CREATETO INC

ALLEN EAST DISTRICT PLAN TRANSPORTATION ADDENDUM

FEBRUARY 2021

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TRANSPORTATION ADDENDUM

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UPDATED TRANSPORTATION ADDENDUM (DRAFT)

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FEBRUARY 2021

WSP
100 COMMERCE VALLEY DRIVE WEST
THORNHILL, ON, CANADA L3T 0A1

TEL.: +1 905 882-4211
FAX: +1 905 882-0055
WSP.COM

February 22, 2021

CREATETO
200 King Street West, Suite 200
Toronto, ON
M5H 3T4

Attention: Carlo Bonanni, Vice President – Land & Development Planning

Dear Mr. Bonanni:

WSP is pleased to present our report documenting the updates to the Transportation Plan for the Allen East District Plan. This report documents our responses to the City of Toronto's Transportation Planning comments regarding the Plan. The addendum addresses comments by the City of Toronto in response to the submitted 2013 Traffic Impact Study and the 2018 addendum, as well as those provided by the City of Toronto's Transportation Planning Staff and the Toronto Transit Commission during working meetings held in 2017 and 2019.

The plan provides an effective multimodal transportation strategy, balancing the need for access to the subway station with the objective of creating a viable mixed-use community.

If there any questions or comments, please do not hesitate to contact us.

