during designated time. Sidewalks are located on both sides of the roadway within the study area.
- **Beecroft Road** is a north-south, four-lane roadway that is classified as a Minor Arterial per the City's Road Classification Map. The posted maximum speed limit is 40 kilometres per hour, and parking is not permitted on either side of the roadway. Within the limits of the study area, sidewalks are provided on both sides.
- **Hounslow Avenue** is an east-west, two-lane roadway that is classified as a Local Road per the City's Road Classification Map. The maximum speed limit is not posted and is assumed to be 50 kilometres per hour. Parking is generally not permitted on either side of the roadway; however, parking is permitted on both sides immediately east of Beecroft Road during designated times. A sidewalk is provided on the south of the roadway between Beecroft Road and Horsham Avenue. On the north side, a sidewalk is provided between Horsham Avenue and the proposed development.
- **Horsham Avenue** is an east-west, two-lane roadway that is classified as a Local Road per the City's Road Classification Map. The maximum speed limit is not posted and is assumed to be 50 kilometres per hour. Parking is permitted on the south side of the roadway between Hounslow Avenue and Yonge Street. No parking is permitted on the north side of the roadway. Sidewalks are provided on both sides of the roadway.

The study area for this study includes the following intersections:

- Beecroft Road at Hounslow Avenue (stop-controlled);
- Hounslow Avenue at Horsham Avenue (stop- controlled);
- Horsham Avenue at Yonge Street (stop- controlled); and
- Hounslow Avenue at site access (future stop-controlled).

The existing lane configurations of the study road network are illustrated in **Figure 2-1**.



Legend

Stop Control Lane Configurations

Figure 2-1

Existing
Lane Configurations

2.2 PUBLIC TRANSIT

The subject site is well served by Government of Ontario (GO) Transit and Toronto Transit Commission (TTC) services. The existing transit network within the study area is described below.

Toronto Transit Commission (TTC)

- **TTC Line 1 Yonge-University Subway** is part of the Toronto rapid transit system. The route operates from the Yonge and Finch area, south to the Downtown core, and continues north to the Vaughan Metropolitan Centre. Line 1 connects with Line 4 at the Sheppard-Yonge station and Line 2 at the Bloor-Yonge, St.George and Spadina Stations. The walking distance from the site to the nearest station entrance is approximately 700 m. Headways range from approximately two to three minutes during the peak hours and every four to five minutes at all other times.
- **Route 97 (Yonge)** operates between Davisville Station and York Mills Station on Line 1, Yonge-University, and the area of Yonge Street and Steeles Avenue West, generally in a north-south direction. It also serves Finch Station (northbound buses ONLY) and the area of Yonge Street and Queens Quay West. The 97F (Davisville Station-Steeles) branch operates at all times, seven days a week, with approximately 30-minute headways.
- **Route 320 (Yonge)** operates between Queens Quay and the area of Steeles Avenue East and Yonge Street during the overnight period, seven days a week, with five-minute headways.

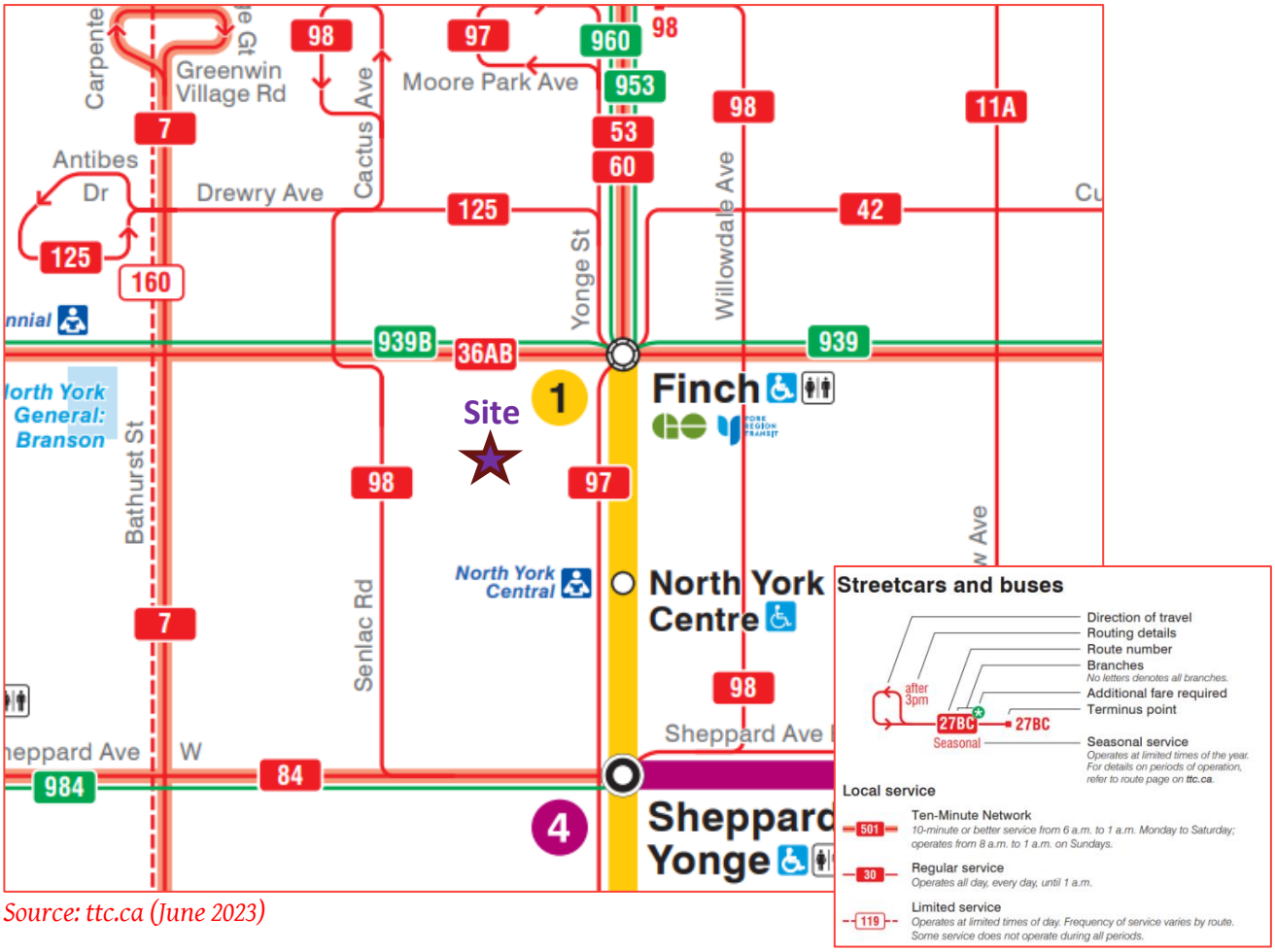
The nearest transit stops are located at the intersection of Yonge Street and Horsham Avenue. Access to Line 1 (Yonge-University) is provided at Finch Station or North York Centre Station, which are at an approximate 10 to 12 minutes walking distance from the site. The Finch Station bus terminal provides connection to York Region Transit (YRT) services and GO Transit services. The TTC network is illustrated in **Figure 2-2.**

GO Transit

GO Transit operates bus routes in the vicinity of the site, with a stop at the intersection of Yonge Street and Horsham Avenue on the east side of the roadway. The following routes service the stop:

- **Route 19 (Mississauga/North York)** provides service from Square One to the York Mill Terminal seven days a week, with approximately 15-minute headways during the rush hours and one hour during the outside the rush hours.
- **Route 27F (Milton/North York)** provides service from the Finch Terminal to the Meadowvale GO Station during the a.m. peak and all-day off-peak periods, and in the opposite direction during the p.m. peak and all-day off-peak periods, seven days a week. The route provides services with a 20-minute headway during the peak periods. The route provides all-day service in both direction during the weekend with one-hour headways.
- **Route 32 (Brampton Trinity Common/North York)** provides service from Trinity Common Mall to the York Mill Terminal during the a.m. period (i.e. until approximately noon), and in the opposite direction during the p.m. period (i.e. starting at approximately noon), Monday to Friday with headways of 10-minutes during the peak periods and one-hour every at all other times.
- **Route 67 (Keswick/ North York)** provides service from Highway 404 at Woodbine to the Finch Terminal Monday to Friday, during the a.m. peak in southbound direction, and in the opposite direction during the p.m. peaks with headways of one hour.
- **Route 96 (Oshawa/Finch Express)** provides services from the Oshawa GO Station to the Finch Terminal seven days a week, with headways of one hour.

Figure 2-2: Existing TTC Transit Network



Source: ttc.ca (June 2023)

2.3 TRAFFIC DATA

2.3.1 TURNING MOVEMENT COUNTS

Table 2-1 summarizes the turning movement counts collected for this study, as well as the source and date of the counts. Traffic data were collected during the weekday morning peak period between 7:00 a.m. and 9:00 a.m. and the afternoon peak period between 4:00 p.m. and 6:00 p.m. Details of the turning movement counts are provided in **Appendix B**.

Table 2-1: Traffic Data Information

Intersections	Date of the count	Source
Horsham Avenue at Yonge Street	Tuesday, June 20, 2023	Horizon Data Services Ltd.
Hounslow Avenue at Horsham Avenue	Tuesday, June 20, 2023	Horizon Data Services Ltd.
Beecroft Road at Hounslow Avenue	Tuesday, June 20, 2023	Horizon Data Services Ltd.

The a.m. and p.m. peak hour volumes at the study intersections, used under existing conditions are illustrated in **Figure 2-3**.

2.4 EXISTING INTERSECTION OPERATIONS

2.4.1 METHODOLOGY

The Synchro 11 traffic analysis software incorporates the methodology outlined in the Highway Capacity Manual (HCM), Transportation Research Board, 2000 and 2010. Intersection capacity analysis provides an indication of traffic operations based on calculations of volume-to-capacity ratio (v/c) and delays for individual movements at an intersection. Level of Service (LOS) denoted by the letters 'A' through 'D' represent satisfactory traffic operations. LOS denoted by the letters 'E' and 'F' represent congested traffic conditions. The Level of Service definitions for signalized and unsignalized intersections are included in **Appendix C**.

2.4.2 MODEL INPUTS AND PARAMETERS

The Synchro model has been established based on the City of Toronto Synchro 11.0 Guidelines, January 2021. The following parameters were used to model the study area under the existing conditions:

SATURATION FLOW

The Synchro model has been established based on a saturation flow of 1,900 vehicles/hour/lane (vphpl) to all movements at all intersections.

PEAK HOUR FACTORS

The peak hour factors (PHF) for the study intersections were calculated based on the 15-minute counts and applied to better reflect the traffic peaking patterns of the intersections. **Table 2-2** lists the PHFs utilized in the analysis.

Table 2-2: Existing Peak Hour Factors

Intersection	Peak Hour Factors	
	Weekday A.M. Peak Hour	Weekday P.M. Peak Hour
Beecroft Road at Hounslow Avenue	0.89	0.92
Hounslow Avenue at Horsham Avenue	0.64	0.82
Horsham Avenue at Yonge Street	0.87	0.95

The pedestrian and heavy vehicle parameters were incorporated based on the observed turning movement counts (TMCs). All these parameters are carried forward from the existing conditions to the future assessment.

2.4.3 EXISTING INTERSECTION LOS

Traffic operations were analyzed at the key intersections to determine the existing Levels of Service during the weekday a.m. and p.m. peak hours. The results of the intersection capacity analysis under existing conditions are summarized in **Table 2-3**. Detailed intersection capacity analysis sheets are included in **Appendix D**.

Table 2-3: Existing Intersection Operations

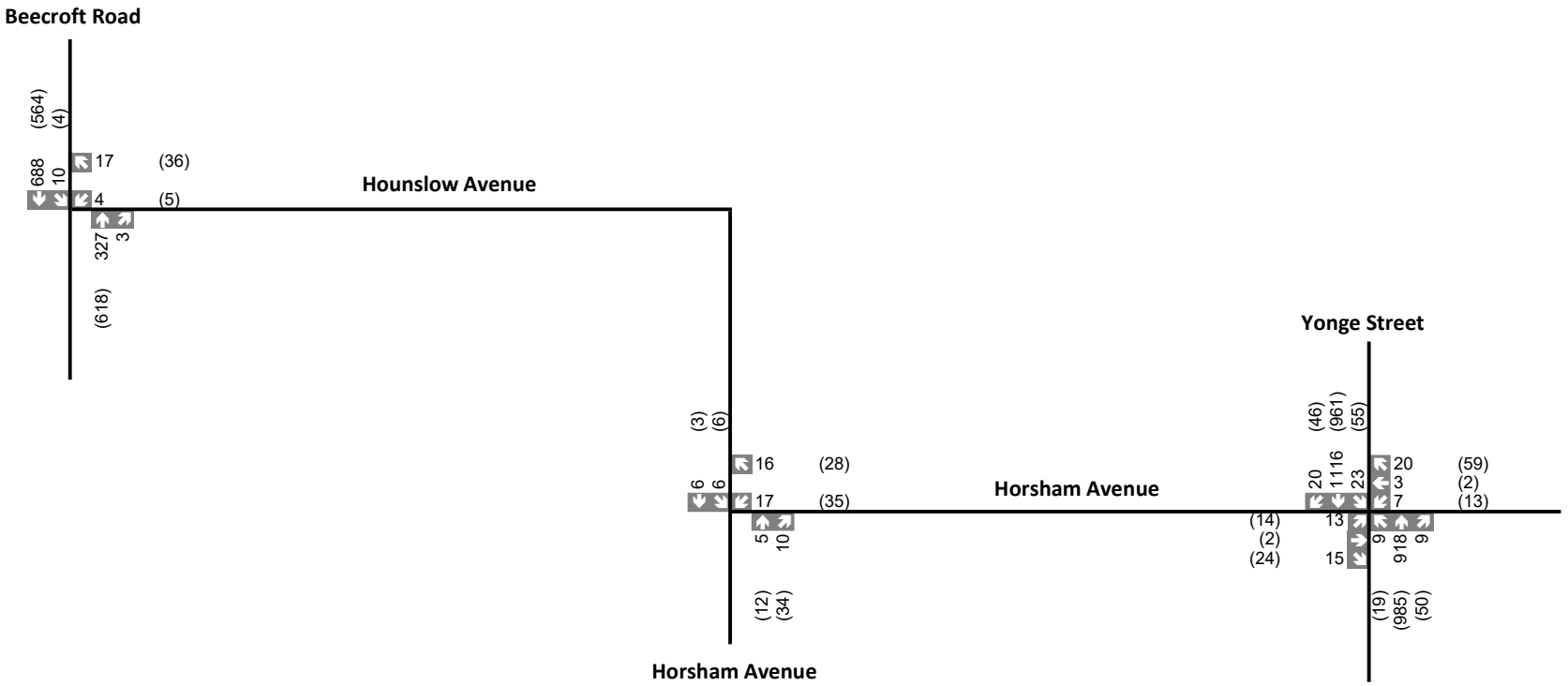
Intersection	A.M. Peak Hour		P.M. Peak Hour	
	Overall LOS (Delay in Seconds)	Critical Movements (Delay) (V/C) LOS	Overall LOS (Delay in Seconds)	Critical Movements (Delay) (V/C) LOS
Yonge Street at Horsham Avenue (Stop-Control) [1]	-	EB-TLR (27) (0.16) D	-	EB-LTR (46) (0.33) E WB-LTR (44) (0.47) E
Beecroft Road at Hounslow Avenue (Stop-Control)	-	WB-LR (12) (0.05) B	-	WB-LR (13) (0.08) B
Hounslow Avenue at Horsham Avenue (All-Way Stop-Control) [2]	A (7)	-	A (7)	-

1 *For minor-street stop control intersections, the level of service is based on the delay associated with the critical movement. Critical movements are identified as those with LOS E or F.*

2 *For all-way stop control intersection, the level of service is based on the overall delay of the intersection.*

The existing traffic operations indicate that all turning movements at the intersection of Beecroft Road at Hounslow Avenue operate at LOS B or better during the a.m. and p.m. peak hours. Turning movements at the east and west approaches of the Horsham Avenue at Yonge Street intersection operate with longer delay at LOS 'E' during the p.m. peak hour but these movements are still operating well within capacity. This is usual as Yonge Street is a major arterial with a seven-lane cross-section operating under free flow conditions and offers a reduced number of gaps for the eastbound and westbound vehicles to enter the traffic stream.

Overall, existing traffic operations show acceptable levels of delay at the study intersections.



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xx A.M. Peak Hour Traffic Volumes

(xx) P.M. Peak Hour Traffic Volumes

Figure 2-3

Existing Traffic Volumes

3 FUTURE BACKGROUND CONDITIONS

This section of our assessment describes the method of deriving future background traffic, the future road network plus the results of our future background traffic analysis within the study area.

3.1 TIME FRAME

Based on the City of Toronto TIS guidelines, a five-year horizon (2028) was assumed in this study as confirmed with the City via ToR. It is assumed that the subject development will be fully completed in one phase and by this horizon year.

3.2 PLANNED ROAD IMPROVEMENTS

Based on correspondence with City staff, there are no planned roadway improvements to the 2028 horizon year for the study area.

3.3 BACKGROUND CORRIDOR TRAFFIC GROWTH

Consistent with the April 2021 TIS, the general growth rate of the study area road network was determined based on historical AADT data provided by the City of Toronto. The annual growth rates along Yonge Street were calculated based on linear regression and are summarized in **Table 3-1**. These growth rates were applied to the through movements on Yonge Street at Horsham Avenue. No growth rates were applied along Beecroft, Horsham Avenue or Hounslow Avenue, as growth along these roadways is assumed to primarily consist of traffic generated by the planned area developments. The growth rate calculations are provided in **Appendix E**.

Table 3-1: Growth Rate Summary

Roads	Direction	Applied Growth Rates (A.M. and P.M. Peak Hours)
Yonge Street	Northbound	0.5%
	Southbound	0%

3.4 TRAFFIC FROM BACKGROUND DEVELOPMENTS

Based on discussions with City transportation staff and reviewing the City of Toronto Development Application site, nine background developments that would have impacts on the study intersections have been included as part of this TIS. Details of these background developments are summarized in **Table 3-2**.

Table 3-2: Background Developments

Number	Development	Statistics	Traffic Volume Source
1	15-21 Holmes Avenue	358 residential units	TOA by WSP, December 2018
2	5400 Yonge Street	324 residential units 800 m^2 retail GFA 1,654 m^2 office GFA	TIS by LEA Consulting Ltd., January 2018
3	5300 Yonge Street	395 residential units 468 m^2 retail GFA	TIS by BA Group, August 2022
4	5220 Yonge Street	308 residential units 11,305 m^2 office GFA 6,760 m^2 commercial GFA	TIS by NexTrans, June 2016
5	5203-5215 Yonge Street & 11 Parkview Avenue	329 residential units 251 m^2 retail GFA	TIS by LEA Consulting Ltd., December 2020
6	68-78 Churchill Avenue	44 townhouse units	TIS by NexTrans, October 2021
7	5576 Yonge Street	608 residential units 507 m^2 retail GFA	TIS by LEA Consulting Ltd., August 2022
8	5051 Yonge Street	365 residential units 1,875 m^2 retail GFA	TIS by BA Group, October 2022
9	5318-5334 Yonge Street and 11 Churchill Avenue	862 residential units 1,464 m^2 retail GFA	TIS by BA Group, April 2022

Figure 3-1 illustrates the traffic volumes generated by these nine background developments, which were determined through their respective studies. Individual trips from each development can be found in **Appendix F.**

3.5 FUTURE BACKGROUND INTERSECTION OPERATIONS

The resulting 2028 background traffic forecasts corresponding to the weekday a.m. and p.m. peak hours were derived by applying the respective growth rates and superimposing the traffic generated by the background developments onto the existing traffic volumes. The resulting future background traffic volumes are illustrated in **Figure 3-2.**

The resulting levels of service are outlined in **Table 3-3** with the details related to the intersection operations provided in **Appendix D.**

Table 3-3: 2028 Future Background Traffic Operations

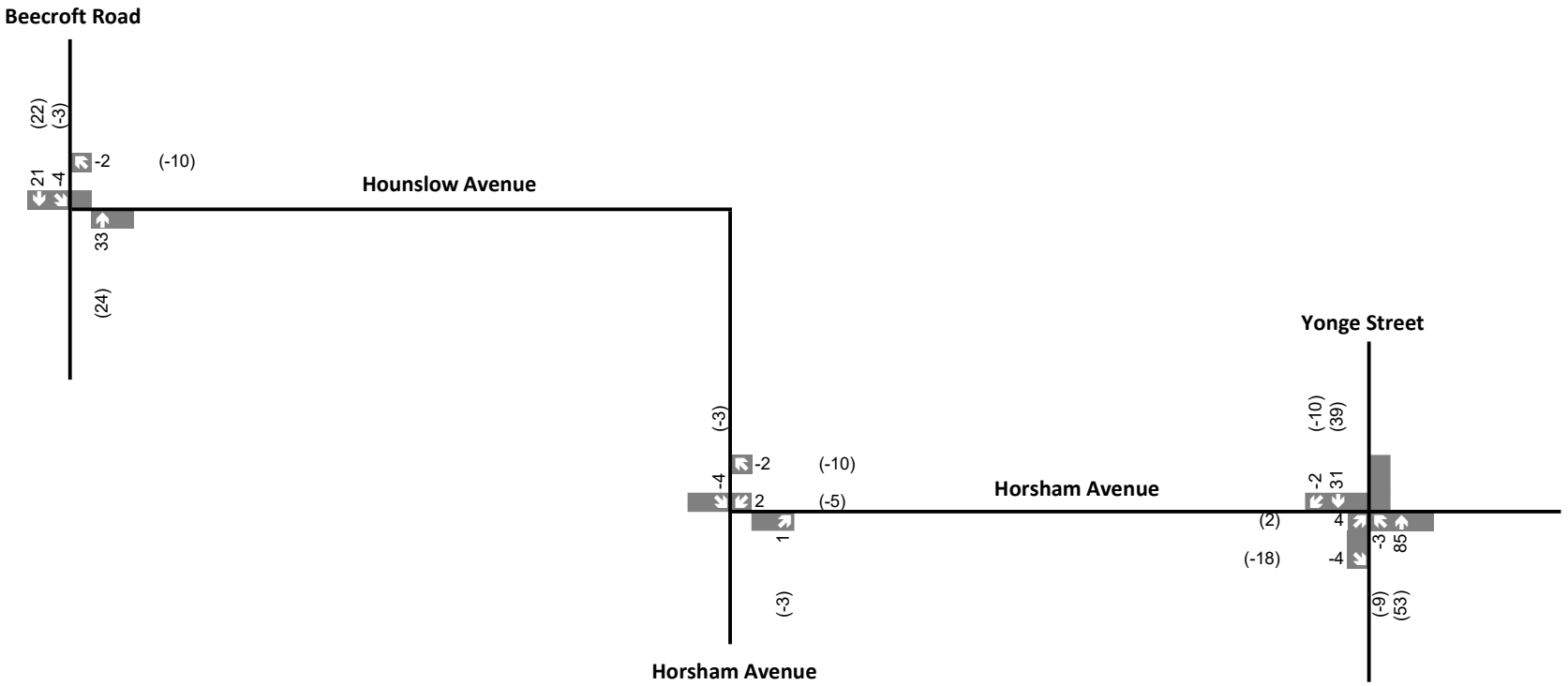
Intersection	A.M. Peak Hour		P.M. Peak Hour	
	Overall LOS (Delay in Seconds)	Critical Movements (Delay) (V/C) LOS	Overall LOS (Delay in Seconds)	Critical Movements (Delay) (V/C) LOS
Yonge Street at Horsham Avenue (Stop-Control) [1]	-	EB-TLR (33) (0.19) D	-	EB-LTR (67) (0.31) F WB-LTR (47) (0.49) E
Beecroft Road at Hounslow Avenue (Stop-Control)	-	WB-LR (12) (0.04) B	-	WB-LR (13) (0.07) B
Hounslow Avenue at Horsham Avenue (All-Way Stop-Control) [2]	A (7)	-	A (7)	-

1 *For minor-street stop control intersections, the level of service is based on the delay associated with the critical movement. Critical movements are identified as those with LOS E or F.*

2 *For all-way stop control intersection, the level of service is based on the overall delay of the intersection.*

The projected 2028 future background traffic operations indicate that all turning movements at the intersections of Beecroft Road at Hounslow Avenue and Hounslow Avenue at Horsham Avenue are projected to operate at LOS 'B' or better, as under existing conditions. Similar to the existing conditions, turning movements at the west approach of the Horsham Avenue at Yonge Street intersection are projected to operate at LOS 'E' during the p.m. peak hour. In addition, the eastbound turning movements at this intersection are projected to deteriorate to LOS 'F' during the p.m. peak hour. However, all of the critical movements are still operating well within capacity. This longer delay is typical when a minor roadway intersects a major arterial operating under free flow, as detailed under existing conditions. Delay at the eastbound approach is projected to be about one minute during the p.m. peak hour, which is deemed acceptable for the intersection.

The future background conditions will be used as the baseline for evaluating the impact of 26-38 Hounslow Avenue development.



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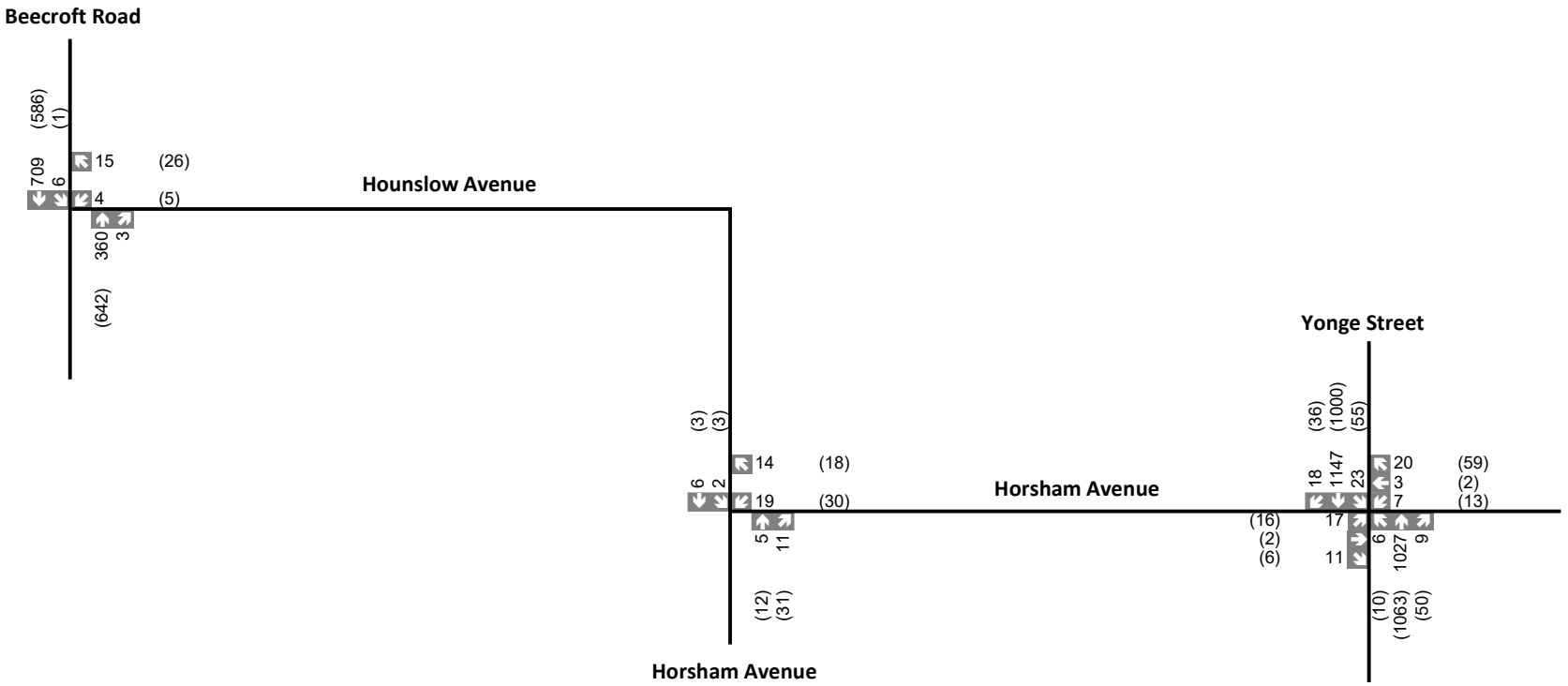
xx A.M. Peak Hour Traffic Volumes

(xx) P.M. Peak Hour Traffic Volumes

Figure 3-1

Background Development Traffic Volumes



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xx A.M. Peak Hour Traffic Volumes

(xx) P.M. Peak Hour Traffic Volumes

Figure 3-2

Future Background Traffic Volumes

4 SITE-GENERATED TRAFFIC

This section of our assessment describes the methodology for site traffic generation, distribution and assignment.

4.1 SITE ACCESS

The proposed development will be served by a full-moves access onto Hounslow Avenue, with a shared left and right-turn lane, as shown in the site plan (Figure 1-2). The site driveway in this study is added to the future total lane configurations in **Figure 4-1**.

4.2 MODEL SPLITS CHARACTERISTICS

The North York Centre Secondary Plan (NYCSP) identifies TDM to promote measures to increase the use of transit, cycling and walking and reduce the use of automobile for trips. One objective of the NYCSP is to encourage the use of public transit and reduce the reliance on vehicles to attain a high transit modal split. In this regard, the City targets an overall average auto driver modal split of no more than 33 percent (in the p.m. peak hour) for all new developments in the North York Centre.

The 2016 Transportation Tomorrow Survey (TTS) has been used to derive the existing residential travel modal split percentages near the study area (Zones 443, 444, 448 and 450) during the morning (6:30 a.m. to 9:30 a.m.) and afternoon (3:30 p.m. to 6:30 p.m.) peak periods, which are summarized in **Table 4-1**. The associated raw TTS data and the map of the selected zones area is provided in **Appendix G**.

Table 4-1: Modal Split Characteristics

Travel Mode	Modal Split Percentage			
	A.M. Peak Period		P.M. Peak Period	
	Inbound	Outbound	Inbound	Outbound
Auto Driver	59.7%	29.7%	30.4%	43.6%
Auto Passenger (including Taxi)	10.4%	6.7%	7.2%	24.0%
Transit and School Bus (excluding GO Rail)	1.9%	55.4%	52.9%	25.0%
Walking	28.0%	8.0%	9.0%	6.1%
Cycling	0%	0.2%	0.5%	1.3%
Total	100%	100%	100%	100%

As shown above, the existing residential auto driver modal split in the study area meets the City's target of 33 percent or lower in the peak directions (i.e. outbound in the a.m. peak hour and inbound in the p.m. peak hour) but not in the off-peak directions (i.e. inbound in the a.m. peak hour and outbound in the p.m. peak hour). Transit is the predominant travel mode in the peak directions with a modal split over 50 percent.

4.3 TRIP GENERATION

The vehicle trips generated by the proposed development during the weekday a.m. and p.m. peak hours were estimated using the rate specified in section 2.2 of the North York Centre Secondary Plan (NYCSP). These rates were confirmed by the City to use for the traffic analysis. The trip generation rates for the subject site are outlined in **Table 4-2**, and the overall vehicle trips generated are shown in **Table 4-3**.

Table 4-2: Auto Trip Generation Rates

Use	Method	Average Trip Generation Rate					
		A.M. Peak Hour			P.M. Peak Hour		
		Inbound	Outbound	Total	Inbound	Outbound	Total
Residential	North York Centre Secondary Plan	0.08	0.16	0.24	0.16	0.08	0.24

Table 4-3: Site Generated Vehicular Trips

Land Use	Parameter	A.M. Peak Hour			P.M Peak Hour		
		Inbound	Outbound	Total	Inbound	Outbound	Total
Residential Condominium (305 Units)	Trip Rate (Trips/Unit)	0.08	0.16	0.24	0.16	0.08	0.24
	Auto Trips	**24**	**49**	**73**	**49**	**24**	**73**

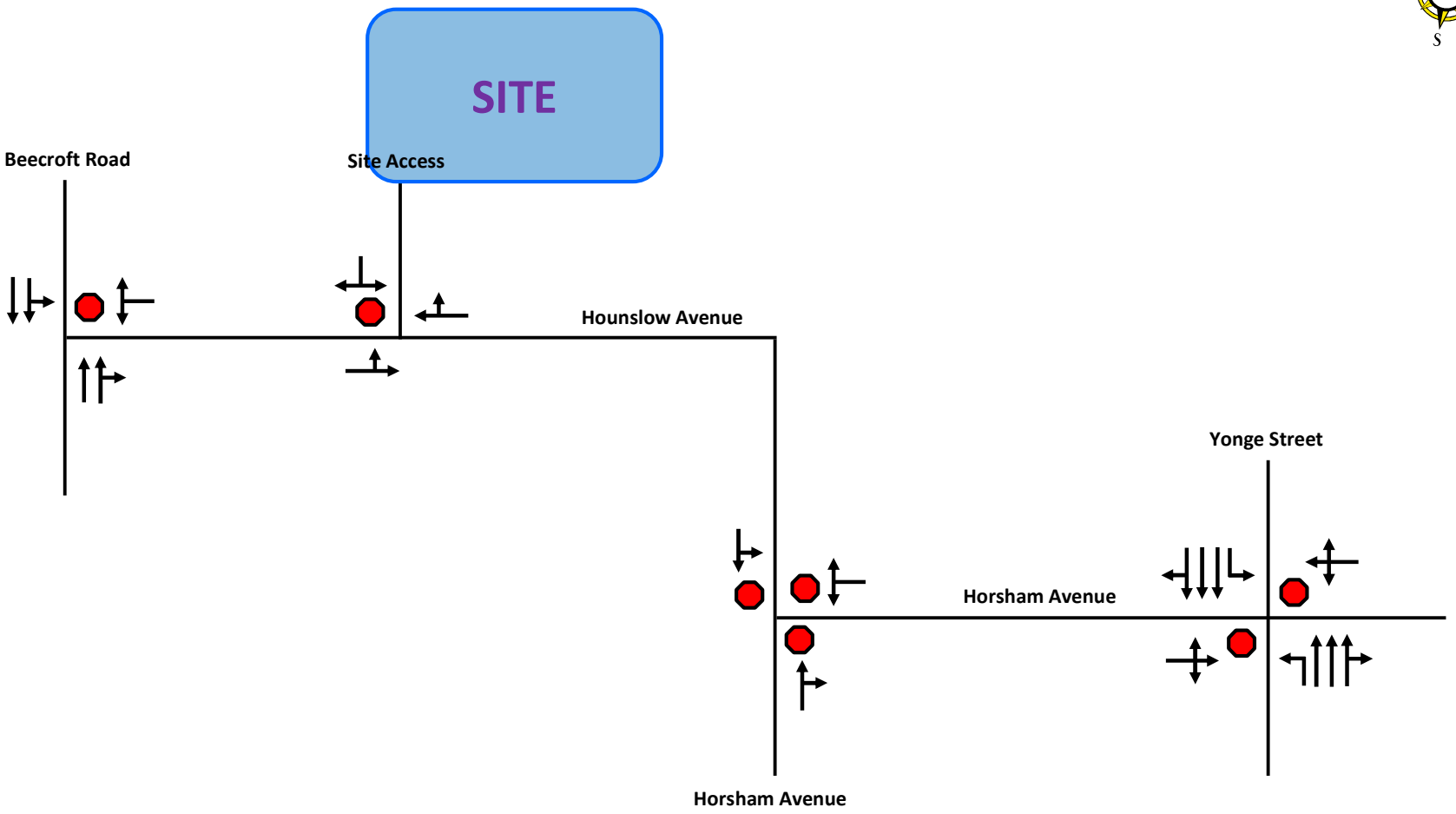
As shown in **Table 4-3**, the proposed development is forecast to generate a total of 73 auto trips during both the weekday a.m. and p.m. peak hours.

4.4 TRIP DISTRIBUTION AND ASSIGNMENT

The trip distribution of the site generated traffic forecast was derived based on a review of the existing travel patterns, 2016 Transportation Tomorrow Survey (TTS) data, and the most logical routes to and from the subject site. The distribution is detailed in **Table 4-4**. The site-generated auto trips are illustrated in **Figure 4-2.**

Table 4-4: Estimated Trip Distribution

TO/FROM	A.M. Peak Hour	P.M Peak Hour
North via Beecroft Road	25%	35%
South via Beecroft Road	25%	15%
North via Yonge Street	30%	20%
South via Yonge Street	20%	30%
Total	**100%**	**100%**



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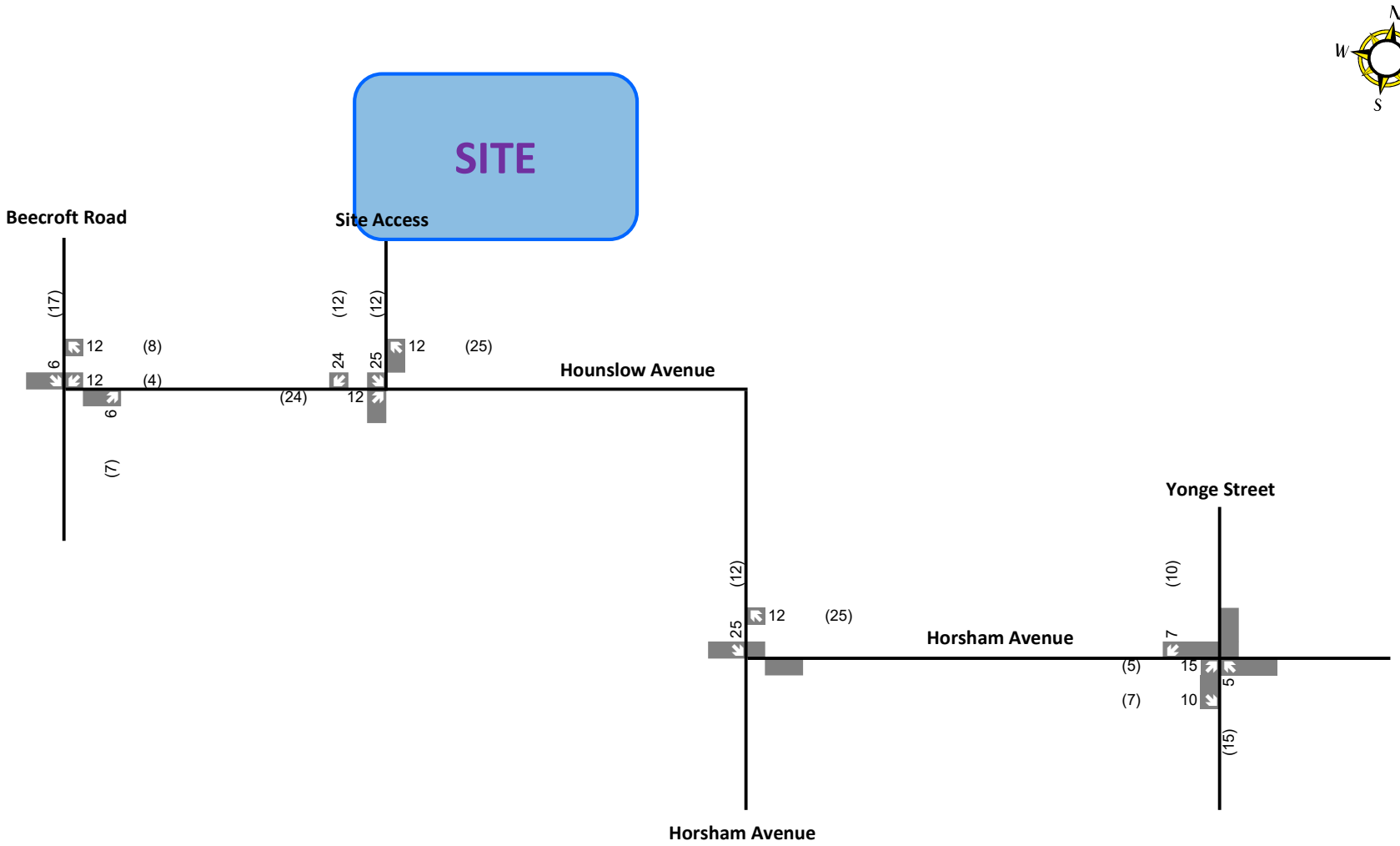
Stop Control Lane Configurations

Figure 4-1

Future Total
Lane Configurations



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xx A.M. Peak Hour Traffic Volumes

(xx) P.M. Peak Hour Traffic Volumes

Figure 4-2

Site Generated Traffic Volumes

5 TOTAL FUTURE TRAFFIC CONDITIONS

The 2028 total traffic conditions were estimated by superimposing the site-generated traffic volumes onto the future background traffic volumes. The resulting 2028 total future traffic forecast is illustrated in **Figure 5-1**.

5.1 TOTAL FUTURE INTERSECTION OPERATIONS

The total future traffic operations at the study intersections were analyzed on the basis of the total future traffic forecasts with a full moves site access.

The resulting levels of service are outlined in **Table 5-1** and detailed Synchro reports are available in **Appendix D.**

Table 5-1: 2028 Total Future Intersection Operations

Intersection	A.M. Peak Hour		P.M. Peak Hour	
	Overall LOS (Delay in Seconds)	Critical Movements (Delay) (V/C) LOS	Overall LOS (Delay in Seconds)	Critical Movements (Delay) (V/C) LOS
Yonge Street at Horsham Avenue (Stop-Control) [1]	-	EB-TLR (40) (0.37) E	-	EB-LTR (73) (0.43) F WB-LTR (51) (0.52) F
Beecroft Road at Hounslow Avenue (Stop-Control)	-	WB-LR (14) (0.11) B	-	WB-LR (14) (0.10) B
Hounslow Avenue at Horsham Avenue (All-Way Stop-Control) [2]	A (7)	-	A (7)	-
Hounslow Avenue at Site Access (Stop-Control)	-	SB-LR (9) 0.08 A	-	SB-LR (9) 0.03 A

1 *For minor-street stop control intersections, the level of service is based on the delay associated with the critical movement. Critical movements are identified as those with LOS E or F.*

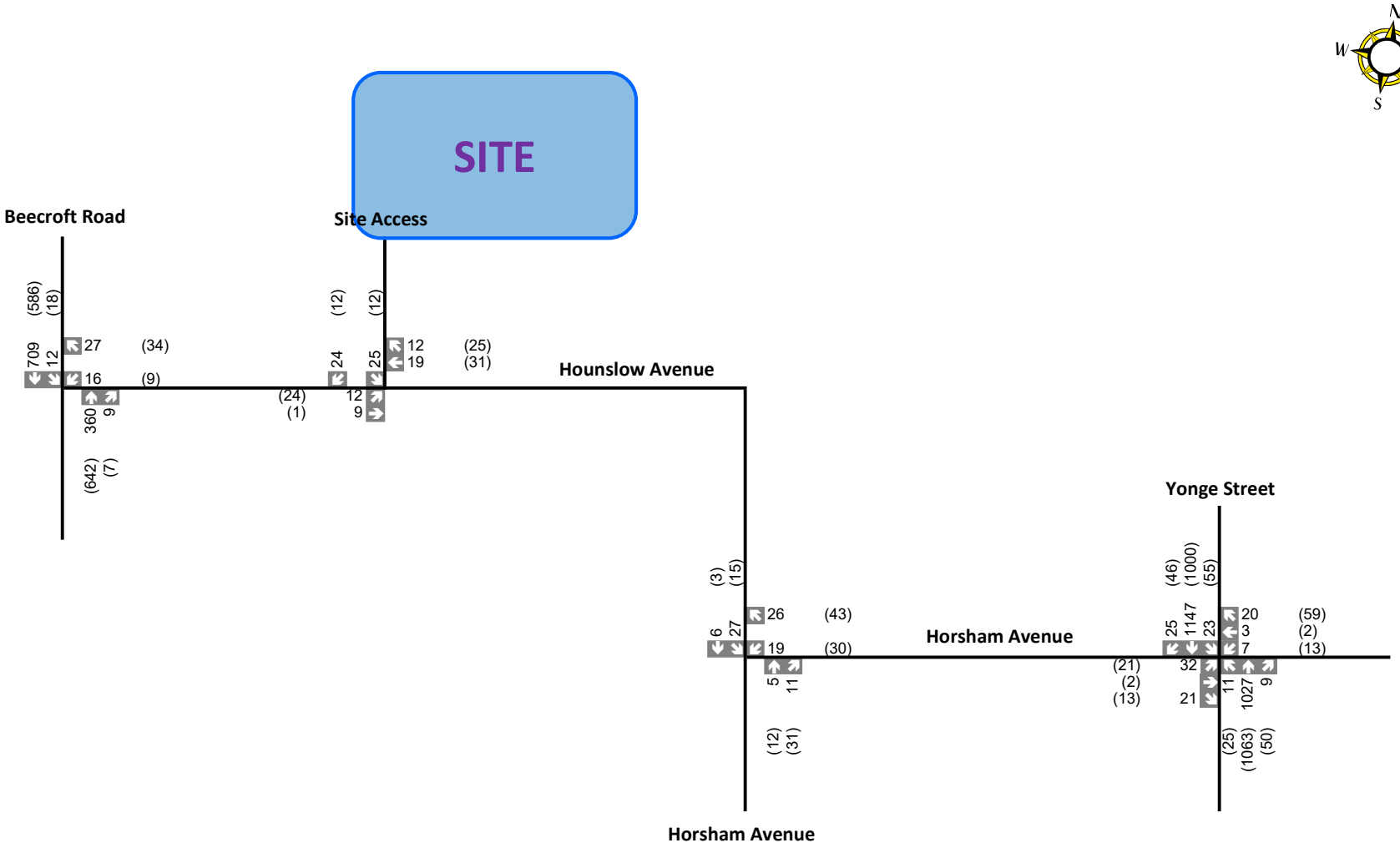
2 *For all-way stop control intersection, the level of service is based on the overall delay of the intersection.*

The projected 2028 future total traffic operations indicate that all turning movements at the intersections of Beecroft Road at Hounslow Avenue and Hounslow Avenue at Horsham Avenue are projected to operate at LOS B or better, as under future background conditions. Turning movements at the east and west approaches of the Horsham Avenue at Yonge Street intersection are projected to operate at LOS 'F' during both the a.m. and p.m. peak hours. However, all of the critical movements are still operating well within capacity.

Moreover, the site access is projected to operate at very well LOS 'A' and experience a delay of 9 seconds during both peak periods, which is expected since there are minimal conflicting movements along Hounslow Avenue.

The addition of site generated traffic is projected to have a minor impact on the operations at the study intersections. Compared to the future background conditions, the addition of site-generated volumes results in a maximum increase in average delay of 6 seconds per vehicle for the eastbound movements at the Yonge Street at Horsham Avenue intersection during both the a.m. and p.m. peak hours.

Based on the future total traffic operations, the site-generated traffic volumes of the proposed development can be readily accommodated by the study area road network.



Legend

xx A.M. Peak Hour Traffic Volumes

(xx) P.M. Peak Hour Traffic Volumes

Figure 5-1

Future Total Traffic Volumes

6 SITE PLAN REVIEW

6.1 SITE ACCESS

The development is proposed to be accessible via a full-moves access to Hounslow Avenue.

The City of Toronto standard for a driving aisle accommodating two-way traffic is a minimum width of 6.0m. The proposed access driveway is proposed to have a width of 6.0m, meeting the City's requirements. Additionally, a drop-off area is proposed within the development ground floor with a width of 3.0m, which is sufficient to accommodate vehicles completing pick-up/drop-off operations. Finally, City of Toronto design standard drawing T-350.01 requires a minimum curb radius of 5.0m for an apartment driveway, which is met by the proposed driveway. Please refer to **Figure 6-1** for the proposed ground floor dimensions.

6.2 PICK-UP/DROP-OFF DEMAND ESTIMATION

The proposed development features a pick-up and drop-off (PUDO) area within the development ground floor with a width of 3.0m. As illustrated in Figure 6-1, the proposed PUDO area can sufficiently accommodate at least two P-TAC vehicles at a time.

The anticipated PUDO activity at this site includes taxis, ride-hailing services such as Uber and Lyft, and carpooling pick-up and drop-off. WSP reviewed PUDO survey data presented in other traffic impact studies for sites near higher-order transit. The short-term PUDO rates observed in the background review are summarized in **Table 6-1**.

Table 6-1: Proxy PUDO Rates

Proxy Site	Units	95th Percentile Vehicle Accumulation	Rate Per Unit
18 Yorkville Avenue	313	4	0.013
1000 Bay Street/ 57 St. Joseph Street	458	2	0.004
		3	0.007
		2	0.004
Average		**3**	**0.007**

Source: Table 36 of the 906 Yonge Street TIS (BA Group, October 14, 2021)

As shown above, the 95th percentile vehicle accumulation is 0.007 per unit. Applying the 95th percentile rate to the proposed 305 residential units, the site is estimated to require two short-term parking spaces to accommodate simultaneous PUDO activities. The proposed PUDO area can accommodate two vehicles at a time, which meets the demand. Given the above considerations, it is our opinion that the proposed PUDO area are appropriate to accommodate PUDO activity for the site.

6.3 PARKING AND LOADING SPACES DIMENSIONS

The City of Toronto standard for parking spaces is 2.6m in width and 5.6m in length. Parking spaces located adjacent to walls require an additional 300mm buffer space. Accessible spaces require a minimum width of 3.4m, as well as the provision of a barrier-free aisle with a width of 1.5m adjacent to each space. Finally, two-way driving aisles providing access to perpendicular parking are required to have a minimum width of 6.0m.

All spaces proposed within the two levels of underground parking, as well as all proposed driving aisles, meet the above noted requirements. Please refer to **Figure 6-2** and **Figure 6-3** for the proposed parking dimensions of levels P1 and P2, respectively.

The site is required to provide one Type "G" loading space, with a minimum length of 13.0m and width of 4.0m based on City of Toronto standards. The proposed loading space meets the City's requirements, as illustrated in **Figure 6-1**.

6.4 SITE CIRCULATION

WSP completed a review of the site circulation for various design vehicles within the subject lands, as detailed below.

WASTE COLLECTION

WSP completed a review of the proposed site circulation for the waste collection vehicle. A City of Toronto 10m front loading garbage truck was used as illustrated in **Figure 6-4** and **Figure 6-5**. The figure shows the design vehicle entering and exiting the proposed development from both sides of Hounslow Avenue, with no projected conflict.

Due to the limited visibility between the loading space and vehicles exiting the underground parking from the ramp and vehicles traveling along the driving aisle to enter the underground parking, a warning system with LED stop and go lights are proposed to be located opposite the loading space and in the northeast section of the passenger pick-up drop-off to warn passenger vehicles that the loading operations are on-going. The lights would be activated when a vehicle is exiting the loading area. The proposed pavement marking and proposed warning system is illustrated in **Figure 6-12**.

It should be noted that on-street parking is permitted along the south side of Hounslow Avenue east of Beecroft Road between 6 p.m. and 8 a.m. The waste collection simulations show the design vehicle travel path close to the parked vehicles when exiting westbound onto Hounslow Avenue, with no projected conflicts. This has been communicated to City staff, who advised that this was acceptable to them.

FIRE TRUCK CIRCULATION

WSP completed a review of the proposed site circulation for a fire truck vehicle. A City of Toronto fire truck was used as illustrated in **Figure 6-6**. The site plan does not identify a fire route on the site and we simulated the fire truck on Hounslow Avenue, with no projected conflict.

LOADING OPERATIONS

WSP completed a review of the proposed site circulation for a loading truck vehicle. An MSU rear loading truck (per TAC 2017 Standards) was used as illustrated in **Figure 6-7**. The figure shows the design vehicle entering and exiting the proposed development from both sides of Hounslow Avenue, with no projected conflict. Additionally, a warning system is proposed to alert vehicles that loading operations are on-going as stated above.

Similar to the waste collection vehicle, the loading truck travel path will be close to the on-street parked vehicles when exiting westbound onto Hounslow Avenue, which was advised as acceptable by staff as for the waste collection vehicle.

GROUND FLOOR SITE CIRCULATION

WSP completed a PTAC vehicle (5.6m long, per TAC 2017 Standards) check showing that two PTAC vehicles can simultaneously circulate the ramp leading to the underground parking as shown in **Figure 6-8**.

WSP also reviewed the proposed site circulation for passenger vehicles at the site access and drop-off area on the ground floor. As illustrated in **Figure 6-9**, there is sufficient space for two PTAC vehicles to simultaneously circulate at the drive aisle while two PTAC vehicles are stopped at the PUDO

UNDERGOUND PARKING AREAS

WSP completed a review of the proposed site circulation for passenger vehicles at the critical parking spaces located within the underground parking levels. A PTAC vehicle (5.6m long) was used for the review. Please refer to **Figure 6-10** and **Figure 6-11** for the review of critical parking spaces on levels P1 & P2 (as they share a similar design). The review shows no projected conflicts within the underground parking areas.

6.5 PUBLIC REALM IMPROVEMENT CONSIDERATIONS

As part of the proposed development and as requested by City of Toronto staff, the Applicant has committed to providing improvements to the public realm infrastructure surrounding the subject lands.

As discussed with City staff, the following improvements are proposed:

- → A continuous sidewalk on the north side of Hounslow Avenue between Beecroft Road and Horsham Avenue.
- → Trees along the boulevard at the site frontage.
- → A curb extension at the intersection of Hounslow Avenue and Horsham Avenue to improve the pedestrian realm.

Considering the above improvements, WSP completed a sightline analysis review at the site access in order to identify all areas that will need to remain free of vertical obstruction. The sightline analysis is illustrated in **Figure 6-13** and **Figure 6-14**, along with the proposed continuous sidewalk. The sightline analysis was conducted in two stages; stage 1 illustrated in Figure 6-13 demonstrates a driver sightline as the vehicle stops at the stop sign at the intersection of Hounslow Avenue and the site entrance. When the vehicle is stopped behind the stop bar, the short-term bike parking east of the site entrance is an obstruction to the driver's sightline. Stage 2 is the driver sightline when the vehicle creeps forward and clears the sidewalk as demonstrated in Figure 6-14. The vehicle in this stage is located at the edge of the road and no longer in conflict with the short-term bike parking.

Per TAC Figure 9.9.6. the sight distance sufficient for a stopped driver on a minor road approach to depart from the intersection and enter the major road safely is 110m at a design speed of 60km/h, and 75m at a design speed of 40km/h. As vehicles coming along Canterbury Place and Horsham Avenue have to stop at their respective stop signs before entering Hounslow Avenue, the average speed along Hounslow Avenue towards the proposed driveway is not anticipated to be more than 40km/h. As the intersection of Beecroft Road at Hounslow Avenue is located at approximately 30m of the site access, the average speed along Hounslow Avenue towards the proposed driveway is anticipated to be low. Both sight distance requirements can be met as shown in Figure 6-13 and Figure 6-14 .

Curb extensions at the intersection of Hounslow Avenue and Horsham Avenue were designed to improve pedestrian realm at the intersection by reducing their exposure to vehicular traffic. A potential design for the curb extension has been illustrated in **Figure 6-15**. The design is based on the City of Toronto Design Guidelines, which is dictated by design vehicle circulation as illustrated in **Figure 6-16**.

WSP understands that medium single unit (MSU) trucks and fire trucks making a northbound right or westbound right maneuver could encroach into the opposing lane and conflict with a vehicle stopped at the stop bar. The encroachment falls within the City of Toronto Road Engineering Design Guidelines for curb radii and is deemed acceptable. This would not occur frequently and at low speeds, and therefore represents a minimum safety risk. Occasional drivers that may need to stop during their maneuvers, which represents a minor tradeoff for improving the pedestrian realm. The turning movement counts showed that 26 and 28 pedestrians crossed the east leg of the intersection during the a.m. and p.m. peak hours and the number of crossings is expected to increase with the addition of the proposed development and other background developments.

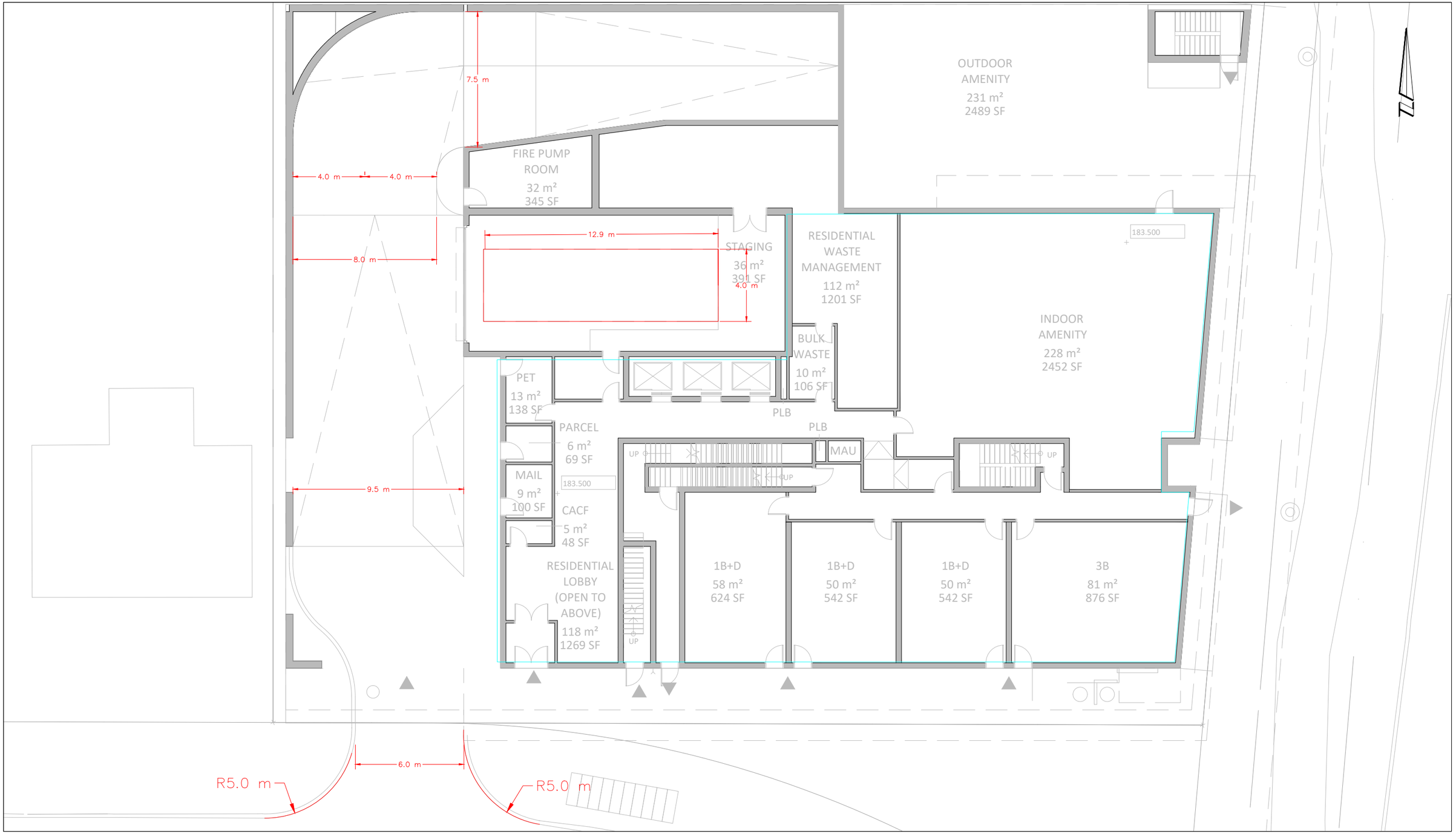


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Figure 6-1
Ground Floor Dimesions
26-38 Hounslow Avenue Transportation Impact Study

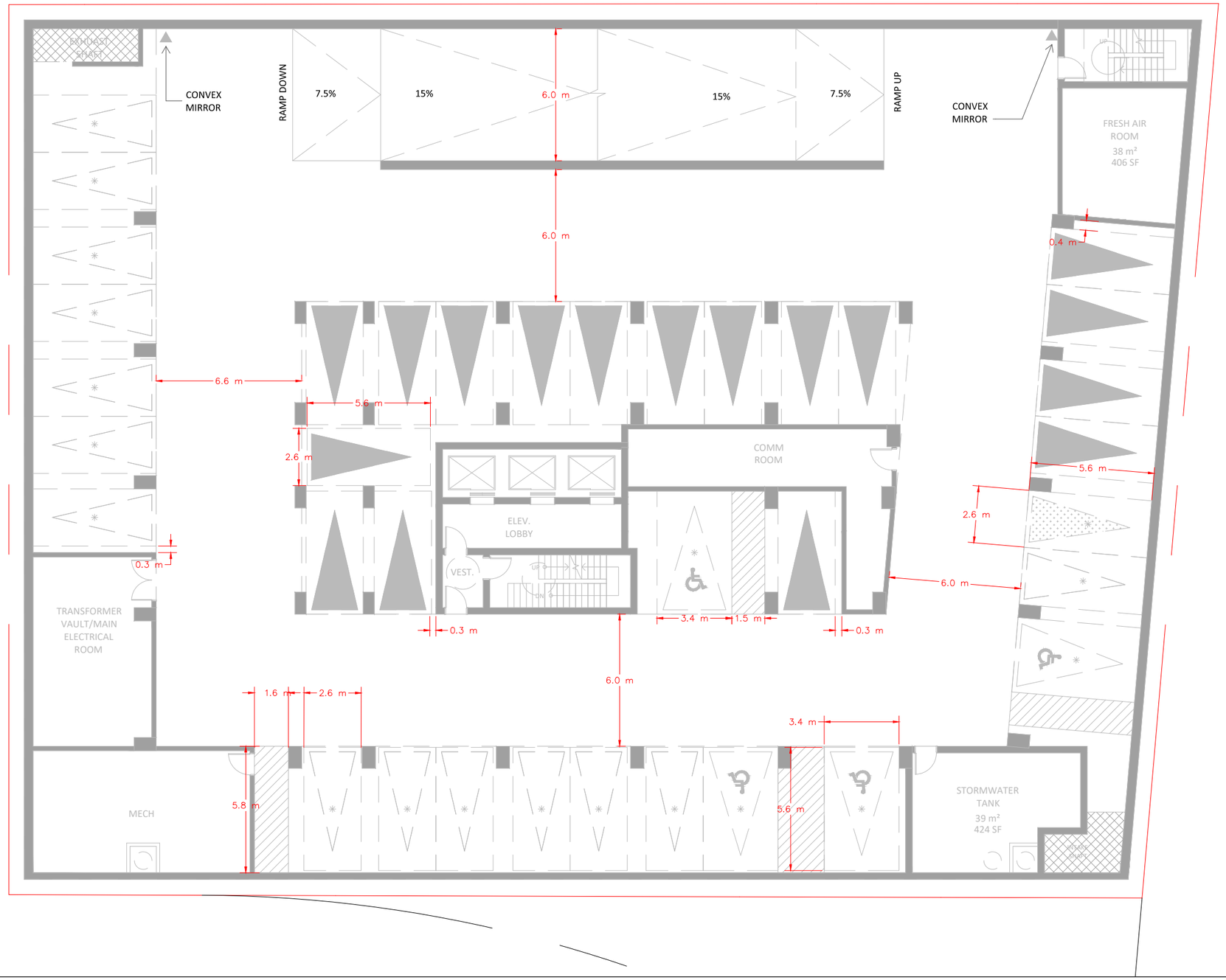

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Figure 6-2
Parking Level P1 Dimensions
26-38 Hounslow Avenue Transportation Impact Study

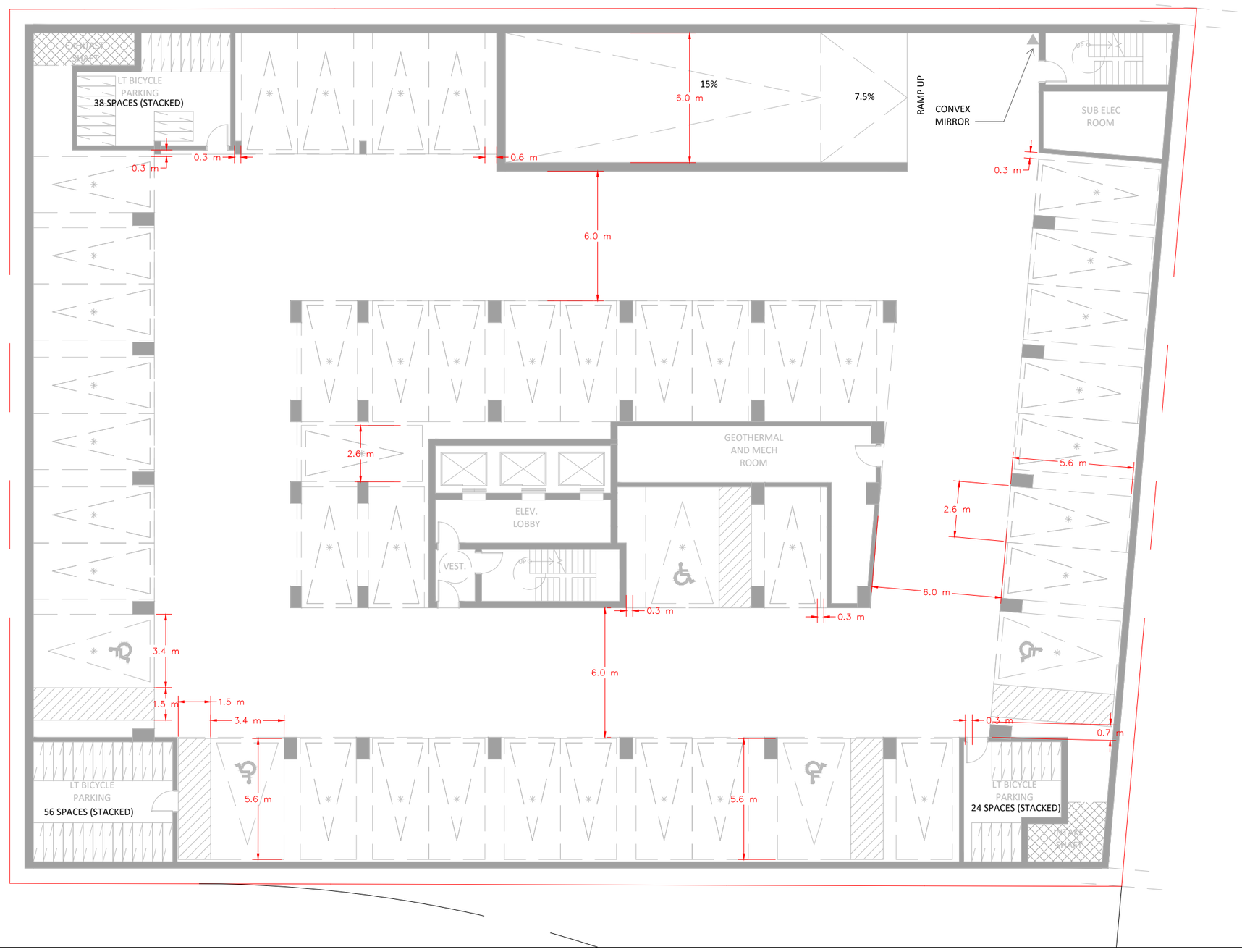

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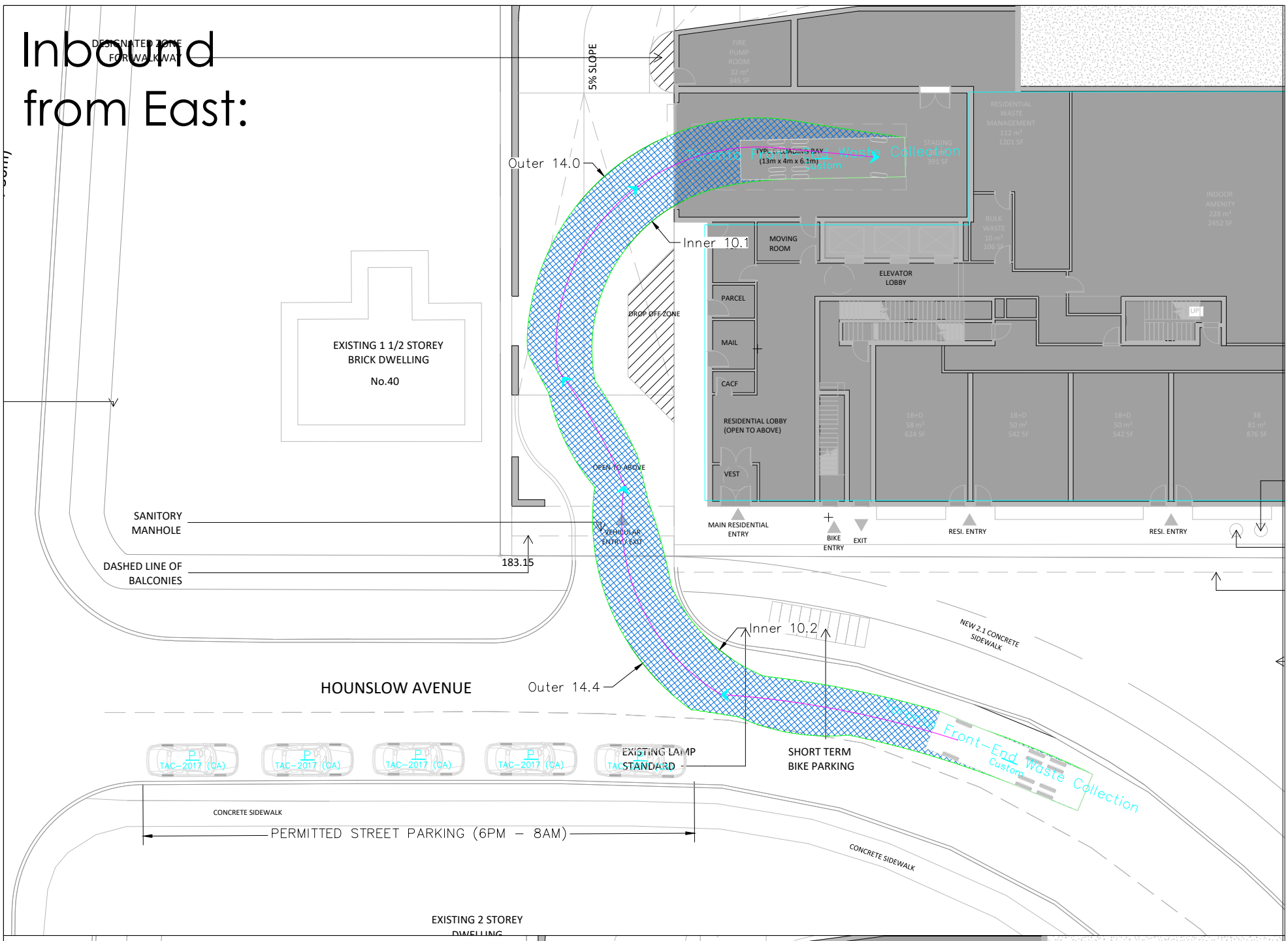
Figure 6-3
Parking Level P2 Dimensions
26-38 Hounslow Avenue Transportation Impact Study

Inbound from East:



Inbound from West:

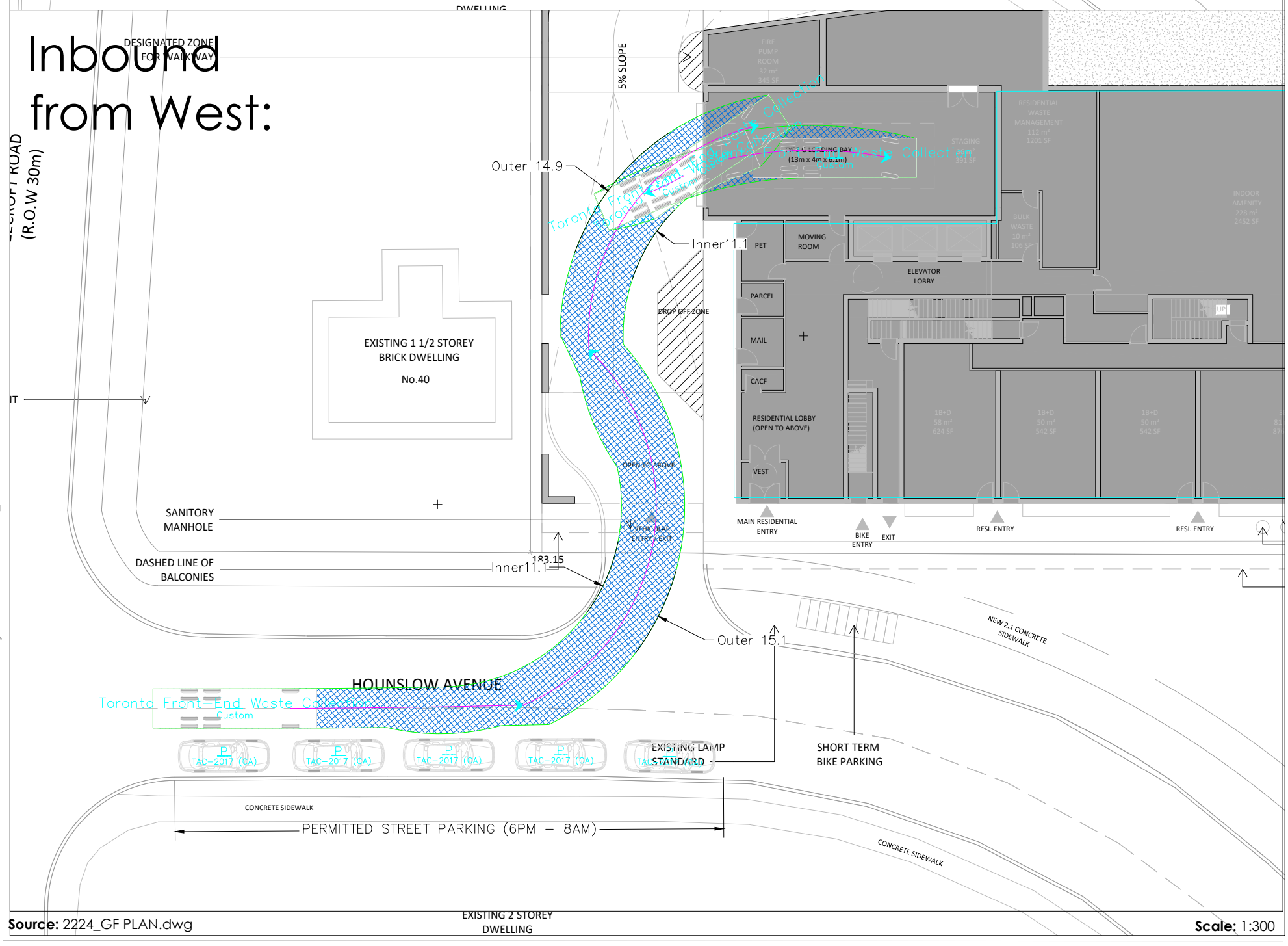


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Figure 6-4
Waste Collection Circulation
26-38 Hounslow Avenue Transportation Impact Study

Toronto Front-End Waste Collection

meters	
Width	: 2.40
Track	: 2.40
Lock to Lock Time	: 6.0
Steering Angle	: 23.1

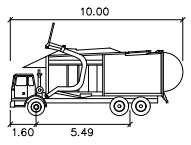

Figure 6-4 to 6-8.dwg_Figure 4

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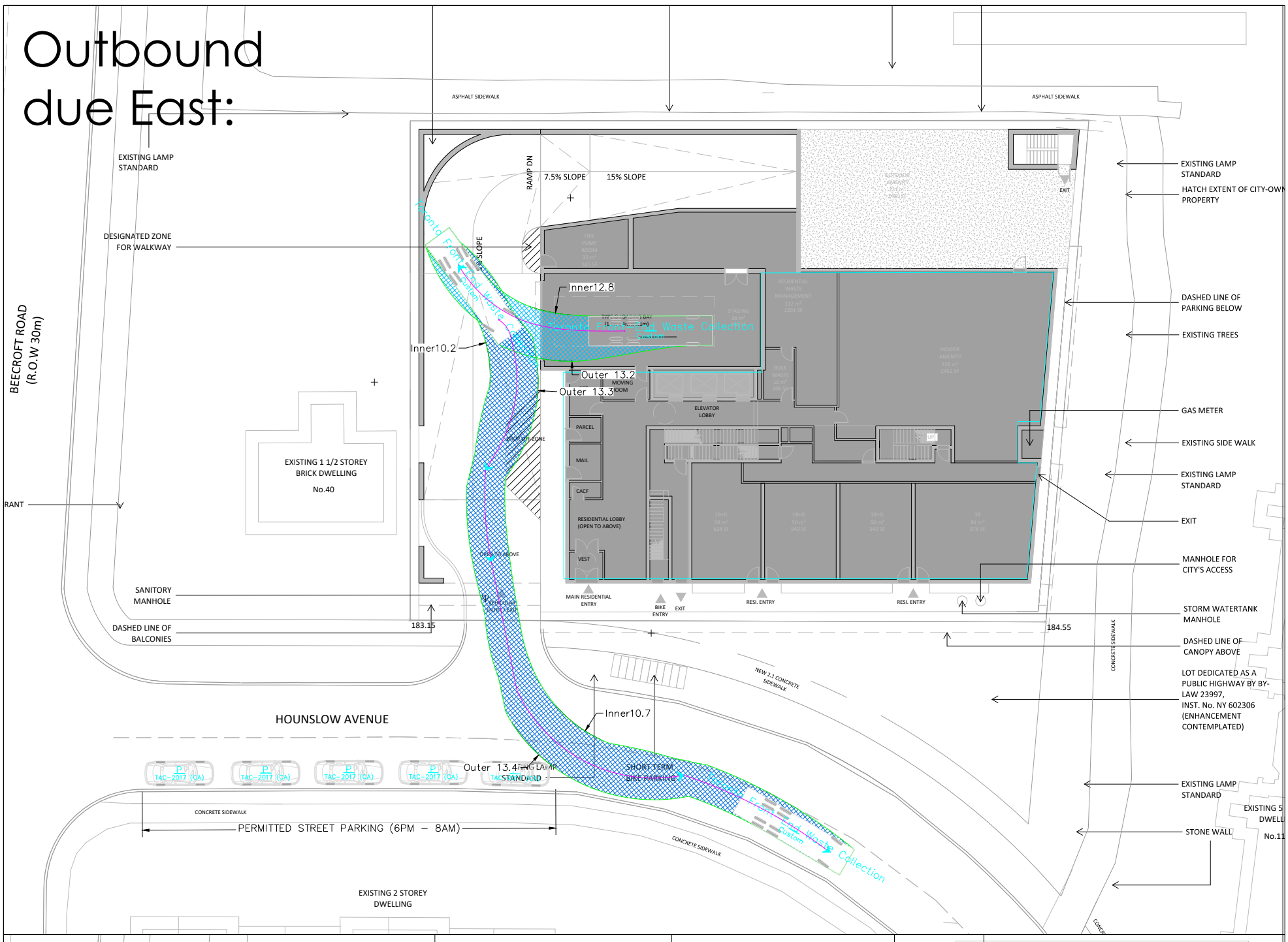
Outbound due East:



Outbound due West:

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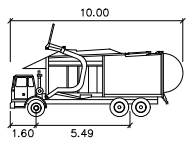
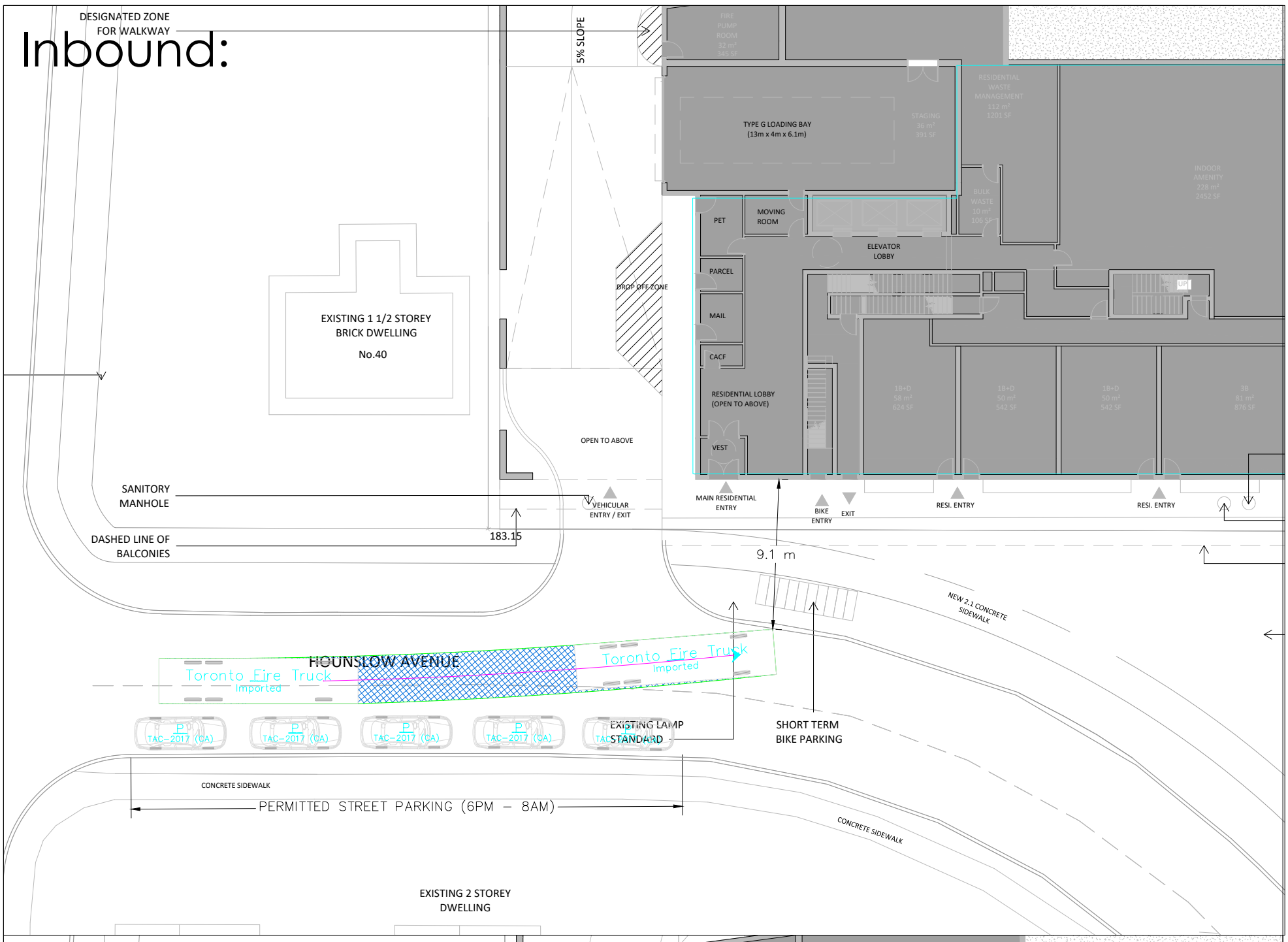
Figure 6-5
Waste Collection Circulation
26-38 Hounslow Avenue Transportation Impact Study

Toronto Front-End Waste Collection
meters

Width	: 2.40
Track	: 2.40
Lock to Lock Time	: 6.0
Steering Angle	: 23.1



Inbound:



Outbound:

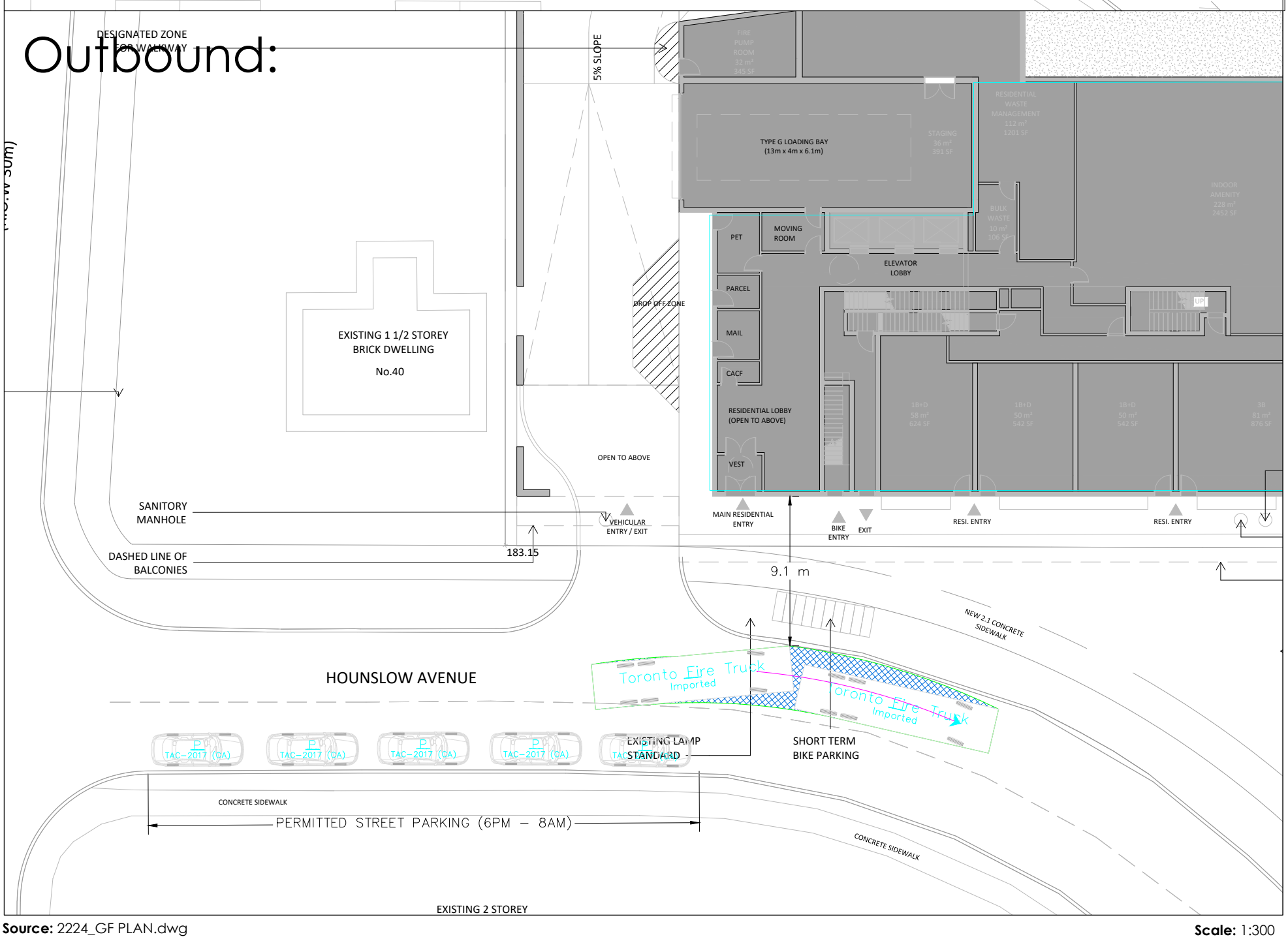


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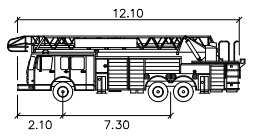
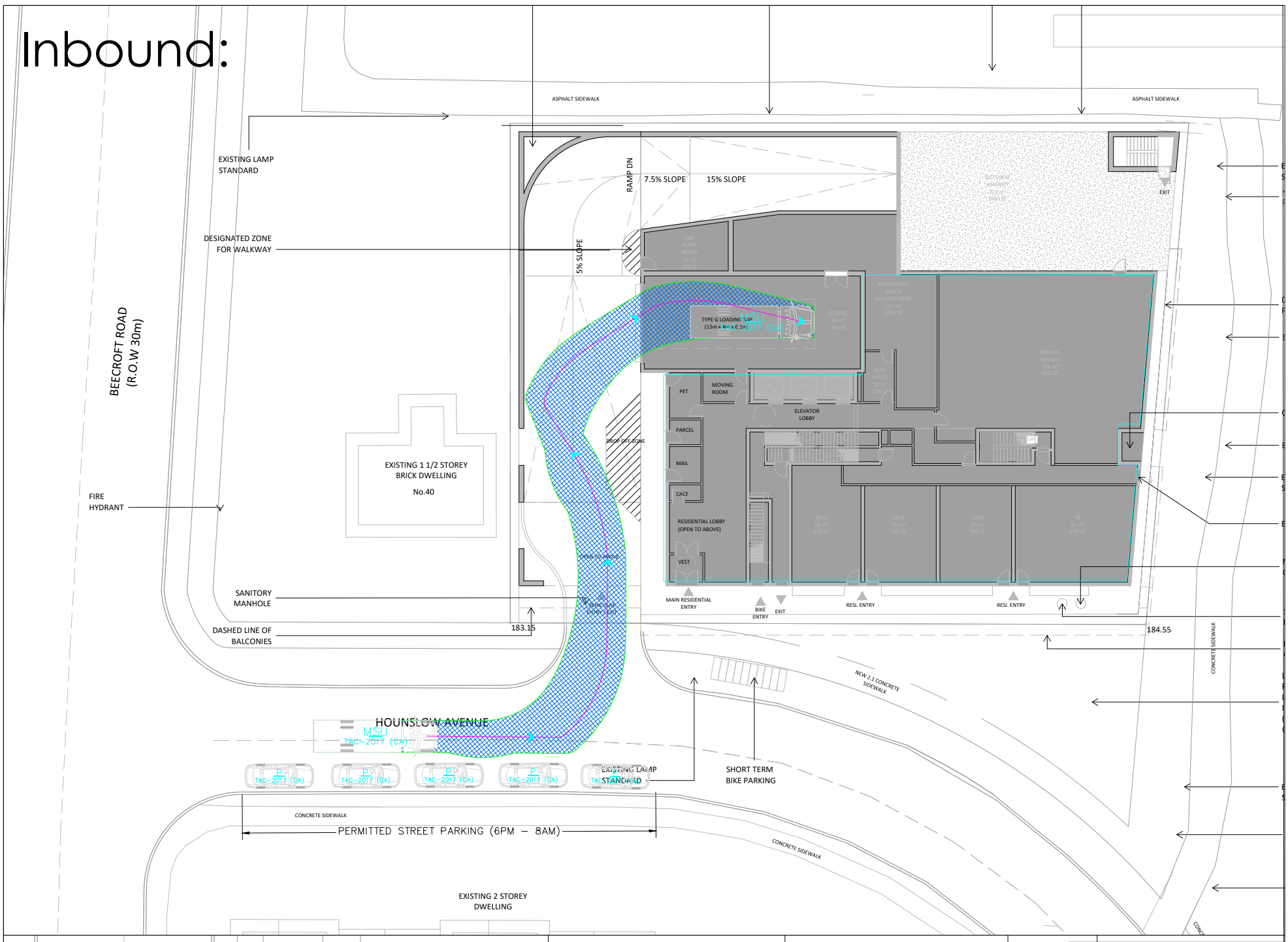
Figure 6-6
Fire Truck Circulation
26-38 Hounslow Avenue Transportation Impact Study

Toronto Fire Truck

	meters
Width	: 2.75
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 37.5



Inbound:



Outbound:

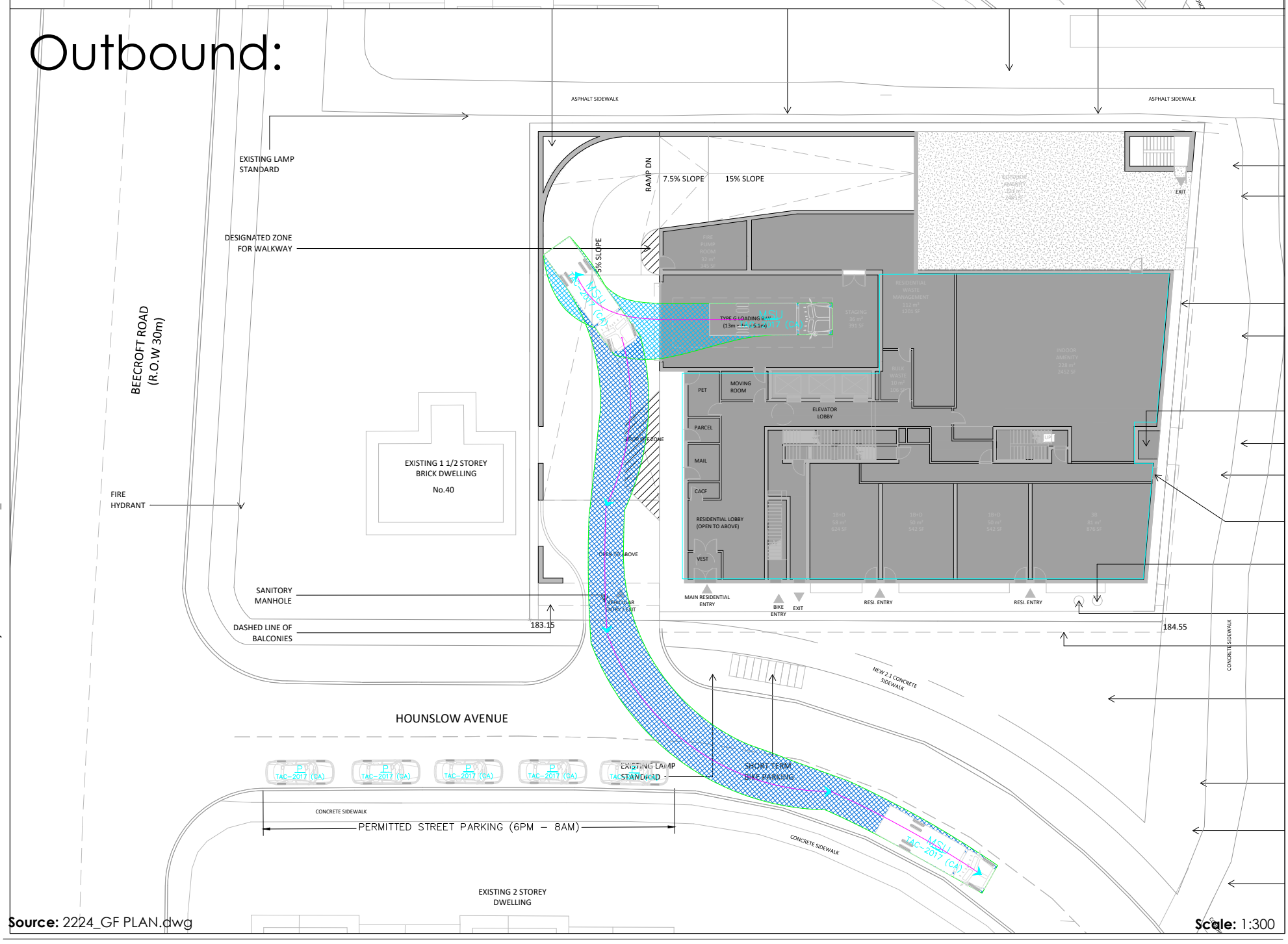


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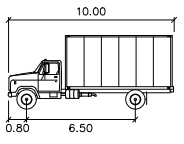
Figure 6-7
Loading Operations Circulation
26-38 Hounslow Avenue Transportation Impact Study

MSU

	meters
Width	: 2.60
Track	: 2.60
Lock to Lock Time	: 6.0
Steering Angle	: 40.1



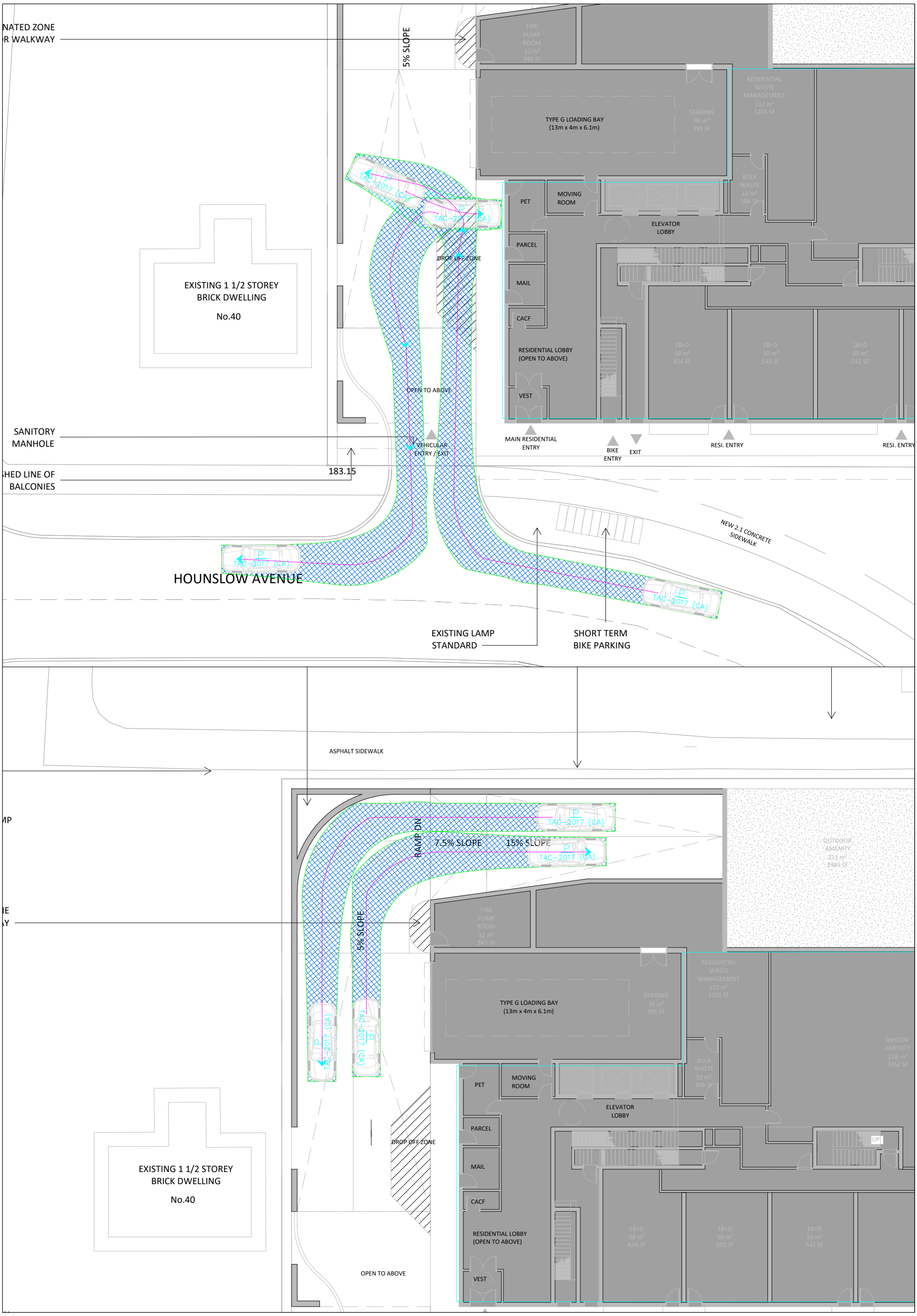


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Figure 6-8
Ground Floor Site Circulation
26-38 Hounslow Avenue Transportation Impact Study

P

	meters
Width	: 2.00
Track	: 2.00
Lock to Lock Time	: 6.0
Steering Angle	: 35.9

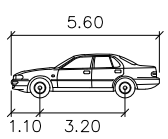

Figure 6-4 to 6-8.dwg_Figure 8

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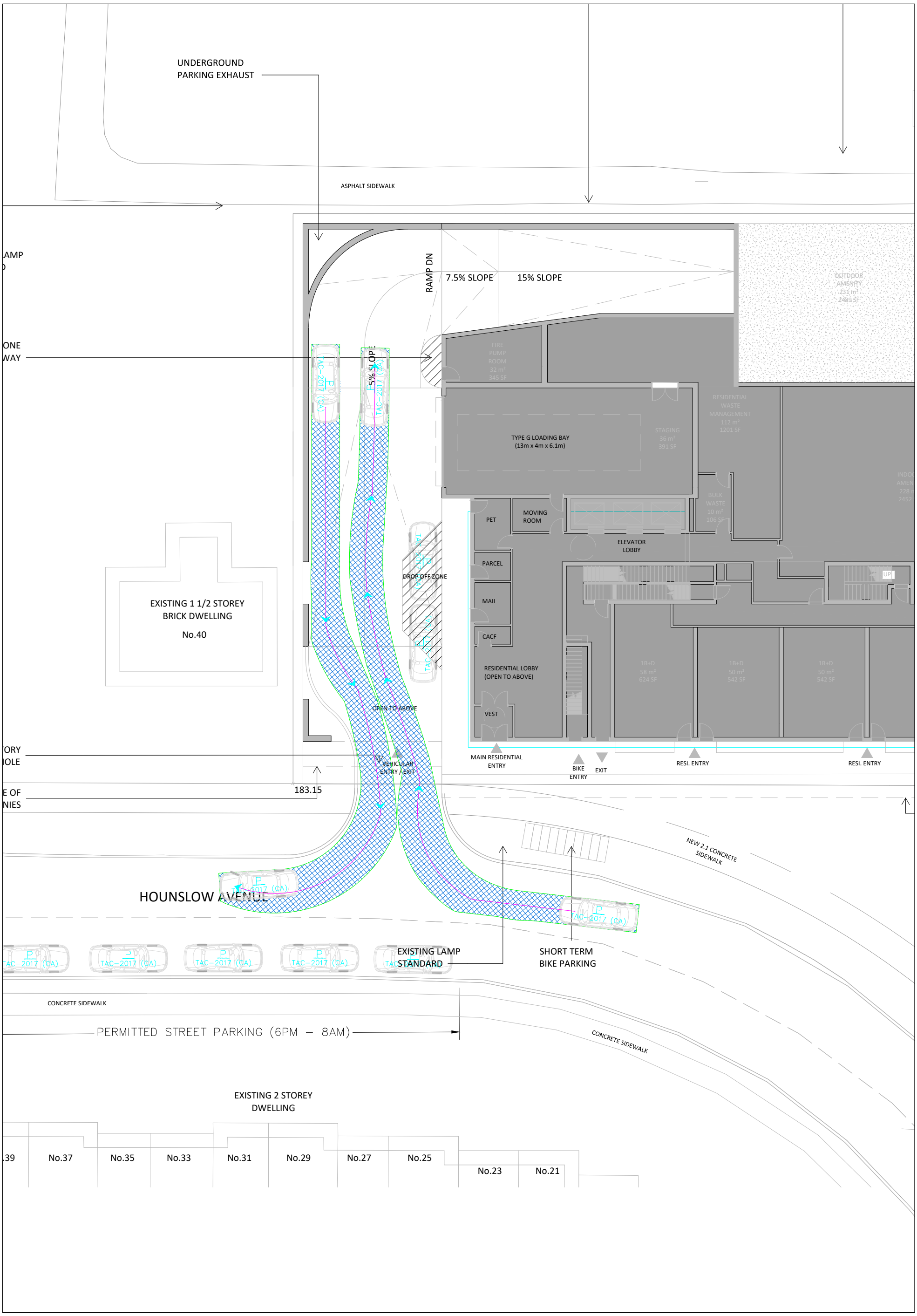

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Figure 6-9
Drop Off Check
26-38 Hounslow Avenue Transportation Impact Study

P

	meters
Width	: 2.00
Track	: 2.00
Lock to Lock Time	: 6.0
Steering Angle	: 35.9

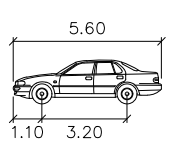

Figure 6-9.dwg_Figure 9

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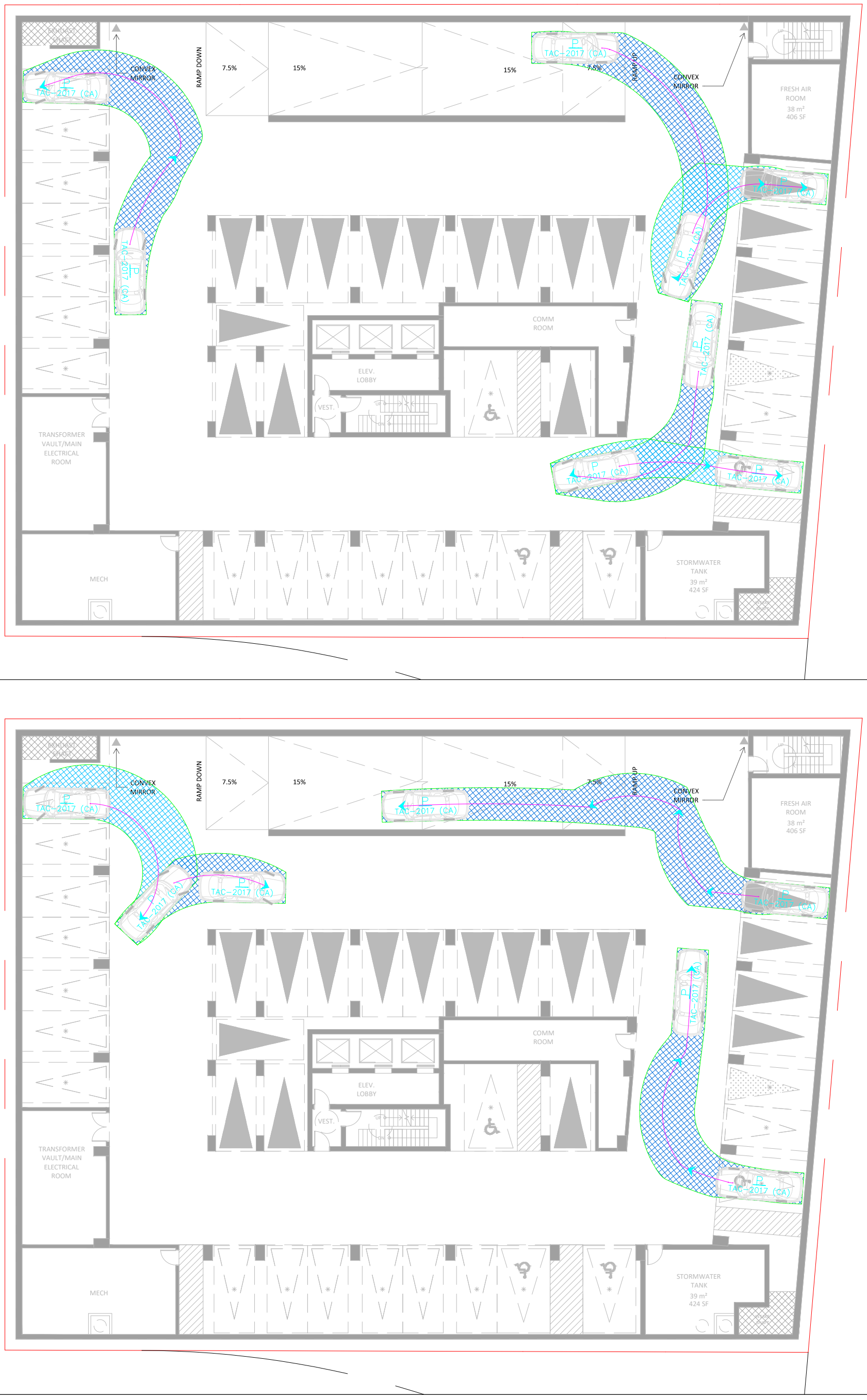

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Figure 6-10
Parking Circulation - P1
26-38 Hounslow Avenue Transportation Impact Study

P

	meters
Width	: 2.00
Track	: 2.00
Lock to Lock Time	: 6.0
Steering Angle	: 35.9

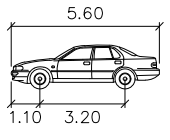

Figure 6-1 to 6-3 and 6-10 to 6-11.dwg_Figure 10

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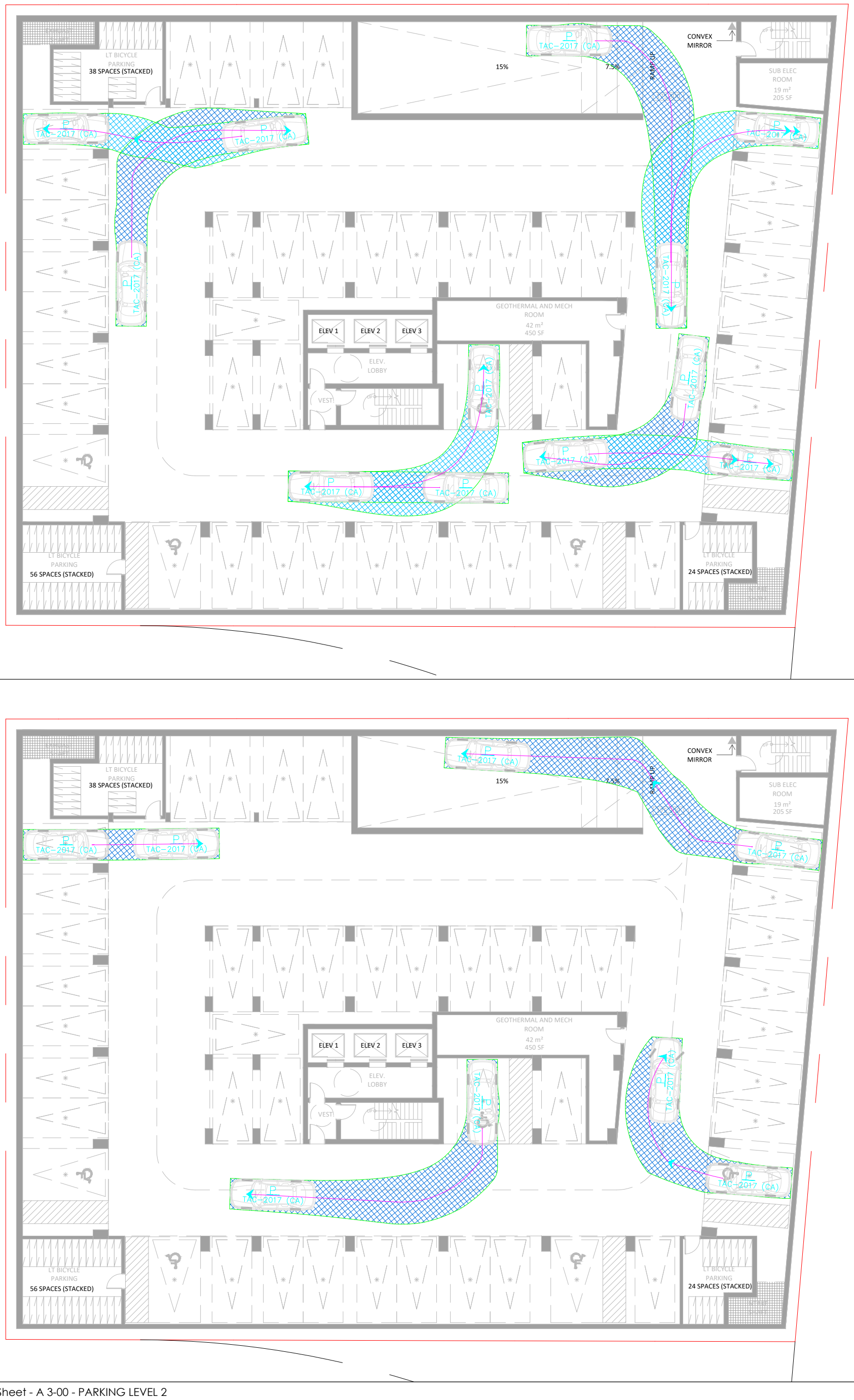

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Figure 6-11
Parking Circulation - P2
26-38 Hounslow Avenue Transportation Impact Study

P

	meters
Width	: 2.00
Track	: 2.00
Lock to Lock Time	: 6.0
Steering Angle	: 35.9

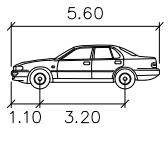

Figure 6-1 to 6-3 and 6-10 to 6-11.dwg_Figure 11

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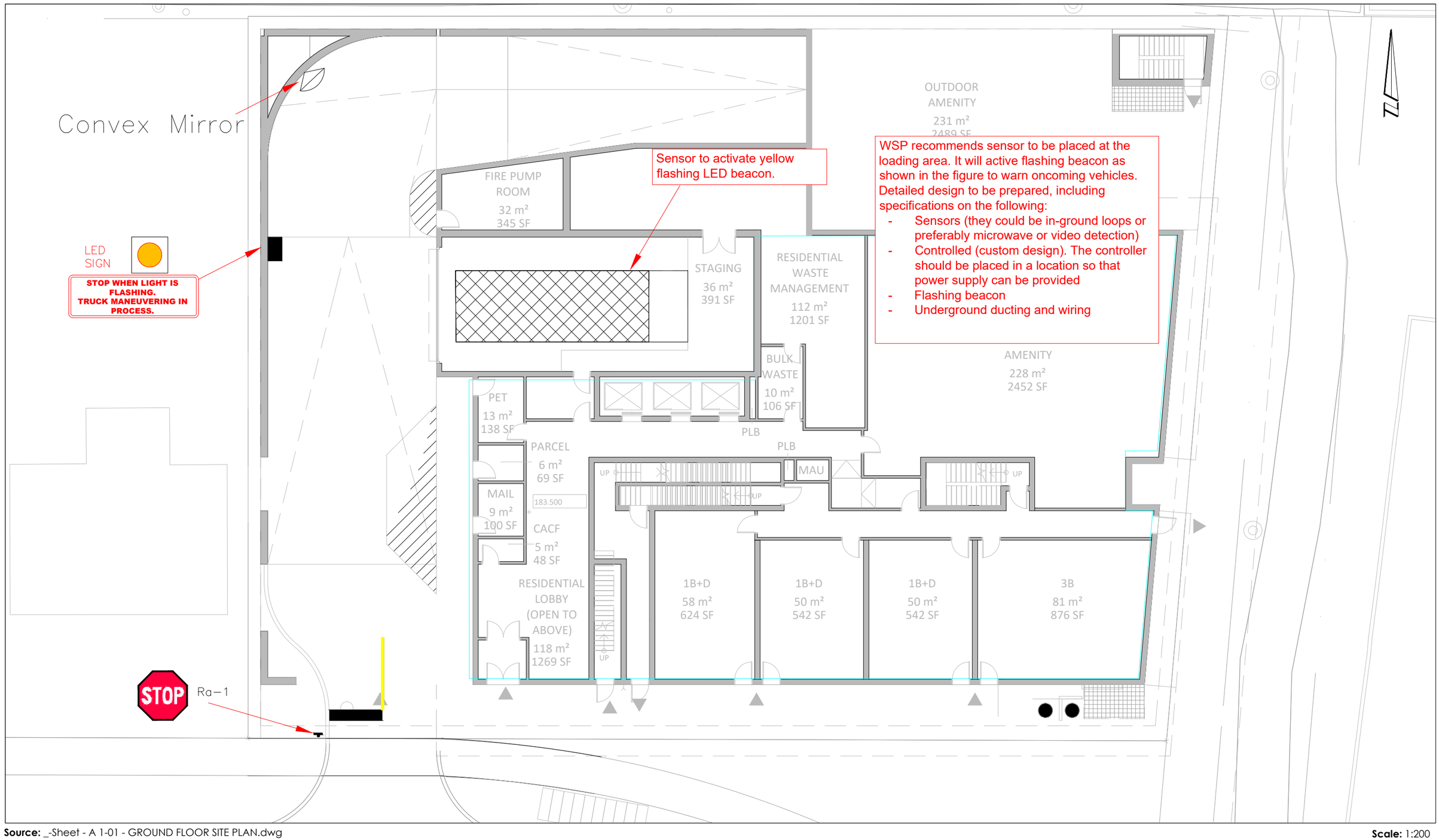

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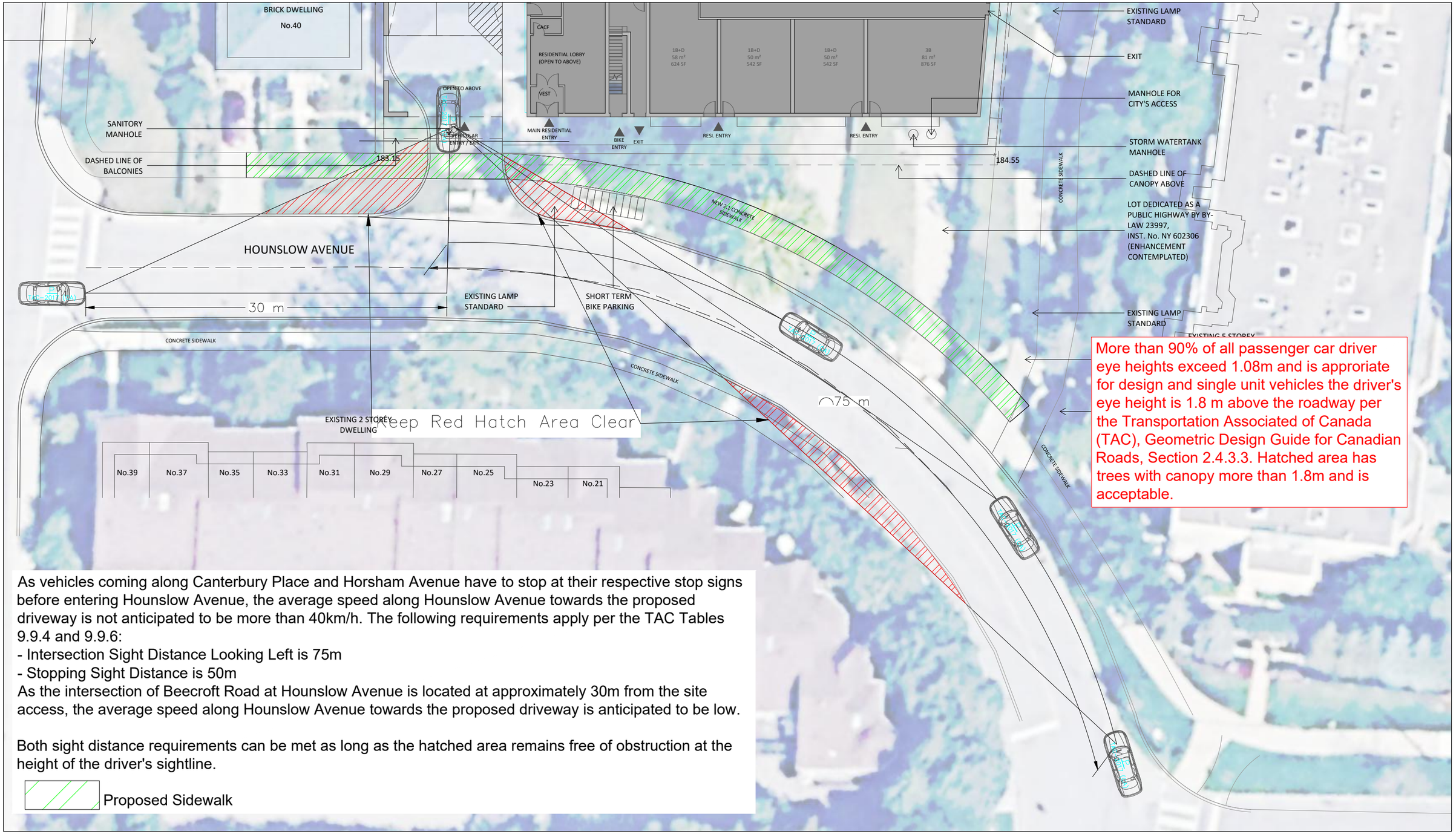
Figure 6-12
Pavement Marking and Proposed Warning System
26-38 Hounslow Avenue Transportation Impact Study



As vehicles coming along Canterbury Place and Horsham Avenue have to stop at their respective stop signs before entering Hounslow Avenue, the average speed along Hounslow Avenue towards the proposed driveway is not anticipated to be more than 40km/h. The following requirements apply per the TAC Tables 9.9.4 and 9.9.6:
- Intersection Sight Distance Looking Left is 75m
- Stopping Sight Distance is 50m

As the intersection of Beecroft Road at Hounslow Avenue is located at approximately 30m from the site access, the average speed along Hounslow Avenue towards the proposed driveway is anticipated to be low.

Both sight distance requirements can be met as long as the hatched area remains free of obstruction at the height of the driver's sightline.