Yours sincerely,

Jim Gough, P.Eng.
Principal Consultant, Transportation Planning

100 Commerce Valley Drive West
Thornhill, ON, Canada L3T 0A1

Tel.: +1 905 882-1100
Fax: +1 905 882-0055
wsp.com

TABLE OF CONTENTS

TABLES

FIGURES

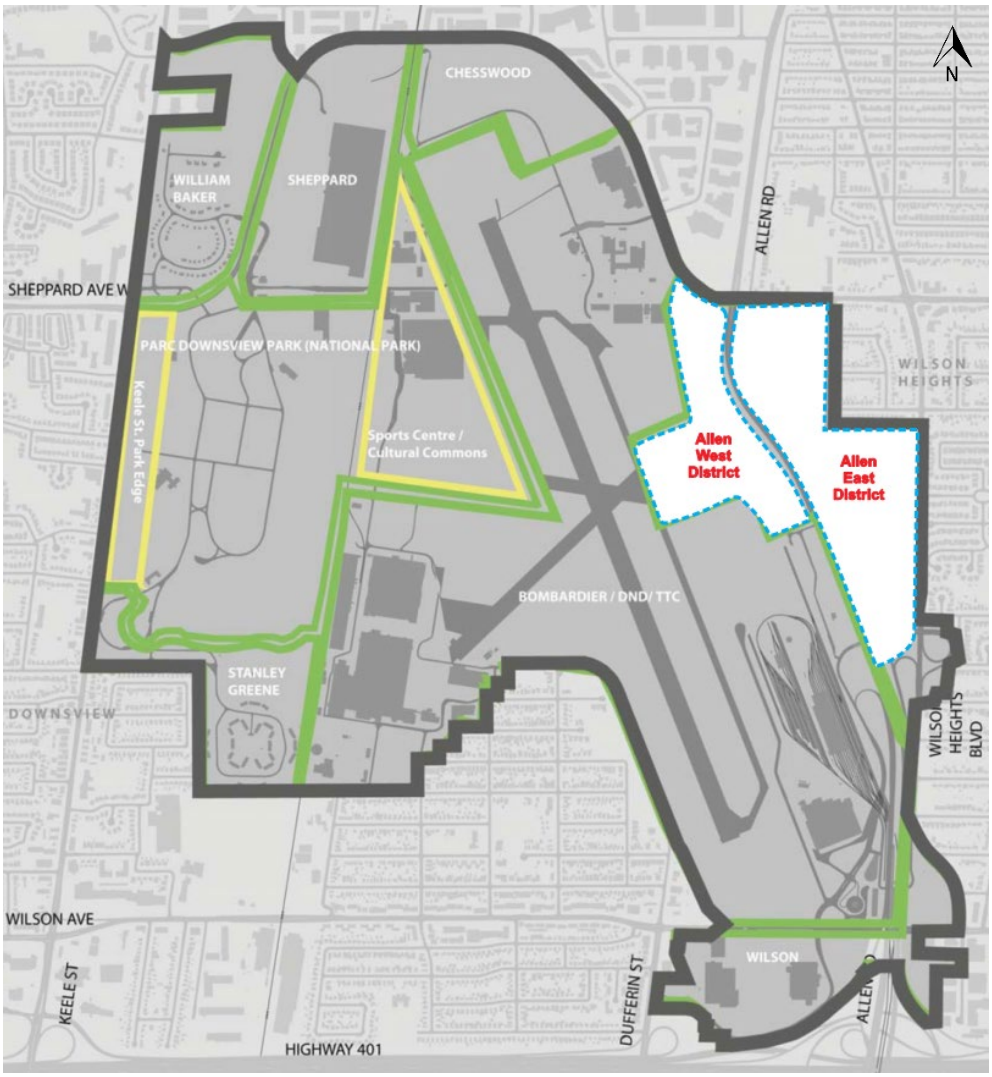
APPENDICES

1 INTRODUCTION

1.1 BACKGROUND

The Allen East District is approximately 29.1 ha (72 acres) in size within the Downsview Area Secondary Plan, **Figure 1,** and generally include the Sheppard West Subway station (formerly Downsivew Station) and the lands between Allen Road and Wilson Heights Boulevard, south of Sheppard Avenue West. The lands approved for transfer to CreateTO are approximately 23.1 ha (57 acres). Banting Park (2.3 ha, 5.8 acres) and the Sheppard West Subway Station (3.6 ha, 8.8 acres) are both being comprehensively planned as part of the Allen East District, but are not approved for transfer to CreateTO.

Figure 1: Highlighted Allen District



The CreateTO lands form only part of the Allen District in the City of Toronto Downsview Secondary Plan, known as the Allen East District. The outstanding portion of the Allen District, the Allen West District, is owned by Canada Lands Company (CLC) Inc. and are the lands in the Downsview Secondary Plan Area that are west of Allen Road. The Allen West District borders Sheppard Avenue to the north, Allen Road to the east and the Downsview airport the west.

The WSP Canada (formerly MMM Group Ltd) project team were engaged to provide services for the Allen East District Plan for the next phase of the project relating to the scope of work identified on July 10th, 2017, addressing the comments received from the City of Toronto and Toronto Transit Commission. The report has been structured to comprehensively respond to the issues raised by the City in their comments and meetings with the project team.

1.2 PROPOSED DEVELOPMENT

The proposed development in the Allen East District in this study reflects a total of 3,076 high/mid rise residential units, 450 semi-detached and townhouse units, 1,643,831 sq. ft (152,717 m^2) of office floor area, 178,899 sq. ft (16,620 m^2) of retail space and 215,278 sq. ft (20,000 m^2) of institutional space for the Ontario Tenants Association community centre, all assumed to be constructed by 2031. The proposed development in the Allen West District in this study reflects a total of 2,100 residential units, approximately 1,100,000 sq. ft (102,193 m^2) of office space, and some ground floor ancillary retail space by 2031.

Table 1: Proposed Development

LAND USE	2013 TIS	CURRENT DEVELOPMENT PROPOSED
General Office	1,877,000 sq. ft	1,643,831 sq. ft
High/Mid Rise Residential	3,600 units	3,076 units
Semi Detached and TH	450 units	450 units
Specialty Retail	40,000 sq. ft	178,899 sq. ft
Institutional	175,000 sq. ft	215,278 sq. ft

The previously completed Traffic Impact Study (TIS) (2013) analyzed the full build out of the Allen East District Plan by 2031. This horizon year reflects the maximum permitted density levels in the approved Downsview Area Secondary Plan. The current proposed development and the development assumed in 2013 TIS are compared in **Table 1**. Directed by the 2013 Traffic Impact Study, the Allen East District plan was to provide a number of recommendations for improving the existing and planned road network. The recommendation of a dual NB left turn movement at Sheppard Avenue and Allen Road was proposed as an interim measure to facilitate northbound turning volumes in conjunction with the construction of the Transit Road extension.