Proposed Sidewalk

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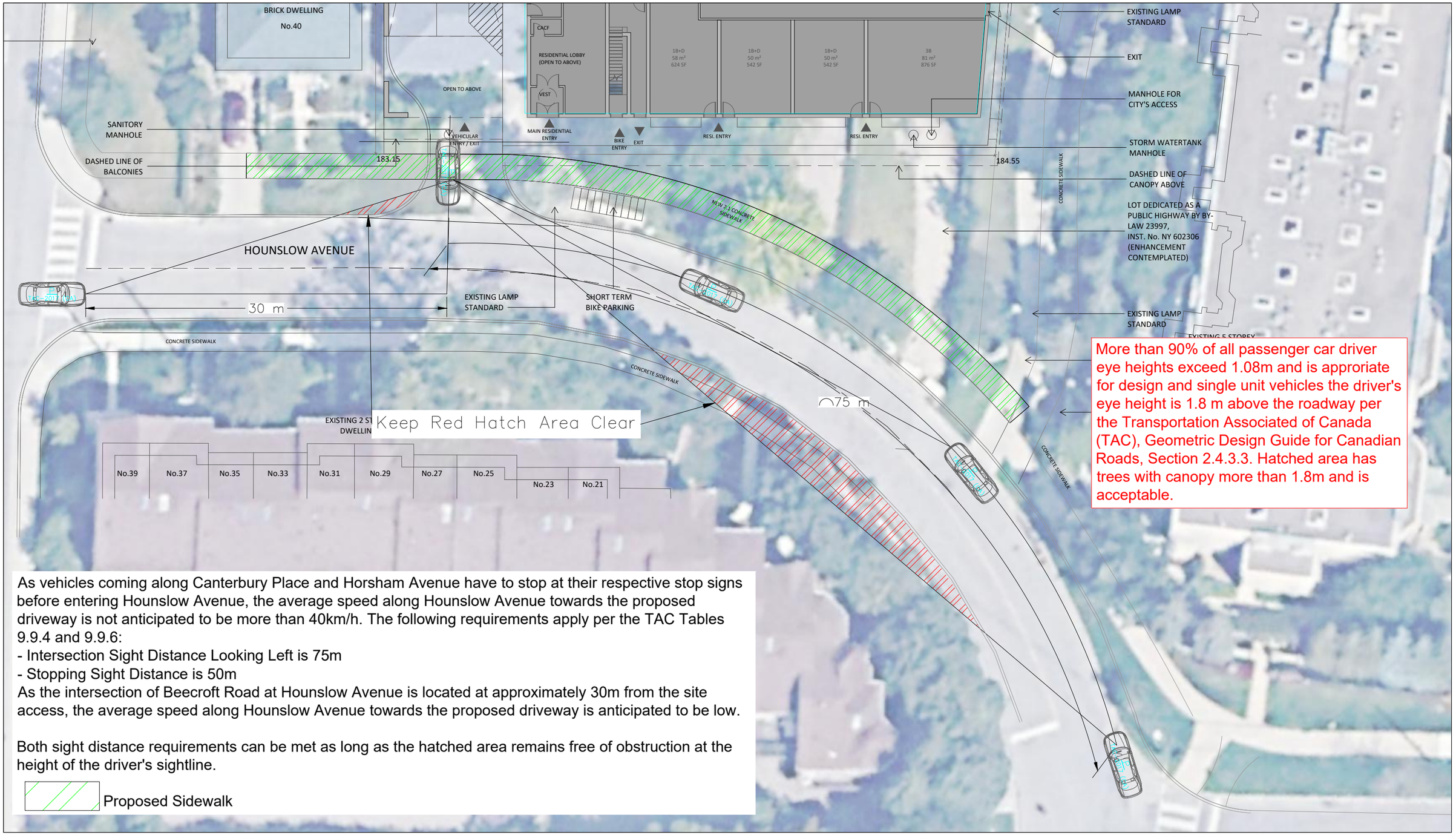
Figure 6-13
Sightline Analysis - Left and Right Turn Stage 1 (Behind the Sidewalk)
26-38 Hounslow Avenue Transportation Impact Study



As vehicles coming along Canterbury Place and Horsham Avenue have to stop at their respective stop signs before entering Hounslow Avenue, the average speed along Hounslow Avenue towards the proposed driveway is not anticipated to be more than 40km/h. The following requirements apply per the TAC Tables 9.9.4 and 9.9.6:

- Intersection Sight Distance Looking Left is 75m
- Stopping Sight Distance is 50m

As the intersection of Beecroft Road at Hounslow Avenue is located at approximately 30m from the site access, the average speed along Hounslow Avenue towards the proposed driveway is anticipated to be low.

Both sight distance requirements can be met as long as the hatched area remains free of obstruction at the height of the driver's sightline.

Proposed Sidewalk

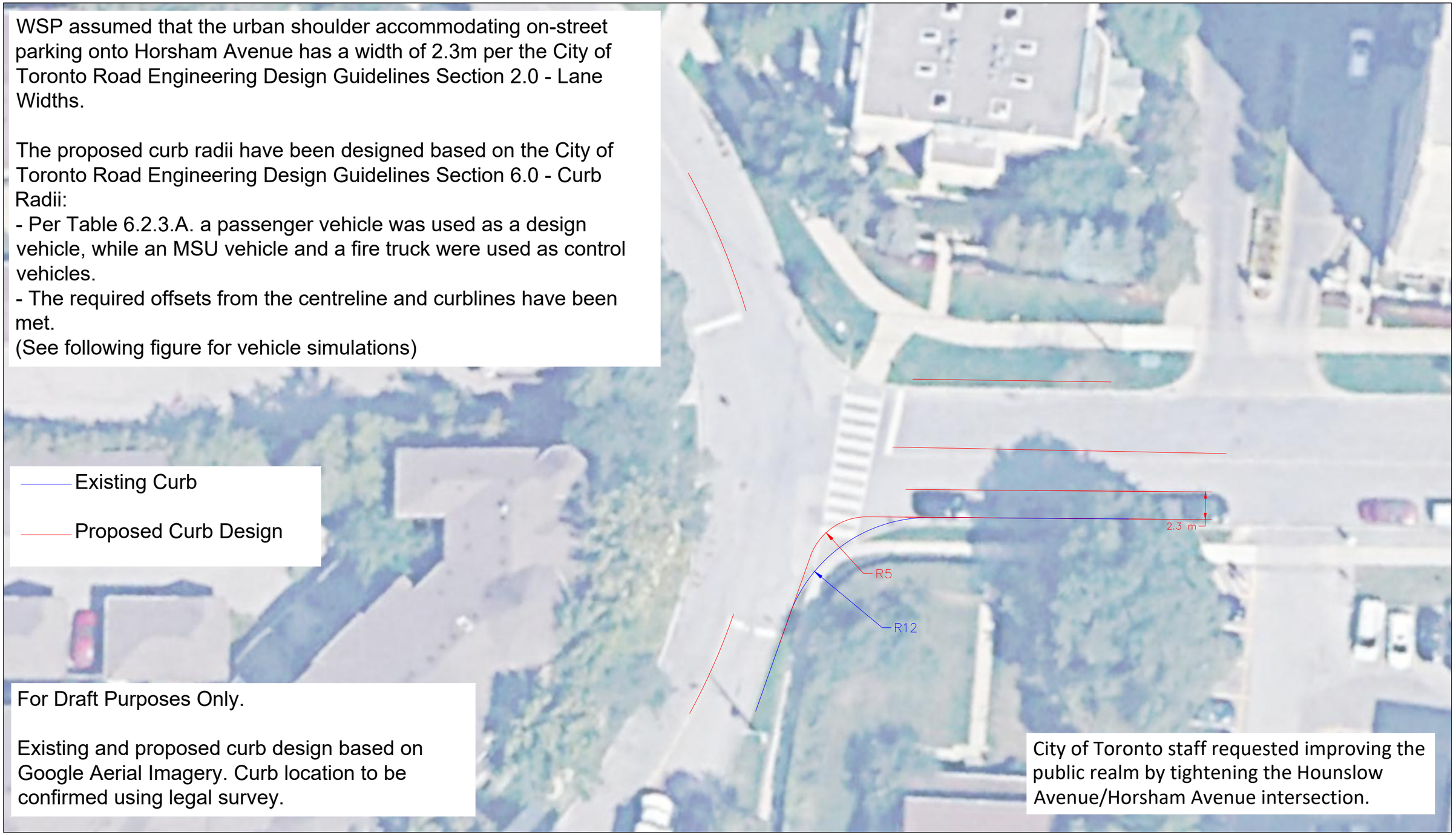
Source: 2224_GF PLAN.dwg

Scale: 1:300

Figure 6-14
Sightline Analysis - Left and Right Turn Stage 2 (Edge of Curb)
26-38 Hounslow Avenue Transportation Impact Study

WSP assumed that the urban shoulder accommodating on-street parking onto Horsham Avenue has a width of 2.3m per the City of Toronto Road Engineering Design Guidelines Section 2.0 - Lane Widths.

The proposed curb radii have been designed based on the City of Toronto Road Engineering Design Guidelines Section 6.0 - Curb Radii:
- Per Table 6.2.3.A. a passenger vehicle was used as a design vehicle, while an MSU vehicle and a fire truck were used as control vehicles.
- The required offsets from the centreline and curblines have been met.
(See following figure for vehicle simulations)



C:\Users\CADA037417\OneDrive - WSP O365\Current Projects\26-38 Hounslow\CAD_Sheets

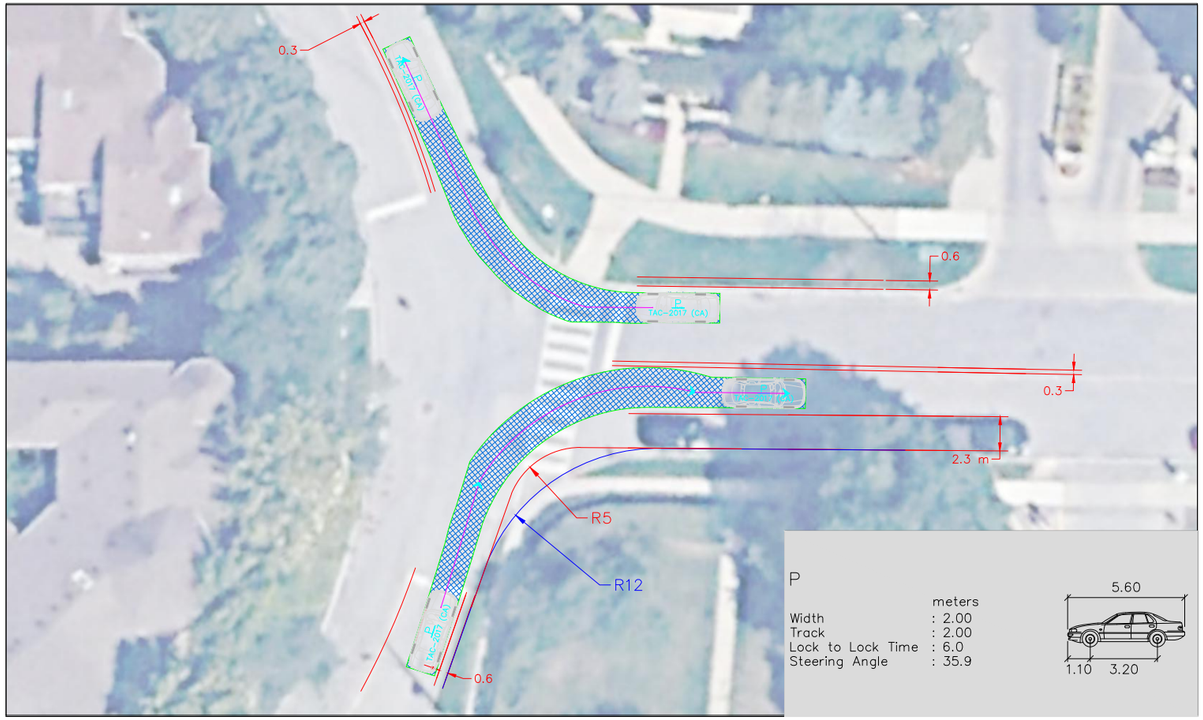
Source: 2224_GF PLAN.dwg

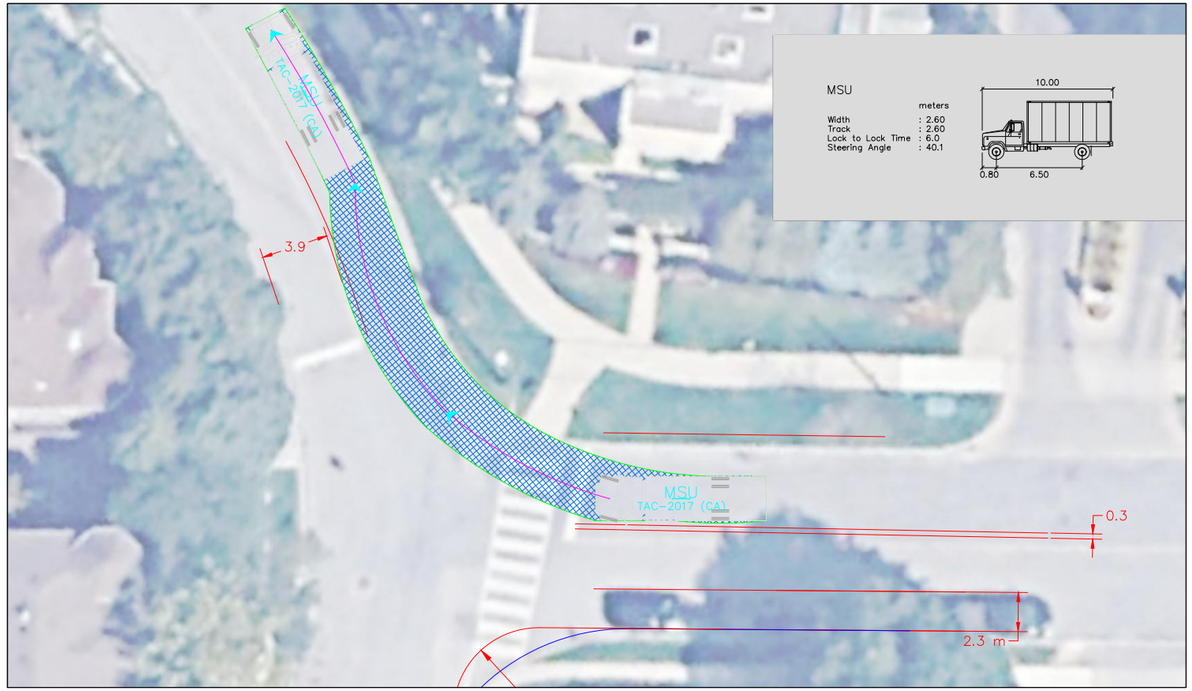
Scale: 1:300

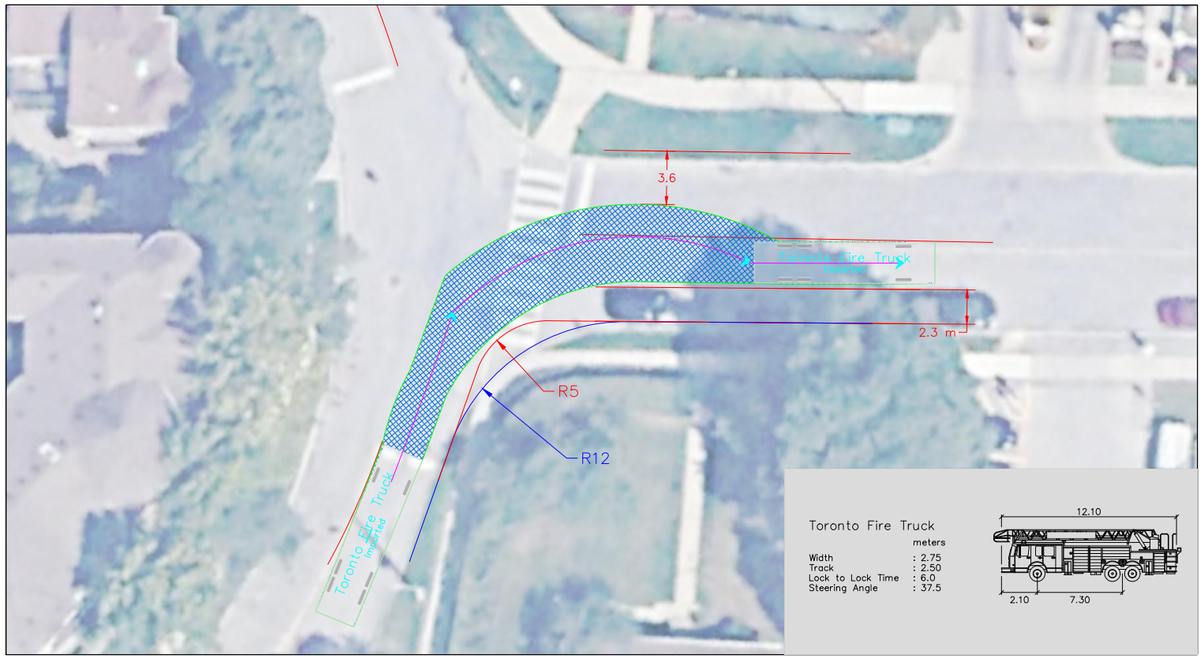
Figure 6-15
Potential Curb Extension at Hounslow Avenue and Horsham Road
26-38 Hounslow Avenue Transportation Impact Study

Hounslow Truck Turning Analysis_Curb Extension.dwg_Figure 15

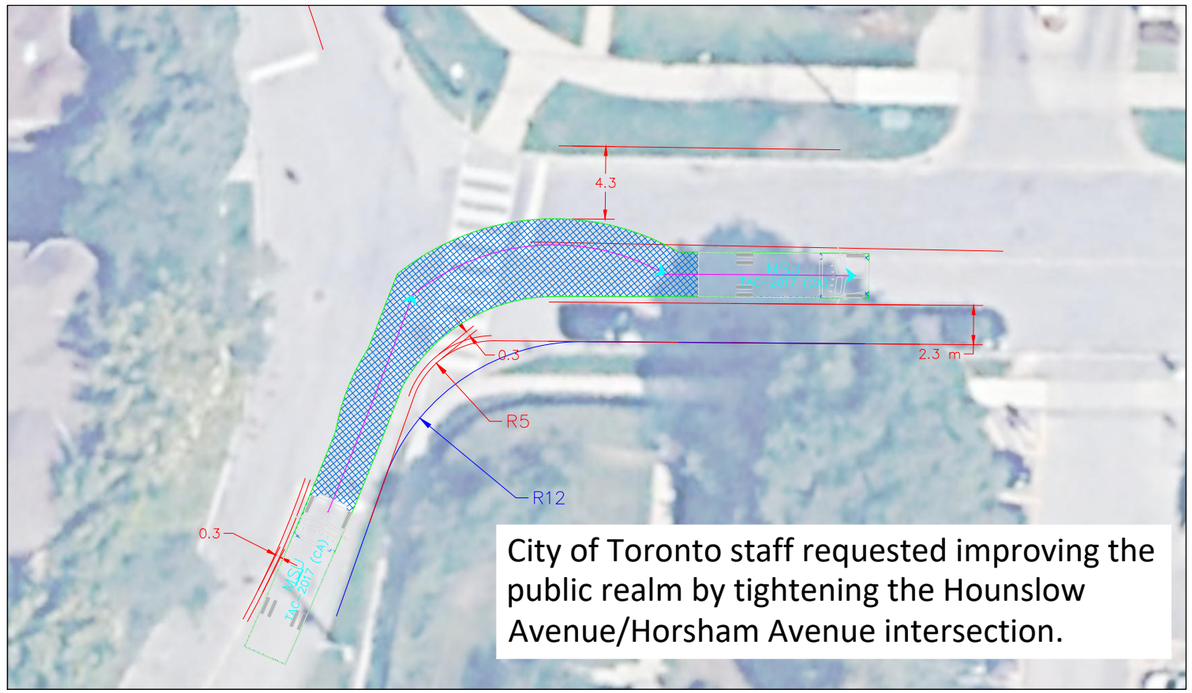
Modified: 9/20/2023 9:50 PM By: CADA037417 Plot Date: 2023/09/20







Scale: 1:400



Scale: 1:350

Figure 6-16
Potential Curb Extension at Hounslow Avenue and Horsham Road - Design Vehicles
26-38 Hounslow Avenue Transportation Impact Study

7 PARKING SUPPLY ASSESSMENT

The following section below assesses the proposed vehicular and bicycle parking supply per the applicable zoning By-law requirements and any resulting surplus or deficiencies from the individual assessments.

7.1 PROPOSED PARKING SUPPLY

The proposed development includes two underground parking garage levels (P1 and P2). As shown in **Table 7-1** below, P1 Level will have 36 spaces, consisting of 18 residential, 17 visitor parking spaces and one car share space. P2 Level is proposed to be entirely for resident parking, consisting of 44 residential parking spaces. In total, the proposed development will provide 80 parking spaces.

Table 7-1: Proposed Parking Supply

Floor	Resident Parking (spaces)	Visitor Parking (spaces)	Car Share Parking (spaces)	Total (spaces)
P1	18	17	1	36
P2	44	0	0	44
Total	**62**	**17**	**1**	**80**

7.2 CITY OF TORONTO ZONING BY-LAW 89-2022

The City has enacted By-laws 125-2022 and 89-2022, which remove the minimum parking requirements for residential parking. The City of Toronto adopted By-law 125-2022 on February 17, 2022, with respect to correcting the mapping errors contained in By-law 89-2022, which was adopted on February 3, 2022 to amend By-law 569-2013, the Zoning By-law. An appeal to By-laws 125-2022 and 89-2022 was received and has been resolved through an order issued by the Ontario Land Tribunal (OLT), and the decision was made under OLT-22-002960. Therefore, these By-laws were deemed to have come into force on the day each was passed. The By-law eliminates the minimum required parking rates except for visitor parking and defines the maximum required parking rates. The minimum and maximum required parking for the site based on this By-law is calculated in **Table 7-2**.

Table 7-2: Resident Parking Requirement - By-Law 89-2022 (in all other areas of the City)

Land Use / Unit Type		No. of Units	By-Law 89-2022 (All Other Areas) [1]			
			Min. Parking Rate	Max. Parking Rate	Min. Parking Required [2]	Max. Parking Permitted [2]
Apartment Resident	1 BD	204	None	0.90 spaces per unit	0	183
	2 BD	71	None	1.0 spaces per unit	0	71
	3 BD	30	None	1.20 space per unit	0	36
				Sub Total	**0**	**290**
Apartment Visitor		305	2 + 0.05 spaces per unit	1.0 space per unit for the first five units, 0.1 spaces per unit for subsequent units	17	35
				Total	**17**	**325**

[1] *Parking rate requirements per City of Toronto Zoning By-law 569-2013 Table 200.5.10.1.*

[2] *Parking space requirements have been rounded down to the nearest whole number as per the Zoning By-law 569-201 Section 200.5.1.10(8).*

As shown in Table 7-2, the maximum required residential parking spaces are 290. The proposed parking supply for residents is 62 spaces, not exceeding the maximum requirement. It should be noted that one car share space is provided for the residents in P1 parking level, which would further reduce the parking demand at the site.

Per the proposed 305 units, the minimum required parking spaces for visitor parking are 17, and the maximum required parking spaces are 35, as presented in Table 7-2. A total of 17 parking spaces are proposed for visitors, which meets the By-law minimum and maximum required spaces. As indicated earlier, all the 17 parking spaces for visitor parking are provided in the proposed P1 parking level.

7.3 ACCESSIBLE PARKING REQUIREMENTS

The minimum required accessible parking supply for the proposed development was based on minimum effective parking rates within the City of Toronto parking amendments By-Law 89-2022, Table 200.15.10.5 for All Other Areas. **Table 7-3** summarizes the effective parking space calculation for the purpose of determining accessible parking space requirements.

Table 7-3: Effective Parking Spaces - By-law 89-2022 (in all other areas of the City)

Land Use / Unit Type		No. of Units	Rate for Calculating Effective Parking Space	Effective Parking Space
Apartment Resident	1 BD	204	0.90 spaces per unit	183
	2 BD	71	1.0 spaces per unit	71
	3 BD	30	1.20 space per unit	36
Apartment Visitor		305	0.10 space per unit	30
			Total	**320**

Per Section 200.15.10.10 of this By-law, the proposed development requires 5 accessible parking spaces plus 1 parking space for every 50 parking spaces exceeding of 100 required parking spaces to be designated barrier-free parking spaces. The accessible parking requirements are shown in **Table 7-4**.

Table 7-4: Required Accessible Parking Spaces

Total Number of Parking Spaces Provided	Minimum Number of Required Accessible Parking Spaces	Required Accessible Parking Spaces
100 or greater	5 + 1 parking space for every 50 parking spaces exceeding of 100 parking spaces required	5+ (320-100)/50 = 9

Based on Table 7-4, 9 accessible parking spaces will be required for the site. Accordingly, a total of 9 accessible parking spaces are provided for the proposed development. Therefore, the By-law requirement is met. It should be noted that the proposed accessible vehicular parking supply is inclusive of the total vehicular parking supply for the entire development.

7.4 BICYCLE PARKING REQUIREMENTS

The bicycle parking requirements for the proposed development have been calculated based on the Zoning By-law 569-2013 outlined in Section 230.5.10.1(5)(A) and Toronto Green Standards (TGS), v4, dated 2022. The subject site is within Bicycle Zone 2. **Table 7-5** summarizes the bicycle parking requirements for the site.

Table 7-5: Bicycle Parking Standards according to Zoning By-law 569-2013 (Bicycle Zone 2)

Standard	Bicycle Parking Space Type	Bicycle Parking Rate	Units	Bicycle Parking	
				Required [1]	Proposed
By-law 2013-569	Long-Term (Residents)	0.68 spaces per dwelling unit	305	208	230
	Short-Term (visitor)	0.07 spaces per dwelling unit		22	24
TGS V4	Short-Term Publicly Accessible	-	-	10	10
			Total	**240**	***264***

1 *Bicycle parking space requirements have been rounded up to the nearest whole number in accordance with City of Toronto Zoning By-law 569-2013 Section 230.5.1.10(2).*

Table 7-5 shows that it is required to provide a total of 240 bicycle parking spaces. A total of 264 including 230 long-term and 34 short-term bicycle parking spaces will be provided at the site which exceeds the requirement. The 230 long-term bicycle parking spaces are provided indoors at Level 2 and Level P2 within the parking garage. The 24 short-term bicycle parking spaces are provided at Level 2 in a publicly accessible area with a staircase connection from the ground floor. In addition, 10 short-term bicycle parking spaces are provided outdoor along Hounslow Avenue close to the residential main entrance as per the City's TGS Version 4.0 – standard AQ 2.6.

7.5 PROPOSED TORONTO GREEN STANDARDS (TGS) PARKING PROVISIONS

Electric Vehicle Infrastructure:

In accordance with City of Toronto Zoning By-law 569-2013 Section 200.5.1.10(14)(A), all parking spaces will be equipped with Electric Vehicle Supply Equipment (EVSE) which is capable of providing Level 2 Charging or higher.

Electric Bicycle Infrastructure:

The TGS Version 4.0, standard AQ2.4 states that at least 15% of the required long-term bicycle parking spaces, or one parking space, whichever is greater, shall include an Energized Outlet (120 V) adjacent to the bicycle rack or parking space. A total of 36 electric bicycle parking spaces are provided with an adjacent 120 V Energized Outlet, which exceeds the 15% requirement per AQ 2.4.

8 TRANSPORTATION DEMAND MANAGEMENT

Transportation Demand Management (TDM) is a general concept that includes various strategies that increase transportation system efficiency by managing the demand for travel. TDM treats mobility as a means to an end, rather than an end in itself, and emphasizes the movement of people and goods rather than motor vehicles. Generally speaking, TDM initiatives discourage single-occupant vehicle travel and encourage more efficient modes such as walking, cycling, ridesharing, public transit and teleworking, particularly under congested conditions. TDM elements are an essential part of any progressive transportation and traffic plan for a proposed development.

As per TGS Version 4 AQ 1.1, there is a requirement to reduce single-occupancy auto vehicle trips generated by a development by 25% through a variety of multi-modal infrastructure strategies and TDM measures. The baseline of this evaluation is the Do Nothing scenario where no TDM measure is proposed and the current TTS-derived modal split documented earlier in the report for the study area continues to apply. By way of background, the existing study area has a non-auto modal split of 40% to 70% during the weekday morning or afternoon peak hours in the peak directional travels (Table 4-1).

Different TDM measures are proposed as part of the development to satisfy the TGS AQ 1.1. The process of quantifying the impacts of various TDM measures is a relatively new aspect in the transportation planning industry and amongst different municipalities. Based on discussions with Transportation Planning staff at the City, WSP understands that BA Group had prepared a Housing Now Transportation Demand Management Framework for CreateTO dated November 2021. This study acknowledges the following:

"While research has been conducted regarding the general effectiveness of a TDM program, insufficient research is available on the effectiveness of individual TDM measures. As a result, the vehicular trip reduction that is associated with each TDM measure in the TDM Programming Framework is representative of a "theory-based approach".

The CreateTO TDM report went on to note that the perception of effectiveness are based upon experience in recommending and assessing TDM plans. The relevant excerpts from this study are documented in **Appendix H**. Through further discussions with Transportation Planning staff at the City, it was also understood that staff acknowledges that more guidance will be developed by the City through the development of a TDM Guideline to support the Toronto Green Standard. WSP has also completed research into what the City of Buffalo has implemented in terms of quantifying the effects of various TDM measures.

Based on this background, WSP has summarized the proposed package of TDM measures along with the associated costs in **Table 8-1**.

Table 8-2 summarizes the expected level of influence each measure will have on the reduction of single occupant vehicle trips. The results demonstrate that the TDM measures proposed result in a SOV reduction satisfying the 25% requirement.

Table 8-1: Proposed TDM Measure and Cost Summary

Objective	Action / Measure	Approximate Unit Cost	Total Estimated Costs
Encourage sustainable modes of travel and discourage auto ownership	Reduce vehicular parking supply (relative to By-law maximum requirements)	Part of building design consideration	N/A
	Unbundle the sales/rental of residential units from parking space sales/rental and charging market rates	-	Marketing strategy – no additional costs
	Car-share spaces	One Car-share space is provided on site, but no membership offered to residents	N/A
	Provide on-site Bicycle Repair/Maintenance Stations at a convenient location. One easily accessible repair station is proposed on the level 2	$1,500 per station	$1,500
	Provide long-term and short-term bicycle parking that meets/exceeds the minimum TGS/By-law requirements	24 additional bicycle parking spaces are proposed beyond the By-law minimum – Approximately $200 per space	$4,800
	PRESTO card distribution	$50 per unit to the first set of move in tenants	305×$50 = $15,250
	Information Session on Active Transportation and Transit when the building is at a meaningful occupancy (i.e. 85%)	Session could be held at the site complex with handouts printed of the available non-auto modes of transportation available. At $500 for the session (disbursements)	$500
Inform residents and provide them with resources	TDM Display Screen	The average cost of displays is approximately $1,500 each. One will be provided in the common area of the building.	$1,500
		Estimated Total TDM Investment	**$23,550**

Table 8-2: Influence of Proposed TDM Strategy and Associated SOV Reduction

TDM Measure	Details	Supporting Research	Influence on SOV Trip Generation
Reduced Auto Parking Supply Rate (relative to the By-law maximum requirement)	As noted in the auto parking section, the maximum amount of vehicle parking that may be provided is 307 spaces as per By-law 89-2022. In contrast, the auto provision for the proposed development is 80 spaces, which is 74% lower than the maximum By-law allowance. According to the website "walkscore.com", the proposed development currently has an excellent Transit Score of 100 out of 100 which means that it is a "rider's paradise" with "world-class public transportation". As such, the excellent transit services in the area will serve to reduce the number of auto trips that need to be made. In addition, there will be transportation alternatives for residents in order to keep parking supply low (i.e., Smart Commute in North Toronto).	It is important to note that this measure is not being relied on solely and is proposed in tandem with other TDM measures to direct residents and visitors to other modes of transportation. The academic research papers from *Sources 1 & 2* (listed in Appendix H based on proxy studies in North America) indicate there is a strong correlation between auto parking supply rate and auto trip generation. In more urban locations with transit readily available, the correlation has been shown to be almost a 1:1 relationship in terms of auto parking reduction and trip generation reduction. To be conservative, a 1:3 relationship has been applied. Meaning that since the auto residential parking rated reduced by 74%, it is reasonable to expect that a minimum there will be at least a 24% reduction in peak hour auto trip generation relative to the By-law allowance for vehicular parking supply.	**Reduction of 24%**
Unbundling Parking from Unit Sales/Rental & Strategic Parking Pricing	Unbundled spaces will be sold/rented separately from a unit rental at the market rate. This allows residents who do not need a vehicular parking space to reduce costs and invest the savings in other modes of transportation. Parking rental/purchase pricing must be determined at the start of the sales/rental program so that the price of the parking is reflective of the supply and the fact that there will be a cost to car ownership and driving to and from the site. This way, residents are aware of this aspect from the start. This measure is particularly effective when implemented with a reduced auto parking supply.	*Source 3* (the 2017 TDM Policy Guide from the City of Buffalo) indicates the % credit/estimated reduction each strategy will have on the estimated final vehicular travel demand. The City policy is based on a review of published literature, a survey of TDM policies and ordinances, and guidance from professional transportation experts. This well- established guide notes that unbundling of parking from unit sales or rental results in a reduction of up to 10%. In the BA Group TDM Framework report prepared for the CreateTO, the report notes that a reduction of 2% to 6% in SOV trips is to be expected from unbundling of the sales/rental of auto parking spaces for all unit types depending on the cost of parking that will be transferred to the purchaser/renter. The BA Group TDM Framework report also notes that research on parking pricing has	**Reduction of 3%**

		found that generally, the price elasticity of vehicle trips as it relates to parking pricing is typically 0.1 to 0.2, meaning a 10% increase in parking fees can reduce auto trips by 1 to 2%. Based on the combined application of unbundling and strategic pricing of the parking, **a reduction of 3% in SOV trips** can be expected.	
Car-Share Parking	Car-share vehicles offer an on-site vehicle for a resident to use if they forego car ownership. As such, the presence of car-share vehicles reduces vehicular trips. One car share vehicle is provided on site, but no membership offered to residents.	The BA Group TDM Framework report (Appendix H) notes that if one car share vehicle is provided on site without membership offered to residents, a reduction of **2% in SOV trips can be expected**.	**Reduction of 2%**
Providing bicycle repair stations on -site	Given the growing prominence of the cycling mode as a first mile and last mile solution to transit and other uses, a bicycle repair station will be proposed on site in an easily accessible location. Providing a repair station will be located in a designated and secure location with bicycle maintenance tools and supplies that could be used for emergency repair or maintenance. These tools and supplies include a bicycle tire pump, wrenches, chain tool, lubricants, hex keys, Allen wrenches, torx keys, screw drivers, etc. 1 repair station is proposed as part of the development and will conveniently serve residents and visitors.	The BA Group TDM Framework report (Appendix H) notes that where a bicycle repair station is provided in a secure bicycle parking room for the use of long-term users, **a SOV trip reduction of 1% can be realized**. One bicycle repair station is proposed that will be accessible to the residents.	**Reduction of 1%**
Bicycle Parking	Based on By-law 569-2013 and TGS, a minimum of 240 bicycle parking spaces is required for this development. The proposed on-site and off-site bicycle parking supply is 264 spaces, which exceeds the minimum requirement by 24 spaces.	The BA Group TDM Framework report (Appendix H) notes that where the minimum By-law and TGS bicycle parking requirements and additional facilities are provided, a reduction of **1% in SOV trips can be realized**.	**Reduction of 1%**
Providing PRESTO card transit incentive to residents and employees	A pre-loaded PRESTO card with a value of $50 will be provided to the first set of move-in units. This is a direct incentive for residents to try transit services and understand how transit can support their day-to-day needs. This is especially true with the current	$50 equates to approximately 15 rides – and with the PRESTO card, there is a 2-hour window for free unlimited travel/transfer. Based on the TTS query of the study area, 40% to 70% of the peak directional trips during the weekday a.m. and p.m. peak hours are made via transit.	**Reduction of 1%**

	work from home and flex work trend that has been established because of the COVID-19 pandemic, where the traditional need to drive to work has reduced and many employers are offering permanent work from home arrangements.	The BA Group TDM Framework report notes that by providing a pre-loaded PRESTO card **a 1% reduction is to be anticipated** with this type of TDM measure. Accordingly, a reduction of 1% has been applied.	
TDM and transit information screen	The proposed building incudes a centralized display that indicates real-time transit information, bicycle parking location, surrounding area alternative travel mode options, weather, etc. These assist residents and visitors with the use of non-auto modes and is particularly important during inclement weather.	Based on the BA Group TDM Framework report (Appendix H), **a reduction of 1%** is anticipated for providing these types of TDM and transit information screens.	**Reduction of 1%**
Travel Mode information package and Community Marketing Outreach	Promotional event (i.e., at the occupancy of the development) and education material tailored to the TDM opportunities and incentives available at the development (i.e., bike repair station, bicycle parking location, schedule, route information for TTC routes). This information will be kept up to date and made available in highly visible location and also distributed to new residents. It is convenient for these to be emailed on a regular basis as part of regular building newsletters or part of the welcome package.	*Source 3* (the 2017 TDM Policy Guide from the City of Buffalo Appendix D) indicate the % credit/estimated reduction each strategy will have on the estimated final vehicular travel demand. This well-established guide notes that promotion and outreach have an influence of up to 2%. Based on the BA Group TDM Framework report (Appendix H), **a reduction of 2% is anticipated** for providing this TDM measure. Accordingly, a 2% has been applied.	**Reduction of 2%**
Total SOV Reduction			**35%**

Source 1: *https://reader.elsevier.com/reader/sd/pii/S0169204616302687?token=4BACCE07EC00D1BA02093411512A12AD855187D3838F65D5D90E0C3A89115480CAF1C9DCF7A478494A4CAB39388142D0&originRegion=us-east-1&originCreation=20211114022007*

Source 2: *https://www.buffalony.gov/DocumentCenter/View/5400/TDM-Policy-Guide---Adopted- 2017-03-27?bidId= Provided in Appendix H for reference*

Source 3: *Housing Now Transportation Demand Management Framework – City of Toronto by BA Group dated November 2021 prepared for CreateTO provided by City of Toronto transportation planning staff.*

9 MULTI-MODAL LOS ANALYSIS

WSP completed a multi-modal analysis for the study intersections under the 2028 future total horizon years. A review of the existing and planned transit, pedestrian and cycling facilities was completed.

Since the City of Toronto does not have formal guidelines for multi-modal LOS, the LOS criteria are based on the York Region Transportation Mobility Guidelines (2016), which provides a thorough LOS assessment for these non-auto modes of transportation and associated facilities. The LOS criteria have been included in **Appendix I**.

9.1 TRANSIT LOS

A review of the transit LOS under the 2028 future total conditions was completed and detailed within **Table 9-1**. The intersections of Hounslow Avenue at Beecroft Road and Horsham Avenue at Hounslow Avenue were not included in the review as no transit stops are located at these intersections.

Table 9-1: Transit Performance Evaluation (Future Total Conditions)

Transit Stop Location	Direction	Access to Transit Stops	Transit Headways		Intersection Approach			
		Level of Service (LOS)	LOS		Delay		V/C	
			AM	PM	AM	PM	AM	PM
Yonge Street at Hounslow Avenue	Northbound	A (<200m)	E (20-30min)	E (20-30min)	A	A	A	A
	Southbound	A (<200m)	E (20-30min)	E (20-30min)	A	A	A	A

Based on the above table, the accessibility to surface transit from the proposed development and transit operations at the study intersection operate with good LOS A during the a.m. and p.m. peak hours. The transit headways currently operate at LOS E during the peak hours (with headways between 20 and 30 minutes). However, with the Finch subway station on Line 1 located approximately 700m to the north (an average walk time of just under 10 minutes), this site has excellent access to public transit services. As stated previously, the *walkscore.com* transit score for the subject lands is 100 out of 100, which is excellent.

9.2 PEDESTRIAN LOS

As previously mentioned, Beecroft Road, Horsham Avenue and Yonge Street have sidewalks on both sides of the roadway. Hounslow Avenue currently has a sidewalk on the south side of the roadway and only partially on the north side of the roadway. As documented in Section 6 a sidewalk is proposed on the north side as part of the proposed development. **Table 9-2** below identifies the pedestrian facilities LOS in the area surrounding the site.

Based on the above table, the 2028 future total pedestrian facilities are assessed at a LOS C or better at all study intersections, which is very acceptable. A higher LOS is not achieved due to the lack of buffer between the sidewalks and roadway along certain road segments.

According to the *walkscore.com* website, the pedestrian score for the subject lands is 83 out of 100, which is very good. This score indicates that the area is “very walkable” and that “most errands can be accomplished on foot”. To further enhance the walkability of this property in connection to the surrounding area, pedestrian connections will be included on the site, which will be connected to the planned sidewalk located on the north side of Hounslow Avenue.

Table 9-2: Pedestrian Performance Evaluation (Future Total Conditions)

Intersection	Direction	Segment		Intersection
		Description	LOS	LOS
Beecroft Road at Hounslow Avenue	Northbound	Beecroft Road east side	C	C
	Southbound	Beecroft Road west side	B	N/A
	Westbound	Hounslow Avenue north side	C	N/A
Horsham Avenue at Hounslow Avenue	Northbound	Canterbury Place east side	B	B
	Southbound	Hounslow Avenue west side	B	N/A
	Westbound	Horsham Avenue north side	A	N/A
Yonge Street at Horsham Avenue	Northbound	Yonge Street east side	A	A
	Southbound	Yonge Street west side	B	B
	Eastbound	Northtown Way north side	B	N/A
	Westbound	Horsham Avenue south side	B	N/A

9.3 CYCLING LOS

There are no dedicated bike lanes or cycle tracks currently in the immediate vicinity of this site, although a trail is located north of Hendon Avenue/Bishop Avenue (north of Finch Avenue) approximately 800m north of the site. With a Bike Score of 50 out of 100 on walkscore.com, this location is considered “bikeable” with “some bike infrastructure”, which is acceptable but could be improved with the addition of cycling routes within the study area.

10 CONCLUSIONS AND RECOMMENDATIONS

Based on our analyses, the following conclusions can be made:

- Traffic operations analysis:
  - Under existing conditions, all turning movements at the intersections of Beecroft Road at Hounslow Avenue and Hounslow Avenue at Horsham Avenue operate at LOS B or better. Turning movements at the east and west approaches of the intersection of Horsham Avenue at Yonge Street operate with longer delay at LOS 'E' during the p.m. peak hour, which is usual when minor street intersects major arterial roadways operating under free flow conditions;
  - A total of nine background developments were included in our future background analysis including developments along Holmes Avenue, Yonge Street and Churchill Avenue;
  - Under future background conditions, all turning movements at the intersections of Beecroft Road at Hounslow Avenue and Hounslow Avenue at Horsham Avenue are projected to operate at LOS B or better, as under existing conditions. Similar to the existing conditions, turning movements at the west approach of the Horsham Avenue at Yonge Street intersection are projected to operate at LOS 'E' during the p.m. peak hour. In addition, the eastbound turning movements at this intersection are projected to deteriorate to LOS 'F' during the p.m. peak hour. Delay at the eastbound approach is projected to be about one minute during the p.m. peak hour, which is deemed acceptable for the intersection;
  - The site is expected to generate 73 auto trips during both the a.m. and p.m. peak hours; and
  - Under future total conditions, all turning movements at the intersections of Beecroft Road at Hounslow Avenue and Hounslow Avenue at Horsham Avenue are projected to operate at LOS B or better, as under future background conditions. Turning movements at the east and west approaches of the Horsham Avenue at Yonge Street intersection are projected to operate at LOS 'F' during both the a.m. and p.m. peak hours. However, all of the critical movements are still operating well within capacity. The addition of site-generated traffic is projected to have a minor impact on the operations at the study intersections.
- Based on our review of the City of Toronto By-law, one Type "G" loading space is required and has been provided within the proposed site. All applicable site design standards and dimensions have been met.
- All vehicles that will service the subject site can be readily accommodated in the Type "G" space provided. All loading, waste collection and passenger vehicles can readily access, maneuver through and leave the site with no projected conflicts.
- When a garbage truck or MSU is exiting the site, simulations show the design vehicle travel path close to the parked vehicles along Hounslow Avenue, with no projected conflicts.
- Based on the City of Toronto By-law, the site is required to provide a minimum of 17 parking spaces (all visitor parking) and up to a maximum of 325 parking spaces (290 residential spaces and 35 visitor spaces). A total of 80 parking spaces, including 17 visitor parking spaces, are proposed for the development, which satisfies the By-law requirement. The proposed 9 accessible parking spaces meet the minimum By-law requirement.

- The proposed bicycle parking supply of 264 spaces satisfies the By-law and TGS minimum requirements (24 residential and 10 publicly accessible short-term, and 230 residential long-term). One bicycle maintenance/repair facility will be provided onsite.
- TDM measures recommended for the proposed development are detailed in Section 8. The recommended TDM measures will promote sustainable travel modes and are estimated to reduce single-occupancy vehicle trips by 35%, satisfying the TGD Version 4 AQ 1.1 requirement.
- Finally, a review of the non-auto modes of travel at the study intersections show good LOS for transit and pedestrian facilities, as reflected on the *walkscore.com* ratings for the site.

Overall, it is WSP's opinion that the proposed development site plan design is adequate, and that the site-generated traffic can be accommodated by the boundary road network.

The following are WSP recommendations for the proposed development:

- Due to the limited visibility between the loading space and vehicles exiting the underground parking from the ramp and vehicles traveling along the driving aisle to enter the underground parking, a warning system with LED stop and go lights are proposed to be located opposite the loading space and in the northeast section of the passenger pick-up drop-off to warn passenger vehicles that the loading operations are on-going as shown in Figure 6-12. The lights would be activated when a vehicle is exiting the loading area.
- The hatched areas identified in Figure 6-13 and Figure 6-14 should remain free of vertical obstruction at the height of driver's sightline to achieve required sightlines.
- A continuous sidewalk should be provided on the north side of Hounslow Avenue as shown in Figure 6-13.
- A curb extension at the intersection of Hounslow Avenue and Horsham Avenue was designed to improve pedestrian realm at the intersection by reducing their exposure to vehicular traffic. A potential design for the curb extension has been illustrated in Figure 6-15. This improvement was requested by City of Toronto staff.
- A Transportation Demand Management Plan (TDM) including unbundling of parking, car sharing and bicycle parking, as well as an information package for residents, will reduce single occupant vehicle (SOV) trips to and from this development.

11 TRAFFIC CERTIFICATION

As outlined in the North York Centre Secondary Plan, Section 4.8.1, for the development with more than 5000 sq.m. of total floor space, an acceptable traffic certification is needed to acknowledge that the proposed development is in line with the Secondary Plan policies and guidelines. There are five criteria with respect to traffic certification in the evaluation of the proposed residential development.

Criteria 1 – Level of Service on Nearby Arterial Roads

"auto traffic resulting from occupancy of the proposed development will not significantly contribute to reducing the level of service on nearby arterial roads and their intersections with local and collector roads to below a generally acceptable level"

Comment:

The proposed residential development is expected to generate 73 auto trips during both the a.m. and p.m. peak hours. Based on the assessment, traffic operations for future total traffic conditions are expected to be readily accommodated by the study area road network. The site-generated traffic volumes impacts are minimal and will not noticeably change operating conditions or significantly contribute to a reduction in the level of service.

Criteria 2 – Impact on Existing and Planned Transportation Infrastructure

"the project can be accommodated by the existing and planned transportation infrastructure, including any identified new functional sections of the North York Centre South or North York Centre North Service Roads, except those excluded by Section 4.8.2, taking into account all existing developments and zoned developments approved but not yet constructed or fully occupied in the North York Centre North and North York Centre South"

Comment:

Considering the fact that the existing and significant future developments are within North York City Centre area, the proposed development can be accommodated by the existing transportation infrastructure. The subject site is well served by GO Transit and Toronto Transit Commission (TTC) services. The bus stops on Yonge Street are located approximately 150 m east of the subject site. Also, Line 1 (Yonge-University) subway service is located near the site.

Criteria 3 – Impacts on Local Residential Road Traffic

"the project will not increase local residential road traffic so significantly as to produce appreciable new hazards, noise, dust and fumes for nearby residential communities"

Comment:

The proposed development is expected to generate 73 auto trips during both the a.m. and p.m. peak hours. The vehicular traffic is projected to be low and is not expected to establish hazards, noise, dust and fumes for nearby residential communities.

Criteria 4 – Parking

"the project provides enough parking so that the building's occupants and visitors will be unlikely to disrupt off-site roadways and unaffiliated parking areas, but does not provide so much parking as to discourage achievement of the transit modal split targets of this Secondary Plan"

Comment:

A total of 80 parking spaces, including 63 spaces allocated for resident use (1 of these is car share), and 17 spaces for visitors, will be provided for the proposed development. This satisfies the City's By-law requirements, and as such, the parking supply is considered reasonable and appropriate.

Criterion 5 – Site Layout

"the site layout provides adequately for the movement needs of visiting pedestrians, automobiles and commercial vehicles without disrupting bordering streets and properties"

Comment:

All design vehicles can readily access, maneuver through and leave the site with no projected conflicts along the proposed driving aisles and loading space. Notwithstanding, there are no projected conflicts for vehicles completing two-way circulation at the site access, as well as within the parking areas and in and out of the parking spaces.

Certification

WSP Canada Inc. acknowledges that the proposed development can be readily accommodated on the boundary road network, parking spaces and circulation are adequate for the uses proposed, and the development satisfies the five requirements set out in Section 4.8.1 of the North York Centre Secondary Plan.

David Lukezic, M.Eng., LEL, RPP
Project Manager - Transportation

APPENDIX

A TERMS OF REFERENCE

Lukezic, Dave

From: Diane Ho <Diane.Ho@toronto.ca>
Sent: June 9, 2023 3:49 PM
To: Lukezic, Dave
Cc: Homayoun Harirforoush; Christina Zhang; Andrew Au
Subject: RE: 26-38 Hounslow Avenue - Proposed TOR

Hi Dave,

Thank you for submitting the TIS Terms of Reference to the City for review, please see below the comments from Transportation Planning. Please follow up with Homay for comments from Transportation Services.

- **North York Centre Secondary Plan:** Please note that the City is initiating a review of the North York Centre Secondary Plan, mobility improvements might be required in the area subject to the outcome of the mobility study.
- **Background Developments:** In addition to the background developments in the approved 2019 TOR, please also review the City's Application Information Centre (AIC) and identify the any new/recent background developments in the area for City staff's review.
- **Travel Demand Management (TDM) plan**: Please note that Toronto Green Standard (TGS) – Version 4 came into effect on May 1, 2022 for new planning applications, and the Single-Occupant Auto Vehicle Trips (AQ 1.1) requirements have changed.
- **Bicycle Parking**: Please include a review of on-site bicycle parking requirements for both occupants and visitors. The numbers, locations, design, dimensions, and types of long-term and short-term bicycle parking spaces should be designed and provided on site in accordance with the City's Zoning By-law 569-2013, Toronto Green Standard (TGS) – Version 4 and Guidelines for the Design and Management of Bicycle Parking Facilities.
- **Electric Bicycle Infrastructure:** In accordance with the City's Toronto Green Standard (TGS) – Version 4 – AQ 2.4 Electric Bicycle Infrastructure, "*Residential: At least 15% of the required long-term bicycle parking spaces, or one parking space, whichever is greater, shall include an Energized Outlet (120 V) adjacent to the bicycle rack or parking space. The number of electric bicycle parking spaces is included as part of the total required bicycle parking rate. Locate the Energized outlet at a maximum distance of 1100 mm from the bike rack to accommodate the typical manufacture supplied power cord. Label the required long-term bicycle parking spaces and electric bicycle charging spaces clearly for users.*"

The City reserves the right to request for additional information. Thank you.

Thanks,
Diane

From: Lukezic, Dave <David.Lukezic@wsp.com>
Sent: June 9, 2023 3:06 PM
To: Homayoun Harirforoush <Homayoun.Harirforoush@toronto.ca>; Diane Ho <Diane.Ho@toronto.ca>
Subject: [External Sender] 26-38 Hounslow Avenue - Proposed TOR

Hi Homayoun and Diane,

WSP has been retained to prepare a Traffic Impact Study for a proposed residential development to be located at 26-38 Hounslow Avenue in the City of Toronto.

The subject lands are currently occupied by four single detached dwellings, each with private driveway access to Hounslow Avenue. The redevelopment of the site is proposed to comprise a 23-storey residential building with approximately 292 units, and a two-storey underground parking garage. Access to the site is proposed via one all-moves driveway connection to Hounslow Avenue, located approximately 50 metres east of Beecroft Road. The development is proposed to be built out in one phase. Attached is the current architectural set for reference.

This e-mail summarizes our proposed work plan to undertake this assignment, which will be completed in general accordance with the City's *Guidelines for the Preparation of Traffic Impact Studies (July 2013)*, and any other comments provided by the City. We kindly request any comments on the work plan no later than **Thursday, June 15, 2023.**

By way of background, we have prepared a TIS for this site in April 2021, and a Response to Comments letter in August 2021. The TIS was prepared based on the TOR that was established in 2019 (attached for your reference). We generally propose to be consistent with those TOR with the exception that we would undertake new TMCs since more than two years have passed (the counts were from October and December 2019) and we would review parking based on the updated parking standards for automobiles as part of By-law 89-2022, which are included in the office consolidation of Zoning By-law 569-2013.

1. **Horizon Years:** We will analyze existing conditions (2023) and a future five-year horizon (2028)
2. **Study Area:** Based on the scope of the development proposal, we propose to analyze the following intersections:
    - Hounslow Avenue and Beecroft Road (unsignalized).
    - Hounslow Avenue and Horsham Avenue (unsignalized).
    - Horsham Avenue at Yonge Street (unsignalized).
    - Hounslow Avenue and Site Driveway (unsignalized).
3. **Traffic Data:** We will retain a third party traffic counter specializing in traffic data collection to complete turning movement counts at the three existing municipal intersections during the weekday AM (7-9) and PM (4-6) peak periods. They are scheduled to undertake the surveys during one weekday (June 20 to 22). It will be important to complete the TMC surveys before the school end and the summer holidays.
4. **Future Background Traffic:** We will forecast future background volumes by applying a background growth rate to the existing traffic volumes and adding potential traffic from any approved or in-stream developments within the vicinity of the subject site. Based on the approved TOR for 2019 we propose to add traffic from the following developments:

Number	**Development**	**Statistics**	**Traffic Volume Source**
1	15-21 Holmes Avenue	358 residential units	TOA by WSP, December 2018
2	5400 Yonge Street	324 residential units 800 m^2 retail GFA 1,654 m^2 office GFA	TIS by LEA Consulting Ltd., January 2018
3	5306 Yonge Street	328 residential units 599 m^2 retail GFA	TIS by BA Group Transportation Consultants, August 2017
4	5220 Yonge Street	308 residential units 11,305 m^2 office GFA 6,760 m^2 commercial GFA	TIS NexTrans, June 2016
5	75 Canterbury Place	385 residential units 619 m^2 retail GFA	TIS by BA Group Transportation Consultants,

5. **Trip Generation & Assignment:** The trip generation will be based on the rate specified in section 2.2 of North York Centre Secondary Plan (NYCSP) Appendix 1, which is commonly applied as follows:

Source	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	T
Proposed Trip Generation Rate	**0.08**	**0.16**	**0.24**	**0.16**	**0.08**	**0**

   We will assign the site trips to the study road network based on a review of the existing traffic counts and the TTS data.

6. **Future Total Traffic:** We will forecast future total traffic volumes by adding the site generated traffic to the future background traffic forecasts. Given the negligible trip generation of the existing uses on the site, we will not remove these existing trips from the forecasts.

7. **Traffic Analysis:** We will analyze the operation of the study area intersections for the weekday AM and PM peak hours under existing, future background and future total conditions. The analysis will be completed using Synchro.

8. **Transportation Demand Management:** Using our TDM matrix, which groups TDM initiatives into categories and prescribes different TDM initiatives based on the type of development, we will develop a list of appropriate TDM initiatives for the proposed development. We will include documentation on how the proposed TDM measures are estimated to contribute to reducing single-occupancy auto trips by 15% or more.

9. **Parking Justification:** We will review the parking supply against the updated parking standards for automobiles as part of By-law 89-2022, which are included in the office consolidation of Zoning By-law 569-2013.

10. **Site Plan Review:** We will review the site plan, including a detailed review of parking space dimensions and drive aisle widths based on City and TAC standards. Using the site plan, we will review the on-site circulation using AutoTURN swept-path analysis for a passenger vehicle, a City of Toronto garbage collection vehicle, and a TAC medium single unit truck. In addition, our site plan review will include a review of the following:
    - **Pedestrian Circulation** – we will review pedestrian access and external connections.
    - **Bicycle Parking** – we will include a review of on-site bicycle parking requirements for both occupants and visitors based on North York Centre Secondary Plan (NYCSP) and TGS.

11. **Multimodal Analysis** - a multi-modal LOS analysis for the study intersections under the 2028 future total horizon years will be completed for transit, pedestrian and cycling.

12. **Public Realm Improvement Considerations.** Similar to the 2021 TIS, we will propose the following improvements:
    - A continuous sidewalk on the north side of Hounslow Avenue between Beecroft Road and Horsham Avenue.
    - Trees along the boulevard at the site frontage.
    - A curb extension at the intersection of Hounslow Avenue and Horsham Avenue to improve the pedestrian realm.

13. **Report:** We will prepare a comprehensive final report summarizing the findings of the Traffic Impact Study and the Site Plan Review. The report will include the Traffic Certification required by section 4.8 of the NYCSP together with detailed printouts from the analysis software.

If you have any questions related to the above TOR, please do not hesitate to contact me.

Thanks

David Lukezic, M.Eng., LEL, RPP
Project Manager
Transportation Planning and Science

DIRECT LINE 289-982-4742

100 Commerce Valley Drive West
Thornhill, Ontario,
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APPENDIX

B TMCs

Horizon Data Services Ltd

Email: nhyree@gmail.com
Phone: (416) 840-6619 Fax: (416) 840-5297
"Your Traffic Count Specialist"

File Name : Yonge Street at Horsham Avenue
Site Code : 00000000
Start Date : 06/20/2023
Page No : 1

Groups Printed- Cars - Trucks - Heavys - Cyclists

	Yonge St From North					Northtown Wy From East					Yonge St From South					Horsham Ave From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	1	178	1	2	182	1	0	3	13	17	2	102	2	1	107	4	0	2	8	14	320
07:15 AM	1	227	1	1	230	3	0	5	17	25	0	133	2	2	137	5	1	3	11	20	412
07:30 AM	3	247	3	0	253	2	0	5	18	25	2	150	2	0	154	2	0	1	12	15	447
07:45 AM	2	243	2	0	247	2	0	1	22	25	5	154	5	1	165	4	2	5	20	31	468
Total	7	895	7	3	912	8	0	14	70	92	9	539	11	4	563	15	3	11	51	80	1647
08:00 AM	3	248	4	1	256	3	1	3	28	35	2	228	2	1	233	2	0	4	21	27	551
08:15 AM	2	256	5	0	263	3	0	3	22	28	1	215	1	0	217	2	0	2	20	24	532
08:30 AM	5	310	7	0	322	7	0	0	31	38	2	239	4	0	245	4	0	3	27	34	639
08:45 AM	10	302	7	1	320	7	2	1	46	56	4	236	2	0	242	7	0	4	40	51	669
Total	20	1116	23	2	1161	20	3	7	127	157	9	918	9	1	937	15	0	13	108	136	2391
04:00 PM	4	237	10	4	255	7	1	1	53	62	6	225	7	0	238	4	1	3	56	64	619
04:15 PM	4	215	13	5	237	8	0	5	50	63	8	232	4	2	246	3	1	4	48	56	602
04:30 PM	7	213	4	1	225	8	1	3	69	81	16	239	1	2	258	8	1	2	62	73	637
04:45 PM	9	233	5	0	247	8	1	1	85	95	6	247	6	2	261	6	0	2	70	78	681
Total	24	898	32	10	964	31	3	10	257	301	36	943	18	6	1003	21	3	11	236	271	2539
05:00 PM	13	235	8	1	257	11	0	4	42	57	8	249	3	2	262	5	0	5	72	82	658
05:15 PM	9	236	17	2	264	12	1	3	62	78	10	275	7	0	292	4	0	2	116	122	756
05:30 PM	14	256	15	4	289	15	1	3	125	144	18	252	3	2	275	6	1	4	73	84	792
05:45 PM	10	234	15	3	262	21	0	3	139	163	14	209	6	0	229	9	1	3	50	63	717
Total	46	961	55	10	1072	59	2	13	368	442	50	985	19	4	1058	24	2	14	311	351	2923
Grand Total	97	3870	117	25	4109	118	8	44	822	992	104	3385	57	15	3561	75	8	49	706	838	9500
Apprch %	2.4	94.2	2.8	0.6		11.9	0.8	4.4	82.9		2.9	95.1	1.6	0.4		8.9	1	5.8	84.2		
Total %	1	40.7	1.2	0.3	43.3	1.2	0.1	0.5	8.7	10.4	1.1	35.6	0.6	0.2	37.5	0.8	0.1	0.5	7.4	8.8	
Cars	96	3719	116	25	3956	115	8	44	822	989	101	3261	56	15	3433	74	8	49	706	837	9215
% Cars	99	96.1	99.1	100	96.3	97.5	100	100	100	99.7	97.1	96.3	98.2	100	96.4	98.7	100	100	100	99.9	97
Trucks	1	46	0	0	47	3	0	0	0	3	2	43	1	0	46	1	0	0	0	1	97
% Trucks	1	1.2	0	0	1.1	2.5	0	0	0	0.3	1.9	1.3	1.8	0	1.3	1.3	0	0	0	0.1	1
Heavys	0	80	0	0	80	0	0	0	0	0	0	71	0	0	71	0	0	0	0	0	151
% Heavys	0	2.1	0	0	1.9	0	0	0	0	0	0	2.1	0	0	2	0	0	0	0	0	1.6
Cyclists	0	25	1	0	26	0	0	0	0	0	1	10	0	0	11	0	0	0	0	0	37
% Cyclists	0	0.6	0.9	0	0.6	0	0	0	0	0	1	0.3	0	0	0.3	0	0	0	0	0	0.4

Horizon Data Services Ltd

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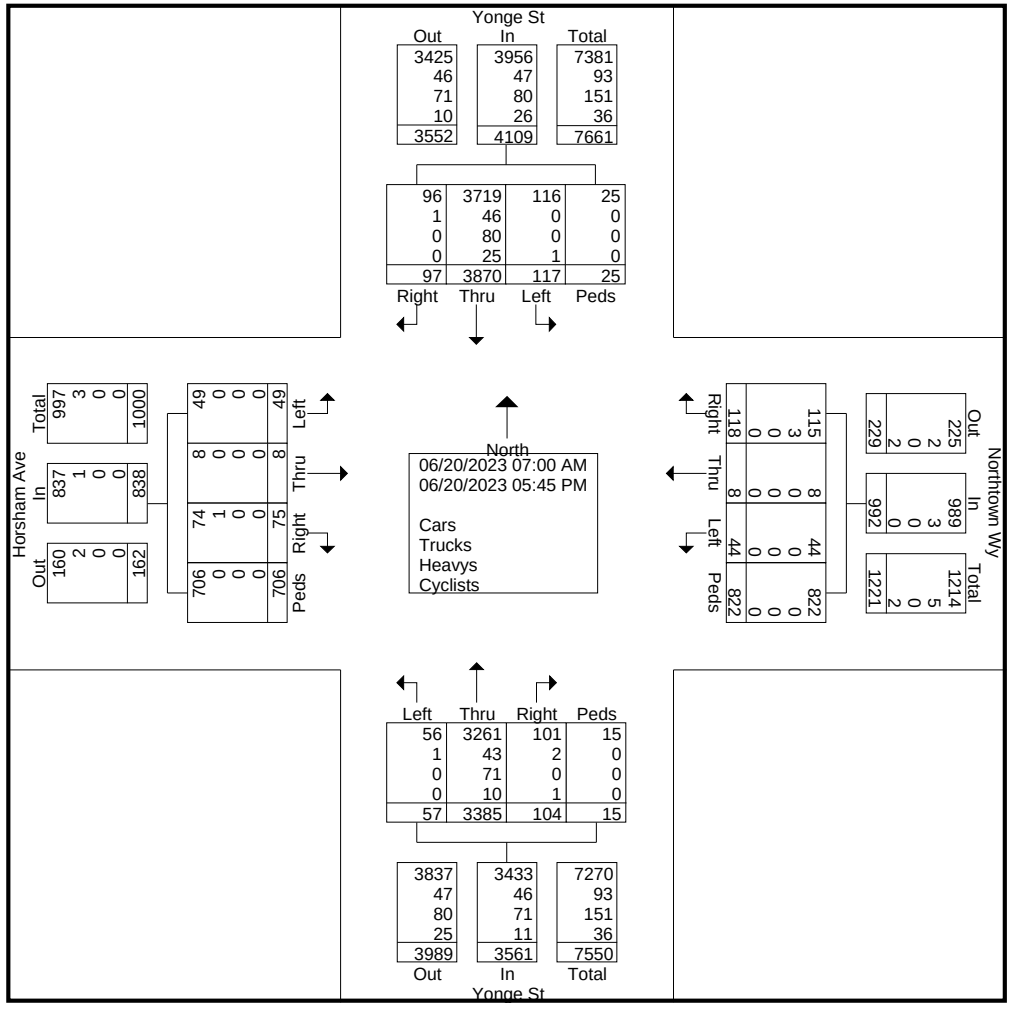
"Your Traffic Count Specialist"

File Name : Yonge Street at Horsham Avenue
Site Code : 00000000
Start Date : 06/20/2023
Page No : 2



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File Name : Yonge Street at Horsham Avenue
Site Code : 00000000
Start Date : 06/20/2023

	Yonge St From North					Northtown Wy From East					Yonge St From South					Horsham Ave From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	3	248	4	**1**	256	3	1	**3**	28	35	2	228	2	**1**	233	2	0	**4**	21	27	551
08:15 AM	2	256	5	0	263	3	0	3	22	28	1	215	1	0	217	2	0	2	20	24	532
08:30 AM	5	**310**	**7**	0	**322**	**7**	0	0	31	38	2	**239**	**4**	0	**245**	4	0	3	27	34	639
08:45 AM	**10**	302	7	1	320	7	**2**	1	**46**	**56**	**4**	236	2	0	242	**7**	0	4	**40**	**51**	**669**
Total Volume	20	1116	23	2	1161	20	3	7	127	157	9	918	9	1	937	15	0	13	108	136	2391
% App. Total	1.7	96.1	2	0.2		12.7	1.9	4.5	80.9		1	98	1	0.1		11	0	9.6	79.4		
PHF	.500	.900	.821	.500	.901	.714	.375	.583	.690	.701	.563	.960	.563	.250	.956	.536	.000	.813	.675	.667	.893
Cars	20	1081	23	2	1126	20	3	7	127	157	8	872	9	1	890	15	0	13	108	136	2309
% Cars	100	96.9	100	100	97.0	100	100	100	100	100	88.9	95.0	100	100	95.0	100	0	100	100	100	96.6
Trucks	0	14	0	0	14	0	0	0	0	0	1	19	0	0	20	0	0	0	0	0	34
% Trucks	0	1.3	0	0	1.2	0	0	0	0	0	11.1	2.1	0	0	2.1	0	0	0	0	0	1.4
Heavys	0	19	0	0	19	0	0	0	0	0	0	24	0	0	24	0	0	0	0	0	43
% Heavys	0	1.7	0	0	1.6	0	0	0	0	0	0	2.6	0	0	2.6	0	0	0	0	0	1.8
Cyclists	0	2	0	0	2	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	5
% Cyclists	0	0.2	0	0	0.2	0	0	0	0	0	0	0.3	0	0	0.3	0	0	0	0	0	0.2

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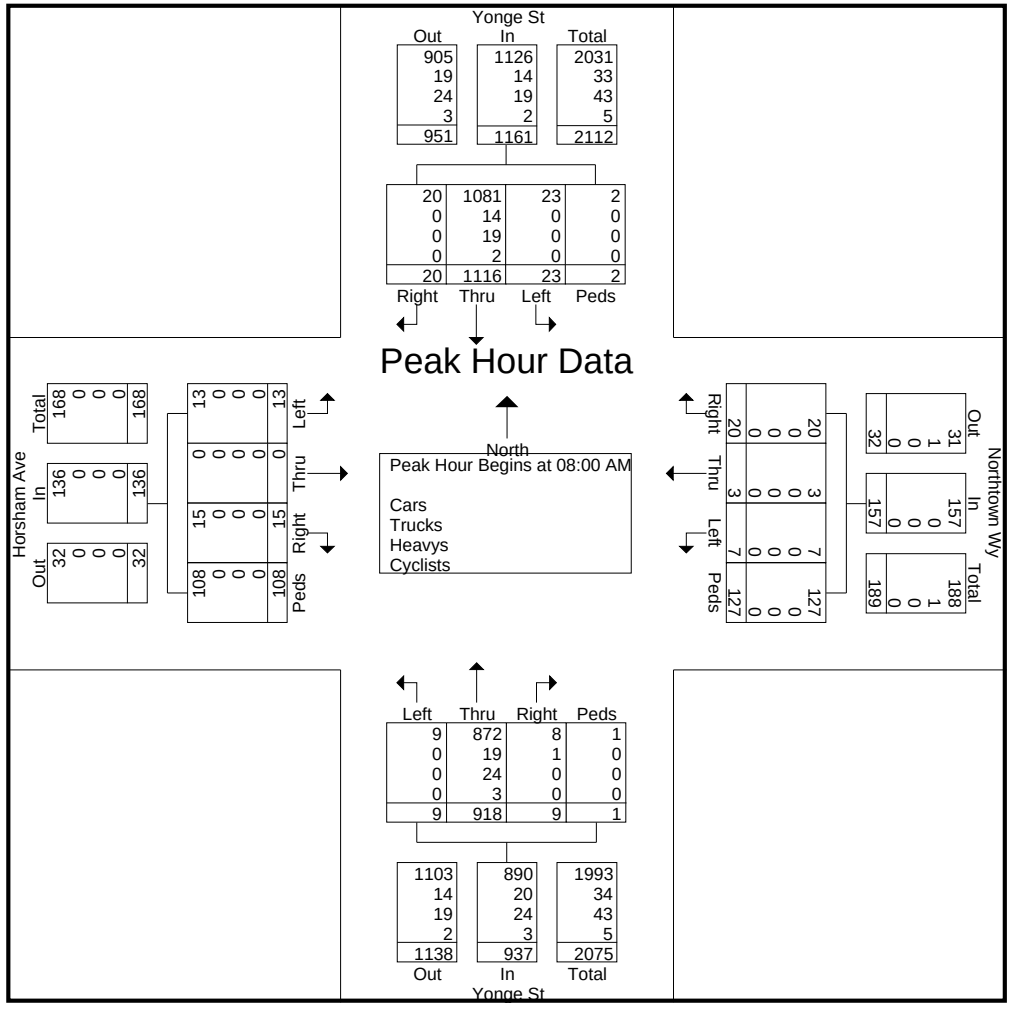
Site Code : 00000000
Start Date : 06/20/2023
Page No : 4



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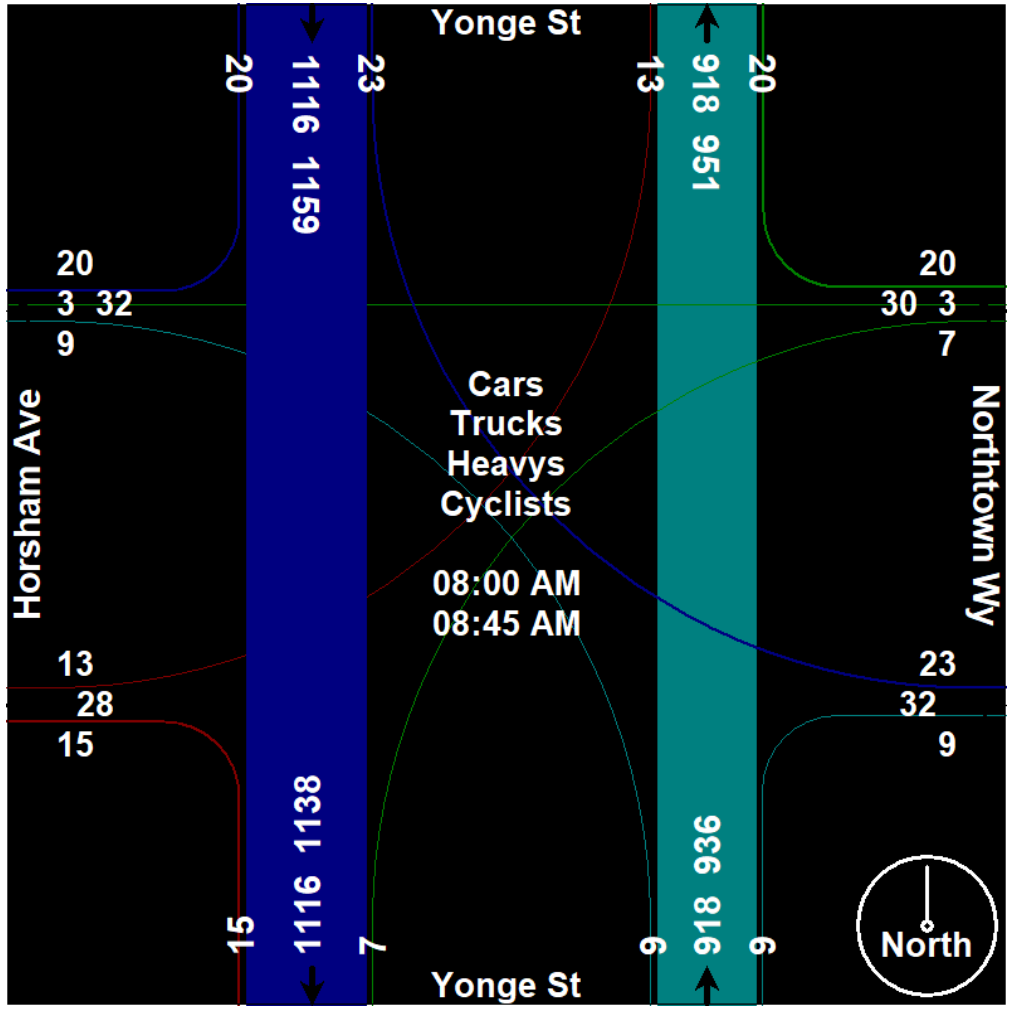

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Page No : 6

	Yonge St From North					Northtown Wy From East					Yonge St From South					Horsham Ave From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	13	235	8	1	257	11	0	**4**	42	57	8	249	3	**2**	262	5	0	**5**	72	82	658
05:15 PM	9	236	**17**	2	264	12	**1**	3	62	78	10	**275**	**7**	0	**292**	4	0	2	**116**	**122**	756
05:30 PM	**14**	**256**	15	**4**	**289**	15	1	3	125	144	**18**	252	3	2	275	6	**1**	4	73	84	**792**
05:45 PM	10	234	15	3	262	**21**	0	3	**139**	**163**	14	209	6	0	229	**9**	1	3	50	63	717
Total Volume	46	961	55	10	1072	59	2	13	368	442	50	985	19	4	1058	24	2	14	311	351	2923
% App. Total	4.3	89.6	5.1	0.9		13.3	0.5	2.9	83.3		4.7	93.1	1.8	0.4		6.8	0.6	4	88.6		
PHF	.821	.938	.809	.625	.927	.702	.500	.813	.662	.678	.694	.895	.679	.500	.906	.667	.500	.700	.670	.719	.923
Cars	46	923	54	10	1033	57	2	13	368	440	49	964	19	4	1036	24	2	14	311	351	2860
% Cars	100	96.0	98.2	100	96.4	96.6	100	100	100	99.5	98.0	97.9	100	100	97.9	100	100	100	100	100	97.8
Trucks	0	8	0	0	8	2	0	0	0	2	0	3	0	0	3	0	0	0	0	0	13
% Trucks	0	0.8	0	0	0.7	3.4	0	0	0	0.5	0	0.3	0	0	0.3	0	0	0	0	0	0.4
Heavys	0	15	0	0	15	0	0	0	0	0	0	14	0	0	14	0	0	0	0	0	29
% Heavys	0	1.6	0	0	1.4	0	0	0	0	0	0	1.4	0	0	1.3	0	0	0	0	0	1.0
Cyclists	0	15	1	0	16	0	0	0	0	0	1	4	0	0	5	0	0	0	0	0	21
% Cyclists	0	1.6	1.8	0	1.5	0	0	0	0	0	2.0	0.4	0	0	0.5	0	0	0	0	0	0.7

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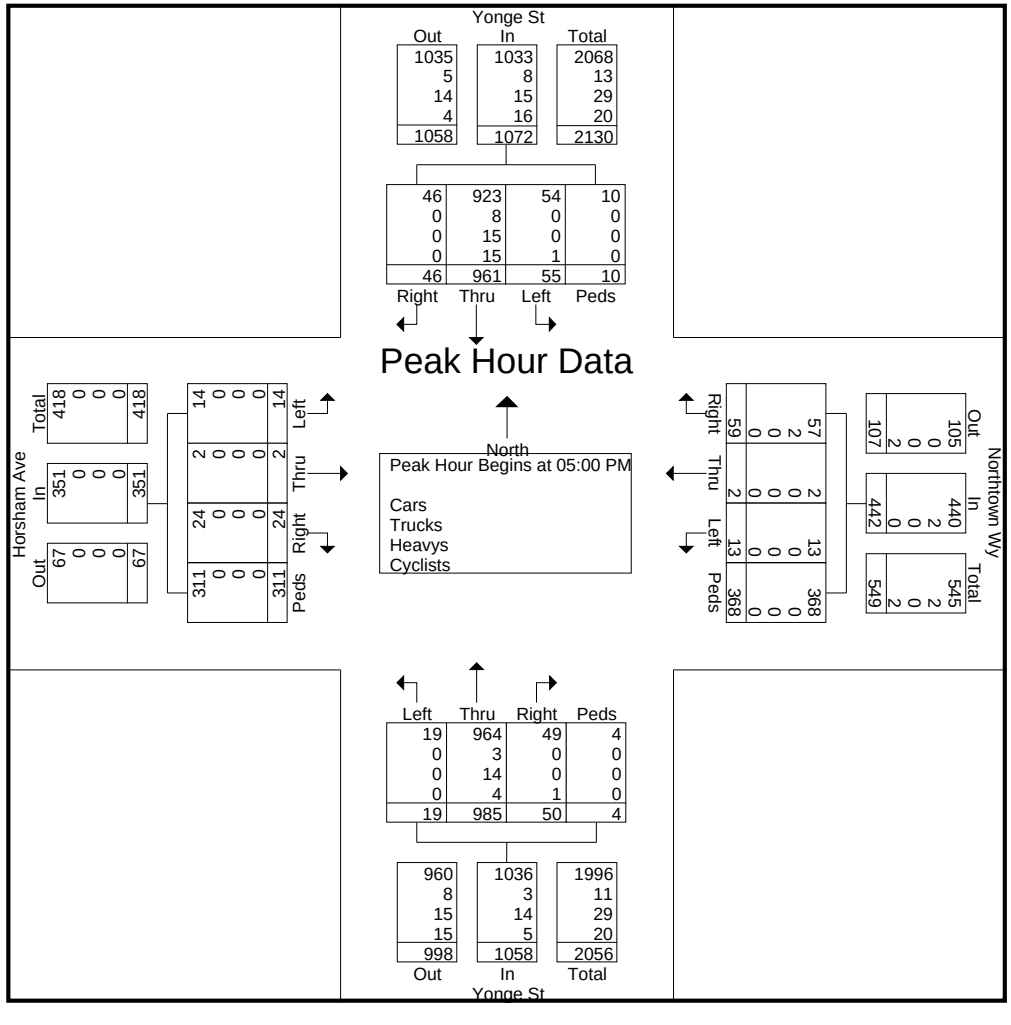
File Name : Yonge Street at Horsham Avenue
Site Code : 00000000
Start Date : 06/20/2023
Page No : 7



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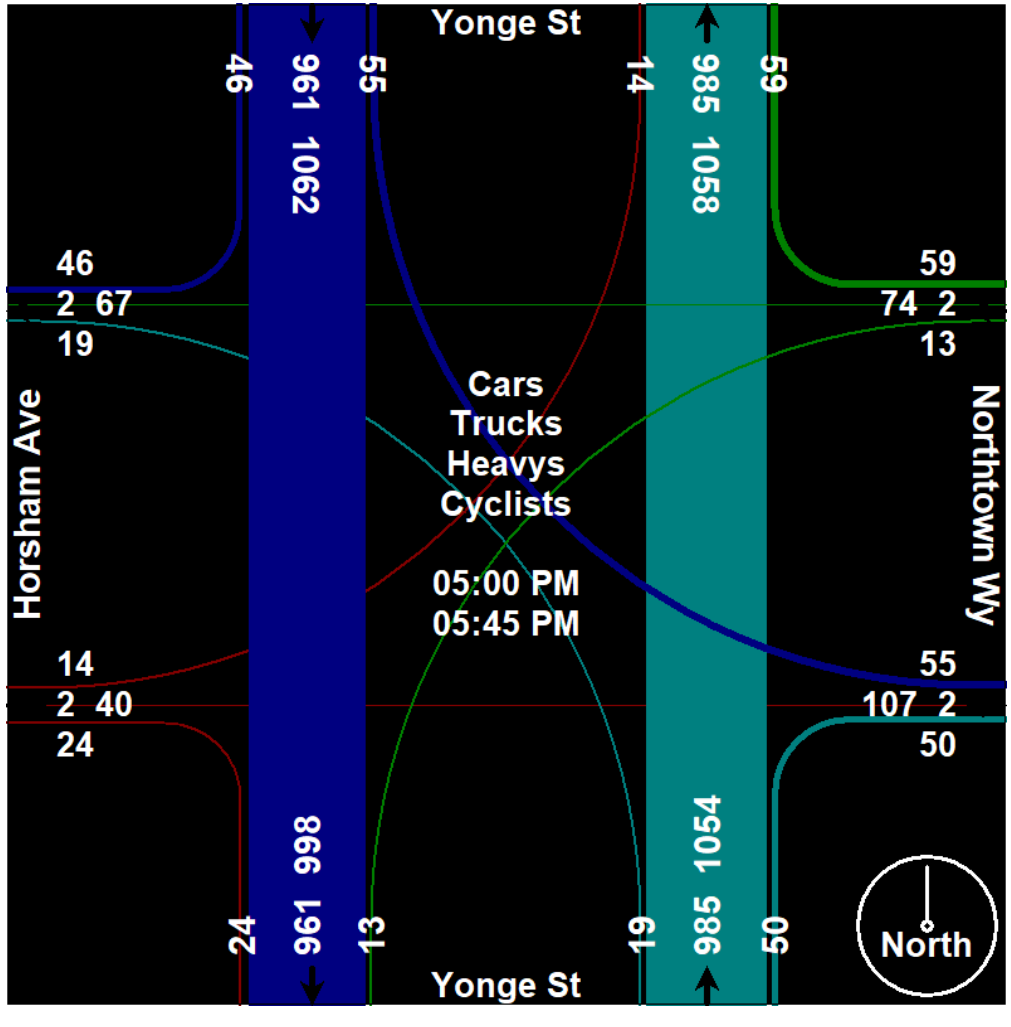
"Your Traffic Count Specialist"

File Name : Yonge Street at Horsham Avenue
Site Code : 00000000
Start Date : 06/20/2023
Page No : 8



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"Your Traffic Count Specialist"

File Name : Hounslow Avenue at Beecroft Road
Site Code : 00000000
Start Date : 06/20/2023
Page No : 1

Groups Printed- Cars - Trucks - Heavys - Cyclists

	Beecroft Rd From North					Hounslow Ave From East					Beecroft Rd From South					From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	65	2	0	67	2	0	0	5	7	0	37	0	2	39	0	0	0	0	0	113
07:15 AM	0	66	1	0	67	1	0	0	7	8	3	42	0	2	47	0	0	0	0	0	122
07:30 AM	0	109	0	0	109	5	0	1	1	7	0	40	0	1	41	0	0	0	0	0	157
07:45 AM	0	120	1	0	121	2	0	0	7	9	1	59	0	1	61	0	0	0	0	0	191
Total	0	360	4	0	364	10	0	1	20	31	4	178	0	6	188	0	0	0	0	0	583
08:00 AM	0	149	3	0	152	3	0	1	9	13	2	64	0	5	71	0	0	0	0	0	236
08:15 AM	0	184	1	0	185	0	0	1	11	12	1	68	0	1	70	0	0	0	0	0	267
08:30 AM	0	185	2	0	187	7	0	1	19	27	0	75	0	3	78	0	0	0	0	0	292
08:45 AM	0	170	4	0	174	7	0	1	16	24	0	120	0	3	123	0	0	0	0	0	321
Total	0	688	10	0	698	17	0	4	55	76	3	327	0	12	342	0	0	0	0	0	1116
04:00 PM	0	96	2	0	98	4	0	0	7	11	2	138	0	9	149	0	0	0	0	0	258
04:15 PM	0	124	3	0	127	2	0	0	6	8	1	117	0	1	119	0	0	0	0	0	254
04:30 PM	0	106	2	0	108	9	0	4	8	21	0	142	0	0	142	0	0	0	0	0	271
04:45 PM	0	114	4	0	118	6	0	3	4	13	2	141	0	1	144	0	0	0	0	0	275
Total	0	440	11	0	451	21	0	7	25	53	5	538	0	11	554	0	0	0	0	0	1058
05:00 PM	0	146	3	0	149	15	0	1	9	25	0	158	0	1	159	0	0	0	0	0	333
05:15 PM	0	138	0	2	140	6	0	0	13	19	0	153	0	1	154	0	0	0	0	0	313
05:30 PM	0	144	1	1	146	8	0	1	6	15	0	143	0	0	143	0	0	0	0	0	304
05:45 PM	0	136	0	0	136	7	0	3	10	20	0	164	0	0	164	0	0	0	0	0	320
Total	0	564	4	3	571	36	0	5	38	79	0	618	0	2	620	0	0	0	0	0	1270
Grand Total	0	2052	29	3	2084	84	0	17	138	239	12	1661	0	31	1704	0	0	0	0	0	4027
Apprch %	0	98.5	1.4	0.1		35.1	0	7.1	57.7		0.7	97.5	0	1.8		0	0	0	0		
Total %	0	51	0.7	0.1	51.8	2.1	0	0.4	3.4	5.9	0.3	41.2	0	0.8	42.3	0	0	0	0	0	
Cars	0	2000	28	3	2031	81	0	17	138	236	10	1630	0	31	1671	0	0	0	0	0	3938
% Cars	0	97.5	96.6	100	97.5	96.4	0	100	100	98.7	83.3	98.1	0	100	98.1	0	0	0	0	0	97.8
Trucks	0	26	0	0	26	3	0	0	0	3	1	15	0	0	16	0	0	0	0	0	45
% Trucks	0	1.3	0	0	1.2	3.6	0	0	0	1.3	8.3	0.9	0	0	0.9	0	0	0	0	0	1.1
Heavys	0	15	1	0	16	0	0	0	0	0	1	5	0	0	6	0	0	0	0	0	22
% Heavys	0	0.7	3.4	0	0.8	0	0	0	0	0	8.3	0.3	0	0	0.4	0	0	0	0	0	0.5
Cyclists	0	11	0	0	11	0	0	0	0	0	0	11	0	0	11	0	0	0	0	0	22
% Cyclists	0	0.5	0	0	0.5	0	0	0	0	0	0	0.7	0	0	0.6	0	0	0	0	0	0.5

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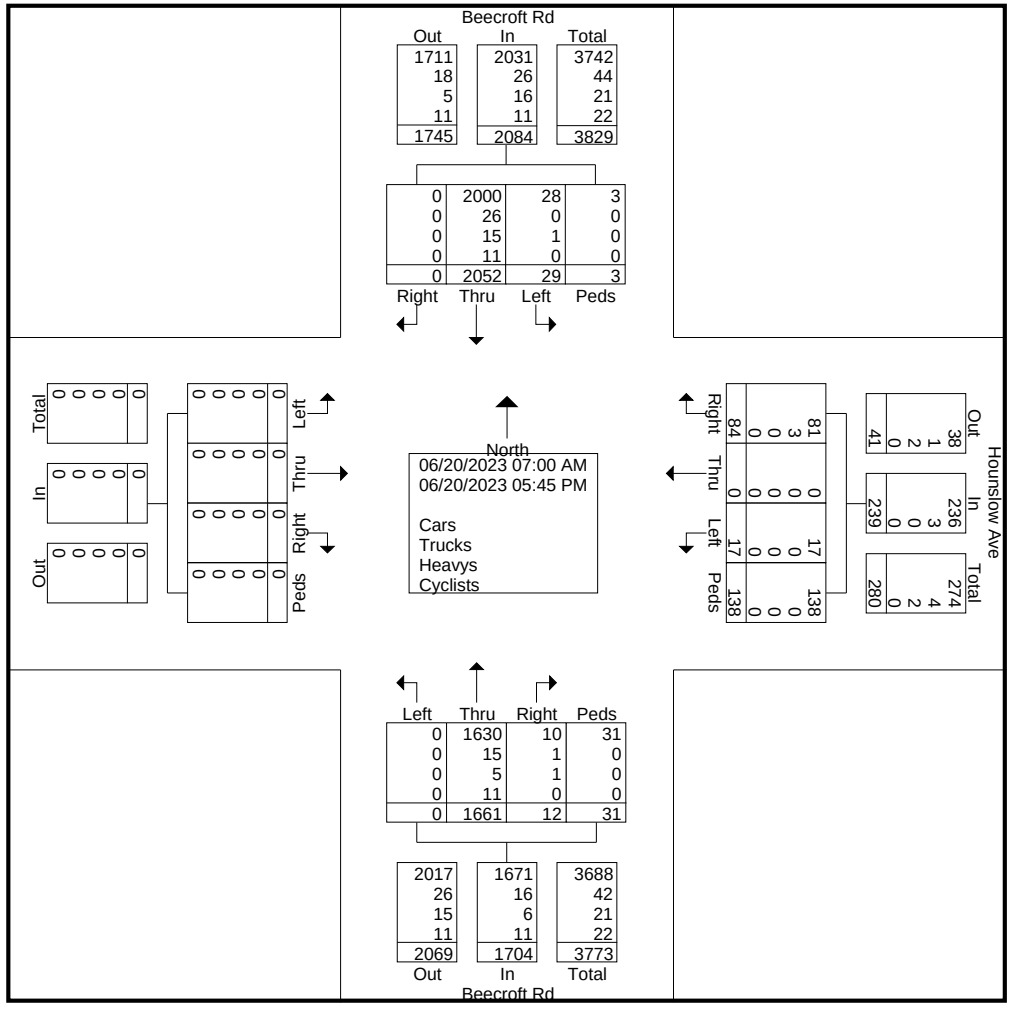
File Name : Hounslow Avenue at Beecroft Road
Site Code : 00000000
Start Date : 06/20/2023



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Start Date : 06/20/2023

	Beecroft Rd From North					Hounslow Ave From East					Beecroft Rd From South					From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	0	149	3	0	152	3	0	**1**	9	13	**2**	64	0	**5**	71	0	0	0	0	0	236
08:15 AM	0	184	1	0	185	0	0	1	11	12	1	68	0	1	70	0	0	0	0	0	267
08:30 AM	0	**185**	2	0	**187**	**7**	0	1	**19**	**27**	0	75	0	3	78	0	0	0	0	0	292
08:45 AM	0	170	**4**	0	174	7	0	1	16	24	0	**120**	0	3	**123**	0	0	0	0	0	**321**
Total Volume	0	688	10	0	698	17	0	4	55	76	3	327	0	12	342	0	0	0	0	0	1116
% App. Total	0	98.6	1.4	0		22.4	0	5.3	72.4		0.9	95.6	0	3.5		0	0	0	0		
PHF	.000	.930	.625	.000	.933	.607	.000	1.00	.724	.704	.375	.681	.000	.600	.695	.000	.000	.000	.000	.000	.869
Cars	0	676	10	0	686	17	0	4	55	76	2	323	0	12	337	0	0	0	0	0	1099
% Cars	0	98.3	100	0	98.3	100	0	100	100	100	66.7	98.8	0	100	98.5	0	0	0	0	0	98.5
Trucks	0	3	0	0	3	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	6
% Trucks	0	0.4	0	0	0.4	0	0	0	0	0	0	0.9	0	0	0.9	0	0	0	0	0	0.5
Heavys	0	7	0	0	7	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	8
% Heavys	0	1.0	0	0	1.0	0	0	0	0	0	33.3	0	0	0	0.3	0	0	0	0	0	0.7
Cyclists	0	2	0	0	2	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	3
% Cyclists	0	0.3	0	0	0.3	0	0	0	0	0	0	0.3	0	0	0.3	0	0	0	0	0	0.3

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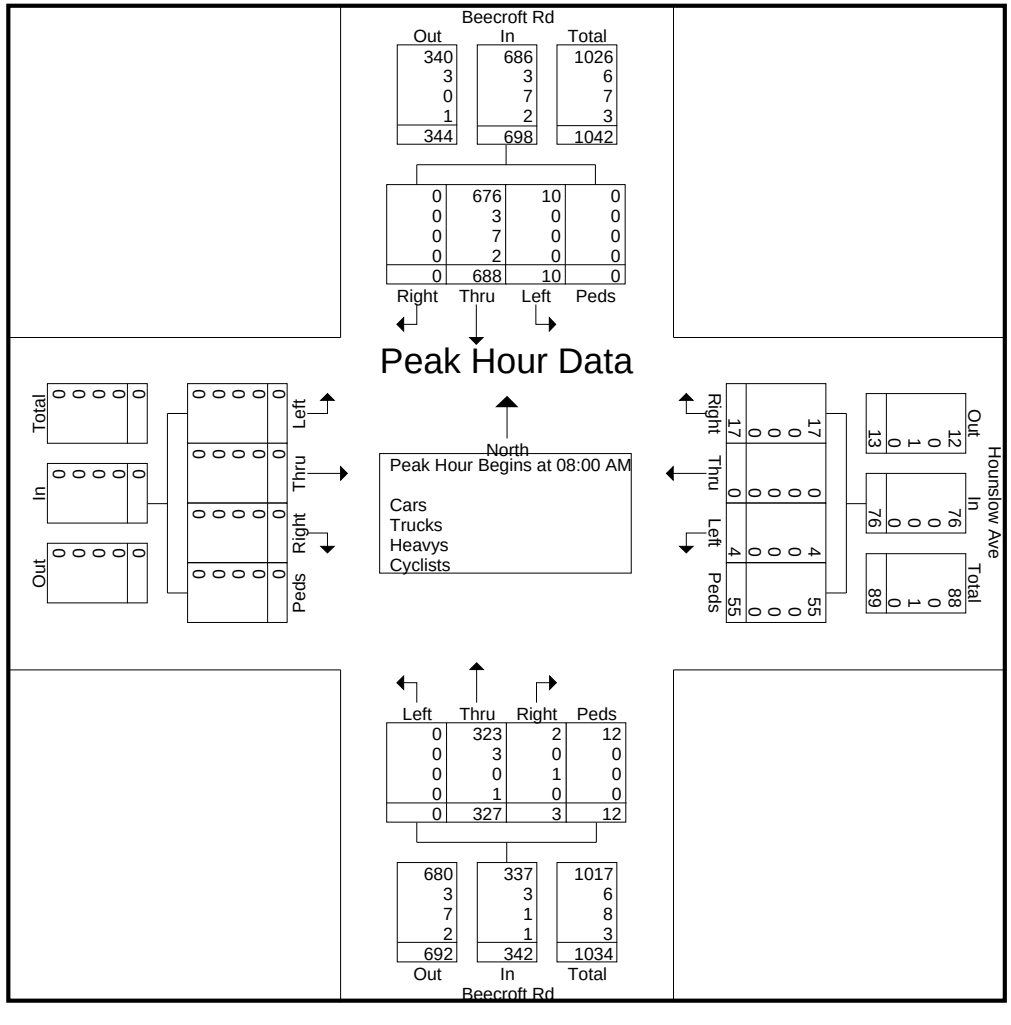
Site Code : 00000000
Start Date : 06/20/2023



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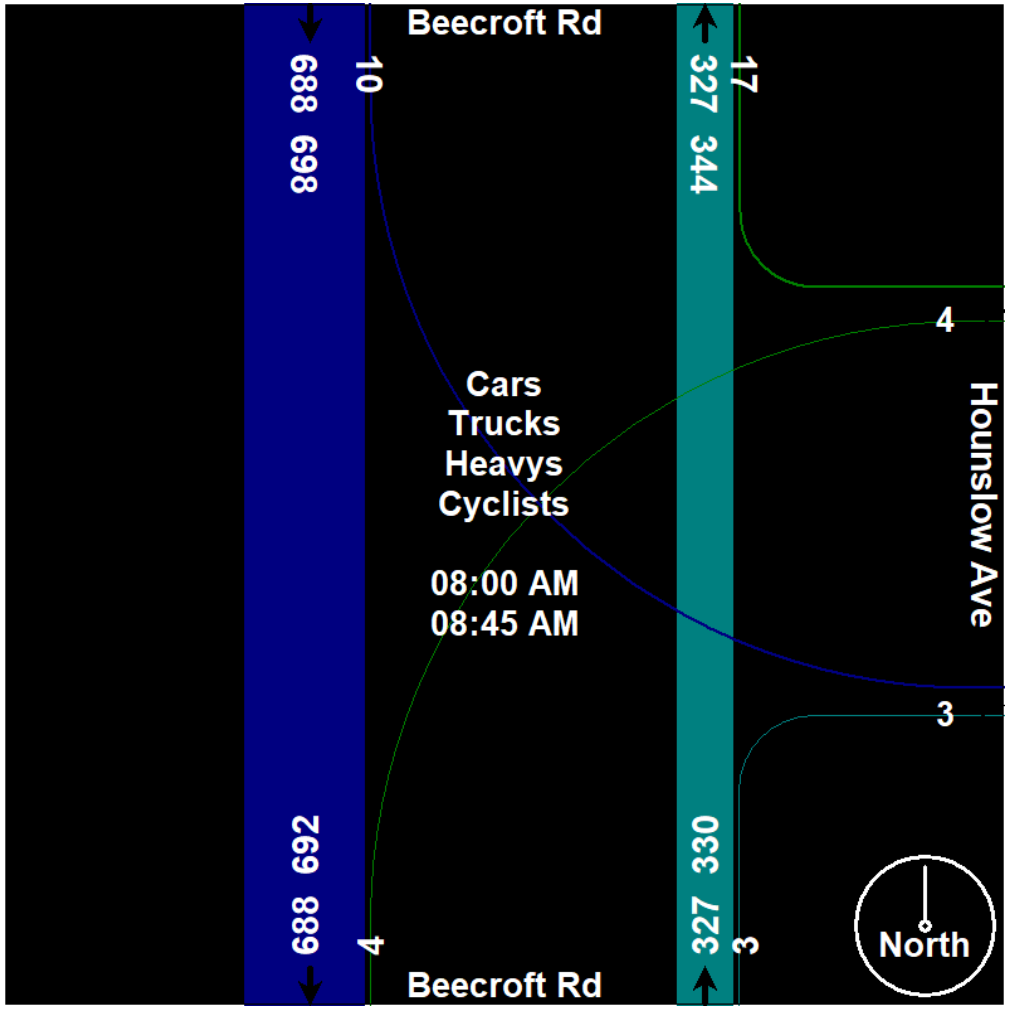
Start Date : 06/20/2023



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File Name : Hounslow Avenue at Beecroft Road
Site Code : 00000000
Start Date : 06/20/2023
Page No : 6

	Beecroft Rd From North					Hounslow Ave From East					Beecroft Rd From South					From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	0	**146**	**3**	0	**149**	**15**	0	1	9	**25**	0	158	0	**1**	159	0	0	0	0	0	**333**
05:15 PM	0	138	0	**2**	140	6	0	0	**13**	19	0	153	0	1	154	0	0	0	0	0	313
05:30 PM	0	144	1	1	146	8	0	1	6	15	0	143	0	0	143	0	0	0	0	0	304
05:45 PM	0	136	0	0	136	7	0	**3**	10	20	0	**164**	0	0	**164**	0	0	0	0	0	320
Total Volume	0	564	4	3	571	36	0	5	38	79	0	618	0	2	620	0	0	0	0	0	1270
% App. Total	0	98.8	0.7	0.5		45.6	0	6.3	48.1		0	99.7	0	0.3		0	0	0	0		
PHF	.000	.966	.333	.375	.958	.600	.000	.417	.731	.790	.000	.942	.000	.500	.945	.000	.000	.000	.000	.000	.953
Cars	0	555	4	3	562	36	0	5	38	79	0	609	0	2	611	0	0	0	0	0	1252
% Cars	0	98.4	100	100	98.4	100	0	100	100	100	0	98.5	0	100	98.5	0	0	0	0	0	98.6
Trucks	0	6	0	0	6	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	8
% Trucks	0	1.1	0	0	1.1	0	0	0	0	0	0	0.3	0	0	0.3	0	0	0	0	0	0.6
Heavys	0	2	0	0	2	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	4
% Heavys	0	0.4	0	0	0.4	0	0	0	0	0	0	0.3	0	0	0.3	0	0	0	0	0	0.3
Cyclists	0	1	0	0	1	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	6
% Cyclists	0	0.2	0	0	0.2	0	0	0	0	0	0	0.8	0	0	0.8	0	0	0	0	0	0.5

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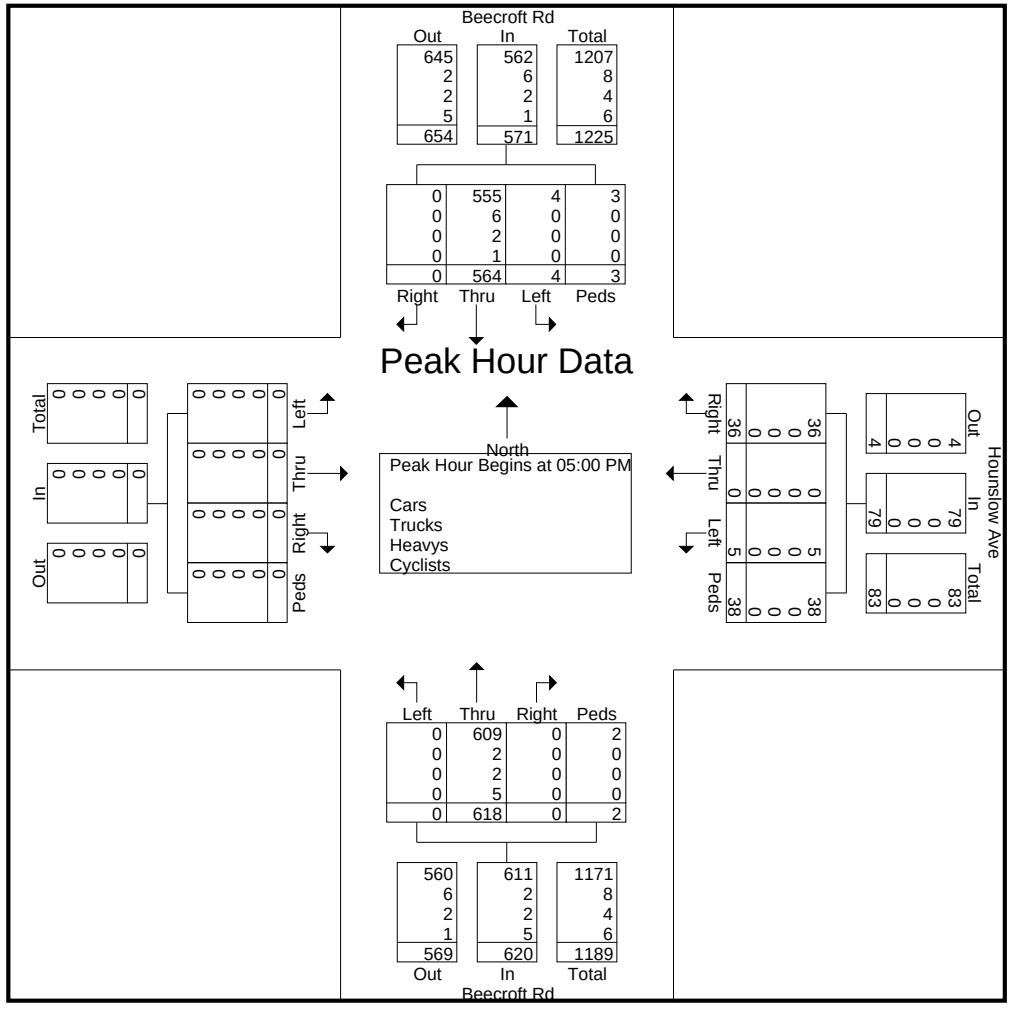
Site Code : 00000000
Start Date : 06/20/2023
Page No : 7



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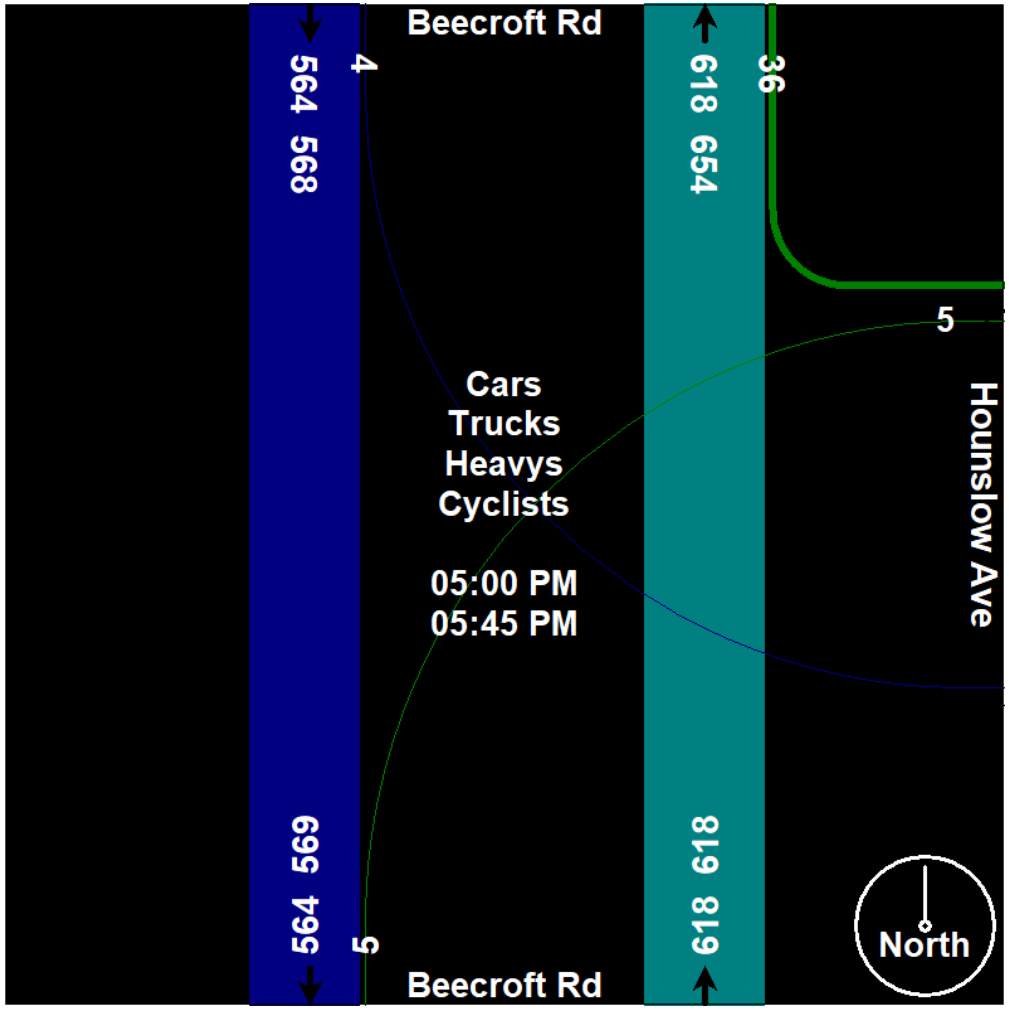

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"Your Traffic Count Specialist"

File Name : Horsham Avenue at Hounslow Avenue
Site Code : 00000000
Start Date : 06/20/2023
Page No : 1

Groups Printed- Cars - Trucks - Heavys - Cyclists

	Hounslow Ave From North					Horsham Ave From East					Horsham Ave From South					From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	1	1	0	2	1	0	4	4	9	4	0	0	1	5	0	0	0	0	0	16
07:15 AM	0	1	4	1	6	1	0	2	2	5	3	0	0	0	3	0	0	0	0	0	14
07:30 AM	0	0	0	0	0	4	0	0	4	8	1	2	0	0	3	0	0	0	0	0	11
07:45 AM	0	0	2	0	2	0	0	2	3	5	6	2	0	0	8	0	0	0	0	0	15
Total	0	2	7	1	10	6	0	8	13	27	14	4	0	1	19	0	0	0	0	0	56
08:00 AM	0	3	2	0	5	3	0	2	2	7	2	1	0	0	3	0	0	0	0	0	15
08:15 AM	0	1	0	1	2	1	0	1	6	8	1	0	0	0	1	0	0	0	0	0	11
08:30 AM	0	0	2	4	6	4	0	5	16	25	2	3	0	0	5	0	0	0	0	0	36
08:45 AM	0	2	2	1	5	8	0	9	2	19	5	1	0	0	6	0	0	0	0	0	30
Total	0	6	6	6	18	16	0	17	26	59	10	5	0	0	15	0	0	0	0	0	92
04:00 PM	0	2	2	0	4	4	0	5	7	16	9	2	0	1	12	0	0	0	0	0	32
04:15 PM	0	3	3	1	7	1	0	4	2	7	6	3	0	2	11	0	0	0	0	0	25
04:30 PM	0	0	2	1	3	7	0	5	0	12	2	2	0	2	6	0	0	0	0	0	21
04:45 PM	0	2	2	3	7	5	0	8	7	20	7	3	0	3	13	0	0	0	0	0	40
Total	0	7	9	5	21	17	0	22	16	55	24	10	0	8	42	0	0	0	0	0	118
05:00 PM	0	1	3	1	5	11	0	6	1	18	8	5	0	3	16	0	0	0	0	0	39
05:15 PM	0	0	0	1	1	4	0	10	5	19	10	2	0	0	12	0	0	0	0	0	32
05:30 PM	0	0	1	1	2	8	0	11	15	34	9	2	0	2	13	0	0	0	0	0	49
05:45 PM	0	0	0	4	4	7	0	8	5	20	8	5	0	2	15	0	0	0	0	0	39
Total	0	1	4	7	12	30	0	35	26	91	35	14	0	7	56	0	0	0	0	0	159
Grand Total	0	16	26	19	61	69	0	82	81	232	83	33	0	16	132	0	0	0	0	0	425
Apprch %	0	26.2	42.6	31.1		29.7	0	35.3	34.9		62.9	25	0	12.1		0	0	0	0		
Total %	0	3.8	6.1	4.5	14.4	16.2	0	19.3	19.1	54.6	19.5	7.8	0	3.8	31.1	0	0	0	0	0	
Cars	0	14	25	19	58	66	0	80	81	227	79	33	0	16	128	0	0	0	0	0	413
% Cars	0	87.5	96.2	100	95.1	95.7	0	97.6	100	97.8	95.2	100	0	100	97	0	0	0	0	0	97.2
Trucks	0	0	1	0	1	3	0	0	0	3	0	0	0	0	0	0	0	0	0	0	4
% Trucks	0	0	3.8	0	1.6	4.3	0	0	0	1.3	0	0	0	0	0	0	0	0	0	0	0.9
Heavys	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
% Heavys	0	12.5	0	0	3.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5
Cyclists	0	0	0	0	0	0	0	2	0	2	4	0	0	0	4	0	0	0	0	0	6
% Cyclists	0	0	0	0	0	0	0	2.4	0	0.9	4.8	0	0	0	3	0	0	0	0	0	1.4

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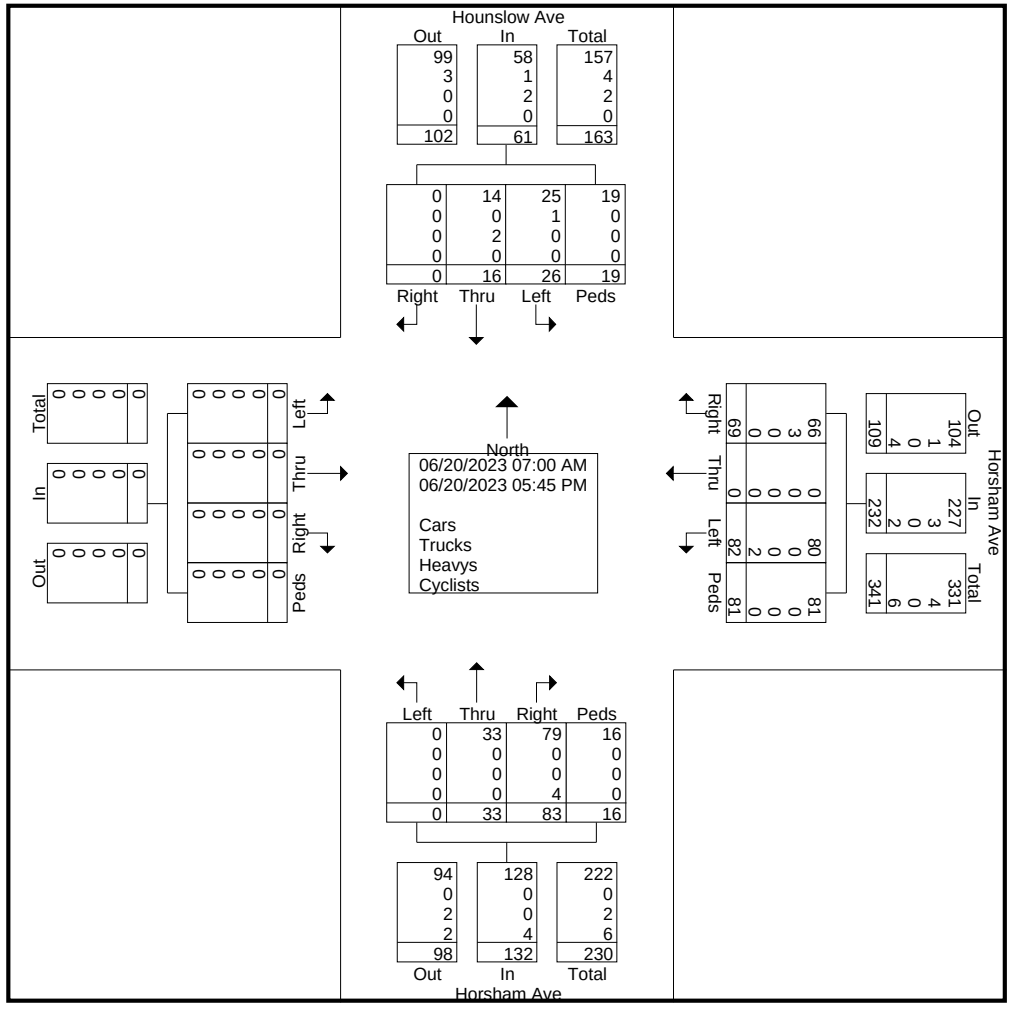
File Name : Horsham Avenue at Hounslow Avenue
Site Code : 00000000
Start Date : 06/20/2023



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File Name : Horsham Avenue at Hounslow Avenue
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Start Date : 06/20/2023

	Hounslow Ave From North					Horsham Ave From East					Horsham Ave From South					From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	0	**3**	**2**	0	5	3	0	2	2	7	2	1	0	0	3	0	0	0	0	0	15
08:15 AM	0	1	0	1	2	1	0	1	6	8	1	0	0	0	1	0	0	0	0	0	11
08:30 AM	0	0	2	**4**	**6**	4	0	5	**16**	**25**	2	**3**	0	0	5	0	0	0	0	0	**36**
08:45 AM	0	2	2	1	5	**8**	0	**9**	2	19	**5**	1	0	0	**6**	0	0	0	0	0	30
Total Volume	0	6	6	6	18	16	0	17	26	59	10	5	0	0	15	0	0	0	0	0	92
% App. Total	0	33.3	33.3	33.3		27.1	0	28.8	44.1		66.7	33.3	0	0		0	0	0	0		
PHF	.000	.500	.750	.375	.750	.500	.000	.472	.406	.590	.500	.417	.000	.000	.625	.000	.000	.000	.000	.000	.639
Cars	0	5	6	6	17	16	0	17	26	59	9	5	0	0	14	0	0	0	0	0	90
% Cars	0	83.3	100	100	94.4	100	0	100	100	100	90.0	100	0	0	93.3	0	0	0	0	0	97.8
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heavys	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
% Heavys	0	16.7	0	0	5.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1
Cyclists	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1
% Cyclists	0	0	0	0	0	0	0	0	0	0	10.0	0	0	0	6.7	0	0	0	0	0	1.1

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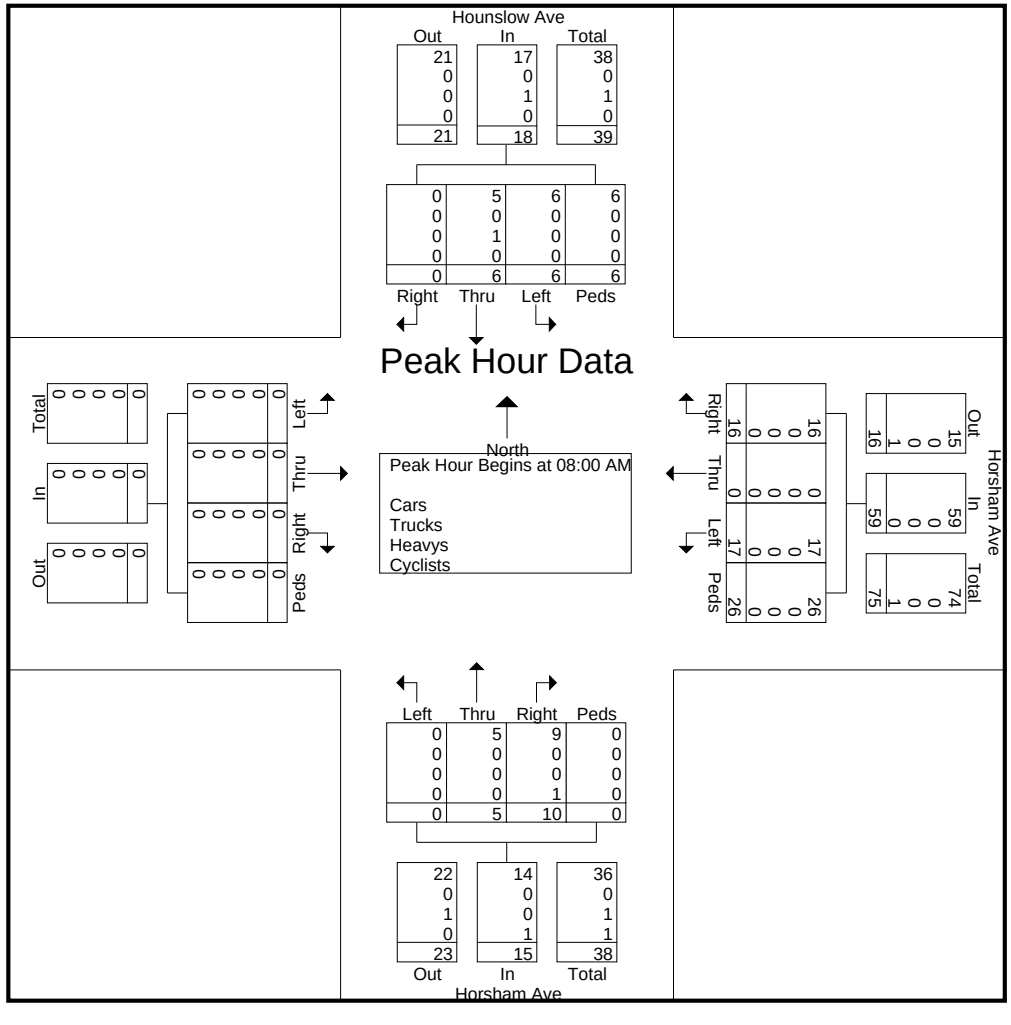
Site Code : 00000000
Start Date : 06/20/2023
Page No : 4



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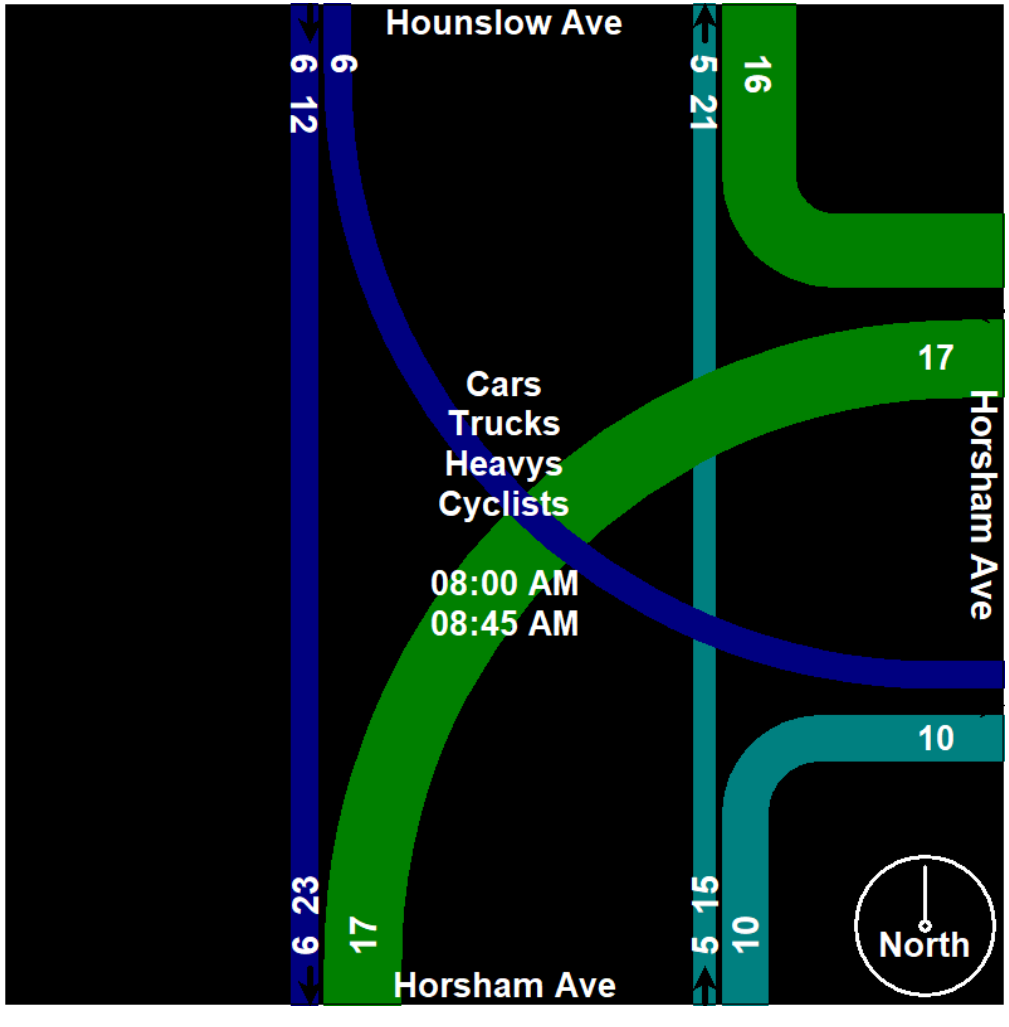