1.3 ITEMS BEYOND THE SCOPE OF THE DISTRICT PLAN

The City had requested a number of items to be addressed, which are beyond the scope of the District Plan. These include:

- Functional layout for Allen Road. This is an issue requiring the City's oversight, to produce a consistent cross-section along the section of Allen Road which it wishes to see redesigned. This includes the City's request for redesign of the Allen Road boulevards. A cross-section has been presented in the Allen District Urban Design Guidelines, which can serve as the basis for the functional plan, for the City's future work;
- Repurposing of the reserved bus lanes on Allen Road. The traffic implications related to this issue were addressed in the 2013 Traffic Impact Study. An improved intersection Level of Service would result from the elimination of the reserve bus lanes. It is our understanding that the City and Toronto Transit Commission are working towards resolution of this issue;
- Phasing for the redesign of Allen Road. This is an issue which the City must define, given its jurisdiction over Allen Road; and
- Design considerations related to the Allen West District.

2 MULTIMODAL ANALYSIS

2.1 MULTIMODAL TRIP GENERATION

The 2013 Allen District Traffic Impact Study projected the total trips generated by the identified land uses according to ITE Trip Generation report, 9th edition, as per the City's Traffic Impact Study requirements. With the adoption of complete streets policies and the shared economy increasingly changing transportation technology and behaviour (e.g. Uber, Communauto), multimodal trip generation will assist in defining how node districts will develop according to the City's Official Plan. The Allen East District is one such node, and it is in a prime location for multimodal development at the early stages. The plan elements identified below follow the approach used for the Tippett Road Regeneration Area Study, which incorporated a comprehensive multimodal analysis to produce a list of recommendations. The Tippett Road Regeneration Area Study reflected similar characteristics to the Allen East District, and under direction from city staff the Tippett methodology was chosen to assess the Allen East District. **Table 2** shows the trip generation of the Allen East District in 2031 using the potential higher development levels included in the 2013 TIS than those currently proposed. This has been taken as the starting point for our update.

The trips generated are generally similar to those used in the 2013 TIS. The difference is less than 100 for the a.m. peak hour, and 15 for the p.m. peak hour. Thus we can conclude that no detailed update to the traffic impact analysis conducted in the 2013 TIS is necessary – the conclusions with respect to the required road network still hold.

Table 2: 2013 TIS Allen East District 2031 Trip Generation

			VEHICLE TRIPS					
			AM PEAK HOUR			PM PEAK HOUR		
LAND USE	DISTANCE TO SUBWAY	2013 TIS	IN	OUT	TOTAL	IN	OUT	TOTAL
Allen East								
General Office	< 500m	1,877,000 sq. ft	1,276	169	1,445	57	1,333	1,390
High/Mid Rise Residential	< 1000 m	3,600 units	109	542	651	576	288	864
Semi-detached Single Family and Townhouse	< 1000 m	450 units	36	104	140	131	77	208
Specialty Retail	-	40,000 sq. ft	24	16	40	32	41	73
Institution	-	175,000 sq. ft	61	26	87	56	60	116
Allen East Cumulative Total (by Horizon Year 2031)			1,506	857	2,363	852	1,799	2,651

2.2 INNOVATIVE MOBILITY STRATEGIES/TDM

Through corresponding research and guidance from City of Toronto staff, the inclusion of eco-mobility hubs were identified as important in planning multimodal interchanges within the Allen East District. An EcoMobility hub is identified as infrastructure that provides a comfortable environment to facilitate transportation options, diversifying transit interchanges for residents and employees. The Consumers Next Study is an example of an eco-mobility hub provided by the City. This study was used as a basis for district level planning related to Transportation Demand Management measures applied to district level planning. The Consumers Road Business Park shares many similarities with the Allen East District in terms of travel patterns, mode split and availability of diverse transit options for residents. The Consumers Next report provides valuable insight into how the City of Toronto is planning multimodal development with prescribed travel demand management (TDM) methodologies to achieve modal split targets.