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Site Code : 00000000
Start Date : 06/20/2023
Page No : 6

	Hounslow Ave From North					Horsham Ave From East					Horsham Ave From South					From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	0	**2**	2	**3**	**7**	5	0	8	7	20	7	3	0	**3**	13	0	0	0	0	0	40
05:00 PM	0	1	**3**	1	5	**11**	0	6	1	18	8	**5**	0	3	**16**	0	0	0	0	0	39
05:15 PM	0	0	0	1	1	4	0	10	5	19	**10**	2	0	0	12	0	0	0	0	0	32
05:30 PM	0	0	1	1	2	8	0	**11**	**15**	**34**	9	2	0	2	13	0	0	0	0	0	**49**
Total Volume	0	3	6	6	15	28	0	35	28	91	34	12	0	8	54	0	0	0	0	0	160
% App. Total	0	20	40	40		30.8	0	38.5	30.8		63	22.2	0	14.8		0	0	0	0		
PHF	.000	.375	.500	.500	.536	.636	.000	.795	.467	.669	.850	.600	.000	.667	.844	.000	.000	.000	.000	.000	.816
Cars	0	3	6	6	15	28	0	35	28	91	33	12	0	8	53	0	0	0	0	0	159
% Cars	0	100	100	100	100	100	0	100	100	100	97.1	100	0	100	98.1	0	0	0	0	0	99.4
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heavys	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Heavys	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyclists	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1
% Cyclists	0	0	0	0	0	0	0	0	0	0	2.9	0	0	0	1.9	0	0	0	0	0	0.6

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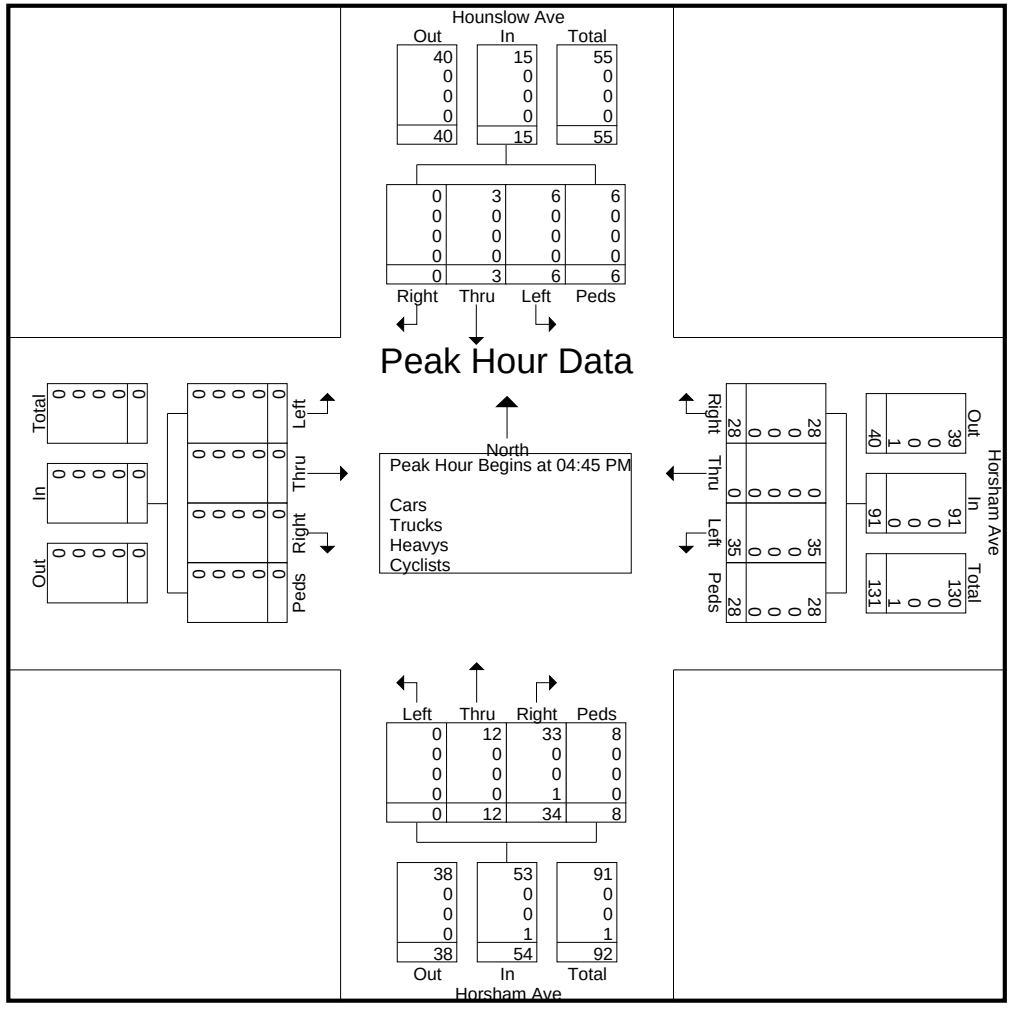

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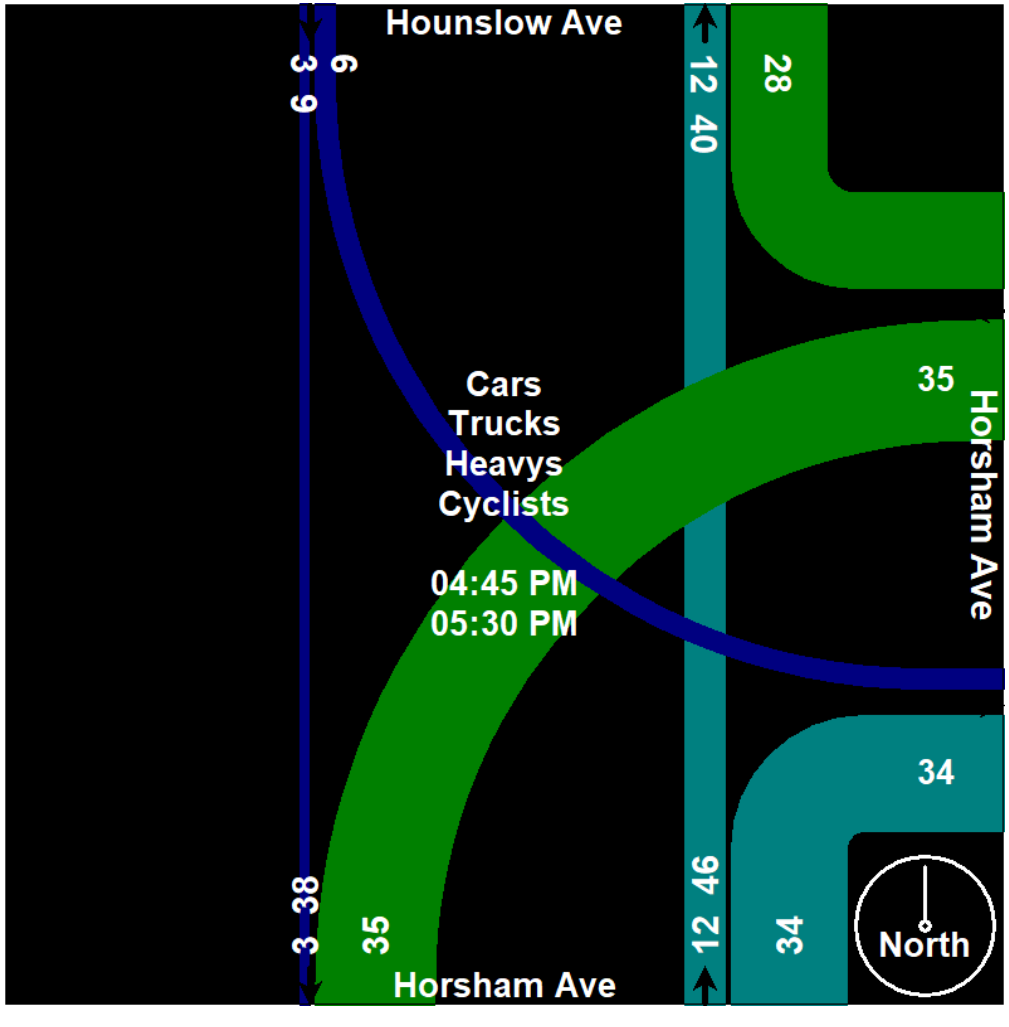


APPENDIX

C LEVEL OF SERVICE DEFINITIONS

LEVEL OF SERVICE DEFINITIONS AT SIGNALIZED INTERSECTIONS[1]

Level of service for signalized intersections is defined in terms of delay, which is a measure of driver discomfort and frustration, fuel consumption, and lost travel time. Specifically, level-of-service (LOS) criteria are stated in terms of the average control delay per vehicle, typically for a 15-min analysis period. The criteria are given in the table below. Delay may be measured in the field or estimated using software such as Highway Capacity Software. Delay is a complex measure and is dependent upon a number of variables, including quality of progression, the cycle length, the green ratio, and the *v/c* ratio for the lane group in question.

Level of Service	Features	Control Delay per vehicle (sec)
A	LOS A describes operations with very low delay, up to 10 sec per vehicle. This level of service occurs when progression is extremely favourable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.	≤ 10
B	LOS B describes operations with delay greater than 10 and up to 20 sec per vehicle. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of average delay.	> 10 and ≤ 20
C	LOS C describes operations with delay greater than 20 and up to 35 sec per vehicle. These higher delays may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, though many still pass through the intersection without stopping.	> 20 and ≤ 35
D	LOS D describes operations with delay greater than 35 and up to 55 sec per vehicle. At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavourable progression, long cycle lengths, of high *v/c* ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	> 35 and ≤ 55
E	LOS E describes operations with delay greater than 55 and up to 80 sec per vehicle. This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high *v/c* ratios. Individual cycle failures are frequent occurrences.	> 55 and ≤ 80
F	LOS F describes operations with delay in excess of 80 sec per vehicle. This level, considered to be unacceptable to most drivers, often occurs with oversaturation, that is, when arrival flow rates exceed the capacity of the intersection. It may also occur at high *v/c* ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.	> 80

(1) Highway Capacity Manual 2000

LEVEL OF SERVICE DEFINITIONS AT UNSIGNALIZED INTERSECTIONS[1]

The level of service criteria for unsignalized intersections are given in the table below. As used here, total delay is defined as the total elapsed time from when a vehicle stops at the end of the queue until the vehicle departs from the stop line; this time includes the time required for the vehicle to travel from the last-in-queue position to the first-in-queue position. The average total delay for any particular minor movement is a function of the service rate or capacity of the approach and the degree of saturation.

Level of Service	Features	Average Total Delay (sec/veh)
A	Little or no traffic delay occurs. Approaches appear open, turning movements are easily made, and drivers have freedom of operation.	≤ 10
B	Short traffic delays occur. Many drivers begin to feel somewhat restricted in terms of freedom of operation.	> 10 and ≤ 15
C	Average traffic delays occur. Operations are generally stable, but drivers emerging from the minor street may experience difficulty in completing their movement. This may occasionally impact on the stability of flow on the major street.	> 15 and ≤ 25
D	Long traffic delays occur. Motorists emerging from the minor street experience significant restriction and frustration. Drivers on the major street will experience congestion and delay as drivers emerging from the minor street interfere with the major through movements.	> 25 and ≤ 35
E	Very long traffic delays occur. Operations approach the capacity of the intersection.	> 35 and ≤ 50
F	Saturation occurs, with vehicle demand exceeding the available capacity. Very long traffic delays occur.	> 50

(1) Highway Capacity Manual 2000.

J:\Capacity Appendix\Unsignalized\hcs unsignalized_delay.doc

APPENDIX

D SYNCHRO RESULTS

APPENDIX

D-1 *2023 EXISTING CONDITIONS*

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	0	15	7	3	20	9	918	9	23	1116	20
Future Volume (vph)	13	0	15	7	3	20	9	918	9	23	1116	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	15.0		0.0	15.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			0.0			0.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor												
Frt		0.928			0.910			0.999			0.997	
Flt Protected		0.977			0.988		0.950			0.950		
Satd. Flow (prot)	0	1704	0	0	1689	0	1785	4877	0	1785	4968	0
Flt Permitted		0.977			0.988		0.950			0.950		
Satd. Flow (perm)	0	1704	0	0	1689	0	1785	4877	0	1785	4968	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		101.1			74.8			121.1			92.4	
Travel Time (s)		7.3			5.4			7.3			5.5	
Confl. Peds. (#/hr)	2		1	1		2	108		127	127		108
Confl. Bikes (#/hr)												1
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	5%	12%	0%	3%	0%
Adj. Flow (vph)	15	0	17	8	3	22	10	1031	10	26	1254	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	32	0	0	33	0	10	1041	0	26	1276	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane								Yes			Yes	
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 32.8%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	0	15	7	3	20	9	918	9	23	1116	20
Future Volume (Veh/h)	13	0	15	7	3	20	9	918	9	23	1116	20
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	15	0	17	8	3	22	10	1031	10	26	1254	22
Pedestrians		108			127			1			2	
Lane Width (m)		3.5			3.5			3.5			3.5	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		9			10			0			0	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1814	2613	538	1671	2619	478	1384			1168		
vC1, stage 1 conf vol	1425	1425		1183	1183							
vC2, stage 2 conf vol	389	1188		488	1436							
vCu, unblocked vol	1814	2613	538	1671	2619	478	1384			1168		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	88	100	96	95	98	95	98			95		
cM capacity (veh/h)	121	129	449	166	130	483	457			543		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	32	33	10	412	412	216	26	502	502	273
Volume Left	15	8	10	0	0	0	26	0	0	0
Volume Right	17	22	0	0	0	10	0	0	0	22
cSH	197	283	457	1700	1700	1700	543	1700	1700	1700
Volume to Capacity	0.16	0.12	0.02	0.24	0.24	0.13	0.05	0.30	0.30	0.16
Queue Length 95th (m)	4.5	3.1	0.5	0.0	0.0	0.0	1.2	0.0	0.0	0.0
Control Delay (s)	26.7	19.4	13.0	0.0	0.0	0.0	12.0	0.0	0.0	0.0
Lane LOS	D	C	B				B			
Approach Delay (s)	26.7	19.4	0.1				0.2			
Approach LOS	D	C								

Intersection Summary					
Average Delay		0.8			
Intersection Capacity Utilization		32.8%	ICU Level of Service		A
Analysis Period (min)		15			

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	17	16	5	10	6	6
Future Volume (vph)	17	16	5	10	6	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.935		0.910			
Flt Protected	0.975					0.976
Satd. Flow (prot)	1713	0	1710	0	0	1690
Flt Permitted	0.975					0.976
Satd. Flow (perm)	1713	0	1710	0	0	1690
Link Speed (k/h)	50		50			50
Link Distance (m)	101.1		124.8			121.4
Travel Time (s)	7.3		9.0			8.7
Confl. Peds. (#/hr)		6		26	26	
Confl. Bikes (#/hr)				1		
Peak Hour Factor	0.64	0.64	0.64	0.64	0.64	0.64
Heavy Vehicles (%)	0%	0%	0%	0%	0%	17%
Adj. Flow (vph)	27	25	8	16	9	9
Shared Lane Traffic (%)						
Lane Group Flow (vph)	52	0	24	0	0	18
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Stop			Stop

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	20.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	17	16	5	10	6	6
Future Volume (vph)	17	16	5	10	6	6
Peak Hour Factor	0.64	0.64	0.64	0.64	0.64	0.64
Hourly flow rate (vph)	27	25	8	16	9	9

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	52	24	18
Volume Left (vph)	27	0	9
Volume Right (vph)	25	16	0
Hadj (s)	-0.18	-0.40	0.24
Departure Headway (s)	3.8	3.6	4.3
Degree Utilization, x	0.05	0.02	0.02
Capacity (veh/h)	930	965	827
Control Delay (s)	7.0	6.7	7.4
Approach Delay (s)	7.0	6.7	7.4
Approach LOS	A	A	A

Intersection Summary			
Delay	7.0		
Level of Service	A		
Intersection Capacity Utilization	20.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	4	17	327	3	10	688
Future Volume (vph)	4	17	327	3	10	688
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.892		0.999			
Flt Protected	0.990					0.999
Satd. Flow (prot)	1659	0	3522	0	0	3497
Flt Permitted	0.990					0.999
Satd. Flow (perm)	1659	0	3522	0	0	3497
Link Speed (k/h)	50		50			50
Link Distance (m)	121.4		210.7			126.8
Travel Time (s)	8.7		15.2			9.1
Confl. Peds. (#/hr)	12			55	55	
Confl. Bikes (#/hr)				4		
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	0%	0%	1%	34%	0%	2%
Adj. Flow (vph)	5	20	376	3	11	791
Shared Lane Traffic (%)						
Lane Group Flow (vph)	25	0	379	0	0	802
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	36.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	4	17	327	3	10	688
Future Volume (Veh/h)	4	17	327	3	10	688
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	5	20	376	3	11	791
Pedestrians	55		12			
Lane Width (m)	3.5		3.5			
Walking Speed (m/s)	1.2		1.2			
Percent Blockage	4		1			
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	862	244			434	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	862	244			434	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	97			99	
cM capacity (veh/h)	279	728			1086	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	25	251	128	275	527
Volume Left	5	0	0	11	0
Volume Right	20	0	3	0	0
cSH	551	1700	1700	1086	1700
Volume to Capacity	0.05	0.15	0.08	0.01	0.31
Queue Length 95th (m)	1.1	0.0	0.0	0.2	0.0
Control Delay (s)	11.8	0.0	0.0	0.4	0.0
Lane LOS	B			A	
Approach Delay (s)	11.8	0.0		0.1	
Approach LOS	B				

Intersection Summary				
Average Delay	0.3			
Intersection Capacity Utilization	36.1%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	2	24	13	2	59	19	985	50	55	961	46
Future Volume (vph)	14	2	24	13	2	59	19	985	50	55	961	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	15.0		0.0	15.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			0.0			0.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor												
Frt		0.918			0.892			0.993			0.993	
Flt Protected		0.983			0.991		0.950			0.950		
Satd. Flow (prot)	0	1695	0	0	1609	0	1785	4998	0	1785	4952	0
Flt Permitted		0.983			0.991		0.950			0.950		
Satd. Flow (perm)	0	1695	0	0	1609	0	1785	4998	0	1785	4952	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		101.1			74.8			121.1			92.4	
Travel Time (s)		7.3			5.4			7.3			5.5	
Confl. Peds. (#/hr)	10		4	4		10	311		368	368		311
Confl. Bikes (#/hr)									1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	4%	0%	2%	0%	0%	3%	0%
Adj. Flow (vph)	15	2	26	14	2	64	21	1071	54	60	1045	50
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	43	0	0	80	0	21	1125	0	60	1095	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane								Yes			Yes	
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	41.8%	ICU Level of Service A	
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	2	24	13	2	59	19	985	50	55	961	46
Future Volume (Veh/h)	14	2	24	13	2	59	19	985	50	55	961	46
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	2	26	14	2	64	21	1071	54	60	1045	50
Pedestrians		311			368			4			10	
Lane Width (m)		3.5			3.5			3.5			3.5	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		25			30			0			1	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1975	3036	688	2007	3034	762	1406			1493		
vC1, stage 1 conf vol	1501	1501		1508	1508							
vC2, stage 2 conf vol	474	1535		499	1526							
vCu, unblocked vol	1975	3036	688	2007	3034	762	1406			1493		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	7.0	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	80	96	91	83	97	73	94			81		
cM capacity (veh/h)	74	50	293	81	68	239	368			320		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	43	80	21	428	428	268	60	418	418	259
Volume Left	15	14	21	0	0	0	60	0	0	0
Volume Right	26	64	0	0	0	54	0	0	0	50
cSH	130	170	368	1700	1700	1700	320	1700	1700	1700
Volume to Capacity	0.33	0.47	0.06	0.25	0.25	0.16	0.19	0.25	0.25	0.15
Queue Length 95th (m)	10.6	17.8	1.4	0.0	0.0	0.0	5.4	0.0	0.0	0.0
Control Delay (s)	45.7	43.7	15.4	0.0	0.0	0.0	18.8	0.0	0.0	0.0
Lane LOS	E	E	C				C			
Approach Delay (s)	45.7	43.7	0.3				1.0			
Approach LOS	E	E								

Intersection Summary				
Average Delay	2.9			
Intersection Capacity Utilization	41.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	35	28	12	34	6	3
Future Volume (vph)	35	28	12	34	6	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.940		0.901			
Flt Protected	0.973					0.969
Satd. Flow (prot)	1718	0	1693	0	0	1821
Flt Permitted	0.973					0.969
Satd. Flow (perm)	1718	0	1693	0	0	1821
Link Speed (k/h)	50		50			50
Link Distance (m)	101.1		124.8			121.4
Travel Time (s)	7.3		9.0			8.7
Confl. Peds. (#/hr)	8	6		28	28	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	43	34	15	41	7	4
Shared Lane Traffic (%)						
Lane Group Flow (vph)	77	0	56	0	0	11
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Stop			Stop

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	22.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	35	28	12	34	6	3
Future Volume (vph)	35	28	12	34	6	3
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	43	34	15	41	7	4

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	77	56	11
Volume Left (vph)	43	0	7
Volume Right (vph)	34	41	0
Hadj (s)	-0.15	-0.44	0.13
Departure Headway (s)	3.9	3.6	4.2
Degree Utilization, x	0.08	0.06	0.01
Capacity (veh/h)	908	959	828
Control Delay (s)	7.2	6.9	7.3
Approach Delay (s)	7.2	6.9	7.3
Approach LOS	A	A	A

Intersection Summary			
Delay	7.1		
Level of Service	A		
Intersection Capacity Utilization	22.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	5	36	618	0	4	564
Future Volume (vph)	5	36	618	0	4	564
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.881					
Flt Protected	0.994					
Satd. Flow (prot)	1645	0	3535	0	0	3500
Flt Permitted	0.994					
Satd. Flow (perm)	1645	0	3535	0	0	3500
Link Speed (k/h)	50		50			50
Link Distance (m)	121.4		210.7			126.8
Travel Time (s)	8.7		15.2			9.1
Confl. Peds. (#/hr)	2	3		38	38	
Confl. Bikes (#/hr)				2		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	1%	0%	0%	2%
Adj. Flow (vph)	5	38	651	0	4	594
Shared Lane Traffic (%)						
Lane Group Flow (vph)	43	0	651	0	0	598
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 29.3%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	36	618	0	4	564
Future Volume (Veh/h)	5	36	618	0	4	564
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	38	651	0	4	594
Pedestrians	38		2			3
Lane Width (m)	3.5		3.5			3.5
Walking Speed (m/s)	1.2		1.2			1.2
Percent Blockage	3		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	996	366			689	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	996	366			689	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	94			100	
cM capacity (veh/h)	236	615			887	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	43	434	217	202	396
Volume Left	5	0	0	4	0
Volume Right	38	0	0	0	0
cSH	518	1700	1700	887	1700
Volume to Capacity	0.08	0.26	0.13	0.00	0.23
Queue Length 95th (m)	2.2	0.0	0.0	0.1	0.0
Control Delay (s)	12.6	0.0	0.0	0.2	0.0
Lane LOS	B			A	
Approach Delay (s)	12.6	0.0		0.1	
Approach LOS	B				

Intersection Summary				
Average Delay		0.5		
Intersection Capacity Utilization		29.3%	ICU Level of Service	A
Analysis Period (min)		15		

APPENDIX

D-2 *2028 FUTURE BACKGROUND CONDITIONS*

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	0	11	7	3	20	6	1027	9	23	1147	18
Future Volume (vph)	17	0	11	7	3	20	6	1027	9	23	1147	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	15.0		0.0	15.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			0.0			0.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor												
Frt		0.948			0.910			0.999			0.998	
Flt Protected		0.970			0.988		0.950			0.950		
Satd. Flow (prot)	0	1728	0	0	1689	0	1785	4877	0	1785	4972	0
Flt Permitted		0.970			0.988		0.950			0.950		
Satd. Flow (perm)	0	1728	0	0	1689	0	1785	4877	0	1785	4972	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		101.1			74.8			121.1			92.4	
Travel Time (s)		7.3			5.4			7.3			5.5	
Confl. Peds. (#/hr)	2		1	1		2	108		127	127		108
Confl. Bikes (#/hr)												1
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	5%	12%	0%	3%	0%
Adj. Flow (vph)	19	0	12	8	3	22	7	1154	10	26	1289	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	31	0	0	33	0	7	1164	0	26	1309	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane								Yes			Yes	
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 33.3%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	0	11	7	3	20	6	1027	9	23	1147	18
Future Volume (Veh/h)	17	0	11	7	3	20	6	1027	9	23	1147	18
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	19	0	12	8	3	22	7	1154	10	26	1289	20
Pedestrians		108			127			1			2	
Lane Width (m)		3.5			3.5			3.5			3.5	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		9			10			0			0	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1883	2764	549	1795	2769	519	1417			1291		
vC1, stage 1 conf vol	1459	1459		1300	1300							
vC2, stage 2 conf vol	424	1305		495	1469							
vCu, unblocked vol	1883	2764	549	1795	2769	519	1417			1291		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	83	100	97	94	98	95	98			95		
cM capacity (veh/h)	114	118	442	144	121	454	444			488		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	31	33	7	462	462	241	26	516	516	278
Volume Left	19	8	7	0	0	0	26	0	0	0
Volume Right	12	22	0	0	0	10	0	0	0	20
cSH	160	256	444	1700	1700	1700	488	1700	1700	1700
Volume to Capacity	0.19	0.13	0.02	0.27	0.27	0.14	0.05	0.30	0.30	0.16
Queue Length 95th (m)	5.5	3.5	0.4	0.0	0.0	0.0	1.3	0.0	0.0	0.0
Control Delay (s)	32.8	21.1	13.2	0.0	0.0	0.0	12.8	0.0	0.0	0.0
Lane LOS	D	C	B				B			
Approach Delay (s)	32.8	21.1	0.1				0.2			
Approach LOS	D	C								

Intersection Summary				
Average Delay		0.8		
Intersection Capacity Utilization		33.3%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	19	14	5	11	2	6
Future Volume (vph)	19	14	5	11	2	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.943		0.908			
Flt Protected	0.972					0.988
Satd. Flow (prot)	1722	0	1706	0	0	1646
Flt Permitted	0.972					0.988
Satd. Flow (perm)	1722	0	1706	0	0	1646
Link Speed (k/h)	50		50			50
Link Distance (m)	101.1		124.8			121.4
Travel Time (s)	7.3		9.0			8.7
Confl. Peds. (#/hr)		6		26	26	
Confl. Bikes (#/hr)				1		
Peak Hour Factor	0.64	0.64	0.64	0.64	0.64	0.64
Heavy Vehicles (%)	0%	0%	0%	0%	0%	17%
Adj. Flow (vph)	30	22	8	17	3	9
Shared Lane Traffic (%)						
Lane Group Flow (vph)	52	0	25	0	0	12
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Stop			Stop

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	20.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	19	14	5	11	2	6
Future Volume (vph)	19	14	5	11	2	6
Peak Hour Factor	0.64	0.64	0.64	0.64	0.64	0.64
Hourly flow rate (vph)	30	22	8	17	3	9

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	52	25	12
Volume Left (vph)	30	0	3
Volume Right (vph)	22	17	0
Hadj (s)	-0.14	-0.41	0.27
Departure Headway (s)	3.8	3.6	4.3
Degree Utilization, x	0.06	0.03	0.01
Capacity (veh/h)	923	969	822
Control Delay (s)	7.1	6.7	7.4
Approach Delay (s)	7.1	6.7	7.4
Approach LOS	A	A	A

Intersection Summary			
Delay	7.0		
Level of Service	A		
Intersection Capacity Utilization	20.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	4	15	360	3	6	709
Future Volume (vph)	4	15	360	3	6	709
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.896		0.999			
Flt Protected	0.989					
Satd. Flow (prot)	1665	0	3523	0	0	3500
Flt Permitted	0.989					
Satd. Flow (perm)	1665	0	3523	0	0	3500
Link Speed (k/h)	50		50			50
Link Distance (m)	121.4		210.7			126.8
Travel Time (s)	8.7		15.2			9.1
Confl. Peds. (#/hr)	12			55	55	
Confl. Bikes (#/hr)				4		
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	0%	0%	1%	34%	0%	2%
Adj. Flow (vph)	5	17	414	3	7	815
Shared Lane Traffic (%)						
Lane Group Flow (vph)	22	0	417	0	0	822
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	33.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	4	15	360	3	6	709
Future Volume (Veh/h)	4	15	360	3	6	709
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	5	17	414	3	7	815
Pedestrians	55		12			
Lane Width (m)	3.5		3.5			
Walking Speed (m/s)	1.2		1.2			
Percent Blockage	4		1			
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	904	264			472	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	904	264			472	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	98			99	
cM capacity (veh/h)	263	708			1051	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	22	276	141	279	543
Volume Left	5	0	0	7	0
Volume Right	17	0	3	0	0
cSH	512	1700	1700	1051	1700
Volume to Capacity	0.04	0.16	0.08	0.01	0.32
Queue Length 95th (m)	1.1	0.0	0.0	0.2	0.0
Control Delay (s)	12.4	0.0	0.0	0.3	0.0
Lane LOS	B			A	
Approach Delay (s)	12.4	0.0		0.1	
Approach LOS	B				

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	33.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	2	6	13	2	59	10	1063	50	55	1000	36
Future Volume (vph)	16	2	6	13	2	59	10	1063	50	55	1000	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	15.0		0.0	15.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			0.0			0.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor												
Frt		0.964			0.892			0.993			0.995	
Flt Protected		0.968			0.991		0.950			0.950		
Satd. Flow (prot)	0	1753	0	0	1609	0	1785	4998	0	1785	4960	0
Flt Permitted		0.968			0.991		0.950			0.950		
Satd. Flow (perm)	0	1753	0	0	1609	0	1785	4998	0	1785	4960	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		101.1			74.8			121.1			92.4	
Travel Time (s)		7.3			5.4			7.3			5.5	
Confl. Peds. (#/hr)	10		4	4		10	311		368	368		311
Confl. Bikes (#/hr)									1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	4%	0%	2%	0%	0%	3%	0%
Adj. Flow (vph)	17	2	7	14	2	64	11	1155	54	60	1087	39
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	26	0	0	80	0	11	1209	0	60	1126	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane								Yes			Yes	
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	42.9%	ICU Level of Service A	
Analysis Period (min)	15		

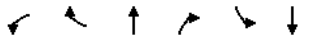
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	2	6	13	2	59	10	1063	50	55	1000	36
Future Volume (Veh/h)	16	2	6	13	2	59	10	1063	50	55	1000	36
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	2	7	14	2	64	11	1155	54	60	1087	39
Pedestrians		311			368			4			10	
Lane Width (m)		3.5			3.5			3.5			3.5	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		25			30			0			1	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	2020	3136	697	2066	3129	790	1437			1577		
vC1, stage 1 conf vol	1538	1538		1572	1572							
vC2, stage 2 conf vol	482	1599		494	1557							
vCu, unblocked vol	2020	3136	697	2066	3129	790	1437			1577		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	7.0	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	76	96	98	82	97	72	97			80		
cM capacity (veh/h)	70	46	289	76	69	229	358			297		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	26	80	11	462	462	285	60	435	435	256
Volume Left	17	14	11	0	0	0	60	0	0	0
Volume Right	7	64	0	0	0	54	0	0	0	39
cSH	83	162	358	1700	1700	1700	297	1700	1700	1700
Volume to Capacity	0.31	0.49	0.03	0.27	0.27	0.17	0.20	0.26	0.26	0.15
Queue Length 95th (m)	9.3	18.9	0.8	0.0	0.0	0.0	5.9	0.0	0.0	0.0
Control Delay (s)	66.6	46.9	15.4	0.0	0.0	0.0	20.2	0.0	0.0	0.0
Lane LOS	F	E	C				C			
Approach Delay (s)	66.6	46.9	0.1				1.0			
Approach LOS	F	E								

Intersection Summary				
Average Delay	2.7			
Intersection Capacity Utilization	42.9%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	30	18	12	31	3	3
Future Volume (vph)	30	18	12	31	3	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.950		0.903			
Flt Protected	0.970					0.976
Satd. Flow (prot)	1731	0	1697	0	0	1834
Flt Permitted	0.970					0.976
Satd. Flow (perm)	1731	0	1697	0	0	1834
Link Speed (k/h)	50		50			50
Link Distance (m)	101.1		124.8			121.4
Travel Time (s)	7.3		9.0			8.7
Confl. Peds. (#/hr)	8	6		28	28	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	37	22	15	38	4	4
Shared Lane Traffic (%)						
Lane Group Flow (vph)	59	0	53	0	0	8
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Stop			Stop

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	21.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	30	18	12	31	3	3
Future Volume (vph)	30	18	12	31	3	3
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	37	22	15	38	4	4

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	59	53	8
Volume Left (vph)	37	0	4
Volume Right (vph)	22	38	0
Hadj (s)	-0.10	-0.43	0.10
Departure Headway (s)	3.9	3.6	4.2
Degree Utilization, x	0.06	0.05	0.01
Capacity (veh/h)	899	971	844
Control Delay (s)	7.2	6.8	7.2
Approach Delay (s)	7.2	6.8	7.2
Approach LOS	A	A	A

Intersection Summary			
Delay	7.0		
Level of Service	A		
Intersection Capacity Utilization	21.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	5	26	642	0	1	586
Future Volume (vph)	5	26	642	0	1	586
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.886					
Flt Protected	0.992					
Satd. Flow (prot)	1651	0	3535	0	0	3500
Flt Permitted	0.992					
Satd. Flow (perm)	1651	0	3535	0	0	3500
Link Speed (k/h)	50		50			50
Link Distance (m)	121.4		210.7			126.8
Travel Time (s)	8.7		15.2			9.1
Confl. Peds. (#/hr)	2	3		38	38	
Confl. Bikes (#/hr)				2		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	1%	0%	0%	2%
Adj. Flow (vph)	5	27	676	0	1	617
Shared Lane Traffic (%)						
Lane Group Flow (vph)	32	0	676	0	0	618
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 28.7%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	26	642	0	1	586
Future Volume (Veh/h)	5	26	642	0	1	586
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	27	676	0	1	617
Pedestrians	38		2			3
Lane Width (m)	3.5		3.5			3.5
Walking Speed (m/s)	1.2		1.2			1.2
Percent Blockage	3		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1026	379			714	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1026	379			714	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	96			100	
cM capacity (veh/h)	226	604			868	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	32	451	225	207	411
Volume Left	5	0	0	1	0
Volume Right	27	0	0	0	0
cSH	479	1700	1700	868	1700
Volume to Capacity	0.07	0.27	0.13	0.00	0.24
Queue Length 95th (m)	1.7	0.0	0.0	0.0	0.0
Control Delay (s)	13.1	0.0	0.0	0.1	0.0
Lane LOS	B			A	
Approach Delay (s)	13.1	0.0		0.0	
Approach LOS	B				

Intersection Summary				
Average Delay		0.3		
Intersection Capacity Utilization		28.7%	ICU Level of Service	A
Analysis Period (min)		15		

APPENDIX

D-3 *2028 FUTURE TOTAL CONDITIONS*

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	0	21	7	3	20	11	1027	9	23	1147	25
Future Volume (vph)	32	0	21	7	3	20	11	1027	9	23	1147	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	15.0		0.0	15.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			0.0			0.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor												
Frt		0.946			0.910			0.999			0.997	
Flt Protected		0.971			0.988		0.950			0.950		
Satd. Flow (prot)	0	1726	0	0	1689	0	1785	4877	0	1785	4968	0
Flt Permitted		0.971			0.988		0.950			0.950		
Satd. Flow (perm)	0	1726	0	0	1689	0	1785	4877	0	1785	4968	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		101.1			74.8			121.1			92.4	
Travel Time (s)		7.3			5.4			7.3			5.5	
Confl. Peds. (#/hr)	2		1	1		2	108		127	127		108
Confl. Bikes (#/hr)												1
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	5%	12%	0%	3%	0%
Adj. Flow (vph)	36	0	24	8	3	22	12	1154	10	26	1289	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	60	0	0	33	0	12	1164	0	26	1317	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane								Yes			Yes	
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 36.6%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	32	0	21	7	3	20	11	1027	9	23	1147	25
Future Volume (Veh/h)	32	0	21	7	3	20	11	1027	9	23	1147	25
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	36	0	24	8	3	22	12	1154	10	26	1289	28
Pedestrians		108			127			1			2	
Lane Width (m)		3.5			3.5			3.5			3.5	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		9			10			0			0	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1897	2778	553	1817	2787	519	1425			1291		
vC1, stage 1 conf vol	1463	1463		1310	1310							
vC2, stage 2 conf vol	434	1315		507	1477							
vCu, unblocked vol	1897	2778	553	1817	2787	519	1425			1291		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	68	100	95	94	97	95	97			95		
cM capacity (veh/h)	113	116	440	139	117	454	441			488		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	60	33	12	462	462	241	26	516	516	286
Volume Left	36	8	12	0	0	0	26	0	0	0
Volume Right	24	22	0	0	0	10	0	0	0	28
cSH	161	251	441	1700	1700	1700	488	1700	1700	1700
Volume to Capacity	0.37	0.13	0.03	0.27	0.27	0.14	0.05	0.30	0.30	0.17
Queue Length 95th (m)	12.7	3.6	0.7	0.0	0.0	0.0	1.3	0.0	0.0	0.0
Control Delay (s)	40.0	21.5	13.4	0.0	0.0	0.0	12.8	0.0	0.0	0.0
Lane LOS	E	C	B				B			
Approach Delay (s)	40.0	21.5	0.1				0.2			
Approach LOS	E	C								

Intersection Summary				
Average Delay		1.4		
Intersection Capacity Utilization		36.6%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	19	26	5	11	27	6
Future Volume (vph)	19	26	5	11	27	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.922		0.908			
Flt Protected	0.979					0.960
Satd. Flow (prot)	1696	0	1706	0	0	1751
Flt Permitted	0.979					0.960
Satd. Flow (perm)	1696	0	1706	0	0	1751
Link Speed (k/h)	50		50			50
Link Distance (m)	101.1		124.8			66.2
Travel Time (s)	7.3		9.0			4.8
Confl. Peds. (#/hr)		6		26	26	
Confl. Bikes (#/hr)				1		
Peak Hour Factor	0.64	0.64	0.64	0.64	0.64	0.64
Heavy Vehicles (%)	0%	0%	0%	0%	0%	17%
Adj. Flow (vph)	30	41	8	17	42	9
Shared Lane Traffic (%)						
Lane Group Flow (vph)	71	0	25	0	0	51
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Stop			Stop

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	20.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	19	26	5	11	27	6
Future Volume (vph)	19	26	5	11	27	6
Peak Hour Factor	0.64	0.64	0.64	0.64	0.64	0.64
Hourly flow rate (vph)	30	41	8	17	42	9

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	71	25	51
Volume Left (vph)	30	0	42
Volume Right (vph)	41	17	0
Hadj (s)	-0.26	-0.41	0.22
Departure Headway (s)	3.8	3.7	4.3
Degree Utilization, x	0.07	0.03	0.06
Capacity (veh/h)	924	943	822
Control Delay (s)	7.1	6.8	7.6
Approach Delay (s)	7.1	6.8	7.6
Approach LOS	A	A	A

Intersection Summary				
Delay	7.2			
Level of Service	A			
Intersection Capacity Utilization	20.9%	ICU Level of Service	A	
Analysis Period (min)	15			

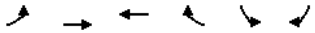
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	16	27	360	9	12	709
Future Volume (vph)	16	27	360	9	12	709
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.915		0.996			
Flt Protected	0.982					0.999
Satd. Flow (prot)	1688	0	3493	0	0	3498
Flt Permitted	0.982					0.999
Satd. Flow (perm)	1688	0	3493	0	0	3498
Link Speed (k/h)	50		50			50
Link Distance (m)	54.0		210.7			126.8
Travel Time (s)	3.9		15.2			9.1
Confl. Peds. (#/hr)	12			55	55	
Confl. Bikes (#/hr)				4		
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	0%	0%	1%	34%	0%	2%
Adj. Flow (vph)	18	31	414	10	14	815
Shared Lane Traffic (%)						
Lane Group Flow (vph)	49	0	424	0	0	829
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	38.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	16	27	360	9	12	709
Future Volume (Veh/h)	16	27	360	9	12	709
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	18	31	414	10	14	815
Pedestrians	55		12			
Lane Width (m)	3.5		3.5			
Walking Speed (m/s)	1.2		1.2			
Percent Blockage	4		1			
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	922	267			479	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	922	267			479	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	96			99	
cM capacity (veh/h)	255	704			1045	

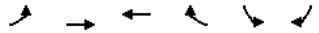
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	49	276	148	286	543
Volume Left	18	0	0	14	0
Volume Right	31	0	10	0	0
cSH	428	1700	1700	1045	1700
Volume to Capacity	0.11	0.16	0.09	0.01	0.32
Queue Length 95th (m)	3.1	0.0	0.0	0.3	0.0
Control Delay (s)	14.5	0.0	0.0	0.5	0.0
Lane LOS	B			A	
Approach Delay (s)	14.5	0.0		0.2	
Approach LOS	B				

Intersection Summary				
Average Delay	0.7			
Intersection Capacity Utilization	38.1%	ICU Level of Service	A	
Analysis Period (min)	15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	12	9	19	12	25	24
Future Volume (vph)	12	9	19	12	25	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.948		0.933	
Flt Protected		0.972			0.975	
Satd. Flow (prot)	0	1826	1781	0	1709	0
Flt Permitted		0.972			0.975	
Satd. Flow (perm)	0	1826	1781	0	1709	0
Link Speed (k/h)		50	50		40	
Link Distance (m)		54.0	66.2		40.4	
Travel Time (s)		3.9	4.8		3.6	
Peak Hour Factor	0.64	0.64	0.64	0.64	0.64	0.64
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	19	14	30	19	39	38
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	33	49	0	77	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 17.8%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	12	9	19	12	25	24
Future Volume (Veh/h)	12	9	19	12	25	24
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.64	0.64	0.64	0.64	0.64	0.64
Hourly flow rate (vph)	19	14	30	19	39	38
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	49				92	40
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	49				92	40
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				96	96
cM capacity (veh/h)	1571				903	1038

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	33	49	77
Volume Left	19	0	39
Volume Right	0	19	38
cSH	1571	1700	965
Volume to Capacity	0.01	0.03	0.08
Queue Length 95th (m)	0.3	0.0	2.1
Control Delay (s)	4.3	0.0	9.1
Lane LOS	A		A
Approach Delay (s)	4.3	0.0	9.1
Approach LOS			A

Intersection Summary			
Average Delay	5.3		
Intersection Capacity Utilization	17.8%	ICU Level of Service	A
Analysis Period (min)	15		

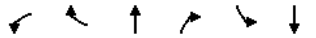
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	2	13	13	2	59	25	1063	50	55	1000	46
Future Volume (vph)	21	2	13	13	2	59	25	1063	50	55	1000	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	15.0		0.0	15.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			0.0			0.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor												
Frt		0.952			0.892			0.993			0.993	
Flt Protected		0.971			0.991		0.950			0.950		
Satd. Flow (prot)	0	1737	0	0	1609	0	1785	4998	0	1785	4951	0
Flt Permitted		0.971			0.991		0.950			0.950		
Satd. Flow (perm)	0	1737	0	0	1609	0	1785	4998	0	1785	4951	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		101.1			74.8			121.1			92.4	
Travel Time (s)		7.3			5.4			7.3			5.5	
Confl. Peds. (#/hr)	10		4	4		10	311		368	368		311
Confl. Bikes (#/hr)									1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	4%	0%	2%	0%	0%	3%	0%
Adj. Flow (vph)	23	2	14	14	2	64	27	1155	54	60	1087	50
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	39	0	0	80	0	27	1209	0	60	1137	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane								Yes			Yes	
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	43.0%	ICU Level of Service A	
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	2	13	13	2	59	25	1063	50	55	1000	46
Future Volume (Veh/h)	21	2	13	13	2	59	25	1063	50	55	1000	46
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	23	2	14	14	2	64	27	1155	54	60	1087	50
Pedestrians		311			368			4			10	
Lane Width (m)		3.5			3.5			3.5			3.5	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		25			30			0			1	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	2057	3174	702	2105	3172	790	1448			1577		
vC1, stage 1 conf vol	1543	1543		1604	1604							
vC2, stage 2 conf vol	514	1631		501	1568							
vCu, unblocked vol	2057	3174	702	2105	3172	790	1448			1577		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	7.0	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	66	95	95	80	97	72	92			80		
cM capacity (veh/h)	69	40	287	69	59	229	355			297		

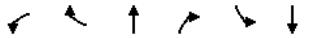
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	39	80	27	462	462	285	60	435	435	267
Volume Left	23	14	27	0	0	0	60	0	0	0
Volume Right	14	64	0	0	0	54	0	0	0	50
cSH	90	155	355	1700	1700	1700	297	1700	1700	1700
Volume to Capacity	0.43	0.52	0.08	0.27	0.27	0.17	0.20	0.26	0.26	0.16
Queue Length 95th (m)	14.4	20.1	2.0	0.0	0.0	0.0	5.9	0.0	0.0	0.0
Control Delay (s)	73.0	50.6	16.0	0.0	0.0	0.0	20.2	0.0	0.0	0.0
Lane LOS	F	F	C				C			
Approach Delay (s)	73.0	50.6	0.3				1.0			
Approach LOS	F	F								

Intersection Summary				
Average Delay	3.3			
Intersection Capacity Utilization	43.0%	ICU Level of Service	A	
Analysis Period (min)	15			



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	30	43	12	31	15	3
Future Volume (vph)	30	43	12	31	15	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.921		0.903			
Flt Protected	0.980					0.961
Satd. Flow (prot)	1696	0	1697	0	0	1806
Flt Permitted	0.980					0.961
Satd. Flow (perm)	1696	0	1697	0	0	1806
Link Speed (k/h)	50		50			50
Link Distance (m)	101.1		124.8			68.8
Travel Time (s)	7.3		9.0			5.0
Confl. Peds. (#/hr)	8	6		28	28	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	37	52	15	38	18	4
Shared Lane Traffic (%)						
Lane Group Flow (vph)	89	0	53	0	0	22
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Stop			Stop

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	22.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	30	43	12	31	15	3
Future Volume (vph)	30	43	12	31	15	3
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	37	52	15	38	18	4

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	89	53	22
Volume Left (vph)	37	0	18
Volume Right (vph)	52	38	0
Hadj (s)	-0.27	-0.43	0.16
Departure Headway (s)	3.8	3.7	4.3
Degree Utilization, x	0.09	0.05	0.03
Capacity (veh/h)	928	945	816
Control Delay (s)	7.2	6.9	7.4
Approach Delay (s)	7.2	6.9	7.4
Approach LOS	A	A	A

Intersection Summary			
Delay	7.1		
Level of Service	A		
Intersection Capacity Utilization	22.7%	ICU Level of Service	A
Analysis Period (min)	15		

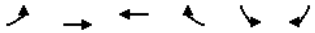
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	9	34	642	7	18	586
Future Volume (vph)	9	34	642	7	18	586
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.892		0.998			
Flt Protected	0.990					0.999
Satd. Flow (prot)	1659	0	3528	0	0	3498
Flt Permitted	0.990					0.999
Satd. Flow (perm)	1659	0	3528	0	0	3498
Link Speed (k/h)	50		50			50
Link Distance (m)	51.6		210.7			126.8
Travel Time (s)	3.7		15.2			9.1
Confl. Peds. (#/hr)	2	3		38	38	
Confl. Bikes (#/hr)				2		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	1%	0%	0%	2%
Adj. Flow (vph)	9	36	676	7	19	617
Shared Lane Traffic (%)						
Lane Group Flow (vph)	45	0	683	0	0	636
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	40.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	9	34	642	7	18	586
Future Volume (Veh/h)	9	34	642	7	18	586
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	9	36	676	7	19	617
Pedestrians	38		2			3
Lane Width (m)	3.5		3.5			3.5
Walking Speed (m/s)	1.2		1.2			1.2
Percent Blockage	3		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1066	382			721	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1066	382			721	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	94			98	
cM capacity (veh/h)	209	601			863	

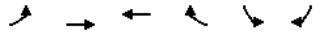
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	45	451	232	225	411
Volume Left	9	0	0	19	0
Volume Right	36	0	7	0	0
cSH	437	1700	1700	863	1700
Volume to Capacity	0.10	0.27	0.14	0.02	0.24
Queue Length 95th (m)	2.7	0.0	0.0	0.5	0.0
Control Delay (s)	14.2	0.0	0.0	1.0	0.0
Lane LOS	B			A	
Approach Delay (s)	14.2	0.0		0.4	
Approach LOS	B				

Intersection Summary				
Average Delay		0.6		
Intersection Capacity Utilization		40.2%	ICU Level of Service	A
Analysis Period (min)		15		



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	24	1	31	25	12	12
Future Volume (vph)	24	1	31	25	12	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.940		0.932	
Flt Protected		0.954			0.976	
Satd. Flow (prot)	0	1792	1766	0	1709	0
Flt Permitted		0.954			0.976	
Satd. Flow (perm)	0	1792	1766	0	1709	0
Link Speed (k/h)		50	50		40	
Link Distance (m)		51.6	68.8		39.7	
Travel Time (s)		3.7	5.0		3.6	
Confl. Peds. (#/hr)	3			3		
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	29	1	38	30	15	15
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	30	68	0	30	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 18.0%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	24	1	31	25	12	12
Future Volume (Veh/h)	24	1	31	25	12	12
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	29	1	38	30	15	15
Pedestrians					3	
Lane Width (m)					3.5	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	71				115	56
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	71				115	56
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				98	99
cM capacity (veh/h)	1538				867	1014

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	30	68	30
Volume Left	29	0	15
Volume Right	0	30	15
cSH	1538	1700	935
Volume to Capacity	0.02	0.04	0.03
Queue Length 95th (m)	0.5	0.0	0.8
Control Delay (s)	7.1	0.0	9.0
Lane LOS	A		A
Approach Delay (s)	7.1	0.0	9.0
Approach LOS			A

Intersection Summary			
Average Delay	3.8		
Intersection Capacity Utilization	18.0%	ICU Level of Service	A
Analysis Period (min)	15		

APPENDIX

E TRAFFIC GROWTH CALCULATIONS

City of Toronto - Traffic Data Centre & Safety Bureau

24-Hour Count Summary Report

DREWRY AVE		STAT CODE	ARTERY CODE	COUNT DATE	AM PEAK	AM PEAK HOUR	PM PEAK	PM PEAK HOUR	OFF HOUR PEAK	OFF HOUR PEAK HOUR	24 HOUR Total
Eastbound	**Category: 24 HOUR**										
DREWRY AVE E/B W OF YONGE ST		22097	22097	10/21/03 Tue	438	08:15 - 09:15	445	17:30 - 18:30	314	14:30 - 15:30	5,039
DREWRY AVE E/B W OF YONGE ST		22097	22097	10/22/03 Wed	405	08:30 - 09:30	468	17:15 - 18:15	345	11:30 - 12:30	5,197
DREWRY AVE E/B W OF YONGE ST		22097	22097	10/23/03 Thu	370	08:15 - 09:15	481	16:45 - 17:45	367	14:30 - 15:30	5,295
DREWRY AVE E/B W OF YONGE ST		22097	22097	11/23/04 Tue	368	07:45 - 08:45	378	15:30 - 16:30	334	14:30 - 15:30	4,649
DREWRY AVE E/B W OF YONGE ST		22097	22097	11/24/04 Wed	351	08:00 - 09:00	368	15:00 - 16:00	346	14:30 - 15:30	4,558
DREWRY AVE E/B W OF YONGE ST		22097	22097	11/25/04 Thu	315	08:15 - 09:15	393	15:00 - 16:00	361	14:30 - 15:30	4,664
DREWRY AVE E/B W OF YONGE ST		22097	22097	10/18/06 Wed	438	08:00 - 09:00	429	14:45 - 15:45	413	14:30 - 15:30	5,050
DREWRY AVE E/B W OF YONGE ST		22097	22097	10/19/06 Thu	695	08:15 - 09:15	499	17:30 - 18:30	358	14:30 - 15:30	5,513
DREWRY AVE E/B W OF YONGE ST		22097	22097	10/20/06 Fri	517	08:00 - 09:00	573	17:00 - 18:00	408	14:30 - 15:30	5,559
DREWRY AVE E/B W OF YONGE ST		22097	22097	10/21/06 Sat	273	09:15 - 10:15	336	14:45 - 15:45	352	14:30 - 15:30	4,191
DREWRY AVE E/B W OF YONGE ST		22097	22097	10/22/06 Sun	157	09:15 - 10:15	305	15:15 - 16:15	342	13:30 - 14:30	3,605
DREWRY AVE E/B W OF YONGE ST		22097	22097	10/23/06 Mon	510	08:00 - 09:00	449	16:30 - 17:30	410	14:30 - 15:30	5,596
DREWRY AVE E/B W OF YONGE ST		22097	22097	10/24/06 Tue	542	08:00 - 09:00	456	15:45 - 16:45	418	14:30 - 15:30	5,585
DREWRY AVE E/B W OF YONGE ST		22097	22097	10/25/06 Wed	442	08:15 - 09:15	453	17:30 - 18:30	378	14:30 - 15:30	5,169
DREWRY AVE E/B W OF YONGE ST		22097	22097	5/12/09 Tue	415	08:15 - 09:15	471	16:15 - 17:15	380	14:30 - 15:30	4,901
DREWRY AVE E/B W OF YONGE ST		22097	22097	5/13/09 Wed	390	08:00 - 09:00	444	15:00 - 16:00	402	14:30 - 15:30	4,787
DREWRY AVE E/B W OF YONGE ST		22097	22097	5/14/09 Thu	395	08:15 - 09:15	423	15:00 - 16:00	371	14:30 - 15:30	4,819
DREWRY AVE E/B W OF YONGE ST		22097	22097	5/12/15 Tue	402	08:30 - 09:30	477	15:15 - 16:15	434	14:30 - 15:30	5,393
DREWRY AVE E/B W OF YONGE ST		22097	22097	5/13/15 Wed	387	08:15 - 09:15	474	16:45 - 17:45	417	14:30 - 15:30	5,268
DREWRY AVE E/B W OF YONGE ST		22097	22097	5/14/15 Thu	390	08:00 - 09:00	467	14:45 - 15:45	432	14:30 - 15:30	5,303
				Eastbound Total:	8,200		8,789		7,582		100,141
				Eastbound Average:	410		439		379		5,007
Northbound	**Category: 24 HOUR**										
YONGE ST N/B S OF CUMMER AVE		1846	1846	5/6/93 Thu	1,571	08:00 - 09:00	2,376	17:00 - 18:00	1,905	18:45 - 19:45	28,851
YONGE ST N/B S OF CUMMER AVE		1846	1846	7/9/96 Tue	1,307	08:00 - 09:00	2,099	16:30 - 17:30	1,947	18:45 - 19:45	26,677
YONGE ST N/B S OF CUMMER AVE		1846	1846	5/9/02 Thu	1,721	08:15 - 09:15	2,275	17:30 - 18:30	2,125	19:00 - 20:00	29,079
YONGE ST N/B S OF CUMMER AVE		1846	1846	5/10/02 Fri	1,668	08:30 - 09:30	2,435	16:45 - 17:45	2,124	19:00 - 20:00	30,465
YONGE ST N/B S OF CUMMER AVE		1846	1846	5/11/02 Sat	1,108	08:30 - 09:30	1,890	17:00 - 18:00	1,939	14:00 - 15:00	27,890
YONGE ST N/B S OF CUMMER AVE		1846	1846	5/12/02 Sun	695	08:30 - 09:30	1,242	15:30 - 16:30	1,401	19:00 - 20:00	21,331
YONGE ST N/B S OF CUMMER AVE		1846	1846	5/13/02 Mon	1,664	08:15 - 09:15	2,405	17:00 - 18:00	1,940	19:00 - 20:00	27,453
YONGE ST N/B S OF CUMMER AVE		1846	1846	5/14/02 Tue	1,748	08:30 - 09:30	2,362	16:45 - 17:45	2,017	19:00 - 20:00	28,244

Printed On: 02 Mar, 2020 11:38:11AM

City of Toronto - Traffic Data Centre & Safety Bureau

24-Hour Count Summary Report

YONGE ST	STAT CODE	ARTERY CODE	COUNT DATE	AM PEAK	AM PEAK HOUR	PM PEAK	PM PEAK HOUR	OFF HOUR PEAK	OFF HOUR PEAK HOUR	24 HOUR Total
YONGE ST N/B S OF CUMMER AVE	1846	1846	7/19/02 Fri	1,620	09:00 - 10:00	2,565	17:30 - 18:30	1,944	13:30 - 14:30	31,842
YONGE ST N/B S OF CUMMER AVE	1846	1846	7/20/02 Sat	875	09:15 - 10:15	2,184	17:15 - 18:15	1,764	13:15 - 14:15	26,440
YONGE ST N/B S OF CUMMER AVE	1846	1846	7/21/02 Sun	416	09:15 - 10:15	1,488	16:00 - 17:00	1,567	13:45 - 14:45	22,630
YONGE ST N/B S OF CUMMER AVE	1846	1846	8/10/02 Sat	1,104	09:15 - 10:15	1,497	15:00 - 16:00	1,601	13:15 - 14:15	24,064
YONGE ST N/B S OF CUMMER AVE	1846	1846	8/11/02 Sun	639	09:15 - 10:15	1,432	16:15 - 17:15	1,478	12:45 - 13:45	20,748
YONGE ST N/B S OF CUMMER AVE	1846	1846	8/12/02 Mon	1,428	08:15 - 09:15	2,283	17:30 - 18:30	1,484	12:15 - 13:15	25,882
YONGE ST N/B S OF CUMMER AVE	1846	1846	10/21/03 Tue	1,626	08:00 - 09:00	2,166	16:45 - 17:45	1,642	14:30 - 15:30	27,313
YONGE ST N/B S OF CUMMER AVE	1846	1846	10/22/03 Wed	1,582	08:15 - 09:15	2,217	17:00 - 18:00	1,614	14:30 - 15:30	26,714
YONGE ST N/B S OF CUMMER AVE	1846	1846	10/23/03 Thu	1,585	08:00 - 09:00	2,167	16:45 - 17:45	1,699	14:30 - 15:30	27,285
YONGE ST N/B S OF CUMMER AVE	1846	1846	12/9/03 Tue	1,698	08:00 - 09:00	2,303	16:45 - 17:45	1,673	12:15 - 13:15	27,802
YONGE ST N/B S OF CUMMER AVE	1846	1846	12/10/03 Wed	1,623	08:00 - 09:00	2,083	17:15 - 18:15	1,687	11:15 - 12:15	27,914
YONGE ST N/B S OF CUMMER AVE	1846	1846	12/11/03 Thu	1,683	08:15 - 09:15	1,806	15:45 - 16:45	1,726	11:45 - 12:45	27,038
YONGE ST N/B S OF CUMMER AVE	1846	1846	2/15/06 Wed	1,763	08:00 - 09:00	2,357	16:45 - 17:45	1,612	12:00 - 13:00	28,650
YONGE ST N/B S OF CUMMER AVE	1846	1846	2/16/06 Thu	1,770	08:00 - 09:00	2,267	17:00 - 18:00	1,607	14:30 - 15:30	27,323
YONGE ST N/B S OF CUMMER AVE	1846	1846	2/17/06 Fri	1,792	08:00 - 09:00	2,389	17:00 - 18:00	1,779	14:30 - 15:30	29,919
YONGE ST N/B S OF CUMMER AVE	1846	1846	2/18/06 Sat	1,403	09:15 - 10:15	1,944	16:45 - 17:45	1,991	12:15 - 13:15	27,953
YONGE ST N/B S OF CUMMER AVE	1846	1846	2/19/06 Sun	836	09:15 - 10:15	1,715	16:45 - 17:45	1,846	13:15 - 14:15	23,145
YONGE ST N/B S OF CUMMER AVE	1846	1846	2/20/06 Mon	1,659	08:00 - 09:00	2,201	17:15 - 18:15	1,706	14:30 - 15:30	27,654
YONGE ST N/B S OF CUMMER AVE	1846	1846	2/21/06 Tue	1,775	08:00 - 09:00	2,364	16:45 - 17:45	1,701	14:30 - 15:30	28,904
YONGE ST N/B S OF CUMMER AVE	1846	1846	10/18/06 Wed	1,697	07:45 - 08:45	2,091	16:45 - 17:45	1,641	14:30 - 15:30	27,722
YONGE ST N/B S OF CUMMER AVE	1846	1846	10/19/06 Thu	1,640	08:00 - 09:00	2,120	16:30 - 17:30	1,684	14:30 - 15:30	28,265
YONGE ST N/B S OF CUMMER AVE	1846	1846	10/20/06 Fri	1,594	08:00 - 09:00	2,051	17:15 - 18:15	1,761	14:30 - 15:30	28,958
YONGE ST N/B S OF CUMMER AVE	1846	1846	10/21/06 Sat	1,410	09:15 - 10:15	1,816	17:00 - 18:00	1,909	13:15 - 14:15	28,932
YONGE ST N/B S OF CUMMER AVE	1846	1846	10/22/06 Sun	819	09:15 - 10:15	1,740	15:45 - 16:45	1,764	14:15 - 15:15	24,042
YONGE ST N/B S OF CUMMER AVE	1846	1846	10/23/06 Mon	1,610	08:00 - 09:00	2,161	16:45 - 17:45	1,750	14:30 - 15:30	27,540
YONGE ST N/B S OF CUMMER AVE	1846	1846	10/24/06 Tue	1,650	08:00 - 09:00	2,132	17:30 - 18:30	1,710	14:30 - 15:30	27,895
YONGE ST N/B S OF CUMMER AVE	1846	1846	10/25/06 Wed	1,631	08:00 - 09:00	2,130	16:15 - 17:15	1,755	14:30 - 15:30	27,807
YONGE ST N/B S OF CUMMER AVE	1846	1846	4/3/07 Tue	1,587	08:00 - 09:00	2,221	16:45 - 17:45	1,632	14:30 - 15:30	27,281
YONGE ST N/B S OF CUMMER AVE	1846	1846	4/4/07 Wed	1,636	08:00 - 09:00	2,115	17:00 - 18:00	1,599	14:30 - 15:30	26,846
YONGE ST N/B S OF CUMMER AVE	1846	1846	4/5/07 Thu	1,514	08:15 - 09:15	2,068	17:00 - 18:00	1,698	14:30 - 15:30	27,850
YONGE ST N/B S OF CUMMER AVE	1846	1846	11/2/10 Tue	1,337	08:30 - 09:30	1,747	17:15 - 18:15	1,451	14:30 - 15:30	24,125
YONGE ST N/B S OF CUMMER AVE	1846	1846	11/3/10 Wed	1,323	08:00 - 09:00	1,652	16:15 - 17:15	1,363	12:00 - 13:00	23,098
YONGE ST N/B S OF CUMMER AVE	1846	1846	11/4/10 Thu	1,387	08:00 - 09:00	1,765	16:45 - 17:45	1,521	14:15 - 15:15	24,129

City of Toronto - Traffic Data Centre & Safety Bureau

24-Hour Count Summary Report

YONGE ST	STAT CODE	ARTERY CODE	COUNT DATE	AM PEAK	AM PEAK HOUR	PM PEAK	PM PEAK HOUR	OFF HOUR PEAK	OFF HOUR PEAK HOUR	24 HOUR Total
YONGE ST N/B S OF CUMMER AVE	1846	1846	10/9/12 Tue	1,719	08:15 - 09:15	2,253	16:00 - 17:00	1,756	14:30 - 15:30	29,159
YONGE ST N/B S OF CUMMER AVE	1846	1846	10/10/12 Wed	1,708	08:00 - 09:00	2,300	17:15 - 18:15	1,803	14:30 - 15:30	29,137
YONGE ST N/B S OF CUMMER AVE	1846	1846	10/11/12 Thu	1,708	08:00 - 09:00	2,286	17:00 - 18:00	1,834	14:30 - 15:30	29,590
			Northbound Total:	64,329		91,160		76,150		1,191,586
			Northbound Average:	1,462		2,072		1,731		27,082
Southbound	**Category: 24 HOUR**									
YONGE ST S/B N OF DREWRY AVE	1850	1850	5/6/93 Thu	2,758	07:30 - 08:30	1,740	16:45 - 17:45	1,581	13:30 - 14:30	28,368
YONGE ST S/B N OF DREWRY AVE	1850	1850	7/9/96 Tue	2,336	07:30 - 08:30	1,496	17:00 - 18:00	1,526	12:30 - 13:30	26,062
YONGE ST S/B N OF DREWRY AVE	1850	1850	10/17/00 Tue	2,050	07:15 - 08:15	1,362	17:15 - 18:15	1,192	12:00 - 13:00	21,437
YONGE ST S/B N OF DREWRY AVE	1850	1850	10/18/00 Wed	2,070	07:15 - 08:15	1,434	17:00 - 18:00	1,219	19:00 - 20:00	22,187
YONGE ST S/B N OF DREWRY AVE	1850	1850	10/19/00 Thu	2,107	07:15 - 08:15	1,414	17:30 - 18:30	1,300	19:00 - 20:00	22,503
YONGE ST S/B N OF DREWRY AVE	1850	1850	10/20/00 Fri	2,135	07:15 - 08:15	1,440	17:30 - 18:30	1,269	13:00 - 14:00	23,275
YONGE ST S/B N OF DREWRY AVE	1850	1850	10/21/00 Sat	924	08:30 - 09:30	1,485	17:30 - 18:30	1,393	13:00 - 14:00	20,461
YONGE ST S/B N OF DREWRY AVE	1850	1850	10/22/00 Sun	445	08:30 - 09:30	1,342	16:15 - 17:15	1,198	14:00 - 15:00	15,301
YONGE ST S/B S OF CUMMER AVE	13878	13878	5/8/02 Wed	2,782	07:45 - 08:45	1,723	17:30 - 18:30	1,516	19:00 - 20:00	28,159
YONGE ST S/B S OF CUMMER AVE	13878	13878	5/9/02 Thu	2,723	07:45 - 08:45	1,722	17:30 - 18:30	1,559	19:00 - 20:00	27,525
YONGE ST S/B S OF CUMMER AVE	13878	13878	5/10/02 Fri	2,649	08:00 - 09:00	1,779	17:30 - 18:30	1,673	14:00 - 15:00	29,803
YONGE ST S/B S OF CUMMER AVE	13878	13878	5/11/02 Sat	1,055	08:30 - 09:30	1,780	15:45 - 16:45	1,749	13:00 - 14:00	26,066
YONGE ST S/B S OF CUMMER AVE	13878	13878	5/12/02 Sun	456	08:30 - 09:30	1,770	16:45 - 17:45	1,664	14:00 - 15:00	21,344
YONGE ST S/B S OF CUMMER AVE	13878	13878	5/13/02 Mon	2,684	07:45 - 08:45	1,724	17:15 - 18:15	1,488	14:00 - 15:00	27,083
YONGE ST S/B S OF CUMMER AVE	13878	13878	5/14/02 Tue	2,878	07:45 - 08:45	1,777	17:30 - 18:30	1,571	10:00 - 11:00	28,626
YONGE ST S/B S OF CUMMER AVE	13878	13878	10/21/03 Tue	2,648	07:30 - 08:30	1,747	17:00 - 18:00	1,545	09:30 - 10:30	27,897
YONGE ST S/B S OF CUMMER AVE	13878	13878	10/22/03 Wed	2,685	07:30 - 08:30	1,737	17:15 - 18:15	1,531	12:45 - 13:45	28,098
YONGE ST S/B S OF CUMMER AVE	13878	13878	10/23/03 Thu	2,726	07:30 - 08:30	1,762	17:30 - 18:30	1,540	12:45 - 13:45	28,563
YONGE ST S/B N OF DREWRY AVE	1850	1850	12/9/03 Tue	2,655	07:30 - 08:30	1,738	17:15 - 18:15	1,605	13:30 - 14:30	28,403
YONGE ST S/B N OF DREWRY AVE	1850	1850	12/10/03 Wed	2,704	07:45 - 08:45	1,806	17:00 - 18:00	1,663	14:15 - 15:15	28,396
YONGE ST S/B N OF DREWRY AVE	1850	1850	12/11/03 Thu	2,562	07:30 - 08:30	1,833	17:00 - 18:00	1,655	13:30 - 14:30	28,522
YONGE ST S/B S OF CUMMER AVE	13878	13878	10/18/06 Wed	2,770	07:45 - 08:45	1,679	17:30 - 18:30	1,523	12:15 - 13:15	28,162
YONGE ST S/B S OF CUMMER AVE	13878	13878	10/19/06 Thu	2,537	07:30 - 08:30	1,786	17:15 - 18:15	1,506	12:30 - 13:30	28,256
YONGE ST S/B S OF CUMMER AVE	13878	13878	10/20/06 Fri	2,587	07:30 - 08:30	1,890	17:30 - 18:30	1,631	14:30 - 15:30	29,580
YONGE ST S/B S OF CUMMER AVE	13878	13878	10/21/06 Sat	1,280	09:15 - 10:15	1,964	17:30 - 18:30	1,880	13:15 - 14:15	28,054
YONGE ST S/B S OF CUMMER AVE	13878	13878	10/22/06 Sun	786	09:15 - 10:15	1,790	16:00 - 17:00	1,741	14:15 - 15:15	22,635

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City of Toronto - Traffic Data Centre & Safety Bureau

24-Hour Count Summary Report

YONGE ST	STAT CODE	ARTERY CODE	COUNT DATE	AM PEAK	AM PEAK HOUR	PM PEAK	PM PEAK HOUR	OFF HOUR PEAK	OFF HOUR PEAK HOUR	24 HOUR Total
YONGE ST S/B S OF CUMMER AVE	13878	13878	10/23/06 Mon	2,686	07:30 - 08:30	1,663	17:15 - 18:15	1,491	14:30 - 15:30	27,859
YONGE ST S/B S OF CUMMER AVE	13878	13878	10/24/06 Tue	2,770	07:30 - 08:30	1,788	17:30 - 18:30	1,576	14:30 - 15:30	28,805
YONGE ST S/B S OF CUMMER AVE	13878	13878	10/25/06 Wed	2,740	07:30 - 08:30	1,746	17:30 - 18:30	1,580	13:30 - 14:30	29,118
YONGE ST S/B N OF DREWRY AVE	1850	1850	4/3/07 Tue	2,075	07:45 - 08:45	1,906	17:15 - 18:15	1,480	12:30 - 13:30	25,687
YONGE ST S/B N OF DREWRY AVE	1850	1850	4/4/07 Wed	2,174	08:15 - 09:15	1,646	17:15 - 18:15	1,465	12:30 - 13:30	25,564
YONGE ST S/B N OF DREWRY AVE	1850	1850	4/5/07 Thu	2,015	08:00 - 09:00	1,800	17:30 - 18:30	1,578	14:15 - 15:15	27,760
YONGE ST S/B N OF DREWRY AVE	1850	1850	9/11/09 Fri	2,404	07:30 - 08:30	2,010	17:30 - 18:30	1,516	12:30 - 13:30	29,210
YONGE ST S/B S OF CUMMER AVE	13878	13878	9/11/09 Fri	1,382	08:15 - 09:15	1,847	17:00 - 18:00	1,527	14:30 - 15:30	25,238
YONGE ST S/B N OF DREWRY AVE	1850	1850	9/12/09 Sat	1,177	09:15 - 10:15	1,839	17:30 - 18:30	1,854	14:30 - 15:30	26,481
YONGE ST S/B S OF CUMMER AVE	13878	13878	9/12/09 Sat	1,094	09:15 - 10:15	1,549	16:15 - 17:15	1,659	12:30 - 13:30	23,456
YONGE ST S/B N OF DREWRY AVE	1850	1850	9/13/09 Sun	816	09:15 - 10:15	1,704	16:15 - 17:15	1,642	14:15 - 15:15	21,850
YONGE ST S/B S OF CUMMER AVE	13878	13878	9/13/09 Sun	748	09:15 - 10:15	1,470	15:30 - 16:30	1,427	12:15 - 13:15	19,645
YONGE ST S/B N OF DREWRY AVE	1850	1850	9/14/09 Mon	2,379	07:30 - 08:30	1,726	17:00 - 18:00	1,456	14:30 - 15:30	27,024
YONGE ST S/B S OF CUMMER AVE	13878	13878	9/14/09 Mon	1,223	08:00 - 09:00	1,774	16:00 - 17:00	1,474	14:30 - 15:30	22,988
YONGE ST S/B N OF DREWRY AVE	1850	1850	9/15/09 Tue	2,389	07:30 - 08:30	1,891	17:15 - 18:15	1,546	13:30 - 14:30	28,253
YONGE ST S/B S OF CUMMER AVE	13878	13878	9/15/09 Tue	1,347	07:45 - 08:45	1,729	17:00 - 18:00	1,458	11:15 - 12:15	23,771
YONGE ST S/B N OF DREWRY AVE	1850	1850	9/16/09 Wed	2,324	08:00 - 09:00	1,953	17:30 - 18:30	1,559	12:45 - 13:45	28,275
YONGE ST S/B S OF CUMMER AVE	13878	13878	9/16/09 Wed	1,250	08:00 - 09:00	1,895	16:15 - 17:15	1,456	14:30 - 15:30	23,769
YONGE ST S/B N OF DREWRY AVE	1850	1850	9/17/09 Thu	2,435	07:30 - 08:30	1,819	17:00 - 18:00	1,512	12:30 - 13:30	28,691
YONGE ST S/B S OF CUMMER AVE	13878	13878	9/17/09 Thu	1,485	08:00 - 09:00	1,859	15:30 - 16:30	1,520	14:30 - 15:30	25,397
YONGE ST S/B S OF CUMMER AVE	13878	13878	11/2/10 Tue	2,169	08:30 - 09:30	1,604	17:15 - 18:15	1,445	09:30 - 10:30	23,367
YONGE ST S/B S OF CUMMER AVE	13878	13878	11/3/10 Wed	2,352	07:30 - 08:30	1,567	17:00 - 18:00	1,317	12:30 - 13:30	24,863
YONGE ST S/B S OF CUMMER AVE	13878	13878	11/4/10 Thu	2,186	07:45 - 08:45	1,527	17:00 - 18:00	1,391	14:30 - 15:30	25,259
YONGE ST S/B N OF DREWRY AVE	1850	1850	10/9/12 Tue	2,304	07:45 - 08:45	1,881	17:15 - 18:15	1,608	09:30 - 10:30	28,164
YONGE ST S/B N OF DREWRY AVE	1850	1850	10/10/12 Wed	2,337	07:45 - 08:45	1,766	17:00 - 18:00	1,583	09:30 - 10:30	28,094
YONGE ST S/B N OF DREWRY AVE	1850	1850	10/11/12 Thu	2,204	08:00 - 09:00	1,903	17:30 - 18:30	1,698	14:15 - 15:15	29,175
			Southbound Total:	106,457		89,582		79,536		1,352,529
			Southbound Average:	2,047		1,723		1,530		26,010
YONGE ST				178,986		189,531		163,268		2,644,256

Comment:

Printed On: 02 Mar, 2020 11:38:11AM

Northbound						
YONGE	ST	N/B	2/15/2006	Wed	28650	
YONGE	ST	N/B	2/16/2006	Thu	27323	
YONGE	ST	N/B	2/17/2006	Fri	29919	
YONGE	ST	N/B	2/18/2006	Sat	27953	
YONGE	ST	N/B	2/19/2006	Sun	23145	
YONGE	ST	N/B	2/20/2006	Mon	27654	
YONGE	ST	N/B	2/21/2006	Tue	28904	
YONGE	ST	N/B	10/18/2006	Wed	27722	
YONGE	ST	N/B	10/19/2006	Thu	28265	
YONGE	ST	N/B	10/20/2006	Fri	28958	
YONGE	ST	N/B	10/21/2006	Sat	28932	
YONGE	ST	N/B	10/22/2006	Sun	24042	
YONGE	ST	N/B	10/23/2006	Mon	27540	
YONGE	ST	N/B	10/24/2006	Tue	27895	
YONGE	ST	N/B	10/25/2006	Wed	27807	28240
YONGE	ST	N/B	4/3/2007	Tue	27281	
YONGE	ST	N/B	4/4/2007	Wed	26846	
YONGE	ST	N/B	4/5/2007	Thu	27850	
YONGE	ST	N/B	11/2/2010	Tue	24125	
YONGE	ST	N/B	11/3/2010	Wed	23098	
YONGE	ST	N/B	11/4/2010	Thu	24129	
YONGE	ST	N/B	10/9/2012	Tue	29159	
YONGE	ST	N/B	10/10/2012	Wed	29137	
YONGE	ST	N/B	10/11/2012	Thu	29590	29295
					2006-2012	**0.62%**

Southbound						
YONGE	ST	10/18/2006	Wed	28162		
YONGE	ST	10/19/2006	Thu	28256		
YONGE	ST	10/20/2006	Fri	29580		
YONGE	ST	10/21/2006	Sat	28054		
YONGE	ST	10/22/2006	Sun	22635		
YONGE	ST	10/23/2006	Mon	27859		
YONGE	ST	10/24/2006	Tue	28805		
YONGE	ST	10/25/2006	Wed	29118	28630	2006
YONGE	ST	4/3/2007	Tue	25687		
YONGE	ST	4/4/2007	Wed	25564		
YONGE	ST	4/5/2007	Thu	27760		
YONGE	ST	9/11/2009	Fri	29210		
YONGE	ST	9/11/2009	Fri	25238		
YONGE	ST	9/12/2009	Sat	26481		
YONGE	ST	9/12/2009	Sat	23456		
YONGE	ST	9/13/2009	Sun	21850		
YONGE	ST	9/13/2009	Sun	19645		
YONGE	ST	9/14/2009	Mon	27024		
YONGE	ST	9/14/2009	Mon	22988		
YONGE	ST	9/15/2009	Tue	28253		
YONGE	ST	9/15/2009	Tue	23771		
YONGE	ST	9/16/2009	Wed	28275		
YONGE	ST	9/16/2009	Wed	23769		
YONGE	ST	9/17/2009	Thu	28691		
YONGE	ST	9/17/2009	Thu	25397		
YONGE	ST	11/2/2010	Tue	23367		
YONGE	ST	11/3/2010	Wed	24863		
YONGE	ST	11/4/2010	Thu	25259		
YONGE	ST	10/9/2012	Tue	28164		
YONGE	ST	10/10/2012	Wed	28094		
YONGE	ST	10/11/2012	Thu	29175	28478	2012
				2006-2012	**-0.09%**	

APPENDIX

F BACKGROUND DEVELOPMENT

xx A.M. Peak Hour Traffic Volumes

(xx) P.M. Peak Hour Traffic Volumes

Figure 1

Site Traffic Volumes

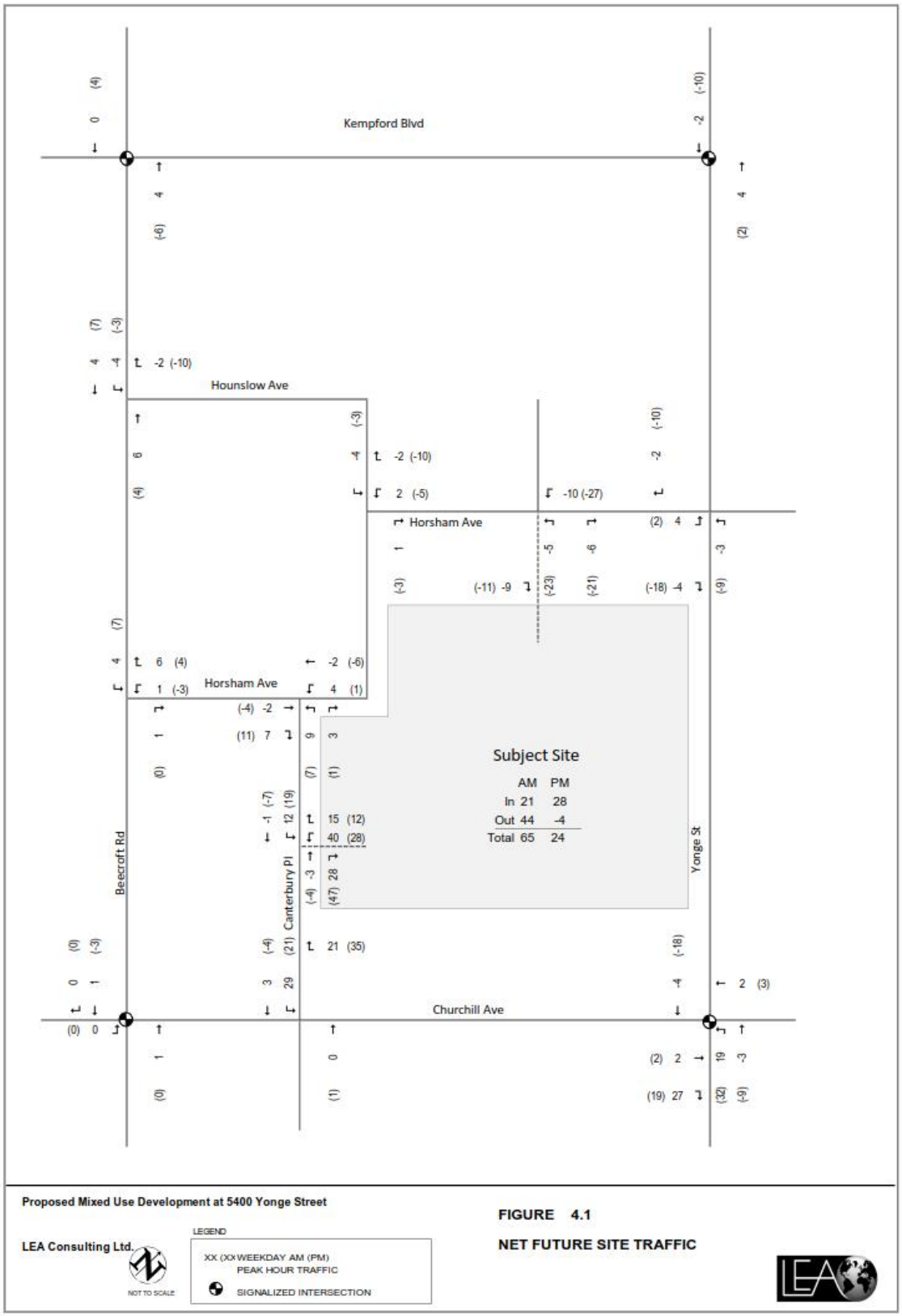


Figure 4.1: Net Site Traffic

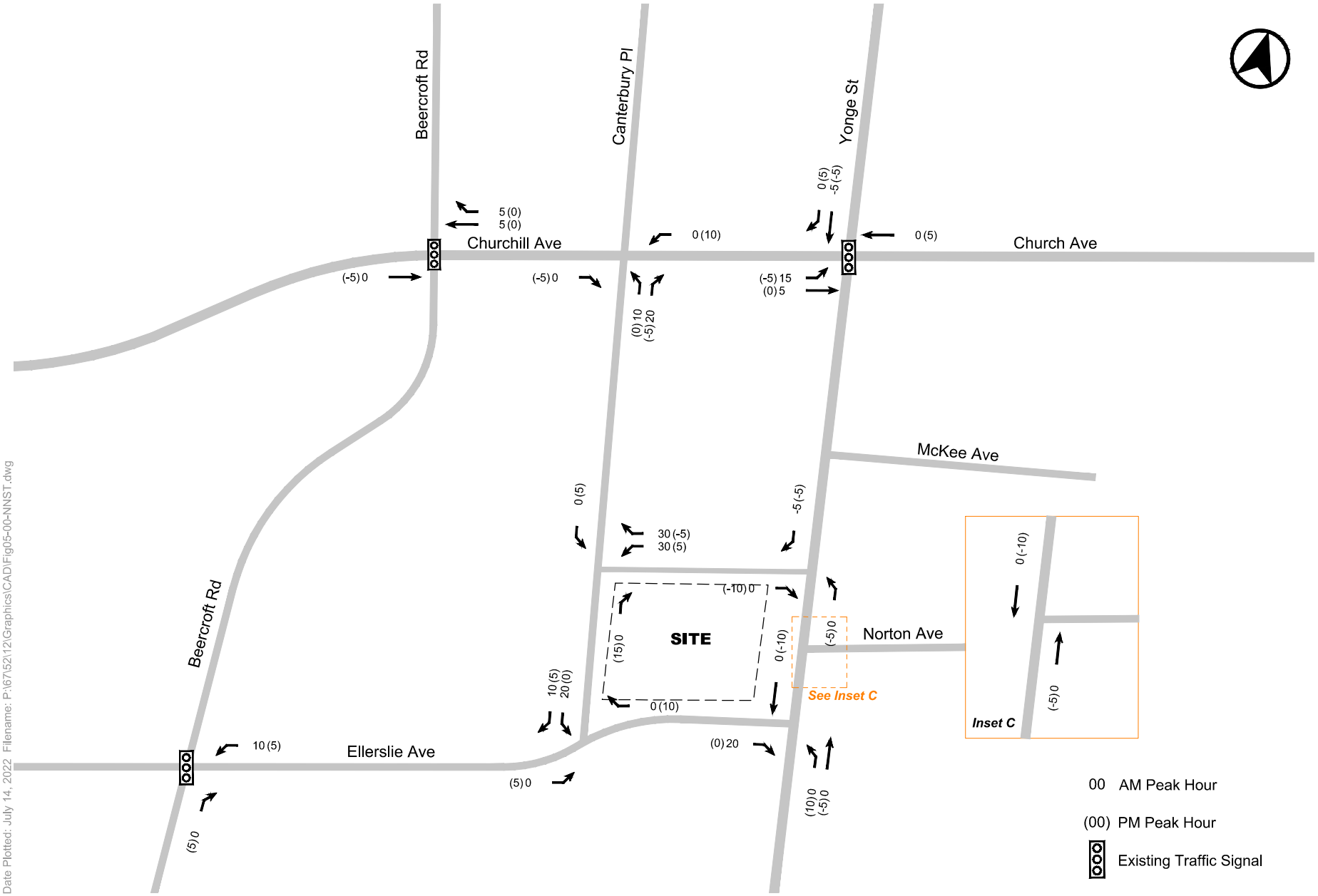
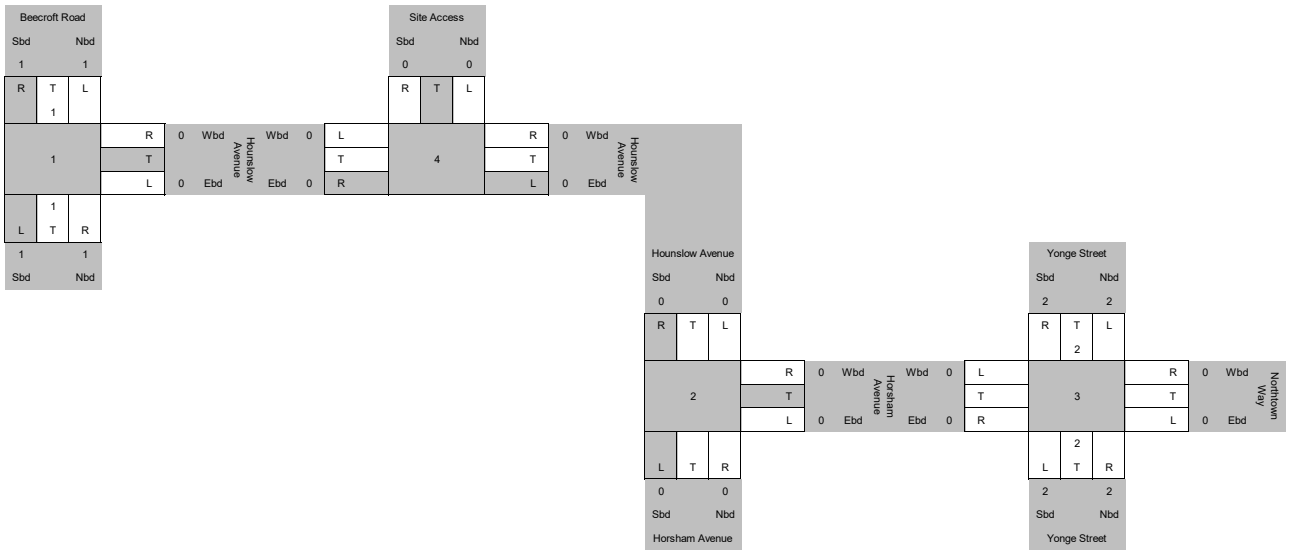
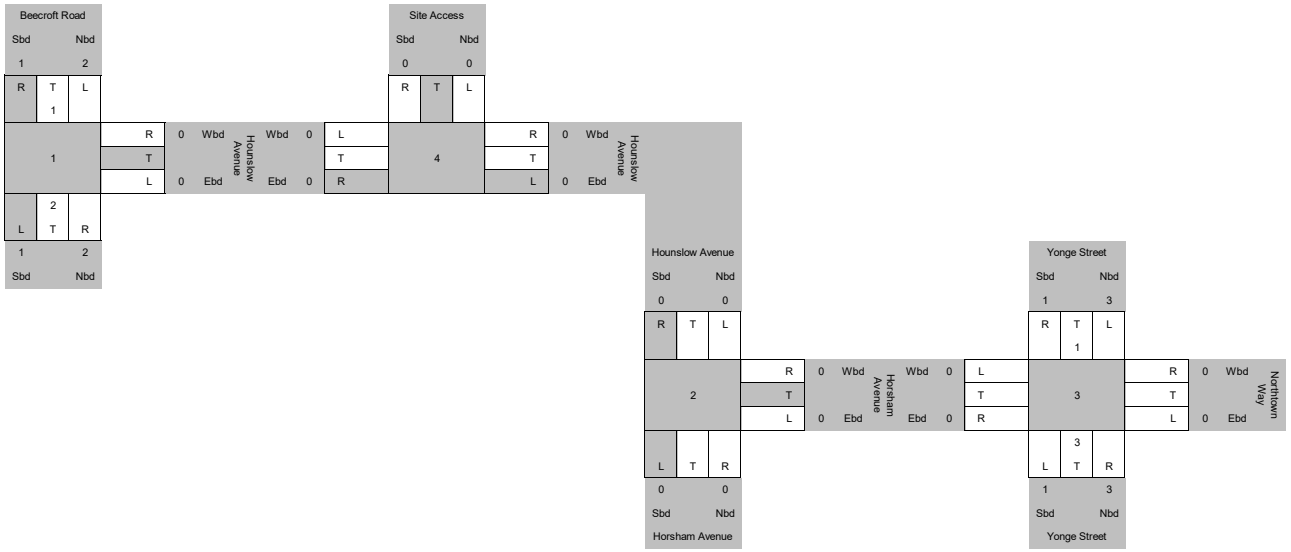


FIGURE 5 NET-NEW SITE TRAFFIC VOLUMES

AM PEAK HOUR



PM PEAK HOUR



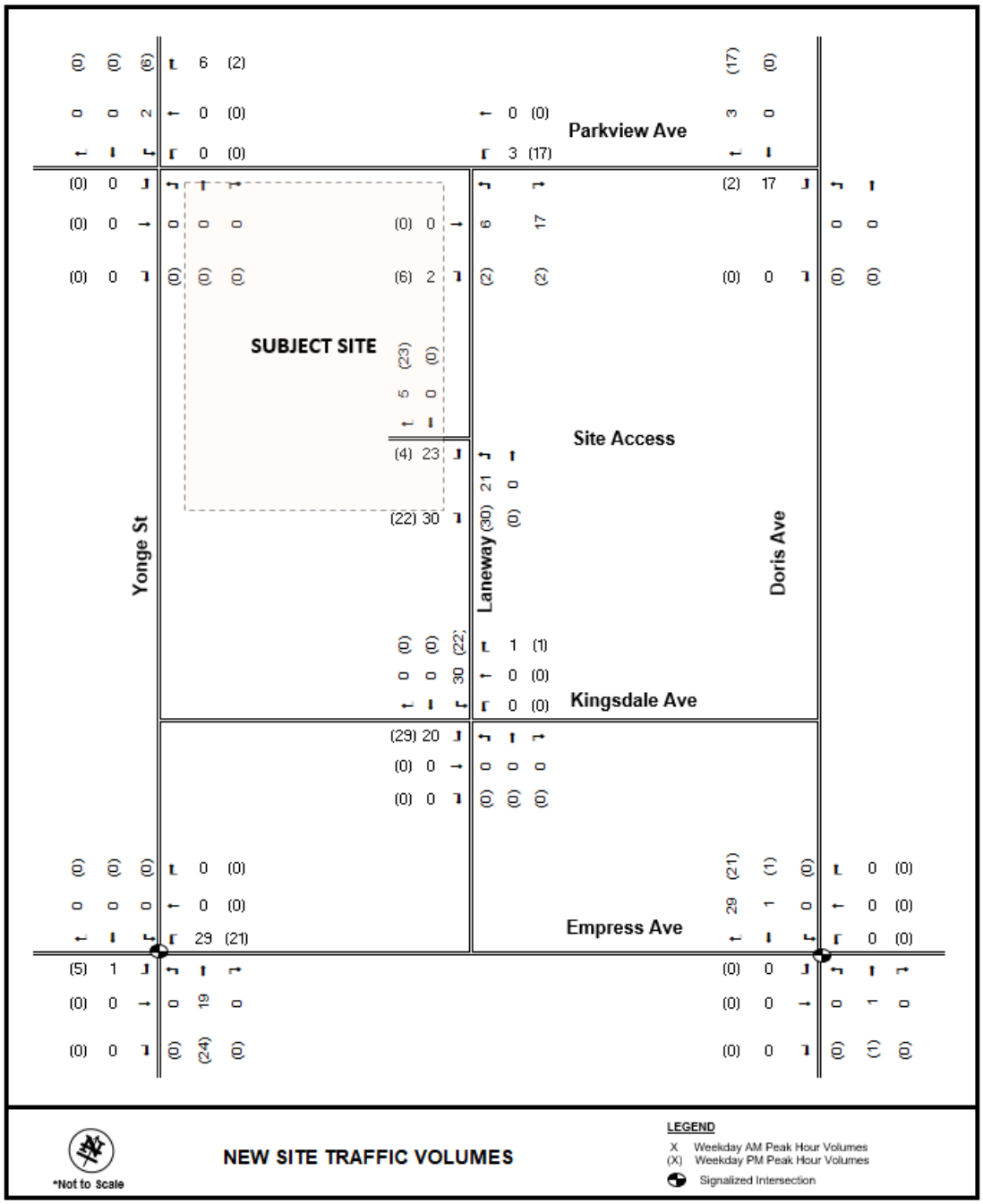
Scale: NTS

Figure X

Background Development - 5220 Yonge Street

26-38 Hounslow Avenue - Transportation Impact Study

Figure 4-1: Site Generated Traffic Volumes



development site. It was assumed that the study area gateways include Churchill Avenue west of Tamworth Road and east of Beecroft Road, and Beecroft Road north and south of Churchill Avenue. The trip distribution percentages are summarized in **Table 4-3**.

Table 4-3: Directional Trip Distribution

Corridor	Direction	Weekday AM Peak Hour		Weekday PM Peak Hour	
		In	Out	In	Out
Beecroft Road	Northbound	42%	6%	31%	15%
	Southbound	8%	30%	12%	42%
Churchill Avenue	Eastbound	27%	30%	29%	26%
	Westbound	23%	34%	28%	17%
TOTAL		**100%**	**100%**	**100%**	**100%**

The auto site-generated traffic was assigned accordingly to reflect the configuration of the site accesses, turning restrictions, and based on logical routing. The auto trip assignment for the proposed development for the 2026 horizon is illustrated in **Figure 4-1**. Detailed TTS data is enclosed in **Appendix G**.

Figure 4-1: Site Traffic Volumes

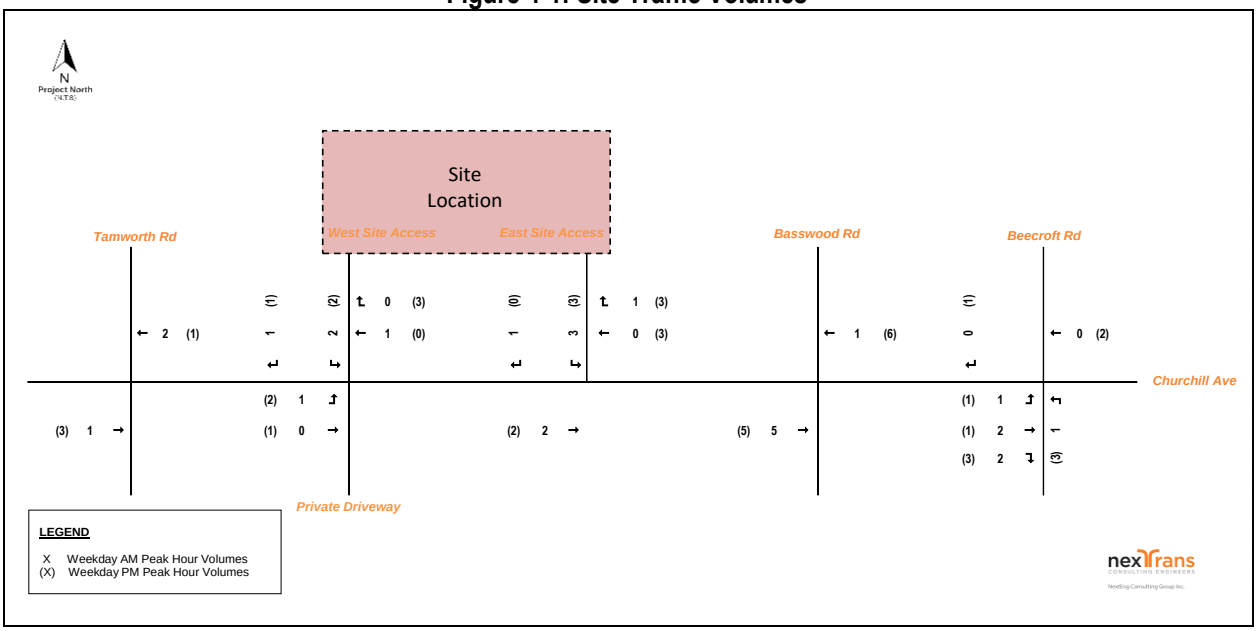
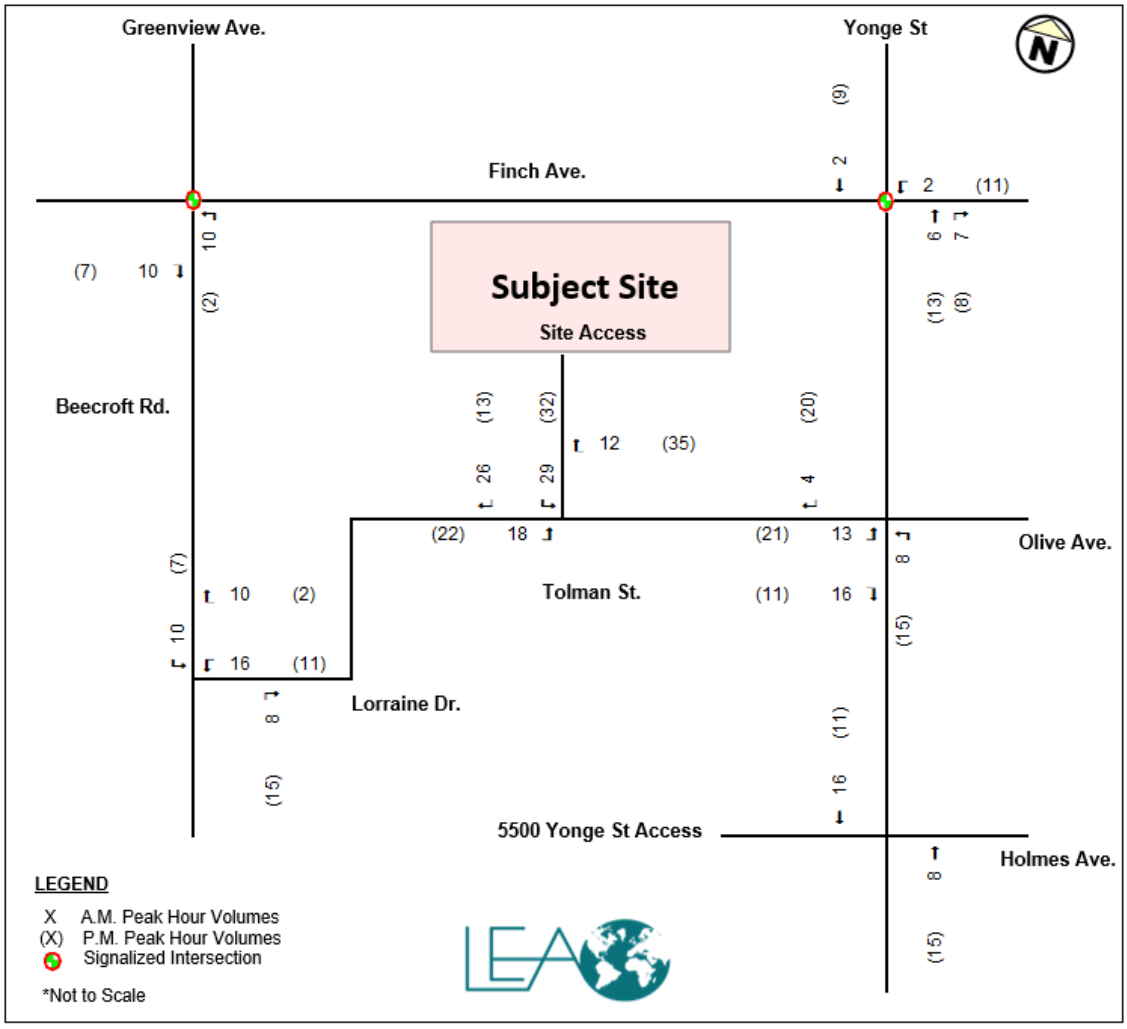


Table 4-4: Retail Trip Distribution

Direction	AM In	PM In	AM Out	PM Out
Yonge St (North)	26%	23%	14%	32%
Hwy 401/Yonge St (East)	15%	15%	12%	13%
Finch Ave (East)	15%	15%	12%	13%
Yonge St (South)	19%	26%	24%	24%
Hwy 401/Yonge St (West)	13%	11%	19%	9%
Finch Ave (West)	12%	10%	19%	9%

The net site-generated traffic volume for weekday AM and PM peak hours for the proposed development are illustrated in **Figure 4-1.**

Figure 4-1: Subject Site Vehicle Trip Volumes



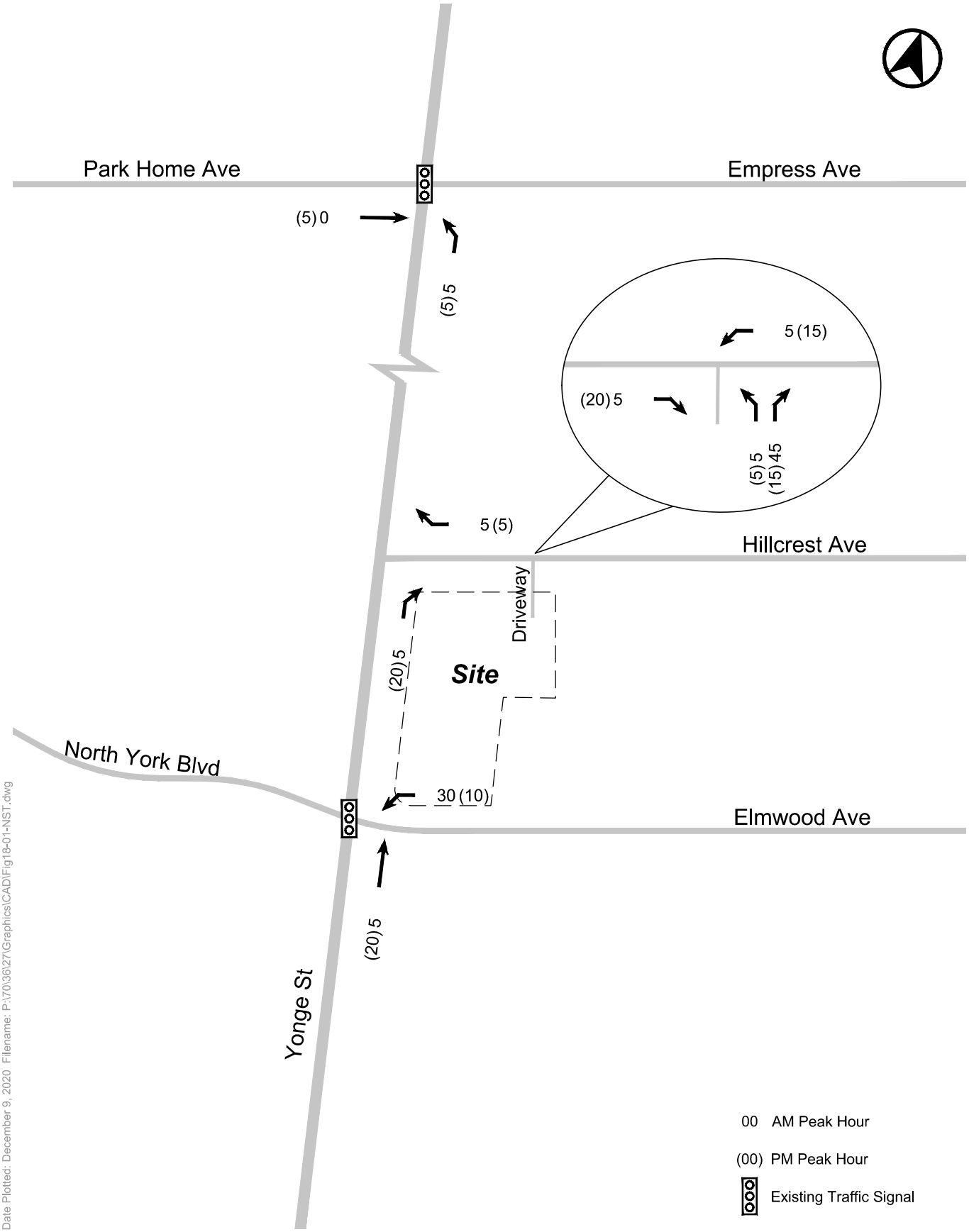
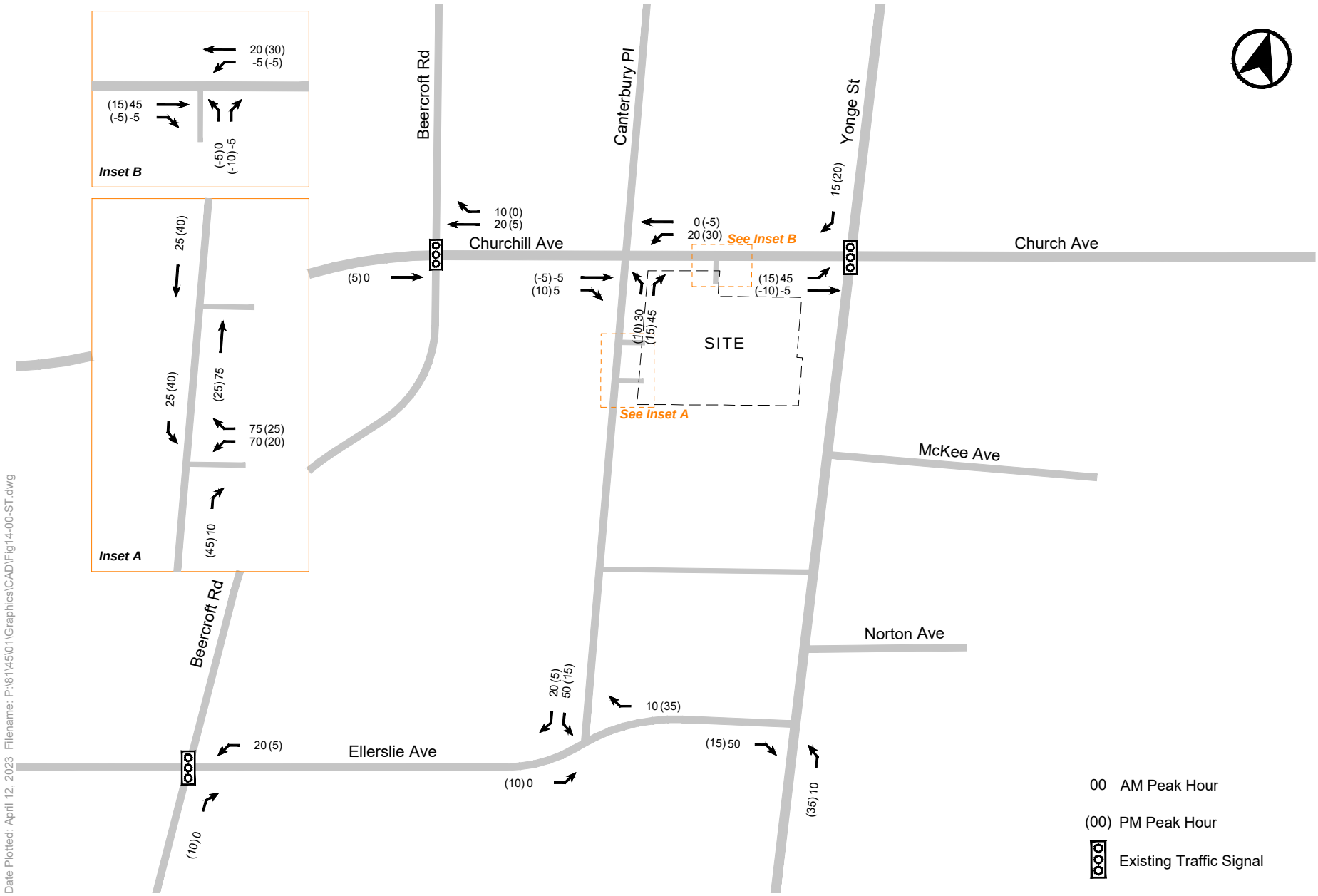


FIGURE 18 NET SITE TRAFFIC VOLUMES



Date Plotted: April 12, 2023 Filename: P:\81145\01\Graphics\CAD\Fig14-00-ST.dwg

FIGURE 14 NET-NEW SITE TRAFFIC VOLUMES

APPENDIX

G TTS DATA

AM IN

Fri Jul 23 2021 11:17:44 GMT-0400 (Eastern Daylight Time)

Frequency Distribution Query Form - Trip - 2016 v1.1

Field: Primary travel mode of trip - mode_prime

Filters:
2006 GTA zone of destination - gta06_dest In 443 444 448 450
and
Start time of trip - start_time In 630-930
and
Trip purpose of destination - purp_dest In H

Table: Trip 2016

Row:	Count:	Expanded:	**Percentage**
Transit excluding GO rail	2	11	**1.9%**
Auto driver	20	352	**59.7%**
Auto passenger	3	61	**10.4%**
Walk	6	165	**28.0%**
Total:	31	589	**100.0%**

AM OUT

Fri Jul 23 2021 11:21:54 GMT-0400 (Eastern Daylight Time)

Frequency Distribution Query Form - Trip - 2016 v1.1

Field: Primary travel mode of trip - mode_prime

Filters:
2006 GTA zone of origin - gta06_orig In 443 444 448 450
and
Start time of trip - start_time In 630-930
and
Trip purpose of origin - purp_orig In H

Table: Trip 2016

Row:	Count:	Expanded:	**Percentage**
Transit excluding GO rail	345	7900	**55.0%**
Cycle	2	33	**0.2%**
Auto driver	220	4276	**29.7%**
Auto passenger	46	965	**6.7%**
School bus	3	58	**0.4%**
Walk	56	1153	**8.0%**
Total:	672	14385	**100.0%**

PM IN

Fri Jul 23 2021 11:19:03 GMT-0400 (Eastern Daylight Time)

Frequency Distribution Query Form - Trip - 2016 v1.1

Field: Primary travel mode of trip - mode_prime

Filters:
2006 GTA zone of destination - gta06_dest In 443 444 448 450
and
Start time of trip - start_time In 1530-1830
and
Trip purpose of destination - purp_dest In H

Table: Trip 2016

Row:	Count:	Expanded:	**Percentage**
Transit excluding GO rail	299	6585	**52.7%**
Cycle	5	67	**0.5%**
Auto driver	209	3799	**30.4%**
Other	1	4	**0.0%**
Auto passenger	40	844	**6.7%**
School bus	2	31	**0.2%**
Taxi passenger	4	57	**0.5%**
Walk	61	1125	**9.0%**
Total:	621	12514	**100.0%**

PM OUT

Fri Jul 23 2021 11:23:58 GMT-0400 (Eastern Daylight Time)

Frequency Distribution Query Form - Trip - 2016 v1.1

Field: Primary travel mode of trip - mode_prime

Filters:
2006 GTA zone of origin - gta06_orig In 443 444 448 450
and
Start time of trip - start_time In 1530-1830
and
Trip purpose of origin - purp_orig In H

Table: Trip 2016

Row:	Count:	Expanded:	**Percentage**
Transit excluding GO rail	29	602	**25.0%**
Cycle	2	31	**1.3%**
Auto driver	53	1048	**43.6%**
Auto passenger	23	562	**23.4%**
Taxi passenger	1	15	**0.6%**
Walk	6	147	**6.1%**
Total:	114	2405	**100.0%**


444
448
450
443
Site
Wedgewood Dr
Doverwood Ct
Gummer Ave
Silverview Dr
Donna Ct
Gustav Crescent
Risebrough Ave
Colwick Dr
Crossen Dr
Peckham Ave
Hilda Ave
Manadon Dr
Cactus Ave
Burke St
Winlock Park
Pemberton Ave
Burbank Dr
Tefley Rd
Blake Ave
Hendon Ave
Altamont Rd
Garney Rd
Grantbrook St
Clarkhill St
Olive Ave
Holmes Ave
Byng Ave
Church Ave
Dunview Ave
Blithfield Ave
Rodney Blvd
Citation Dr
Lorraine Dr
Holcolm Rd
Edithvale Dr
Claywood Rd
Tamworth Rd
Basswood Rd
Lurgan Dr
Finchurst Dr
Vorton Ave
Parkview Ave
Kingsdale Ave
Empress Ave
Princess Ave
Highgate Ave
Estelle Ave
Elmwood Ave
Hillcrest Ave
Kenneth Ave
Willowdale Ave
Alfred Ave
Wilfred Ave
Clairtel Rd
Doris Ave
Yonge St
Elynhill Dr
Ellerslie Ave
Senlac Rd
Diagonal Rd
Betty Ann Dr
Park Home Ave
Wynn Rd
Cobden St
Lister Dr
Ilton Blvd
ght Ave
es Ave
Ave
445
434
458
449
448
435
457
451
438
437
456
453
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APPENDIX

H TDM BACKGROUND RESEARCH

HOUSING NOW
TRANSPORTATION DEMAND MANAGEMENT FRAMEWORK

City of Toronto

Prepared For: CreateTO

November 2021

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Toronto, ON M4V 1K9
www.bagroup.com

TABLE OF CONTENTS

TABLE OF APPENDICES

1.0 INTRODUCTION

BA Group is retained by CreateTO to provide transportation advisory services in support of the *Housing Now* initiative. *Housing Now* is an initiative to activate 17 sites (11 sites in phase one, 6 sites in phase two) owned by the City of Toronto for the development of affordable housing within mixed-income, mixed-use, transit-oriented communities. City Council launched the first phase of *Housing Now* in 2019.

The result of a collaborative effort by CreateTO and BA Group, in consultation with City of Toronto staff, it is the purpose of this memorandum to establish a *Housing Now* transportation demand management (TDM) framework. The intention is for the proponents of development proposals for *Housing Now* sites to work within the framework to develop site-specific TDM Plans that are intended to reduce vehicle trips and in turn, reduce parking demand. The TDM Framework has been established with a specific target of achieving the requirement of the *Toronto Green Standard (TGS), Version 3 (Mid to High-Rise Residential and All Non-Residential)* to utilize TDM measures to directly reduce single occupant auto vehicle trips.

As part of the Zoning By-law Amendment stage of the development application process for each site, TDM will be integrated within the Transportation Impact Study (TIS) through the TDM Framework. At the Site Plan Application stage, The TDM Framework will be established within each site plan and incorporated into each site agreement (Ground Lease / Project Agreement).

It is noted that the proposed TDM Framework is representative of a “theory-based approach” due to a lack of industry research regarding the effectiveness of individual TDM measures. As a result, the various TDM measures that are listed as part of the TDM Framework have been weighted based upon perceived effectiveness. The perceptions of effectiveness are based upon BA Group’s experience in recommending and assessing TDM Plans, and based upon consultation with City of Toronto Transportation Services and Transportation Planning staff.

A comprehensive monitoring program is recommended to assess the effectiveness of site-specific TDM Plans and to potentially refine the TDM Framework. Elements of the monitoring program include extensive on-site data collection at *Housing Now* sites to assess general program effectiveness, specific monitoring strategies for individual TDM measures, and annual transportation behaviour surveys at all *Housing Now* sites.

It is acknowledged that the aforementioned “theory-based approach” that has informed the initial assessment of TDM measures for effectiveness may ultimately prove to be inaccurate at some or all sites; part of the role of the monitoring program will be for its results to be used to “recalibrate” the TDM Framework based upon observed data. The intent of the TDM Framework is to provide a living document that can be refined over time based on confirmed, real-world data to help guide the City of Toronto and developers with established links between TDM measures and evolving travel patterns.

2.0 APPLICATION TO *HOUSING NOW*

It should be noted that BA Group and CreateTO have conceptually developed the TDM Framework to be uniquely applicable to *Housing Now* sites. Key considerations that have informed the development of the framework include the characteristics that are inherent to the *Housing Now* project: affordable housing is being developed on City of Toronto owned sites to foster mixed-income, mixed-use, and transit-oriented communities. Each *Housing Now* site will be a transit-oriented development (TOD) and will contain a mix of affordable rental, market rental and ownership housing options to serve Toronto residents.

As such, the TDM Framework contained within this memorandum pertains to the 21 *Housing Now* sites (and any future additions to the project) exclusively. Proponents of development proposals for each site will be required to support the overall transportation objectives of each project with a TDM Plan that is developed in adherence to the TDM Framework established within this memorandum.

3.0 TDM PRIMER

Within **Appendix A**, a TDM Primer is provided outlining TDM, as a concept, in detail, and the various TDM measures that are included in the TDM Framework.

4.0 *HOUSING NOW* TDM FRAMEWORK

CreateTO and BA Group have collaboratively worked to establish a standardized TDM framework, attached in **Appendix B**. It is the purpose and intention of the TDM framework that the proponents of development proposals for *Housing Now* sites will work within the framework to development site-specific TDM Plans. As part of the Zoning By-law Amendment stage of the development application process for each site, TDM will be integrated within the Transportation Impact Study (TIS) through the TDM Framework (which will be included as an Appendix in the TIS). At the Site Plan Application stage, The TDM Framework will be established within each site plan and incorporated into each site agreement (Ground Lease / Project Agreement).

Importantly, the TDM Framework has been established with a specific target of achieving the requirement of the *Toronto Green Standard (TGS), Version 3 (Mid to High-Rise Residential and All Non-Residential)* to utilize TDM measures to directly reduce single occupant auto vehicle trips. Specifically, requirement "AQ 1.1 Transportation Demand Management (TDM) and Multimodal Infrastructure" states the following:

> *Reduce single occupancy auto vehicle trips from generated by proposed development by 15% through a variety of multimodal infrastructure strategies and TDM measures.*

The above is stated to be the "Tier 1" requirement; the "Tier 2" requirement is similarly to reduce vehicle trips by 30%, as per requirement "AQ 1.4 Single-Occupant Auto Vehicle Trips (Optional)":

> *Reduce single occupancy vehicle trips generated by proposed development by 30% through a variety of multimodal infrastructure strategies and TDM measures.*

It is notable that research has been conducted regarding the general effectiveness of TDM programming in reducing automobile travel. A well managed and supported TDM program has been estimated to have the potential to cumulatively reduce overall vehicle by 10%-30%.[1] As such, the proposed TDM Framework has been developed to have the ability to achieve vehicle trip reductions within this range, which is comparable to the range between the TGS Tier 1 requirement (15%) and the TGS Optional Tier 2 target (30%).

[1] Litman, T. (2016). "Transportation Management Programs: An Institutional Framework for Implementing TDM". Victoria Transport Policy Institute. DOI: https://www.vtpi.org/tdm/tdm42.htm

Toronto Green Standard, Version 4 (May 2022)
TGS Version 4 (V4) was adopted by Toronto City Council on July 14, 2021 and will come into effect in May 2022 for all new planning applications. TGS V4 includes updated performance measures and requirements to further advance the City's goals and commitments around climate change.

Of note, requirement AQ 1.1 (now "AQ 1.1 Single-Occupant Vehicle Trips"), under Tier 1, has been revised:

> *Reduce single occupancy auto vehicle trips generated by the proposed development by 25% through a variety of multimodal infrastructure strategies and Transportation Demand Management (TDM) measures.*

There is no longer an optional Tier 2 requirement as part of TGS V4.

In advance of May 2022, the TDM Framework (**Appendix B**) will be revised in order to require Housing Now sites to meet the new TGS Tier 1 requirement of 25% vehicle trip reduction.

4.1 GUIDELINES TABLE

TDM Measures have been described in detail and categorized based upon effectiveness within the "Guidelines Table" included in the TDM Framework (**Appendix B**). Specific TDM Measures have been placed within each tier based upon their general ability to directly reduce single occupant vehicle trips. Each specific TDM measure has been further categorized based upon the level to which it is applied as part of site-specific TDM programming.

- Tier 1A: Parking Management TDM Measures
- Tier 1B: Elevated TDM Measures
- Tier 2: Effective TDM Measures
- Tier 3: Supplementary TDM Measures

- Level 0: Do Nothing (i.e. the TDM measure is not included in the TDM Plan)
- Level 1: Minimal Application
- Level 2: General Application
- Level 3: Comprehensive Application

Based upon the aforementioned two types of categorization – the effectiveness tier and the level of application – each TDM measure that is included within the TDM Programming Framework is associated with a vehicular trip reduction percentage. It is intended that the base of the vehicular trip reductions (i.e. 0% vehicle trip reduction) are what the vehicular trip generation for a project would be if the TDM measures were not implemented.

It is noted that while research has been conducted regarding the general effectiveness of a TDM program, insufficient research is available on the effectiveness of individual TDM measures. The vehicular trip reduction that is associated with each TDM measure in the TDM Programming Framework is representative of a "theory-based approach."

As a result, the various TDM measures that are listed as part of the TDM Framework have been weighted based upon perceived effectiveness. The perceptions of effectiveness are based upon BA Group's experience in recommending, proposing, and assessing TDM Plans, and based upon consultation with City of Toronto Transportation Services and Transportation Planning staff. As is noted in **Section 6.0** of this document, part of the role of the proposed TDM monitoring program will be for its results to be used to "recalibrate" the TDM Framework based upon observed data. It is acknowledged that the aforementioned "theory-based approach" that has informed the initial assessment of TDM measures for effectiveness may ultimately prove to be inaccurate at some or all sites.

It is also acknowledged that area-specific and building-specific factors can influence the effectiveness of individual TDM measures. The convenience of access to parking facilities on- or off-site and the proximity and quality of connections to a multi-use path or rapid transit station are examples of factors that can be have effect, primarily based upon the travel time (usually walking time) required to access the facilities.

The level of application has been factored into the TDM Framework for each TDM measure. This is intended to further assess the potential impact of each TDM measure based upon the intensity of its application. For example, there is likely to be a larger effect on travel behaviour if each resident is provided with a PRESTO card pre-loaded with $50 in comparison to a PRESTO card pre-loaded with the equivalent of a monthly transit pass or more. The inclusion of level of application facilitates a more thorough and comprehensive assessment of the TDM Plan proposed for each *Housing Now* site.

4.2 TRIP REDUCTION CHECKLIST

The "Trip Reduction Checklist" included in **Appendix B** is intended to be completed for each *Housing Now* development based upon the descriptions of each TDM measure included in the "Guidelines Table". If a TDM measure is to be included in the TDM Plan for a given site, then the TDM Measure is to be toggled to "Yes", to the extent of its application. Site-specific description (e.g. the number of car-share vehicles) must be entered into the checklist. The "Trip Reduction Checklist" automatically tabulates points directly correlate to vehicular trip reduction percentages (i.e. 1 point = 1% vehicular trip reduction). It is important to note that the purpose of the Trip Reduction Checklist is to assess the theoretical impact of the TDM Plan on vehicular trip reduction; it is not the TDM Plan for each site.

Each Tier is qualified before a total points tally is taken to ensure that a sufficient TDM program has been developed within each tier. For example, if the Tier 2 points tally does not meet or exceed 5 points, no vehicular trip reduction is recognized by the checklist. The points tally for each tier is recalibrated prior to the calculation of the total vehicular trip reduction percentage associated with the TDM Plan.

This mechanism is intended to impose a philosophy recognizing that TDM measures are more effective when collectively implemented than rather than if TDM measures are minimally and individually applied. For example, if a bicycle repair station is implemented within a site plan but without additional TDM measures, it is unlikely to be associated within any vehicular trip reduction. Rather, it can be effective when combined with other TDM measures as part of a comprehensive TDM plan.

Lastly, it is noted that the calibration of each tier is intended to ensure that the TDM plan adds to a sum of 15 points, equivalent to a 15% vehicular trip reduction. In this manner, the proposed TDM Framework has been

developed to facilitate *Housing Now* sites meeting the TGS 15% vehicular trip reduction requirement and potentially, the TGS Optional Tier 2 (30%) vehicular trip reduction target.

5.0 ILLUSTRATIVE EXAMPLE – SAMPLE SITE TDM PLAN

The *Housing Now* TDM Programming Framework has been utilized to develop a sample TDM Plan, attached as **Appendix C**.

At the sample site, the TDM measures included in the sample TDM Plan would be submitted to the City of Toronto for review and approval through the City's Site Plan Control process.

6.0 RECOMMENDED *HOUSING NOW* TDM MONITORING PROGRAM

As is noted above, while research has been conducted regarding the general effectiveness of a TDM program, insufficient research is available on the effectiveness of individual TDM measures. As a result, the vehicular trip reduction that is associated with each TDM measure in the TDM Programming Framework is representative of a “theory-based approach.”

It is inevitable that some TDM measures at *Housing Now* sites will be more effective than others at reducing vehicular trips and that the relative efficacy of each TDM measure may not necessarily reflect the vehicle trip reduction stated in the Guidelines Table and Trip Reduction Checklist, as outlined in **Appendix A**. It would be beneficial to the long-term success of the *Housing Now* TDM Framework if a comprehensive monitoring program was included to assess the effectiveness of site-specific TDM Plans and to potentially refine the TDM Framework.

A TDM Monitoring Program is recommended, inclusive of three general types of monitoring:

1. Extensive on-site data collection at all *Housing Now* sites to assess general program effectiveness.
In order to assess the general effectiveness of the site specific TDM Plan for each *Housing Now* site, empirical data collection studies will be conducted by a transportation engineering consultant. Three types of studies are recommended:

a) Parking utilization surveys; three days from 7:00am to 12:00am, and 3:00 am
b) Vehicle “ins & outs” at site driveway(s); three days from 7:00am to 12:00am
c) Person counts (i.e. person tracing); three days from 7:00am to 12:00am

Please note: the timeframes outlined above are conceptual. Closer to the implementation of the TDM Monitoring Program, further work will be conducted to identify appropriate timeframes for study. For example, it is known that during the COVID-19 global pandemic, the morning peak period for essential workers (e.g. when they leave for work or arrive home from work) is often earlier than 7:00am). Contemporary factors will be perpetually monitored to ensure ideal data collection is conducted.

Baseline data collection is recommended to be conducted at initial complete building occupancy to determine an empirical baseline and follow-up surveys are recommended to be conducted on an annual basis. The annual changes in empirical measures are intended to assess whether transportation behaviour evolves over time.

2. Specific monitoring strategies for individual TDM measures.
As is outlined in the Guidelines Table in **Appendix A**, monitoring actions and benchmarks have been identified for specific TDM measures. The monitoring strategies consist of qualitative and quantitative assessments, dependant on the nature of each measure.

3. Annual Transportation Behaviour Surveys at all *Housing Now* sites.
Surveys are to be conducted of building residents and daytime parking occupants at each *Housing Now* site. The style and format of each survey would resemble *Smart Commute* transportation behaviour surveys; the surveys would be focussed upon determining transportation modal splits and to ask survey participants about "why" engage in their chosen transportation behaviour and "what" could make them alter their behaviour.

A baseline transportation behaviour survey is recommended to be conducted at initial complete building occupancy to determine an empirical baseline and follow-up surveys are recommended to be conducted on an annual basis. It is recommended to make the survey mandatory for building residents and daytime parking occupants (with assurance of identity protection). The annual changes in empirical measures are intended to assess whether transportation behaviour evolves over time.

Collectively, the three study types that are recommended will provide sufficient data that can be analyzed to determine the effectiveness of the site specific TDM Plan on an ongoing basis.

It is the intent of the TDM Monitoring Program for it's effectiveness to be monitored (both individual measures and comprehensively) and for adjustments to be made to site-specific TDM Plans through mitigation of issues, introduction of new TDM measures, or deepening the extent of application for TDM measures that were already included in Plan. The goal of the TDM Program for each *Housing Now* site is to consistently and measurably reduce vehicle trips; the monitoring program is the proposed mechanism to ensure continued reduction in vehicle trips and continued uptake of TDM measures.

7.0 CONCLUSION

BA Group is retained by CreateTO to establish a *Housing Now* transportation demand management (TDM) framework. The intention is for the proponents of development proposals for *Housing Now* sites to work within the framework to develop site-specific TDM Plans that are intended to reduce vehicle trips and in turn, reduce parking demand. The TDM Framework has been established with a specific target of achieving the requirement of the Toronto Green Standard (TGS), Version 3 (Mid to High-Rise Residential and All Non-Residential) to utilize TDM measures to directly reduce single occupant auto vehicle trips.

As part of the Zoning By-law Amendment stage of the development application process for each site, TDM will be integrated within the Transportation Impact Study (TIS) through the TDM Framework. At the Site Plan Application stage, The TDM Framework will be established within each site plan and incorporated into each site agreement (Ground Lease / Project Agreement).

As part of the TDM Framework, the *Housing Now* development proponents are to use the TDM Measures – Guideline Table to develop a TDM Plan for their site. The TDM measures are categorized as part of the framework based upon their effectiveness and the level of application for each TDM Measure. A “theory-based approach” was utilized to assess the effectiveness of each TDM measure due to the insufficient research available on the effectiveness of individual TDM Measures.

A comprehensive monitoring program is recommended to assess the effectiveness of site-specific TDM Plans and to potentially refine the TDM Framework. Elements of the monitoring program include extensive on-site data collection at Housing Now sites to assess general program effectiveness, specific monitoring strategies for individual TDM measures, and annual transportation behaviour surveys at all Housing Now sites. Part of the role of the monitoring program will be for its results to be used to “recalibrate” the TDM Framework based upon observed data.

Overall, it is our opinion that the recommended TDM Framework, the result of a collaborative effort by CreateTO and BA Group, in consultation with City of Toronto staff, will provide the tools to the proponents of development proposals for Housing Now sites to work within the Framework to develop site-specific TDM Plans that will reduce vehicle trips and in turn, reduce parking demand.

APPENDIX A:
TDM Measures Primer

TDM PRIMER

Transportation (or Travel) Demand Management (TDM) is defined in the City of Toronto Official Plan (February 2019 Consolidation) as follows on Page 2-35:

> *TDM measures are aimed at encouraging people to take fewer and shorter vehicle trips to reduce congestion, energy consumption and pollution. In the past, transportation planning has often focused on supply-side solutions by identifying where additional transportation capacity is needed to satisfy forecast travel demands. TDM, in contrast, puts the emphasis on changing travel behaviour to modify and reduce our demand for vehicular travel in cities. TDM is most effective when supported by complementary actions in the key areas of land use planning and public transit improvements. Typical TDM measures include:*

Primary objectives of TDM measures include:

- reducing demand on road infrastructure, thereby minimizing road and parking capital expenditures;
- increasing travel efficiency;
- reducing emissions that cause climate change;
- improving air quality; and
- improving overall health.

The City of Toronto Official Plan embraces a range of TDM measures and the TDM Framework provided herein outlines TDM strategies that are recommended as options for *Housing Now* sites to align with the operational and functional needs of the developments.

TDM Measures included in the TDM Framework are outlined in detail herein.

REDUCED VEHICULAR PARKING SUPPLY

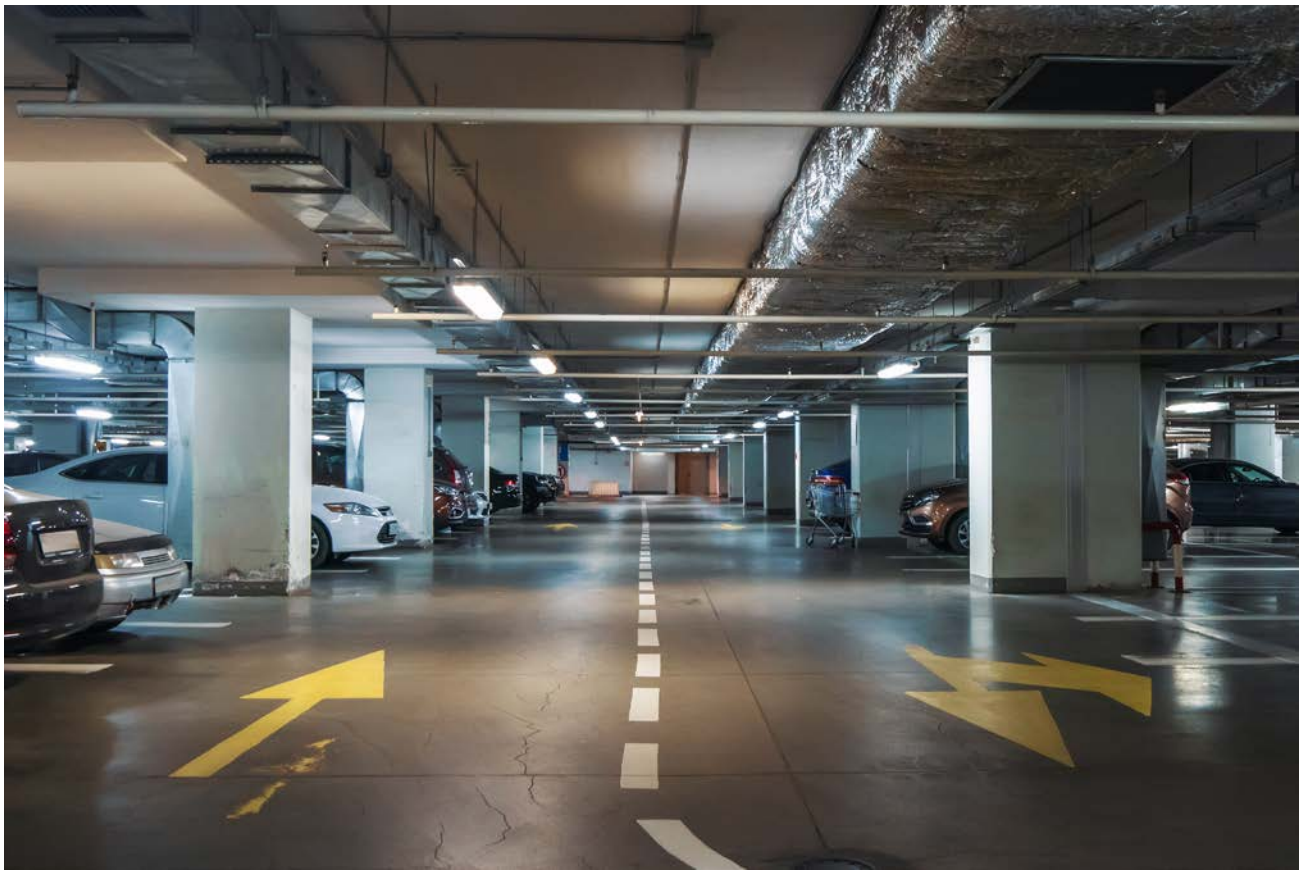
The reduction of parking supply (compared to the applicable Zoning By-law requirements) is itself a TDM measure as it will force potential parkers to consider alternative travel modes. All developments require a minimum number of parking spots based on their size or unit make-up (as stipulated by the Zoning By-law). If the number of spots available is reduced, people accessing a site will be more inclined to seek-out alternative modes of transportation to and from the site.

Sensible vehicular parking management and the provision of an extensive suite of TDM measures are mutually supportive. *Housing Now* sites are favourably located with good access to existing non-auto travel options. These options will be enhanced as part of the application of the TDM Framework. If vehicular parking is easily available on the site, residents and visitors would have less incentive to utilize these non-auto options. A reduced on-site parking supply, if not accompanied by appropriate TDM measures, will negatively affect local traffic and increase parking demand in the surrounding area.

STRATEGIC PARKING PRICING

Research conducted on parking pricing has found that, generally, the price elasticity of vehicle trips, as they relate to parking pricing, is typically -0.1 to -0.3 (ie. a 10% increase in parking fees can reduce trips by 1-3%).[2] It has been noted that this decrease in parking demand is best achieved if implemented as part of a comprehensive TDM program. Similar to a vehicle parking reduction, people using a site will be more inclined to seek-out alternative modes of transportation if the cost of parking is prohibitive, particularly in comparison to alternative transportation options.

A specific example of a parking pricing measure that is explicitly TDM-oriented is to ensure that vehicle parking permits (i.e. vehicle parking leasing) are kept at rates that are higher than a monthly transit pass. This type of direct, strategic parking pricing is intended to directly influence residents to consider transit over vehicle ownership.



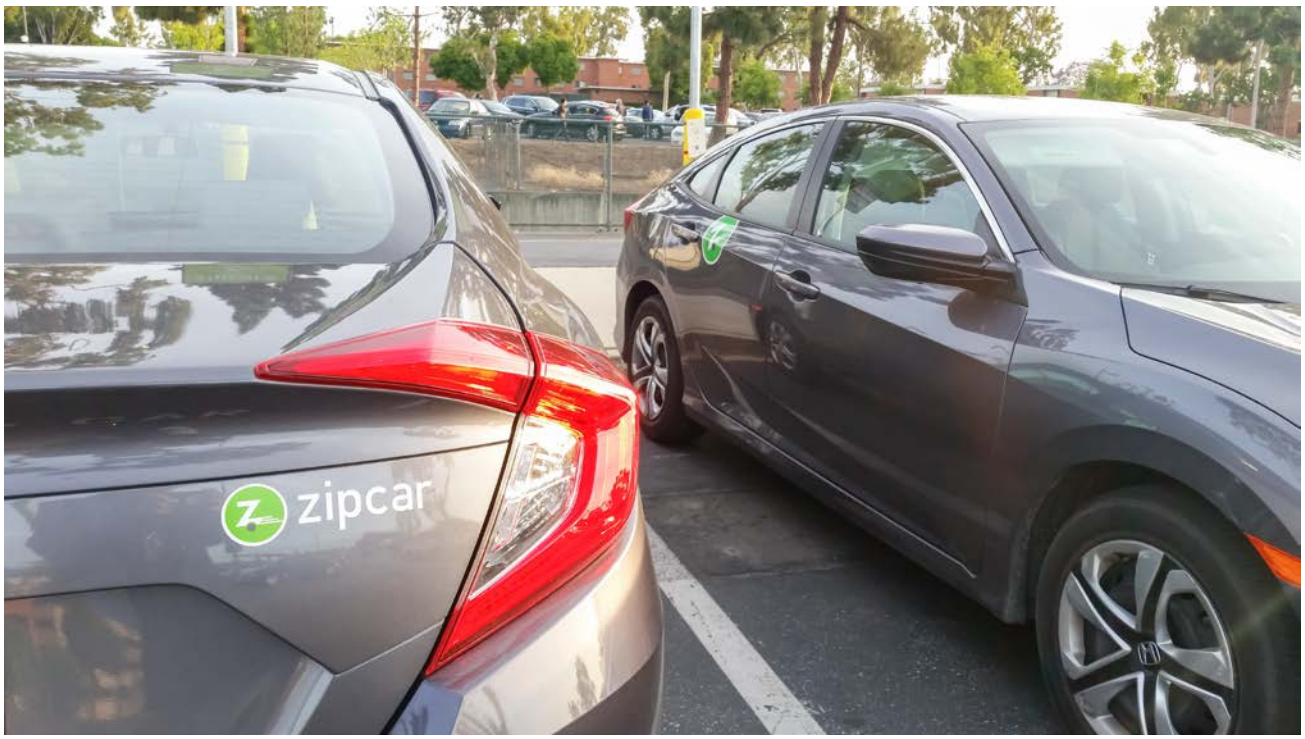
[2] [2] Litman, T. (2016). “Transportation Management Programs: An Institutional Framework for Implementing TDM”. Victoria Transport Policy Institute. DOI: https://www.vtpi.org/tdm/tdm42.htm

CAR-SHARE

Car-share vehicles offer an on-site vehicle for a resident to use if they forego car ownership, but need an automobile for a small number of trips. As such, the presence of car-share vehicles reduces on-site parking demand. All residents / employees are given membership with the on-site car-share vehicle provider (e.g. Enterprise Car Share, Zipcar, etc.).

Car-sharing programs should be introduced through third-party providers at each *Housing Now* site. It should be noted that the provision of a car-share program on-site is contingent on a service provider agreeing to locate car-share spaces on the site.

Zipcar is the world's largest car sharing program and entered into the Toronto market in 2006 with approximately 100 vehicles; it has since grown the fleet to approximately 700 vehicles. Enterprise CarShare (formerly AutoShare) was founded in 1998 and currently has over 12,000 members and 400 vehicles at over 150 locations across the City.



FREE BICYCLE

The initial purchasers of a condominium unit and/or initial lessees of are given vouchers to purchase a free bicycle. Alternatively, if a deal can be reached with a bicycle manufacturer, a bicycle will be provided directly to building occupants. The provision of a free bicycle removes the cost barrier of accessing a bicycle and would encourage the use of bicycle infrastructure around the site. Bicycles can limit the number of auto trips because they allow riders to travel further and carry more than a pedestrian.

An added benefit to the provision of a free bicycle is that it can be utilized as a marketing tactic to present the *Housing Now* site as being environmentally conscious and forward thinking. In addition, every resident owning a bicycle at building occupancy assists in the establishment of a “cycling culture” at the *Housing Now* site.

PRE-LOADED PUBLIC TRANSIT FARE CARD (E.G. PRESTO)

Considering the location of *Housing Now* sites relative to existing rapid transit service, it is recommended that pre-loaded PRESTO fare cards be provided to all buyers and renters during the initial purchase / leasing period for all buildings to encourage the use of transit to travel to and from the site. A pre-loaded public transit fare card is provided as a method of allowing people to "try" transit for free.

Transit cards can easily be distributed along with the material given to new residents and employees when they move in or start a new job. The cards are loaded with a pre-set amount and can encourage transit ridership beyond the period when the initial fares run out.

CARPOOL PARKING

Priority carpool parking spots (in support of commercial land uses, primarily office use) can incentivize carpooling and reduce single occupant vehicle trips. These spots will only be available to employees that travel to and from work with two or more occupants in their automobile. As such, for every commuter in the same vehicle, one less vehicle trip is taken and thus, demand for one less parking space occurs.

Preferred locations of the spots (e.g. near the elevator or front door) and parking discounts can increase the effectiveness of carpool parking. Carpool participants are afforded convenience and their activity is given prominence given that other commuters see the parking space on the way in or out of the building. As such, carpool can be influential to other commuters.

To facilitate usage of the carpool parking spaces, Housing Now sites with commercial land uses should explore opportunities to offer ride-sharing (carpooling) programs originating within the buildings through property management. Free online ride-matching (with potential to upgrade to location-only matching services at cost) are widely available.

BICYCLE PARKING

Easily accessible and secure bicycle parking within and around a development can encourage bicycle use. The minimum bicycle parking requirements stipulated by City of Toronto comprehensive Zoning By-law 569-2013 and Toronto Green Standard, Version 3 (TGS V3), Tier 1 must be met. To help reduce the vehicular parking requirement, TGS V3 Tier 2 requirements should be considered at each *Housing Now* site, or a higher bicycle parking supply.

In addition to supply provisions, bicycle parking facilities should be considered within each site plan to increase the attractiveness of cycling as a commuting option. All long-term bicycle parking should be located in secure bicycle parking areas and all short-term bicycle parking should be conveniently located.

BIKE SHARE TORONTO INCLUSION / CONTRIBUTION

The Bike Share Toronto program provides flexible cycling options within the City of Toronto with bicycles that can be used on a short term basis and picked up/dropped off at different stations across the City. The system underwent an expansion in 2020 which expanded the network to include 6,850 bicycles and 625 stations. There is a continued effort to expand the network further outwards from the city's downtown area and locate new stations along major corridors in conjunction with other investments in cycling infrastructure.

At each Housing Now site, as part of site plan design, space will be allocated for a future Bike Share Toronto station. Alternatively, if the Site Plan cannot accommodate a future Bike Share Toronto station, the development proponent will make a financial contribution to the City for the provision a Bike Share Toronto station for the local area. Generally, the City asks for $50,000 per station in cash contribution when this option is taken.

PRIVATE BIKE FLEET

In areas of Toronto where Bike Share Toronto has yet to expand, a private bike fleet operator is contracted to provide a similar service at a site. With a private bike fleet initiative, the intention is to provide a shared bicycle service that does not compete with Bike Share Toronto; as Bike Share Toronto expands its service area to a *Housing Now* site, the private bike fleet contract would be stipulated to end, and the site would be serviced by Bike Share Toronto on-site or in the local area.

CHANGE AND SHOWER FACILITIES

City of Toronto Zoning By-law 569-2013 requires new, non-residential developments (if long-term bicycle parking is required) to have change and shower facilities for active transit users. These facilities encourage biking, walking, running and other active transportation modes as commuting options because employees can wear appropriate clothing while active, shower upon reaching the office, and change into and out of work attire as needed at the beginning and end of the work day, respectively. Change and shower facilities facilitate active transportation in this manner because they provide comfort that all the facilities that would be helpful on-site are present.

BICYCLE REPAIR STATION

An on-site bicycle repair station (like those seen at TTC subway stations) can be provided so that cyclists can make on-site repairs. A bicycle repair station provides bicyclists with basic tools (e.g. wrenches, pumps, screwdrivers) to help repair and maintain their bicycles. These repair stations can either be in public areas or residential/employee bike locker rooms.

TRANSIT INFORMATION SCREENS

Building lobby has a television displaying real-time transit information to assist residents / employees in taking transit. Transit Information Screens provide residents and employees with up-to-date transit times for nearby transit stops and stations. These screens usually tell users when the next transit vehicle is arriving at a nearby stop or station and how far that transit stop or station is from the site.

It should be maintained by the property manager of each building in tandem with the TTC. The objective of providing real-time transit information is to enhance the convenience and comfort of using public transit. Bus arrival times, transit route information, and transit service advisory notices should be included among the information provided at these stations. Some information screens may also have information on nearby car-share and Bike Share Toronto facilities.

TRAVEL MODE INFORMATION PACKAGES

Travel Mode Information Packages are sheets or emails provided to new residents and employees (or sent out periodically) that detail all of the non-driving transportations options around the site.

Marketing programs aimed at new residential unit purchasers/lessees should be implemented to ensure that new residents have comprehensive information on modal choices in the area now and in the future. These programs should be made available to residents of *Housing Now* sites once occupied. Residents should have the option to opt-in to emailing lists dedicated to updates regarding their travel options and printed materials should also be available.

COMMUNITY MARKETING OUTREACH

Community marketing events are usually held around the time of building launches. These events provide initial residents and employees with information about sustainable transit options including information on pedestrian, cycling and transit routes. Highly successful events also give residents and employees the option to sign-up for other TDM initiatives like car- and bike-share.

APPENDIX B:
Housing Now TDM Programming Framework

Transportation Demand Management (TDM) Programming Framework - Version 6
Housing Now

Produced by: BA Group
November 2021

TDM Measures - Guidelines Table

TDM Measure	Description	Land Use Applicability	Implementation Timing	Implementation Extent				Monitoring Program - Recommended TDM Measure-specific Monitoring Strategies
				Level 0 - Do Nothing	Level 1 - Minimal Application	Level 2 - General Application	Level 3 - Comprehensive Application	
Tier 1A - Parking Management TDM Measures				**Estimated Vehicular Trip Reduction: 0%**	**Estimated Vehicular Trip Reduction: 2%**	**Estimated Vehicular Trip Reduction: 4%**	**Estimated Vehicular Trip Reduction: 6%**	
Reduced Vehicular Parking Supply	The reduction of parking supply (compared to the applicable requirements) is itself a TDM measure as it will force potential parkers to consider alternative travel modes.	Any land use	A reduced vehicular parking supply generally must be approved prior to the construction of a project.	Meet the applicable minimum parking requirements stipulated by zoning	Provide 15% less parking than what is stipulated by the applicable zoning minimum parking requirements	Provide 30% less parking than what is stipulated by the applicable zoning minimum parking requirements	Provide at least 50% less parking than what is stipulated by the applicable zoning minimum parking requirements	- Annual parking utilization studies to be undertaken to determine parking occupancy.
Strategic Parking Pricing	Research conducted on parking pricing has found that, generally, the price elasticity of vehicle trips, as they relate to parking pricing, is typically -0.1 to -0.3 (ie. a 10% increase in parking fees can reduce trips by 1-3%).	Any land use	For a condominium building, parking pricing must be determined at the beginning of the sales program. For a rental building, institutional, or other commercial use, parking pricing can be changed at any time as a method of managing traffic and parking demand.	Parking is free.	The cost of parking is noticeable to the user and is "market price" or somewhat higher.	The cost of parking is approximately double the "market price".	The cost of parking to the user is directly equal to the "per parking space" cost of the developer constructing the parking.	- Ongoing effort by property management to enforce strategic parking pricing to reflect on-site demand and market effects.
Tier 1B - Elevated TDM Measures				**Estimated Vehicular Trip Reduction: 0%**	**Estimated Vehicular Trip Reduction: 2%**	**Estimated Vehicular Trip Reduction: 4%**	**Estimated Vehicular Trip Reduction: 6%**	
Car-Share	Car-share vehicles offer an on-site vehicle for a resident to use if they forego car ownership. As such, the presence of car-share vehicles reduces vehicular trips. All residents / employees are given membership with the on-site car-share vehicle provider (e.g. Enterprise Car Share, Zipcar, Maven, etc.)	Any land use (usually residential or office)	Can be implemented at any time.	No car-share vehicle provided on site.	1 car share vehicle is provided on site.	At least 1 car share vehicle is provided on site and all residents / employees are given free membership with the on-site provider.	At least 2 car share vehicles are provided on site and all residents / employees are given free membership with the on-site provider.	- Annual parking utilization studies to include occupancy study of car-share vehicles provided on-site. - In agreement with car-share providers, detailed usage data to be provided to CreateTO to assess marketing needs. - Coordinated ongoing effort to convert commuter/commercial parking spaces to dedicated car-share parking spaces if on-site demand is high in relation to supply.
Free Bicycle	Initial purchasers of condominium dwelling units are given a voucher to purchase a bicycle.	Residential (Condominium only)	This is an expensive strategy and therefore, must be decided prior to the construction of the project.	No bicycle voucher is provided.	A bicycle voucher is provided to all initial purchasers of condo units worth up to $500.	A bicycle voucher is provided to all initial purchasers of condo units worth up to $1,000.	A bicycle voucher is provided to all initial purchasers of condo units worth up to $1,000 and an agreement is sought with a local cycling store to subsidize bicycle maintenance for a year.	- Annual transportation behaviour survey to ask question about the effectiveness of free bicycle provision in increasing cycling activity and decreasing driving activity / car ownership.
Tier 2 - Effective TDM Measures				**Estimated Vehicular Trip Reduction: 0%**	**Estimated Vehicular Trip Reduction: 1%**	**Estimated Vehicular Trip Reduction: 2%**	**Estimated Vehicular Trip Reduction: 3%**	
Pre-loaded Public Transit Fare Card (e.g. PRESTO)	A pre-loaded public transit fare card is provided as a method of allowing people to "try" transit for free. For residential developments, the card is given to first time buyers or each new lessee for a specified period of time. For office developments, new employees are provided with a fare card.	Any land use (usually residential or office)	The fare card should be distributed along with all materials related to the building and/or employer.	No fare card is provided.	Pre-loaded fare card with a value of $50-$100 is provided.	Pre-loaded fare card with a value equivalent to a monthly transit pass is provided.	Pre-loaded fare card with a value that exceeds a monthly transit pass is provided. For a rental apartment building, all new tenants receive the public transit fare card in perpetuity. For an office, all new employees receive the public transit fare card in perpetuity.	- Annual transportation behaviour survey to ask question about the effectiveness of pre-loaded public transit fare card in increasing transit usage and decreasing driving activity / car ownership.
Carpool Parking	Priority parking spaces are allocated to employees who carpool to and from work. Carpooling directly reduces vehicular trips by placing two or more employees in the same commuting vehicle.	Office or other employment uses, and daytime commuter parking occupants	Can be implemented at any time.	No carpool parking is allocated.	Carpool parking is provided on site in a preferential location (i.e. near the elevator or front door).	Carpool parking is provided on site in a preferential location (i.e. near the elevator or front door) and if a fee is charged for parking on site, a discount is provided to those who carpool.	A substantial amount of carpool parking is provided on site (2-5% of total parking supply) in a preferential location (i.e. near the elevator or front door) and if a fee is charged for parking on site, a discount is provided to those who carpool.	- Annual parking utilization studies to include occupancy study of carpool parking provided on-site. - Annual transportation behaviour survey to ask question about the effectiveness of carpool parking in increasing carpooling activity and decreasing driving singe occupant vehicle driving. - Coordinated ongoing effort to convert commuter/commercial parking spaces to carpool parking if on-site demand is high in relation to supply.
Bicycle Parking	The minimum bicycle parking requirements stipulated by Zoning By-law 569-2013 and Toronto Green Standard, Version 3 (TGS V3), Tier 1 must be met. To help reduce the vehicular parking requirement, TGS V3 Tier 2 requirements should be considered.	Any land use	On-site bicycle parking supply is generally allocated prior to the construction of a project although in some cases, bicycle racks can be added or unused space can be converted to a secure bicycle parking room.	The minimum bicycle parking requirements stipulated by Zoning By-law 569-2013 and Toronto Green Standard, Version 3 (TGS V3), Tier 1 are met.	The minimum bicycle parking requirements stipulated by Zoning By-law 569-2013 and Toronto Green Standard, Version 3 (TGS V3), Tier 1 are met and additional infrastructure is provided to aid navigation to the bicycle parking (e.g. dedicated bicycle ramp, bicycle elevator, etc.).	Bicycle parking is provided at least 20% in excess of the minimum requirements.	Bicycle parking is provided at least 20% in excess of the minimum requirements and additional infrastructure is provided to aid navigation to the bicycle parking (e.g. dedicated bicycle ramp, bicycle elevator, etc.).	- Annual parking utilization studies to include bicycle parking counts to determine demand. - Ongoing property management effort to find space for additional secure or non-secure parking, if demand is determined to exceed supply.
Bike Share Toronto Inclusion / Contribution	An official Bike Share Toronto station is provided on-site to facilitate cycling in the area without the need to own a bicycle. Alternatively, if the Site Plan cannot accommodate a future Bike Share Toronto station, the development proponent will make a financial contribution to the City for the provision a Bike Share Toronto station for the local area.	Any land use	Implemented during building construction or at a later date if site space allocated. Alternatively, financial contribution to be made at Site Plan Agreement stage of development process.	No Bike Share Station is provided on site.	A Bike Share Toronto Station with at least 6 bicycle parking spaces is provided on-site.	A Bike Share Toronto Station with at least 12 bicycle parking spaces is provided on-site.	A Bike Share Toronto Station with at least 12 bicycle parking spaces is provided on-site and all residents or employees are given free membership with Bike Share Toronto.	- Bike Share Toronto to share detailed ridership data with CreateTO pertaining to stations located at Housing Now sites. - Opportunities to expand on-site Bike Share Toronto stations (or add a station) to be explored if on-site demand exceeds supply.
Private Bike Fleet	In areas of Toronto where Bike Share Toronto has yet to expand, a private bike fleet operator is contracted to provide a similar service at a site.	Any land use (usually commercial)	Can be implemented at any time.	No bike fleet provider is constracted to provide service on site.	A private bike fleet operator provides bicycles to a site for use by residents / employees.	A private bike fleet operator provides bicycles to a site for use by residents / employees, with enough bicycles for 1% of residents / employees.	A private bike fleet operator provides bicycles to a site for use by residents / employees, with enough bicycles for 1% of residents / employees. The operator has a mobile app that facilitates easy check in and check out of bicycles.	- On-site property management to keep detailed record of private bike fleet program utilization. - Ongoing property management effort to increase bicycle fleet if it is determined that demand exceeds supply.
Change and Shower Facilities	City of Toronto Zoning By-law 569-2013 has a requirement for change and shower facilities for non-residential uses to promote active transportation.	Office or other employment uses	Facilities should be built during building construction but can be retrofitted at a later date.	No change and shower facilities available on site.	City of Toronto Zoning By-law 569-2013 minimum change and shower facilities requirements are met.	Change and Shower Facilities are provided in excess of the minimum requirements of City of Toronto Zoning By-law 569-2013.	Change and Shower Facilities are provided to meet LEED minimum requirements.	- Annual transportation behaviour survey to ask question about the effectiveness of on-site change and shower facilities in increasing active transportation and decreasing driving activity / car ownership.
Tier 3 - Supplementary TDM Measures				**Estimated Vehicular Trip Reduction: 0%**	**Estimated Vehicular Trip Reduction: 0.2%**	**Estimated Vehicular Trip Reduction: 0.5%**	**Estimated Vehicular Trip Reduction: 1%**	
Bicycle Repair Station	An on-site bicycle repair station (like those seen at TTC subway stations) can be provided so that cyclists can make on-site repairs.	Any land use	Can be implemented at any time; space can be allocated during construction with a indoor bicycle parking area/room.	No bicycle repair station is provided on site.	A bicycle repair station is provided in a publicly accessible area.	A bicycle repair station is provided in a secure bicycle parking room for the use of long term users (residents or employees).	A bicycle repair station is provided in a secure bicycle parking room for the use of long term users (residents or employees) and an additional bicycle repair station is provided in a publicly accessible area.	- Annual transportation behaviour survey to ask question about the effectiveness of on-site bicycle repair station in increasing cycling activity and decreasing driving activity / car ownership. - Ongoing property management effort to upgrade and/or increase on-site bicycle repair equipment if it is determined that demand exceeds supply.
Transit Information Screens	Building lobby has a television displaying real-time transit information to assist residents / employees in taking transit.	Any land use (must be located in common area)	Can be implemented at any time.	No transit screen provided on site.	A television providing real-time transit information to residents or building patrons is included in a common area.	A television providing real-time transit information to residents or building patrons is included in a common area. The television does not rotate information off the screen; transit information remains on the screen at all times.	A television providing real-time transit information to residents or building patrons is included in a common area within more than one building on the site. The television does not rotate information off the screen; transit information remains on the screen at all times.	- Annual transportation behaviour survey to ask question about the effectiveness of transit information screen in increasing transit usage and decreasing driving activity / car ownership. - Ongoing property management effort to upgrade and/or increase transit information (s) if it is determined annual transportation behaviour survey determines high effectiveness.
Travel Mode Information Package	Each new resident or employee receives a package and/or receives regular email communications informing them of the different available travel options aside from driving a personal vehicle. For entertainment venues, transportation options are communicated to all potential guests.	Any land use	Program to distribute packages should be determined prior to the launch or opening of a development project.	No travel mode information package is provided to new residents, guests, or emplyees.	Packages are available from a lobby area but are not given to all residents, guests, or employees.	Packages are distributed to all residents and employees upon moving in or starting new employment.	In addition to printed packages, all residents and employees are added to a emailing list that regularly informs of transportation options.	- Annual transportation behaviour survey to ask question about the effectiveness of transit information screen in increasing transit usage and decreasing driving activity / car ownership. - Ongoing property management effort to continually provide custom transportation information to residents and daytime commuter parkers via e-mailing lists and newsletters.
Community Marketing Outreach	An event is held around the time of building launch focused on disseminating information about sustainable travel options.	Any land use	Event should be held at the time of building launch.	No community event is held.	An event is held with the purpose of disseminating transportation information.	An event is held that is widely promoted within the building to new residents and/or employees.	An event is held that is widely promoted within the building to new residents and/or employees. The event features assistance for signing up for various TDM initiatives (i.e. car share membership).	- Annual transportation behaviour survey to ask question about the effectiveness of community marketing outreach in increasing general non-automobile activity and decreasing driving activity / car ownership. - Ongoing property management effort to schedule more community marketing outreach events for residents and daytime commuter parkers to promote non-automobile transportation options.

Notes:
1. Litman, T. (2018). Parking Pricing Implementation Guidelines: How More Efficient Parking Pricing Can Help Solve Parking and TrafficProblems, Increase Revenue, and Achieve Other Planning Objectives. Victoria Transport Policy Institute.

DISCLAIMER: The vehicular trip reduction that is associated with each TDM measure in the Guidelines Table is representative of a "theory-based approach."

Transportation Demand Management (TDM) Programming Framework - Version 6
Housing Now

Produced by: BA Group
November 2021

TDM Measures - Trip Reduction Checklist

TDM Measure	Implementation Extent			
	Level 0 - Do Nothing	Level 1 - Minimal Application	Level 2 - General Application	Level 3 - Comprehensive Application
Tier 1A - Parking Management TDM Measures AND Tier 1B - Elevated TDM Measures	**Estimated Vehicular Trip Reduction: 0% = 0 points**	**Estimated Vehicular Trip Reduction: 2% = 2 points**	**Estimated Vehicular Trip Reduction: 4% = 4 points**	**Estimated Vehicular Trip Reduction: 6% = 6 points**
Reduced Vehicular Parking Supply (Tier 1A)		No	No	No
Number of Points:	0	0	0	0
Describe:				
Strategic Parking Pricing (Tier 1A)		No	No	No
Number of Points:	0	0	0	0
Describe:				
Car-Share (Tier 1B)		No	No	No
Number of Points:	0	0	0	0
Describe:				
Free Bicycle (Tier 1B)		No	No	No
Number of Points:	0	0	0	0
Describe:				
Tiers 1A and 1B Combined Points Tally	**0**	**0**	**0**	**0**
	0			
Tier 2 - Effective TDM Measures	**Estimated Vehicular Trip Reduction: 0% = 0 points**	**Estimated Vehicular Trip Reduction: 1% = 1 point**	**Estimated Vehicular Trip Reduction: 2% = 2 points**	**Estimated Vehicular Trip Reduction: 3% = 3 points**
"Unbundle" Parking		No	No	No
Number of Points:	0	0	0	0
Describe:				
Pre-loaded Public Transit Fare Card (e.g. PRESTO)		No	No	No
Number of Points:	0	0	0	0
Describe:				
Carpool Parking		No	No	No
Number of Points:	0	0	0	0
Describe:				
Bicycle Parking		No	No	No
Number of Points:	0	0	0	0
Describe:				
Bike Share Toronto Inclusion / Contribution		No	No	No
Number of Points:	0	0	0	0
Describe:				
Private Bike Fleet		No	No	No
Number of Points:	0	0	0	0
Describe:				
Change and Shower Facilities		No	No	No
Number of Points:	0	0	0	0
Describe:				
Tier 2 Points Tally	**0**	**0**	**0**	**0**
	0			
Tier 3 - Supplementary TDM Measures	**Estimated Vehicular Trip Reduction: 0% = 0 points**	**Estimated Vehicular Trip Reduction: 0.2% = 0.2 points**	**Estimated Vehicular Trip Reduction: 0.5% = 0.5 points**	**Estimated Vehicular Trip Reduction: 1% = 1 point**
Bicycle Repair Station		No	No	No
Number of Points:	0	0	0	0
Describe:				
Transit Information Screens		No	No	No
Number of Points:	0	0	0	0
Describe:				
Travel Mode Information Package		No	No	No
Number of Points:	0	0	0	0
Describe:				
Community Marketing Outreach		No	No	No
Number of Points:	0	0	0	0
Describe:				
Tier 3 Points Tally	**0**	**0**	**0**	**0**
	0			
Does Tier 1A and 1B Combined Tally meet or exceed 8 points?	No			
Does Tier 2 Tally meet or exceed 5 points?	No			
Does Tier 3 Tally meet or exceed 2 points?	No			
Tier 1A and 1B Combined Recalibrated Points Tally (Qualified Points)	**0**			
Tier 2 Recalibrated Points Tally (Qualified Points)	**0**			
Tier 3 Recalibrated Points Tally (Qualified Points)	**0**			
TOTAL Points Tally (Qualified Points)	**0**			

RESULT

TDM Plan Vehicle Trip Reduction:
0.0%

1 point = 1% Vehicle Trip Reduction

DISCLAIMER: The vehicular trip reduction that is associated with each TDM measure in the Trip Reduction Checklist is representative of a "theory-based approach.

APPENDIX C:
Illustrative Example – Sample Site TDM Plan

SAMPLE SITE TDM PLAN (*HOUSING NOW* TDM PROGRAMMING FRAMEWORK)

TDM Measure	Description/Detail	Application Level	Number of Points
Reduced Vehicular Parking Supply	351 spaces required, 239 spaces provided = 32% parking reduction compared to By-law.	Level 2	4
Strategic Parking Pricing	Potential for "market price" commuter parking.	Level 1	2
Car-Share	2 car-share spaces provided on site, but no membership offered to residents	Level 1	2
Tier 1 – Highly Effective TDM Measures	**Does Tier 1 Tally meet or exceed 8 points?**		**8**
	Yes		
Public Transit Fare Card (e.g. PRESTO)	Pre-loaded fare card with a value equivalent to a monthly transit pass is provided.	Level 2	2
"Unbundle" Parking	Parking is unbundled from unit sales regardless of unit type.	Level 3	3
Bicycle Parking	364 spaces provided, 352 required = Requirement met and some extra facilities on site	Level 1	1
Tier 2 – Very Effective TDM Measures	**Does Tier 2 Tally meet or exceed 5 points?**		**6**
	Yes		
Bicycle Repair Station	Repair stations in each area as appropriate to achieve Level 2 reduction	Level 2	0.5
Transit Information Screens	Real-time transit screen in common area	Level 1	0.2
Travel Mode Information Package	High-quality brochures etc. promoting sustainable transport	Level 3	1
Community Marketing Outreach	TDM event upon site opening to promote initiatives	Level 2	0.5
Tier 3 - Effective TDM Measures	**Does Tier 3 Tally meet or exceed 2 points?**		**2.2**
	Yes		
TOTAL Points Tally:			**16.2 points**
TDM Plan Vehicle Trip Reduction:			**16.2%**

Through the application of the Housing Now TDM Programming Framework, it is proposed that the TDM Plan for (the sample site) will contain ten (10) TDM measures, together achieving 16.2% vehicle trip reduction.

TRANSPORTATION DEMAND MANAGEMENT

POLICY GUIDE

Prepared for
The City of Buffalo
Mayor's Office of Strategic Planning
Mayor Byron W. Brown

Adopted March 27, 2017

Produced by

FISHER
ASSOC

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Table of Contents

1.0 TDM Overview

1.1 Intent and Purpose

Transportation Demand Management, or TDM, refers to a set of strategies that are designed to increase overall transportation system efficiency by encouraging a shift from single-occupancy vehicle (SOV) trips to non-SOV modes, or shifting auto trips out of peak periods.

The concept of TDM is consistent with the City of Buffalo Comprehensive Plan, *Queen City in the 21st Century*, and *One Region Forward: A New Way to Plan for Buffalo Niagara*, particularly with regard to principles of smart growth and sustainability. The Buffalo Green Code Land Use Plan and Unified Development Ordinance (UDO) build upon these principles by encouraging compact mixed-use development, which promotes walking, biking, and transit; conserves energy; and reduces pollution.

One of the primary goals of the Green Code Land Use Plan and UDO is to reinforce Buffalo's traditional mixed-use neighborhoods. In consideration of this goal, it is important to recognize the critical relationship between transportation and land use. Developing a more sustainable transportation system will help support and reinforce the City's walkable mixed-use neighborhoods.

The *Queen City in the 21st Century* Comprehensive Plan and the Buffalo Green Code provide a vision for the City to reverse its population decline of the past several decades and to grow sustainably in the 21st century. To grow sustainably, our transportation system must align with the smart growth development regulations codified in the UDO. A sustainable transportation system facilitates multiple modes of transportation, increases occupancy per vehicle, reduces vehicle miles traveled (VMT) and resulting pollution, and provides for a safer, healthier, and more livable community. Sustainable transportation also involves managing congestion through TDM strategies and complementary public improvements, rather than through the conventional practice of increasing capacity for vehicles, which ultimately is much more costly, requires more parking, increases VMT and pollution, and impairs the fabric of the built environment and livability of traditional mixed-use neighborhoods.

Supporting a variety of modes of transportation is also important to ensure that the City is accessible for all of its residents. Buffalo has a high poverty rate (31 percent) and approximately 30 percent of households in the City do not have access to a personal vehicle. Implementing TDM strategies will help make Buffalo more affordable, accessible, and livable for all of its residents.

Buffalo enjoys a well-developed transit system, including the Metro Rail along Main Street and bus routes that align with many of the UDO's designated mixed-use neighborhood zones. Implementing TDM strategies for development projects will complement the UDO's standards by promoting alternative modes of transportation and reducing SOV trips. These strategies and other provisions within the UDO will ensure that the estimated travel demand for a proposed project does not create an unreasonable burden upon public transportation infrastructure within the adjacent neighborhood, including transit facilities and on-street parking.

In recent years, the City has taken steps toward building a more sustainable transportation system and promoting alternative modes of transportation.

- In 2008, Buffalo became the first city in New York State to adopt a complete streets policy, which ensures that public rights-of-way are designed to be safe, comfortable, and convenient for persons of all ages and abilities, using a variety of modes.
- In 2016, the City, in partnership with Go Bike Buffalo, released the City of Buffalo Bicycle Master Plan. In addition, the City set a goal of adding 10 miles of bicycle facilities per year, and to reach 150 miles by 2018, which would propel Buffalo from a Bronze- to a Silver-level bicycle-friendly community designation by the League of American Bicyclists.
- In 2017, the UDO was signed into law, a Citywide form-based zoning code that emphasizes walkability, mixed uses, transit-supportive development, and public realm standards.

As Buffalo continues to advance in the 21st century, these progressive transportation policies facilitate TDM strategies that support a more sustainable city and transportation system.

1.2 TDM Policy Guide Overview

In accordance with section 8.4.2 (A) (1) of the UDO, the methods and requirements contained within this Policy Guide are intended to ensure appropriate compliance with the TDM Plan requirements within Section 8.4 of the UDO. Each TDM Plan drafted by a development project must be consistent with this Policy Guide and the requirements of the UDO.

This Policy Guide contains methods and policies for estimating travel demand, choosing and applying TDM strategies, providing accommodations for travel demand, implementation timeframes for TDM strategies, and guidance on reporting the progress of a site's TDM Plan. This Policy Guide has been organized in to the following sections:

1.0 TDM Overview: Provides an overview that describes the intent and purpose of the TDM Policy Guide as it relates to the Green Code, the UDO, and the Comprehensive Plan.

2.0 General: Policies detailing general requirements for TDM plans completed by the applicant. These policies include applicability and exemptions from the UDO, compliance requirements, responsibility requirements, and rules of interpretation.

3.0 TDM Plan Requirements: This section includes specific requirements for each TDM Plan, including how applicants must estimate travel demand, choose and apply TDM strategies, and provide accommodations for estimated travel demand.

4.0 Approval Procedure: Overview of the approval process for an applicant's TDM plan as it relates to Major Site Plan Review and the Approval Standards for City Planning Board.

5.0 Reporting: This section includes requirements for reporting, including implementation status, strategy utilization, level of success, and any strategy adjustments.

6.0 Glossary of Terms: For the purpose of this Policy Guide, terms found throughout the Guide have been defined.

2.0 General

2.1 Applicability

In accordance with Section 8.4 of the UDO, a TDM plan must be prepared for certain development projects as follows:

A. A TDM plan is required for new construction of a principal building in excess of 5,000 square feet.

B. A TDM plan is required for substantial renovation of a principal building with a gross floor area of at least 50,000 square feet and involving a change of use.

2.2 Exemptions

A TDM plan is not required for single-unit dwellings, double-unit dwellings, or any project in a D-C, D-IL, or D-IH zone, irrespective of the applicability requirements above.

2.3 Compliance

The applicant must comply with the requirements of this Policy Guide, the UDO, and any other applicable federal, state, or local regulations. In addition, the applicant must comply with any conditions imposed by the Planning Board to meet the requirements and approval standards of this Policy Guide and the UDO.

A. Major Site Plan. A TDM plan must be reviewed and approved, approved with modifications, or disapproved by the City Planning Board as part of major site plan review per Section 11.3.7 of the UDO. No building permit or certificate of occupancy may be granted prior to TDM plan approval.

B. Qualified Professional. A TDM plan must be prepared by a qualified professional with demonstrated experience in transportation planning, traffic engineering, or comparable field.

C. UDO Standards. The TDM plan must meet all performance standards as outlined in Section 8.4.2(C) of the UDO and be prepared in accordance with this Policy Guide.

D. ADA Compliance. Notwithstanding the applicable provisions of the UDO and this Policy Guide, a TDM plan must comply with the requirements of the Americans with Disability Act (ADA). ADA parking requirements will be determined based on the result of the adjusted parking estimates for single-use and mixed-use projects found in Section 3.4 of this Policy Guide.

2.4 Responsibility

A. Burden of Proof. The applicant must include within the TDM Plan all necessary information to demonstrate that the standards and requirements of the UDO and this Policy Guide have been met.

B. Financial Burden. The responsibility and cost associated with the creation, implementation, maintenance and operation of a TDM plan will be the responsibility of the applicant or property owner associated with the proposed project.

C. Subsequent site modification. A subsequent site modification involves a change of use, increase in square footage, change to available parking, or other site modification that occurs after approval of a TDM plan, per Section 8.4 of the UDO.

1. For any subsequent site modification, a TDM plan must be adjusted to meet the standards of Section 8.4 of the UDO and requirements of this Policy Guide. The site modification and TDM plan adjustment(s) must be reflected in the required TDM reporting (see Section 5.0 of this Policy Guide).

D. Change in Ownership. An approved TDM plan will remain in effect and will become the responsibility of the new owner, upon transfer of the property. The applicant or property owner will notify the Zoning Administrator within 30 days prior to any change in ownership.

2.5 Rules of Interpretation

In instances where the standards and requirements of the UDO and this Policy Guide cannot be clearly applied to a TDM plan or any aspect of such TDM plan, the Zoning Administrator will have the authority to make an interpretation. The interpretation authority given to the Zoning Administrator is not intended to add or change the essential content of the standards and requirements of the UDO or this Policy Guide, but only to allow authoritative application of that content to specific cases.

3.0 TDM Plan Requirements

3.1 Overview

A TDM plan must be prepared in accordance with this section and include the following provisions which are described in Sections 3.2 through 3.9 below:

A. Project Information (3.2)

B. Site Inventory (3.3)

C. Travel Demand Estimate (3.4)

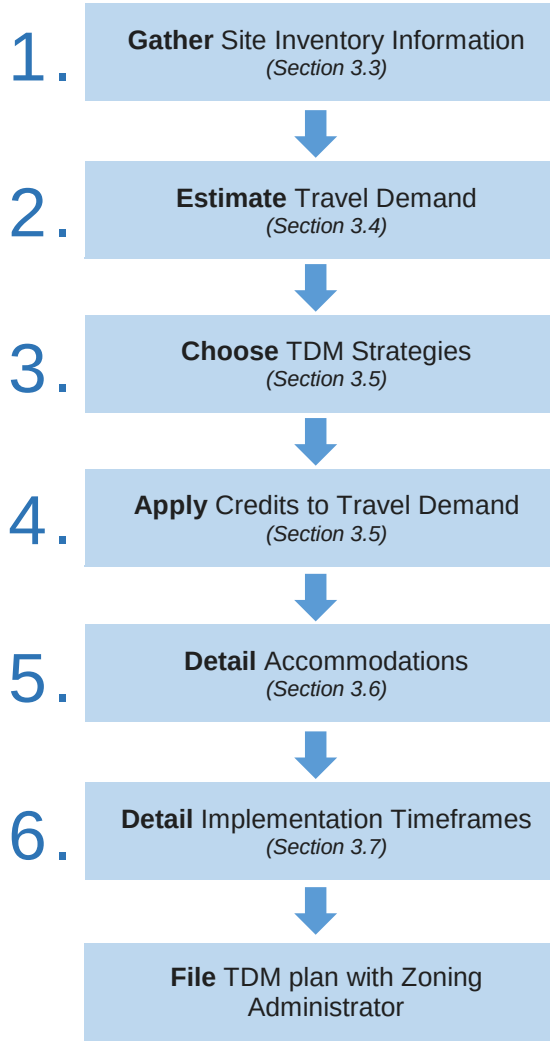
D. TDM Strategies and Objectives (3.5)

E. Travel Demand Accommodations (3.6)

F. Implementation Timeframe (3.7)

G. Commitment Statement (3.8)

H. Verification Statement (3.9)



3.2 Project Information

The following project-related information must be included in this section of the TDM Plan:

A. Project name, address

B. Owner name, address, contact

C. Preparer name, address, contact

D. General project description

3.3 Site Inventory

The site inventory describes the land use, zoning, and local transportation accommodations for the proposed project, including maps and other information, as appropriate, presented in a clear and legible format, including information sources and dates. The following sections must be included in this section of the TDM plan.

A. **Land use.** Existing and proposed land use (e.g., residential, commercial, industrial, etc,) and gross square footage and number and type of residential units (i.e. studio, one-bedroom, two-bedroom, three-bedroom, etc.) associated with on-site buildings.

B. **Users.** Existing and proposed number of employees, residents, visitors, etc. associated with the proposed project.

C. **Zoning.** Current zoning of the site.

D. **Local Transportation Accommodations.** Maps and tables showing the following within 1/4 mile (1,320 feet) of the proposed project.

1. Location of transit routes, stops, and stations.
2. Location of bicycle infrastructure, including current and planned bicycle lanes/sharrows, bicycle-share locations and number of bicycles, and publicly available bicycle parking facilities.
3. Location of any car-sharing programs and number of cars at each location.
4. Location and quantity of on-street and off-street public parking (if the project will seek to use these facilities to accommodate estimated demand). The maps/tables must include any associated time-limits or user-limits (parking permits).

3.4 Travel Demand Estimate

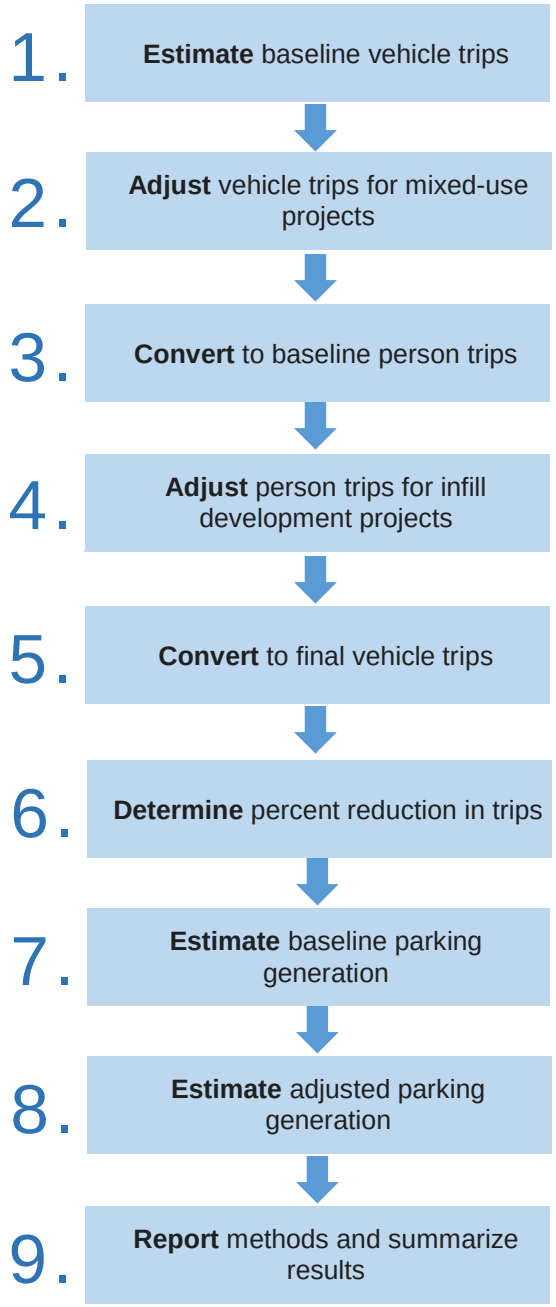
A. Purpose. In accordance with Section 8.4 of the UDO, a TDM plan must include a determination of anticipated travel demand for the proposed project. Travel demand includes vehicular, transit, and non-vehicular modes. To meet this requirement, this section of the Policy Guide also details methods for estimating parking demand.

B. Methods. The methods included within this Policy Guide were chosen based on a review of trip generation (travel demand) and parking generation (parking demand) methods from publications issued by the Institute of Transportation Engineers (ITE) and from research conducted by the National Cooperative Highway Research Program. For projects that propose shared parking, parking demand methods were chosen based on the Urban Land Institute (ULI) Shared Parking Analysis.

C. Substitutions. The methods and data sources included in this section of the Policy Guide represent the preferred methodology and must be followed by the applicant with consideration to the following data substitutions:

1. **Proxy Sites.** To offer greater flexibility and accuracy, this Policy Guide allows for applicants to use data from proxy sites. Proxy site data collection must follow the recommended steps and procedures found within the latest editions of the ITE *Trip Generation Handbook* and ITE *Trip Generation Manual*. Proxy site data that was not collected for the purposes of the proposed project's TDM plan can also be used by the applicant if the data is appropriate to the proposed project and follows the recommended steps and procedures from the latest editions of the ITE *Trip Generation Handbook* and ITE *Trip Generation Manual*. All proxy site data used for the TDM plan must be included with the TDM plan.

2. **Census Data.** If the proposed project includes residential land use, the TDM plan can utilize census data for converting that portion of baseline vehicle trips to baseline person trips (see step 3 below). Census data is available from the American Community Survey Program and can be downloaded from the American FactFinder website. The data available is specific to census tracts and specific to the means of transportation to work. The application of this census data to any non-residential land use is not appropriate for the purposes of this Policy Guide and cannot be included in the TDM plan.



3. **Other Data/Information.** Other data and/or information may be used for the purposes of estimating travel demand if sufficient justification is provided to the Office of Strategic Planning and it determines that the data and/or information is appropriate for the proposed project. This determination of appropriateness must be made before the TDM plan is prepared for staff review and submitted to the City Planning Board.

D. Justification. The qualified professional preparing the TDM plan must use his/her professional experience and judgement in applying the preferred methodology. If a substitution allowed under section 3.4.C of this Policy Guide is used to estimate travel demand, the TDM plan must include a sufficient justification to determine if the substitution is appropriate for the proposed project.

E. Preferred Methodology. For the purposes of this Policy Guide, the following steps are the preferred methodology for estimating travel demand:

Step 1: Estimate Baseline Vehicle Trips

The comprehensive datasets available in ITE *Trip Generation Manual* (latest edition) offer a breadth of data to estimate travel demand. These datasets, however, are often based on vehicle trips from primarily suburban locations. While the subsequent steps in this Policy Guide adjust this number to account for the multi-modal options available in compact urban areas, this first step is necessary to create a baseline for these future adjustments**.** Using the latest edition of ITE *Trip Generation Manual*, estimate the baseline number of vehicle-trips associated with the proposed project. The estimated number of vehicle-trips for the proposed project is determined by summing the peak hour vehicle trip generation associated with each land use as reported by ITE (Equation 1). ITE *Trip Generation Manual* and the ITE *Trip Generation Handbook* contain guidance for estimating the number of baseline vehicle-trips.

Equation 1: Baseline Vehicle-Trips

$$VehicleTrips_{BASELINE} = (VehicleTrips_{LANDUSE1} + Vehicle\ Trips_{LANDUSE2} + \cdots)$$

Where:

$VehicleTrips_{BASELINE}$ = Sum of the peak vehicle trip generation for each land use of the proposed project.

$VehicleTrips_{LANDUSE1}$ = Peak vehicle trip generation for the first land use associated with the project.

$VehicleTrips_{LANDUSE2}$ = Peak vehicle trip generation for the second land use associated with the project (if applicable).

Step 2: If the Proposed Project is Mixed-use, Adjust Baseline Vehicle Trips

If the project is not mixed-use, skip to Step 3. Otherwise, mixed-use projects have a proportion of trips that originate from one internal use to another internal use (e.g., from on-site residential to on-site commercial). To adjust for these internal trips, baseline vehicle trips from Step 1 must be reduced. Using Equation 2, baseline vehicle trips are adjusted by subtracting the estimated number of internal trips. The steps and procedures required to make this adjustment for mixed-use projects is provided in Chapter 6 of the ITE *Trip Generation Handbook* (3rd Edition).

Equation 2: Adjusted Baseline Vehicle Trips (Mixed-use projects only)

$$VehicleTrips_{ADJUSTED} = VehicleTrips_{BASELINE} - Trips_{INTERNAL}$$

Where:

$VehicleTrips_{ADJUSTED}$ =	Number of vehicle trips after internal trips have been discounted.
$VehicleTrips_{BASELINE}$ =	Number of baseline vehicle trips from step 1.
$Trips_{INTERNAL}$ =	Number of person trips that occur internal to the site. See ITE *Trip Generation Handbook* for guidance.

Step 3: Convert Vehicle Trips to Baseline Person Trips

To estimate the total number of trips associated with the proposed project, including those associated with transit, walking, and biking, vehicle-trips must be converted to person-trips. Using Equation 3, vehicle-trips are converted to person trips by using baseline mode share and a vehicle occupancy factor plus transit trips and non-vehicle trips. The steps and procedures required to make this conversion are provided in Chapter 5 of the ITE *Trip Generation Handbook* (3rd Edition).

Equation 3: Baseline Person-Trips

$$PersonTrips_{BASELINE} = [VehicleTrips \times VehicleOccupancy] + TransitTrips + NonVehicleTrips$$

Where:

$PersonTrips_{BASELINE}$ =	Baseline vehicle-trip generation from Step 1, converted to baseline person-trips by all modes of travel.
VehicleTrips =	Either baseline vehicle trips from step 1 or adjusted vehicle trips from step 2.
VehicleOccupancy =	1.4 (2009 National Household Travel Survey)
TransitTrips =	See ITE *Trip Generation Handbook* for guidance.
NonVehicleTrips =	See ITE *Trip Generation Handbook* for guidance.

Step 4: If the proposed project is "Infill Development," Adjust Person Trips

Some proposed projects may require an adjustment if they are located in compact urban areas with a greater number of pedestrians, transit riders, bicyclists, or a high rate of vehicle occupancy. These projects are often called urban infill development sites. ITE defines thresholds for a typical infill development site in Chapter 7 of the ITE *Trip Generation Handbook* (3rd Edition). If the project does not meet at least one of those thresholds, skip to step 5. Using Equation 4, baseline person trips are adjusted. The steps and procedures required to make this adjustment for infill development sites is provided in Chapter 7 of the ITE *Trip Generation Handbook* (3rd Edition).

Step 5: Convert Person Trips to Final Vehicle Trips

To estimate the final number of vehicle trips associated with the proposed project, use Equation 5 to convert person-trips to final vehicle-trips by using the mode share estimate for person trips and the vehicle occupancy factor. The steps and procedures required to make this conversion to final vehicle trips is provided in Chapter 5 of the ITE *Trip Generation Handbook* (3rd Edition).

Step 6: Determine Percent Reduction in Vehicle Trips

The percent difference between the baseline vehicles trips from step 1 and final vehicle trips from step 5 represents the difference between suburban and urban travel demand. Using Equation 6, estimate the percent reduction in vehicle trips. This percent reduction will be used to adjust the estimated baseline parking generation in step 7 to a parking generation that takes into account the multi-modal options available in compact urban areas.

Equation 4: Adjusted Person Trips (Infill Development projects only)

$$PersonTrips_{ADJUSTED} = PersonTrip_{BASELINE} +/- PersonTrips_{INFILL}$$

Where:

$PersonTrips_{ADJUSTED}$ =	Number of adjusted person trips.
$PersonTrips_{BASELINE}$ =	Either baseline person trips from step 2 or adjusted person trips from step 3.
$PersonTrips_{INFILL}$ =	See Chapter 7 of the ITE *Trip Generation Handbook* for guidance.

Equation 5: Final Vehicle Trips

$$VehicleTrips_{FINAL} = \frac{[PersonTrips \times (Percent\ Person\ Trips\ in\ Vehicles)]}{VehicleOccupancy}$$

Where:

$VehicleTrips_{FINAL}$ =	Number of person trips taken by vehicle. Vehicle person trips takes into account auto occupancy.
PersonTrips =	Either baseline person trips from step 3 or adjusted person trips from step 4.
Percent Person Trips in Vehicles =	The percent of person trips associated with vehicles from step 3 or step 4.
VehicleOccupancy =	1.4 (2009 National Household Travel Survey)

Equation 6: Percent Reduction in Vehicle Trips

$$\%ReductionTrips = \frac{VehicleTrips_{BASELINE} - VehicleTrips_{FINAL}}{VehicleTrips_{BASELINE}}$$

Where:

%ReductionTrips =	The estimated percent reduction that can be expected based upon the use of alternative modes of transportation.
$VehicleTrips_{BASELINE}$ =	Number of baseline vehicle trips from step 1.
$VehicleTrips_{FINAL}$ =	Number of final vehicle trips from step 5.

Step 7: Estimate Baseline Parking Generation

Each TDM plan must detail the travel demand accommodations for the proposed project. As vehicular travel demand results in parking demand, steps 7 and 8 detail the methods for estimating parking demand in order to determine the appropriate amount of accommodations needed for the proposed project. The methods within step 7 estimate the baseline parking generation which is adjusted in step 8.

Single-use Projects: Using the ITE *Parking Generation* (4th Edition), estimate the baseline number of parking spaces associated with the proposed project (Equation 7). The land use for the proposed project should be matched with the same or similar land use contained within ITE *Parking Generation*. The TDM plan must indicate which ITE land use category was used and provide a justification for using that category.

Mixed-use Projects: For proposed projects with more than one proposed land use, a shared parking analysis is required. Shared parking is the use of a parking facility to serve two or more individual land uses without conflict. Use the ULI Shared Parking guide, which takes into account the hourly variation of parking required for each land use, to estimate the number of parking spaces required for each proposed land use by hour of day. Using Equation 8, sum the parking demand for each land use for the hour which has the highest total parking demand.

Equation 7: Baseline Parking for Single-use Projects

$$ParkSingleUse_{BASELINE} = (Parking_{LANDUSE1})$$

Where:

$ParkSingleUse_{BASELINE}$ = Peak parking demand for the land use of the proposed project.

$Park_{LANDUSE1}$ = "Average Peak Period Parking Demand" for the land use multiplied by the independent variable (acres, gross floor area, employees, dwelling units, etc) as reported in ITE *Parking Generation*.

Equation 8: Baseline Parking for Mixed-use Projects

$$ParkMixedUse_{BASELINE} = (Park_{LANDUSE1} + Park_{LANDUSE2} + \cdots)$$

Where:

$ParkMixedUse_{BASELINE}$ = Sum of the "Average Peak Parking Demand" for each land use of the proposed project.

$Park_{LANDUSE1}$ = "Average Peak Period Parking Demand" for the first land use multiplied by the independent variable as reported in ITE Parking Generation.

$Park_{LANDUSE2}$ = "Average Peak Period Parking Demand" for the second land use multiplied by the independent variable as reported in ITE *Parking Generation*.

Step 8: Estimate Adjusted Parking Generation

As previously mentioned in Step 1, most of the data collected within ITE *Trip Generation Manual* was from suburban locations. The same is true for most of the data within ITE *Parking Generation* (4th Edition). To adjust this data to a more urban environment, the percent reduction in vehicle trips from Step 6 is used as the factor for adjusting the ITE *Parking Generation* data to a more urban environment.

For Single-use Projects: Using Equation 9, estimate adjusted parking generation for single-use projects using the baseline parking from step 7 and the estimated percent reduction in vehicle trips from step 6.

For Mixed-use Projects: Using Equation 10, estimate the adjusted parking generation for a mixed-use project by using the baseline parking estimate from step 6 and the estimated percent reduction in vehicle trips from step 6.

Step 9: Report methods and summarize results

The TDM plan must include any necessary information and calculations to demonstrate that each of the above steps have been correctly followed to provide an estimate of travel demand by mode. In addition, each TDM plan must provide a summary table showing the following:

1. Estimate of baseline vehicle trips (step 1) compared to the estimate of final vehicle trips (step 5); include the percent reduction (step 6). If proxy site data was used, compare baseline vehicle trips (step 1) to the proxy site data.
2. Estimate of person trips (step 3) or adjusted person trips (step 4) with detail showing person trips by mode.
3. Estimate of baseline parking demand (step 7) compared to the estimate of adjusted parking demand (step 8). If proxy site data is used, compare baseline parking generation to the proxy site data.

Equation 9: Adjusted Parking for Single-use Projects

$$ParkSingleUse_{ADJUSTED} = ParkSingleUse_{BASELINE} - (ParkSingleUse_{BASELINE} \times \%ReductionTrips)$$

Where:

ParkSingleUse$_{ADJUSTED}$ = Adjusted parking generation for single-use projects.

ParkSingleUse$_{BASELINE}$ = From Equation 7, baseline parking for single-use projects.

%ReductionTrips = From Equation 6, percent reduction in vehicle trips.

Equation 10: Adjusted Parking for Mixed-use Projects

$$ParkMixedUse_{ADJUSTED} = ParkMixedUse_{BASELINE} - (ParkMixedUse_{BASELINE} \times \%ReductionTrips)$$

Where:

ParkMixedUse$_{ADJUSTED}$ = Adjusted parking generation for a mixed-use projects.

ParkMixedUse$_{BASELINE}$ = From Equation 8, baseline parking for mixed-use projects.

%ReductionTrips = From Equation 6, the percent reduction in vehicle trips.

3.5 TDM Strategies and Objectives

In accordance with Section 8.4 of the UDO, a TDM plan must include strategies that are employed to reduce single-occupancy vehicle trips, reduce vehicle miles traveled by site users, and promote transportation alternatives such as walking, cycling, ridesharing, and transit.

A. Strategies. TDM Strategies listed in the UDO are detailed in Table 1 and include specific implementation requirements and credits. Strategies not included in Table 1 may be considered if sufficient information is included in the TDM plan to determine the effect/impact on the estimated final vehicular travel demand and adjusted parking demand.

B. Target. To meet the purpose and intent of Section 8.4 of the UDO, each TDM plan must, at a minimum, include TDM strategies that demonstrate a reduction in the estimated final vehicular travel demand and adjusted parking demand.

1. Proposed projects within the N-1D, N-1C, C-M zone, or within ¼ mile (1,320 feet) of a Metro Rail Station must reduce by 20%.
2. Proposed projects for all other zones, respective of the above, must reduce by 10%.

C. Credits. The credits in Table 1 represent the estimated reduction each strategy will have on the estimated final vehicular travel demand and adjusted parking demand. These credits are based on a review of published literature, a survey of TDM policies and ordinances, and guidance published by professional transportation experts.

1. For the purposes of this Policy Guide it is assumed that the credits included in Table 1 equally reduce both the estimated final vehicular travel demand (step 5 of the Policy Guide) and adjusted parking demand (step 8 of the Policy Guide). If the TDM plan estimated travel demand and/or parking demand using the alternative methods, the credits are applied to the result of those methods.
2. Where a credit in Table 1 is listed as a range or a limit, the amount of credit that can be applied is dependent on the degree of implementation and the geographic transportation context of the proposed project. This determination will be at the discretion of the City Planning Board based on the information provided in the TDM plan.
3. Each TDM Plan may propose to use a different credit than the credit associated with each TDM strategy in Table 1. The TDM plan must provide a justification for the proposed credit which including information or data validating the estimated impact on travel demand and/or parking demand.

D. Modal Share Objectives. Based on the chosen TDM strategies to reduce the estimated final vehicular travel demand and adjusted parking demand, the TDM plan must detail the modal share objectives for the proposed project. The modal share objective is the result of the credits associated with each TDM strategy on the estimated final vehicular travel demand (step 5 of the Policy Guide)**Error! Reference source not found.** and adjusted parking demand (step 8 of the Policy Guide). Alternatively, if the TDM plan estimated travel demand and/or parking demand using the alternative methods, the modal share objective is the result of the credits on those methods.

E. Requirements. To evaluate the level of effect/impact of TDM strategies on the estimated final vehicular travel demand and adjusted parking demand, the following is required to be included in the TDM plan:

1. The strategy or strategies chosen to reduce the estimated final vehicular travel demand and adjusted parking demand.
2. The degree of implementation for each strategy. The plan must include sufficient information to determine how the strategy adheres to the requirements listed in Table 1.
3. The amount of credit the applicant determined is appropriate for the degree of implementation of each chosen strategy.
4. The anticipated implementation timeframe for each chosen strategy.
5. The result of each credit on the estimated final vehicular travel demand and adjusted parking demand.

Table 1: TDM Strategy Options

Category	Strategy	Requirements	Credit
Share Programs	**1. Car-share** Car-sharing is an automobile rental service that can be used as a substitute to private car ownership. Generally, car-sharing programs have more of an impact when associated with residential projects.	**Stations.** Car-share stations must be located on the same zone lot of the proposed project site. Consider partnering with existing car-share service providers in Buffalo.	**2 trips** for each **1 car-share space**
		Membership. Employee, tenant, or resident memberships to existing car-share service providers located within ¼ mile (1,320 feet).	**1 trip** for each **1 car-share membership**
	2. Bike-share Bike-sharing is a bicycle rental service for short convenient trips and is often associated with popular destinations/neighborhoods, major bicycle transit corridors, or transportation centers. Bike-share strategies include providing direct access through a bike-share station or through a bike-share membership to an existing local service.	**Stations.** Bike-share stations must be located in the same building, on the same proposed project site, or in the public right-of-way abutting the site. Consider partnering with existing bike-share service providers in Buffalo.	**1 trip** for each **5 bike-share spaces**
		Membership. Employee, tenant, or resident memberships to existing bike-share service providers located within ¼ mile (1,320 feet).	**1 trip** for each **5 bike-share memberships**
Promotion and Outreach	**3. Promotion and Education** Providing direct information regarding TDM opportunities and incentives to increase awareness and participation.	Promotion and education material must be tailored to the TDM opportunities and incentives available at the project site and include all available information associated with those opportunities and incentives. This information must be kept up-to-date, be made available in a highly visible location, and be provided directly to any new employee, resident, or tenant.	**Up to 2%**
Employee Incentives and Programs	**4. Alternative/flexible work schedules** Alternative/flexible work schedules aids the distribution of travel demand from peak periods. They are often referred to as flextime, compressed work week, or staggered shifts. Telecommuting is also considered as part of this strategy.	Information regarding the availability of these options must be made available in a highly visible location and provided directly to any new employee.	**Up to 2%**

Category	Strategy	Requirements	Credit
Employee Incentives and Programs (continued)	**5. Transit Pass** Subsidies offer free or reduced price transit passes to employees of the project site and provide a direct incentive to use an alternative mode.	A transit pass subsidy can be for a 7-day pass, 30-day pass, monthly pass, or Paratransit Access Line (PAL) pass. Passes must be renewed monthly. Use of the pass is at the discretion of the employee.	**Number of trips =** number of passes multiplied by % of subsidy (Example: 5 passes @ 20% subsidy = 1 trip)
	6. "Live near your work" programs "Live near your work' programs consist of financial incentives for an employee to buy or rent a home close to their place of work.	Incentives and benefits offered to employees must consist of financial assistance for closing costs, moving expenses, or an adjustment in base compensation. Any home or rental unit within 1 mile of the employee's place of work qualifies for a "live near your work" program.	**1 trip** for each employee that utilizes program
	7. Guaranteed ride home (GRH) A guaranteed ride home (GRH) program provides the opportunity for an employee to travel home after working unexpectedly late or due to a family emergency.	The guaranteed ride home program can be implemented through car-share membership, taxi service, or on-demand ride-share. The program is intended to be used by employees that already use an alternative mode but need a guarantee for a ride home. The program must be free-of-charge to any employee, but can be capped per employee at 5 times/uses per year.	**Up to 2%**
Enhanced Design Amenities	**8. Roadway Improvements** Roadway improvements adjacent to the site that help encourage transportation alternatives. Improvements include additional streetscape elements or infrastructure improvements within the public right-of-way that would increase the safety, accessibility, convenience, or attractiveness for a person walking.	Roadway improvements must comply with UDO Article 10, Transportation Network, and any other applicable standards in the UDO and other local, state, and federal regulations. These improvements must be for encouraging transportation alternatives for transit riders, pedestrians, and bicyclists.	**Up to 4%**

Category	Strategy	Requirements	Credit
Enhanced Design Amenities (continued)	**9. Bicycle Facilities and Services** Providing bicycle facilities and services increases the convenience, security, and appeal of bicycle use. Strategies for bicycle facilities and services should be considered together to enhance their effectiveness and should be consistent with the UDO and Buffalo Bicycle Master Plan.	**Parking.** Only bicycle parking spaces in excess of the minimum required Section 8.2 of the UDO qualify for the TDM Credit.	**1 trip** for each **5 bike spaces**
		Shower facilities and lockers. Shower facilities and lockers must be conveniently located to bicycle parking facilities.	**Up to 4%**
		Repair station. A bicycle repair station must be located in a designated and secure location with bicycle maintenance tools and supplies that could be used for emergency repair or maintenance. These tools and supplies include a bicycle tire pump, wrenches, chain tool, lubricants, hex keys, Allen wrenches, torx keys, screwdrivers, spoke wrenches, etc.	**1%**
	10. Transit Facilities Enhanced transit facilities can increase the comfort, convenience, accessibility, or safety of transit riders. These improvements increase the appeal of using transit and should be considered in conjunction with bicycle parking strategies.	Enhanced transit facilities can consist of bus shelters, seating, lighting, or other improvements. Transit facility improvements must be coordinated with the NFTA and may require appropriate right-of-way approvals found in Section 11.4 of the UDO.	**Up to 4%**
High Occupancy	**11. Shuttles (Buspool)** Transit-to-work shuttles provide the project site's residents, tenants, and/or employees transit service to local residential areas, commercial centers, or transit hubs.	Shuttles must be provided free-of-charge, not replicate any NFTA transit route, operate during peak travel times from 7AM-9AM and 4PM-6PM with a 15-minute headways, and during off-peak times until at least 8PM with a 30-minute headways. Shuttle routes, stop locations, and schedules must be posted in highly visible locations. A shuttle program would require a designated TDM Coordinator. The amount of credit to be applied to the site's estimated travel demand is based on the frequency and quality of service provided.	**Up to 10%**
	12. Vanpool A vanpool program provides employees of the project site with direct service from the site to their place of residence.	Vanpool service may not replicate any NFTA transit route and requires a designated TDM Coordinator (specified below).	**Up to 5%**

Category	Strategy	Requirements	Credit
High Occupancy (continued)	**13. Carpool** Carpool programs generally operate using employees own cars to pick up fellow employees while traveling to work. These programs offer ease of implementation but can incur direct costs to employees.	Employee vehicles associated with a carpool program should be given preferred parking located close to the main entrance of the principal building and/or be offered parking discounts if the site has unbundled parking. Information regarding the availability of carpool must be made available in a highly visible location and provided directly to any new employee. The financial cost of the carpool is the responsibility of the employees in the carpool. A carpool program would require a designated TDM Coordinator (specified below).	**2%**
Parking Management	**14. Shared-Parking** Shared parking facilities are used by multiple users, destinations, and/or land uses.	Shared parking facilities must be located within ¼ mile (1,320 feet). Other requirements for shared-parking arrangements are included in section 3.6.1 of this Policy Guide.	**Up to 10%**
	15. Parking Cash-out Parking cash-out programs offer cash alternatives to subsidized parking for employees.	Any employer that subsidizes for its employee's parking space shall provide the employee the option of forgoing the subsidy for a cash payment equivalent to the cost associated with the parking space. The cash-out value associated with the parking space can be up to one-year in duration.	**Up to 10%**
	16. Unbundled Parking Parking sold or rented separately from building space for the life of the property.	Unbundled spaces would be required to be sold or rented separately from the building space at market-rate. The rental or purchase of a parking space would be at the discretion and direct cost of the employee, tenant, or resident.	**Up to 10%**

Category	Strategy	Requirements	Credit
TDM Management	**17. TDM Coordinator** The TDM Coordinator has the responsibility of coordinating and implementing the strategies within the TDM plan.	The coordinator may be an employee or a contracted third-party (transportation brokerage service).	**2%**
	18. Membership in a Transportation Management Association (TMA) Transportation Management Associations (TMAs) are non-profit, member-controlled organizations that provide transportation services in a particular area, such as a commercial district, mall, medical center or industrial park. They are often public-private partnerships and generally consist of area businesses, organizations, and government agencies.	Requirements of the TMA would be determined by the public-private partnership and should include the institutional structure to implement various TDM strategies. To receive credits, active participation in the TMA and coordination with TMA partners in pursuing TDM strategies for the area and the project site, is required.	**2%**

3.6 Travel Demand Accommodations

In accordance with Section 8.4 of the UDO, a TDM plan must detail how the anticipated travel demand for the proposed project will be met. In addition, the TDM plan must demonstrate how travel demand will be met without placing an unreasonable burden on public infrastructure and the surrounding neighborhood.

3.6.1 Vehicle Parking Accommodations

A. Vehicle Parking Demand. The amount of vehicle parking the proposed project must accommodate is based on the modal share objectives described in section 3.5.D of this Policy Guide.

B. Accommodations. The TDM plan must detail how the parking for the proposed project will be met on-site and/or off-site, including the number of on-street spaces, off-street spaces, shared parking arrangements, and ADA accessible spaces.

C. Public Parking Facilities. Any applicant that proposes to utilize on-street and/or off-street public parking facilities to meet their modal share objective must conduct a parking utilization count. The utilization count determines the amount of public parking that could be utilized without placing an unreasonable burden on the neighborhood. The parking utilization count must be included with the TDM plan and meet the following requirements:

1. **Study Area.** The maximum area that can be considered for the utilization count is defined as ¼ mile (1,320 feet) from the proposed project site.
2. **Parking Infrastructure.** Data collected must include the location and quantity of any public parking space that is being considered for accommodating the site's modal share objective. Data collected must include documentation of any regulatory parking signage and/or parking fees.
3. **Utilization Counts.** Utilization counts must be completed during the peak hour(s) and days associated with each land use of the proposed project. Peak hours associated with various land uses are provided in ITE *Trip Generation Manual* (latest edition). Utilization counts must be completed for at least two counting periods per land use.
4. **Threshold.** Parking facilities could be considered for accommodating the project's modal share objective if the facility's utilization counts are below 75% for the corresponding peak hours associated with each land use of the proposed project.
5. **Limit.** A TDM plan can propose to use public parking facilities up to 85% utilization for the corresponding peak hours associated with each land use of the proposed project.

D. Shared Parking. If shared parking is utilized to meet the modal share objectives for the proposed project in whole or in part, the TDM plan must include documentation that provides evidence of compliance with the estimates calculated in accordance with this Policy Guide. Evidence provided with the TDM plan may include but is not limited to, executed agreements with, or correspondence from, a third party parking provider or other documentation deemed appropriate by the City Planning Board. Evidence must also specify the number of parking spaces being provided to meet the estimated parking demand.

E. Over-providing. If the proposed project seeks to provide at least 10% more vehicular parking spaces than the modal share objective, the TDM plan must include a written justification based on at least one of the following criteria:

1. Additional parking will be available for unrestricted-use by the general public. The TDM plan must include evidence supporting the need for public parking.
2. Additional parking will be utilized as part of a shared-parking agreement associated with another location. The TDM plan must include documentation of the shared parking agreement.
3. Additional parking will be utilized to accommodate parking for another location owned by the applicant. Evidence must be provided that shows the other location has a parking deficiency (beyond 85% utilization).
4. Additional parking is deemed necessary due to the unique characteristics of the users or the activity of the site. Justification must describe the unique characteristic(s) and provide sufficient evidence to justify the proposed additional parking.
5. Additional parking is deemed necessary based on the applicant's previous experience with developing the same or similar use. Sufficient evidence must be provided to justify the additional parking.

F. **Under-providing.** If the proposed project seeks to provide at least 10% fewer vehicular parking spaces than the modal share objective, the TDM plan must include a written justification based on at least one of the following criteria.

1. The number of vehicular parking spaces estimated is deemed unnecessary due to the unique characteristics of the users or the activity of the site. Justification must describe the unique characteristic(s) and include sufficient evidence to justify the reduced parking.
2. Fewer parking spaces will be needed based on the applicant's previous experience with developing the same or similar use. Sufficient evidence must be provided to justify the reduced parking.
3. The project site is constrained and the provision of additional parking would substantially hinder the potential for reasonable development. In such cases, the applicant must demonstrate that considerable efforts have been made to minimize vehicular travel through TDM strategies and how the under-provision of parking will not create an unreasonable burden on public infrastructure and the surrounding neighborhood.

3.6.2 Bicycle Parking Accommodations

A. **Minimum Bicycle Parking Requirements.** The TDM plan must meet the bicycle parking standards and requirements of Section 8.2 of the UDO and detail how those bicycle parking spaces will be accommodated by the proposed project. This includes describing provisions for short-term and long-term bicycle parking spaces.

B. **Additional Bicycle Parking Accommodations.** If a TDM plan includes TDM strategy #9 (Bicycle Parking and Facilities), the plan must detail the accommodations for short-term and long-term spaces that will be provided above the minimum standards. Where appropriate, these accommodations must be included on the site plans submitted for the proposed project. These spaces, in excess of the minimum bicycle parking requirements, must meet the standards and requirements of Section 8.2 of the UDO.

3.6.3 Transit and Pedestrian Accommodations

A. **Pedestrian Access.** The TDM plan must meet the pedestrian access standards and requirements of Section 8.1 of the UDO.

B. **Accommodations.** The TDM plan must detail the accommodations for pedestrians and transit-riders. These accommodations must take into consideration the intent and purpose of the UDO, this Policy Guide, and recommended practices of the National Association of City Transportation Officials (NACTO) or other similar transportation planning organizations.

3.7 Implementation Requirements

A. **TDM Strategies.** The TDM plan must detail the implementation timeframe for each TDM strategy included for the proposed project.

1. If the TDM plan includes strategies 8, 9, or 10 (Enhanced Design Amenities), these strategies must be available for use by employees, residents, customers, visitors, etc. at the time the certificate of occupancy is issued by the Department of Permit and Inspection Services for the proposed project.
2. Any other TDM strategy not described above, but included within the TDM plan, must be implemented by the applicant or property owner within six (6) months of the issuance of the certificate of occupancy by the Department of Permit and Inspection Services for the proposed project.

B. **Travel Demand Accommodations.** The accommodations for travel demand as detailed within the TDM plan must be available for use by employees, residents, customers, visitors, etc. at the time the certificate of occupancy is issued by the Department of Permit and Inspection Services for the proposed project.

3.8 Commitment Statement

The TDM plan must include a signed commitment statement from the property owner acknowledging the following:

A. Responsibility and cost associated with the TDM plan's implementation and maintenance will be the responsibility of the property owner.

B. The property owner will ensure the implementation of all of the elements included within the TDM plan as approved by the City Planning Board within the defined timeframe described in this Policy Guide.

C. The property owner will maintain records associated with the implementation and maintenance of the TDM plan.

D. The property owner will allow the City to inspect TDM facilities included in the approved TDM plan and to audit any TDM implementation and maintenance records.

E. The property owner will notify the Zoning Administrator within 30 days prior to any change in ownership of the property subject to the approved TDM plan.

F. The property owner will adjust the TDM plan, as appropriate, for any subsequent site modification (per Section 2.4.C of this Policy Guide) and will reflect such subsequent site modification and TDM plan adjustments in the required TDM reporting (per Section 5.0 of this Policy Guide).

3.9 Verification Statement

The TDM plan must include a verification statement signed by the preparer that includes the following:

A. A brief description of the preparer's credentials and experience related to transportation planning, transportation engineering, or comparable field.

B. Verification that the TDM plan was prepared in compliance with the UDO and this Policy Guide.

4.0 Approval Procedure

4.1 Procedure

The TDM plan must be submitted as part of a major site plan review application. Section 11.3.7 of the UDO outlines the review and approval procedure for major site plan review.

4.2 TDM Performance Standards

As described in section 8.4 of the UDO, in making its decision, the City Planning Board must make written findings of fact on the following matters:

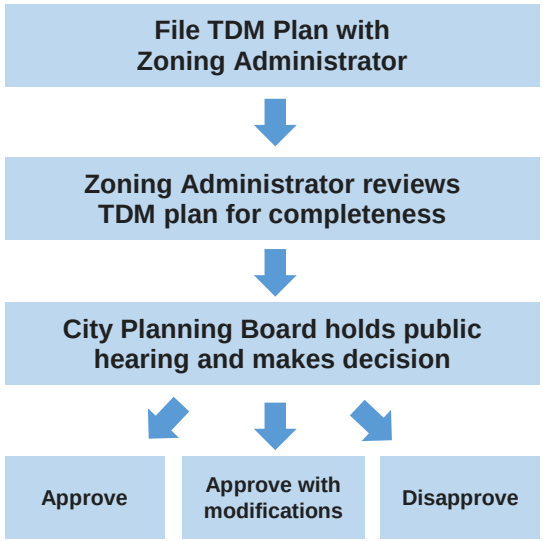
A. The project includes performance objectives to minimize single-occupancy vehicle trips and maximize the utilization of transportation alternatives to the extent practicable, taking into account the opportunities and constraints of the site and the nature of the development.

B. The project must meet the anticipated transportation demand without placing an unreasonable burden on public infrastructure, such as transit and on-street parking facilities, and the surrounding neighborhood.

4.3 Approval Standards

The City Planning Board must make written findings of fact based on the approval standards for major site plan review, per Section 11.3.7.G of the UDO, which includes the following criterion:

> The project will be located, designed, and/or managed to meet its anticipated travel demand, and will include reasonable efforts to minimize single-occupancy vehicle trips, reduce vehicle miles travelled, and promote transportation alternatives. If required by this Ordinance, a TDM plan must be approved by the City Planning Board as evidence of the project meeting this criterion.



5.0 Reporting

5.1 Reporting Requirement

A. The property owner responsible for development and implementation of a TDM plan will be required to ensure compliance with the reporting requirements of this section.

B. Upon approval of the TDM plan and issuance of a certificate of occupancy by the Department of Permit and Inspection Services, the property owner will be required to file status reports with the Zoning Administrator to demonstrate compliance with the TDM requirements of Section 8.4 of the UDO and this Policy Guide.

5.2 Implementation Status Report

A. Applicability. All projects with an approved TDM plan.

B. Timeframe. Within 30 calendar days of the six (6) month anniversary of issuance of the certificate of occupancy by the Department of Permit and Inspection Services.

C. Requirement. The applicant or property owner must submit a report to the Zoning Administrator documenting the implementation status of all TDM strategies included in the approved TDM plan. The report must include the following:

1. Brief summary (preferably in tabular format) of each TDM strategy included in the TDM plan and the implementation status of each strategy.
2. Verification statement verifying that all TDM strategies have been implemented. For any strategy that has not been fully implemented, an explanation detailing the reason(s) why the strategy has not been fully implemented and the expected implementation timeframe are required.
3. Supplemental documentation demonstrating compliance with implementation, as appropriate.

5.3 Brief Status Report

A. Applicability. Projects involving less than 50,000 square feet of gross floor area of new construction of a principal building.

B. Timeframe. Within 30 calendar days of the two (2) year anniversary of issuance of the certificate of occupancy by the Department of Permit and Inspection Services and on a bi-annual basis thereafter.

1. Upon the 10 year anniversary of the issuance of the certificate of occupancy, if the owner of the site has consistently complied with the standards of Section 8.4 of the UDO and the requirements of this Policy Guide, the Zoning Administrator may waive the requirement for future TDM plan reports for the site.

C. Requirement. The applicant or property owner must submit a report to the Zoning Administrator which includes the following:

1. Utilization and performance summary of all TDM strategies included in the approved TDM plan. Include any supplemental documentation demonstrating compliance with the TDM plan and the utilization of TDM strategies, as appropriate.
2. Based on the utilization and performance summary, the status report must determine if any TDM strategies need adjustment or if additional TDM strategies are necessary to maximize the utilization of alternative modes. If any adjustments or additions are identified, the status report must include a description and implementation timeframe.

5.4 Comprehensive Status Report

A. Applicability. Projects with a gross floor area of at least 50,000 square feet, including new construction and renovation.

B. Timeframe. Within 30 calendar days of the two (2) year anniversary of issuance of the certificate of occupancy by the Department of Permit and Inspection Services and on a bi-annual basis thereafter.

1. Upon the 10 year anniversary of the issuance of the certificate of occupancy, if the owner of the site has consistently complied with the standards of Section 8.4 of the UDO and the requirements of this Policy Guide, the Zoning Administrator may waive the requirement for future TDM plan reports for the site.

C. Requirement. The applicant or property owner must submit a report to the Zoning Administrator which includes the following:

1. Utilization and performance summary of all TDM strategies included in the approved TDM plan. Include any

supplemental documentation demonstrating compliance with the TDM plan and the utilization of TDM strategies, as appropriate.

2. Based on the utilization and performance summary, the status report must determine if any TDM strategies need adjustment or if additional TDM strategies are necessary to maximize the utilization of alternative modes. If any adjustments or additions are identified, the status report must include a description and implementation timeframe.

3. A comparison of estimated travel demand from the TDM plan with actual travel demand. Each comprehensive status report must include a summary of bi-annually collected data for the actual travel demand by mode for the project. The method used to determine actual travel demand by mode must follow the recommended steps and procedures in ITE *Trip Generation Handbook* (3rd Edition).

4. Based on the comparison of estimated versus actual travel demand, the status report must determine if the modal share objectives from the TDM plan have been met. If the modal share objectives have not been met, the status report must include TDM strategy adjustments or additions, including implementation timeframes, that will be implemented to meet modal share objectives.5.5 TDM Plan Updates

5.5 TDM Plan Updates

As indicated in section 2.4 of this Policy Guide, Subsequent Site Modification, an owner must update the TDM plan to reflect current conditions. For any subsequent site modification, the TDM plan must be appropriately updated to comply with the standards and requirements of the UDO and this Policy Guide, as follows:

A. For any subsequent site modification, a TDM plan must be adjusted to meet the standards and requirements of Section 8.4 of the UDO and the requirements of this Policy Guide. The site modification and TDM plan adjustment(s) must be reflected in the required bi-annual TDM status report (see Section 5.3 of this Policy Guide).

6.0 Glossary of Terms

Alternative Transportation: The use of modes of transportation other than the single passenger motor vehicle including but not limited to carpools, vanpools, buspools, public transit, walking, and bicycling.

Applicant: A property owner, a person holding an option or contract to purchase a property, or any other person authorized in writing to act for such persons, who submits an application under the provisions of the UDO.

Bicycle Parking, Long-Term: Long-term bicycle parking accommodates employees, students, residents, commuters, and other persons who intend to leave their bicycle parked for more than two hours. Fixtures include lockers and bicycle racks in secured areas, and are always sheltered or enclosed.

Bicycle Parking, Short-Term: Short-term bicycle parking accommodates visitors, customers, messengers, and other persons who intend to depart within two hours or less. Fixtures include bicycle racks, which may be unsheltered.

Bicycle repair station: A facility located in a designated and secure location with bicycle maintenance tools and supplies that could be used for emergency repair or maintenance. These tools and supplies include a bicycle tire pump, wrenches, chain tool, lubricants, hex keys, Allen wrenches, torx keys, screwdrivers, spoke wrenches, etc**.**

Bike-Share: A bicycle rental service for short convenient trips and are often associated with popular destinations/neighborhoods, major bicycle transit corridors, or transportation centers. Bike-share strategies include providing direct access through a bike-share station or through a bike-share membership to an existing local service.

Carpool: A vehicle carrying two (2) to six (6) persons commuting together to and from work on a regular basis.

Car-Share Service: A mobility enhancement service that provides an integrated citywide network of neighborhood-based motor vehicles available only to members by reservation on an hourly basis, or in smaller intervals, and at variable rates. Car-share vehicles must be located at unstaffed, self-service locations (other than any incidental garage valet service), and generally be available for pick-up by members 24 hours per day.

Change of Use: A change of gross floor area from one category of use to another category of use listed in the UDO use table for the zoning district of the subject lot.

Commitment Statement: A signed statement included in the TDM plan pursuant to Section 3.8 of this Policy Guide indicating an applicant's or property owner's acknowledgment that he/she will be responsible for costs associated with the plan's cost for implementation and maintenance, adherence to implementation timeframes, recordkeeping, access for inspections, and change in ownership notification.

Development Project or Project: New construction of a principal building in excess of 5,000 square feet or substantial renovation of a principal building with a gross floor area of at least 50,000 square feet and involving a change of use.

Enhanced transit facilities: Bus shelters, seating, lighting, or other improvements to enhance transit user experience.

Guaranteed ride home (GRH): A program that can be implemented through car-share membership, taxi service, or on-demand ride-share and that is intended to be used by employees that already use an alternative mode but need a guarantee for a ride home. The program must be free-of-charge to any employee, but can be capped per employee at 5 times/uses per year.

Infill Development: A development site located in a fully developed urbanized area, often with different interactive land uses and with good pedestrian and vehicular connectivity, and served by convenient/frequent transit and/or designated bicycle facilities.

Live near your work program: Financial incentives provided to an employee to buy or rent a home close to their place of work.

Major Site Plan Review: The discretionary review of the site configuration and architectural design of projects which, due to their magnitude, are more likely to have significant impacts on their surroundings. Major site plan review is required for

Mixed-Use Project/Development: An integrated development (usually master planned) consisting of at least two complimentary and interactive land uses designed to foster synergy among activities generated by the land uses. Some trips are between on-site land uses and do not travel on off-site streets. A mixed-use development may also be referred to as a multi-use development.

Modal Share Objective: The result of the TDM credits associated with each TDM strategy on the estimated final vehicular travel demand (step 5 of the Policy Guide)**Error! Reference source not found.** and adjusted parking demand (step 9 or 10 of the Policy Guide). Alternatively, if the TDM plan estimated travel demand and/or parking demand using the alternative methods, the model share objective is the result of the credits on those methods.

Parking Cash-out: A program offered to employees that include cash alternatives to subsidized parking.

Parking Utilization Counts: A process involving counting on-street and/or off-street public parking facilities to determine the amount of public parking that could be utilized without placing an unreasonable burden on the neighborhood.

Person Trip: A trip made by any mode of travel by an individual person from an origin to a destination. Every trip made anywhere by a person is a person trip. If three people leave a development site in a single vehicle, this is counted as three person trips.

Property Owner: See "Applicant" definition.

Proxy Sites: A development site with the same land use characteristics, similar size (in terms of the independent variable), and comparable setting (area type, density, compactness or land coverage, parking availability, access to land use diversity, transit service or availability, or apparent vitality) as the study site.

Public Parking Facility: A publicly-owned lot, street, garage, building or structure or combination or portion thereof, on or in which motor vehicles are parked.

Qualified Professional: A person with demonstrated experience in transportation planning, traffic engineering, or comparable field.

Roadway Improvements: Improvements adjacent to a development project site that help encourage transportation alternatives. Improvements may include additional streetscape elements or infrastructure improvements within the public right-of-way that would increase the safety, accessibility, convenience, or attractiveness for a person walking.

Shared Parking: The use of a parking facility to serve two or more individual land uses without conflict. Shared parking arrangements utilize the available parking spaces by multiple uses within the proposed project.

Shuttles (Buspool): A vehicle carrying 16 or more passengers commuting on a regular basis to and from work with a fixed route, according to a fixed schedule.

Single-Occupancy Vehicle (SOV): A privately operated vehicle used primarily for personal travel, daily commuting and for running errands and whose only occupant is the driver. The definition excludes human-powered vehicles such as bicycles.

Single-Use Project: A development project that involves a single land use (e.g., residential, commercial, industrial).

Status Report, Brief: A status report prepared pursuant to Section 5.3 of this Policy Guide for projects involving a gross floor area of less than 50,000 square feet of new construction of a principal building.

Status Report, Comprehensive: A status report prepared pursuant to Section 5.4 of this Policy Guide for projects involving a gross floor area of at least 50,000 square feet of new construction of a principal building.

Subsequent site modification: A change of use, increase in square footage, change to available parking, or other site modification that occurs after approval of a TDM plan by the City Planning Board.

TDM Coordinator: A person having the responsibility of coordinating and implementing the TDM strategies included within the TDM plan.

TDM Credits: The estimated reduction each strategy would have on the estimated final vehicular travel demand and adjusted parking demand.

TDM Plan: A plan prepared pursuant to Section 8.4.2 of the UDO and this Policy Guide that details a development project, its site inventory, estimated travel demand, TDM strategies, travel demand accommodations, implementation requirements, and reporting requirements.

TDM Strategies: Strategies that are employed to reduce single-occupancy vehicle trips, reduce vehicle miles traveled by site users, and promote transportation alternatives such as walking, cycling, ridesharing, and transit.

Transit Pass: A pass that provides riders with unlimited use of the local transit system. This is typically provided to employees of a development project and provides a direct incentive to use an alternative mode of travel.

Transportation Demand Management (TDM): The alteration of travel behavior - usually on the part of commuters - through programs of incentives, services, and policies. TDM addresses alternatives to single-occupancy vehicles such as carpooling and vanpooling, and changes in work schedules that move trips out of the peak period or eliminate them altogether (as is the case in telecommuting or compressed work weeks).

Transportation Management Association (TMA): An organized group, often legally constituted with a financial dues structure, applying carefully selected approaches to achieving mobility and air quality goals within a designated area.

Unbundled Parking: Parking sold or rented separately from building space for the life of the property.

Vanpool: A vehicle carrying seven (7) or more persons commuting together to and from work on a regular basis, usually in a vehicle with a seating arrangement designed to carry seven (7) to 15 adult passengers, and on a prepaid subscription basis.

Vehicle Miles Traveled: A measure of the amount and distance that a Development Project causes people to drive.

Vehicle Trip: An inbound or outbound person trip that crosses the site cordon line in a personal passenger vehicle or truck, or that crosses the site cordon line as a pedestrian to or from a personal passenger vehicle or truck. If, for example, a person drives a personal passenger vehicle from home, parks off-site, and walks from parking facility to an office building, the trip (at both ends) is considered a vehicle trip.

Vehicle Trip, Baseline: Vehicle trips estimated with the aid of *Trip Generation Handbook* methodologies to represent the estimated vehicle trips at baseline sites. These baseline trips are converted to baseline person trips and then adjusted using study site vehicle occupancy and mode share assumptions in order to estimate vehicle trip generation at a multimodal study site.

Verification Statement: A signed statement included in the TDM plan pursuant to Section 3.9 of this Policy Guide indicating the TDM plan preparer's acknowledgment that he/she is a qualified professional with demonstrated experience in transportation planning, traffic engineering, or a comparable field, and that the TDM plan was prepared in compliance with the UDO and this Policy Guide.

Written Findings of Fact: A written narrative that documents whether a TDM plan meets the City Planning Board's TDM performance standards and Major Site Plan Review approval standards of sections 8.4.2.C. and 11.3.7.G.6.of the UDO, respectively.

APPENDIX

I NON-AUTO MULTI-MODAL LOS CRITERIA

Table 2 summarizes the level of service evaluation requirement for the automobile mode.

Table 2 - Automobile Level of Service Criteria (Signalized Intersection)

Level of Service	Delay (seconds/veh)	V/C
A	≤10	0 to 0.60
B	>10-20	0.61 to 0.70
C	>20-35	0.71 to 0.80
D	>35-55	0.81 to 0.90
E	>55-80	0.91 to 1.00
F	>80	>1.00

Table 3 illustrates an example of automobile level of service criteria for signalized intersections.

Table 3 - Automobile Level of Service Summary

Intersection	Existing Conditions LOS (delay in seconds) Critical Movement[1] [v/c ratio]	Future Conditions LOS (delay in seconds) Critical Movement[1] [v/c ratio]
Main Street/ Street A	C (22) SB T: [0.90] NB L: [0.95]	E (58) SB T: [1.11] NB L: [0.96]
Main Street/ Street B	B (15) No Critical Movement	C (23) No Critical Movement
Main Street/ Street C	A (3) No Critical Movement	E (70) SB T: [1.16] NB L: [0.98]

Note: SB T = Southbound Through
NB L = Northbound Left

It should be noted that all detailed analyses or supporting information related to the level of service calculations or observations for automobile mode should be included in the appendices.

1.10.3 Transit performance evaluation requirement

When performing the intersection capacity analysis, transportation specialists should also consider transit vehicles, especially when transit vehicles share the same facilities as automobiles. The intersection capacity analysis should consider the frequency of transit vehicle stops and whether the intersection would be able to accommodate the scheduled transit service frequency.

There are three required criteria for the transit mode level of service performance: 1) access to the transit stops, 2) transit headways and 3) transit vehicle performance at the intersection approach. Where there are more than one intersection within the study area, the most critical intersection approach should be identified and LOS indicated for each intersection. All of these criteria should be completed and included in the Transportation Mobility Plan Study.

Transit LOS Target: C or better for Access to Transit Stops and Transit Headways. LOS D or better for Intersection Approach.

Table 4 summarizes the level of service criteria for the transit mode.

Table 4 - Transit Level of Service Criteria

Level of Service	Access to Transit Stops	Transit Headways	Intersection Approach (transit or curb lanes)	
			Delay (seconds/ veh)	V/C
A	90% within ≤200 m	≤5 minutes	≤10	0 to 0.60
B	90% within ≤500m and 70% within ≤200	>5-10 minutes	>10-20	0.61 to 0.70
C	90% within ≤500m and 50% within ≤200m	>10-15 minutes	>20-35	0.71 to 0.80
D	100% within ≤600m	>15-20 minutes	>35-55	0.81 to 0.90
E	100% within ≤800m	>20-30 minutes	>55-80	0.91 to 1.00
F	100% >800m	>30 minutes	>80	>1.00

Definitions

Access: development's potential transit riders' straight line walking distance to transit stops

Stops: bus stops, rapid transit stations, subway stations, RER/GO Train/Bus stations

Transit headway: time interval between transit vehicles for a transit corridor

Intersection Approach: critical lane group or curb lane with transit vehicles approaching an intersection

Transit or curb lanes: general purpose lane or curb lane where buses will operate

Table 5 illustrates the example of transit level of service.

Table 5 - Transit Level of Service Summary

Transit Stop Location	Direction	Access to Transit Stops	Transit Headways	Intersection Approach (transit or curb lanes)
		LOS	LOS	LOS
Main Street/ Street A	Eastbound	C	D	D
	Westbound	C	D	D
	Northbound	C	C	C
	Southbound	C	C	C
Main Street/ Street B	Eastbound	B	D	D
	Northbound	B	C	C
	Southbound	B	C	C

All detailed analyses or supporting information related to the level of service calculations or observations for transit mode should be included in the appendices.

1.10.4 Pedestrian performance evaluation requirement

Walking can be a mode of choice for short trips such as going to transit stations, schools, running errands, and going to work. As pedestrians are more vulnerable than motorists, facilities and measures should be provided to separate pedestrians from vehicular traffic. Traffic control devices such as pedestrian signals, pedestrian only signals, zebra cross-walks, sufficient illumination, proper sidewalks and designated waiting areas can improve pedestrian safety.

In general, 1.2 metres per second walking speed can be used to calculate pedestrian clearance time at the signalized intersections. However, in school or senior resident areas, 1.0 metres per second walking speed should be used to calculate pedestrian clearance time at the signalized intersections.

There are two required criteria for the pedestrian mode level of service performance, at the segment (between two or more intersections) and at intersection (signalized or unsignalized) areas. Both of these criteria should be completed and included in the Transportation Mobility Plan Study.

It should be noted that signalized intersections with

high left turn and right turn traffic volumes, channelized right turn and wide intersection will have negative impacts on pedestrian mode. As such, when conducting intersection capacity analysis, transportation specialists should consider and evaluate the pedestrian mode to provide appropriate mitigation measures and improvements to address these impacts.

Table 6 summarizes the level of service criteria for pedestrian mode.

Pedestrian LOS Target: C or better for these LOS Categories

Table 6 - Pedestrian Level of Service Criteria

Level of Service	Segment	Intersection
A	≥2.0 m sidewalk with minimum 3.5 m buffer including planting and edge zone; or ≥3.0 m multi-use path	▪ ≥2.0 m sidewalk with minimum 3.5 m buffer including planting and edge zone; or ≥3.0 m multi-use path ▪ Pedestrian signal head with sufficient pedestrian clearance time ▪ Clearly delineated cross-walk
B	≥1.5 m sidewalk with minimum 1.0 m buffer including edge zone; or <3.0 m multi-use path	▪ ≥1.5 m sidewalk with minimum 1.0 m buffer including edge zone; or <3.0 m multi-use path ▪ Pedestrian signal head with sufficient pedestrian clearance time ▪ Clearly delineated cross-walk
C	≥1.5 m curb-faced sidewalk (no buffer)	▪ ≥1.5 m curb-faced sidewalk (no buffer) ▪ Pedestrian signal head with sufficient pedestrian clearance time ▪ Clearly delineated cross-walk
D	<1.5 m sidewalk	▪ <1.5 m sidewalk ▪ Pedestrian signal head sufficient pedestrian clearance time ▪ No clearly delineated cross-walk
E	Paved shoulder or no sidewalk provision	▪ Paved shoulder or no sidewalk provision ▪ No pedestrian signal head ▪ No clearly delineated cross-walk
F	No sidewalk provision	▪ No sidewalk provision ▪ No pedestrian signal head ▪ Not clearly delineated cross-walk

Definitions

Buffer: green or landscaped space separating the sidewalk and pavement street curb.

Curb-faced: the sidewalk is located adjacent to the pavement and street curb.

Delineated cross-walk: painted or special pavement to facilitate pedestrians.

Table 7 illustrates an example of pedestrian level of service.

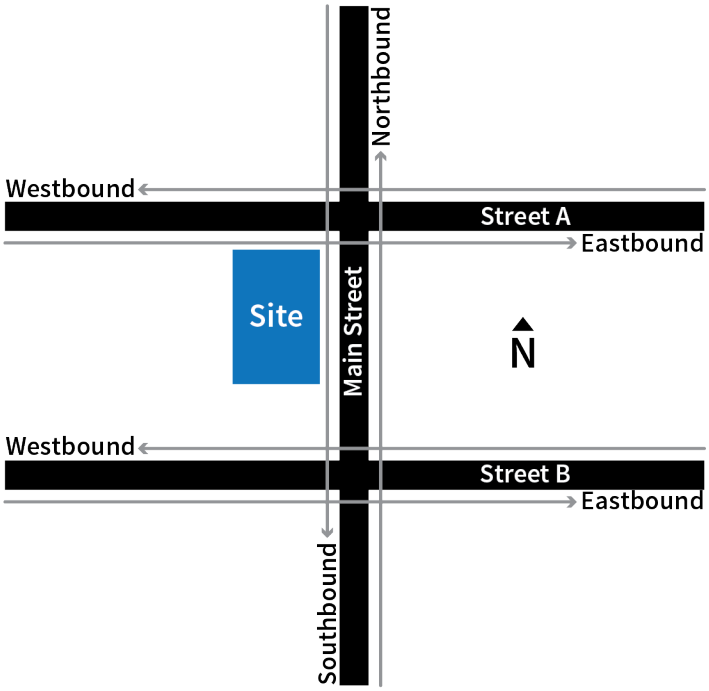
Table 7 - Pedestrian Level of Service Summary

Intersection	Direction	Segment		Intersection
		Description	LOS	LOS
Main Street/ Street A	Eastbound	Street A	C	B
	Westbound	Street A	B	A
	Northbound	Main Street	C	B
	Southbound	Main Street	B	B
Main Street/ Street B	Eastbound	Street B	A	A
	Westbound	Street B	B	B
	Northbound	Main Street	C	B
	Southbound	Main Street	C	B

It should be noted that all detailed analyses or supporting information related to the level of service calculations or observations for pedestrian mode should be included in the appendices.

Figure 4 illustrates an example of level of service assessment for pedestrian and bicycle modes.

Figure 4 - Example of Level of Service Assessment



1.10.5 Bicycle performance evaluation requirement

Cycling can also be a mode of choice for short to medium distance trips. A bicycle is defined as a vehicle under the Ontario Highway Traffic Act and cyclists must abide by the rules of the road. However, cyclists are more vulnerable than motorists so safety measures should be provided as much as possible. Bicycle signals, dedicated or separated cycling facilities, shared facilities, cross-rides and other pavement markings can improve cycling safety.

There are two required criteria for the bicycle mode level of service performance, at the segment (between two or more intersections) and at intersection (signalized or unsignalized) areas. Both of these criteria should be completed and included in the Transportation Mobility Plan Study.

Signalized intersections with high left turn and right turn traffic volumes, long exclusive right turn lanes, channelized right turn and wide intersection will have negative impacts on bicycle mode. As such, when conducting intersection capacity analysis, transportation specialists should consider and evaluate the bicycle mode to provide appropriate mitigation measures and improvements to address these impacts.

Bicycle LOS Target: C or better for these LOS Categories

Table 8 summarizes the level of service criteria for bicycle mode.

Table 8 - Bicycle Level of Service Criteria

Level of Service	Segment	Intersection
A	Separated cycling facilities (e.g. cycle tracks, multi-use path)	Separated cycling facilities Bicycle box or clearly delineated bicycle treatment or bicycle signal head
B	≥1.8 m dedicated cycling facilities (e.g. bicycle lanes with and without buffer)	>1.8 m dedicated cycling facilities (e.g. bicycle lanes with and without buffer), Bicycle box, clearly delineated bicycle treatment or bicycle signal head
C	<1.8 m dedicated cycling facilities with no buffer	<1.8 m dedicated cycling facilities with no buffer, Bicycle box, clearly delineated bicycle treatment or bicycle signal head
D	≤1.5 m bicycle lane with no buffer	≤1.5 m bicycle lane and no buffer Bicycle treatment
E	Shared facilities (e.g. signed routes, sharrows or paved shoulder with minimum 1.2 m in constrained area)	Shared facilities (e.g. signed routes, sharrows or paved shoulder with minimum 1.2 m in constrained area) No clearly delineated bicycle treatment
F	No bicycle provision	No bicycle provision

Definitions

Shared: Shared facilities include roadways or streets where cyclists and motorists use the same road space. Types of shared facilities include signed routes, bicycle boulevards or shared lanes (“sharrows”). Since cyclists and motorists share the same space, these facilities are appropriate on streets with low traffic volumes and/or low speeds.

Dedicated: Designated or dedicated facilities are those that provide space on the road intended for use by cyclists only. They are generally adjacent to motor vehicle lanes and defined by pavement markings. In urban areas, dedicated facilities typically include bike lanes and buffered bike lanes while paved shoulders provide dedicated space on rural roads.

Separated: Separated bikeways are separated from traffic by more than just a painted line. Separation may consist of bollards or delineators, mountable or barrier curbs, planters, concrete medians, etc. Types of separated facilities can include cycle tracks, raised bike lanes, or multi-use trails. These facilities improve safety and comfort for cyclists along higher-speed, busy roadways.

Buffer: a painted area or physical barrier that separates the bicycle lane from the adjacent traffic lane.

Bicycle box: A bike box is used at intersections with dedicated bike lanes or a cycle track to designate a space for cyclists to wait at a red light or to assist cyclists in making left turns. Cyclists stop in front of motorists and can proceed through the intersection first when the light turns green.

Paved shoulder: Paved shoulders are located next to the travelled portion of the roadway and used to accommodate cyclists on rural roads.

Table 9 illustrates the example of bicycle level of service.

Table 9 - Bicycle Level of Service Summary

Intersection	Direction	Segment		Intersection
		Description	LOS	LOS
Main Street/ Street A	Eastbound	Street A	C	B
	Westbound	Street A	B	A
	Northbound	Main Street	C	B
	Southbound	Main Street	B	B
Main Street/ Street B	Eastbound	Street B	A	A
	Westbound	Street B	B	B
	Northbound	Main Street	C	B
	Southbound	Main Street	C	B

It should be noted that all detailed analyses or supporting information related to the level of service calculations or observations for bicycle mode should be included in the appendices.

1.11 Alternate multimodal level of service evaluation methodologies

Recognizing that the multimodal level of service analysis methods are new, the Region will accept both the Region's multimodal level of service analysis approach, or quantitative methods that are recognized as the industry best practices including those found in the latest edition of the Highway Capacity Manual (HCM2010), Pedestrian Exposure to Traffic at Signalized Intersections (PETSI) or other published approaches that are appropriate to the York Region context. However, all referenced methodologies should be consulted and examined carefully for appropriateness.

*While engineering and professional judgment are required to interpret the results, all assumptions must be clearly documented. As illustrated in **Figure 3**, there are potential interactions between the automobile mode and non-auto modes of transportation. As automobile volume or speed increases, level of service for other modes may decrease due to potential conflict and other safety issues. If bicycle, pedestrian or transit flows increase, the level of service for the automobile traffic stream may decrease. As such, when preparing analysis and recommendations, the analyst must keep in mind that not all factors can be improved as level of service for one mode may affect the other modes. Typically, a combined level of service is not required or recommended.*

1.12 Software and input parameters

For intersection operational analysis, there are several tools and methods accepted, including:

- Highway Capacity Software based on the Highway Capacity Manual (HCM)
- Synchro software using HCM outputs
- InterCalc software based on the Canadian Capacity Guide for Signalized Intersections
- Micro-simulation software such as Vissim, Paramics and Sim-Traffic
- Other specialized roundabout analysis software (Rodel, Sidra, Arcady, etc…)

Other proprietary tools based on the Highway Capacity Manual and Canadian Capacity Guide for Signalized Intersections can be applied subject to approval by Regional and local municipal staff. Transportation specialists using proprietary software other than those mentioned above should consult with the Regional and respective local municipal staff prior to its application in the Transportation Mobility Plan. It is the Region's preference that transportation specialists apply the latest version of the analytics software, where applicable.

All input parameters and assumptions should be clearly documented. The transportation specialist should confirm that