As identified in the Tippett and Consumers Next reports, the majority of the TDM measures should be centred on the development of eco-mobility hubs. These hubs encompass multiple TDM measures, the specifics of which are dependent on their purpose, relative location and accessibility to larger local and regional networks. The Ecomobility hub represents the peak of modal integration, whereby all identified modes of travel are available and overlap one another to create conditions which meet mode split aspirations. Transit infrastructure such as the Yonge/University subway extension is aimed at improving service catchment, diversifying mode choice and increasing reliability.

Interchange Eco Mobility developments such as those in the District Plan provide a mix of travel modes at major junctions, typically with the inclusion of a bus stop, bike lanes, vehicular access and mixed use paths. The large scale EcoMobility development promotes connections with the transit interchange, linking the residential zones with tertiary links to primary nodes such as the Sheppard West Station. Smaller scale EcoMobility development encompasses the local links in terms of bike lanes, mixed use paths and automobile traffic. These illustrate the potential for permeable active transportation connections into residential areas, linking them to a larger and more diverse network. Complimenting these connections is the Smart Commute program, operated by Metrolinx in conjunction with governments, businesses and residents which facilitate and encourages new users to utilize travel modes which reduce congestion and traffic on the GTA roadways.

Cycling infrastructure is also proposed. Cycling Infrastructure connects with the approved 2016-2025 cycling network which border the Allen East District. The improvements identified create enhanced connectivity throughout the Allen East District while connecting cyclists to the larger active transportation network. The Active Transportation network proposed is shown in this report.

CreateTO acknowledges the growing trends in innovative mobility strategies, such as ride-share programs, car sharing and bike sharing. Facilitating such trends and fostering the infrastructure of these emerging travel modes within the Allen East District is key to diversifying travel options for last mile trips. The Mobility Strategies and TDM initiatives have been defined and discussed for each of the concerns raised through continued dialogue with City staff. The objectives of the proposed TDM strategy are to inform, encourage and facilitate the utilization of the non-automobile travel opportunities within the study area. An example of a program that will help achieve this, could be a marketing strategy for the proposed residential component highlight key characteristics based on the items below via knowledgeable sales staff and visually attractive information packages to ensure that buyers are well aware of the various opportunities prior to purchasing their unit. This will help to target and encourage non-driver modes of transportation from the earliest point in the process.

Similarly, visually attractive maps and information packages are recommended to be provided on the commercial establishments' websites and distributed at these businesses to facilitate trip planning.

The proposed initiatives to be investigated during the future Site Plan Approvals stage are:

1. Carpool services and spaces. Priority parking is an important part of the encouragement of the use of sustainable transportation. Providing parking near entrances for carpools, electric vehicles and carshare will help to encourage the use of these modes. Registered carpools could also be provided with discounted or free parking to encourage increasing vehicle occupancies for those coming on site.
2. Bike sharing is a program where there could be a promotional opportunity to encourage cycling and to make access to bicycles simpler for those working as well as visiting the site. To encourage workers on site to use the program, reduced rates or complimentary one-month memberships could be provided to employees, which could lead to their permanent participation in the program.
3. Transit infrastructure integrated into street design and building to accommodate transit traffic, such as subway connections, bus stops and mixed use trails throughout the Allen East District.
4. Programs:

   Participation in regional TDM programs, such as Smart Commute, with the following range of transportation demand management services:

   a. A carpool ride -matching program that uses an online platform to connect drivers and passengers;
   b. Emergency Ride Home programs;
   c. Discounted transit pass programs;
   d. Telework programs and flexible work arrangements;
   e. Walking and cycling programs;
   f. Employer and community based outreach events and promotions;
   g. Mobility as a Service (MaaS), part of the broad shift away from personally-owned modes of transportation towards an integrated model that encompasses a wide range of transport services into a single mobility service accessible on demand;
   h. Localised Cycling information (all weather bike parking & public cycling facilities);
   i. Community Outreach (Workplace Transit Oriented Education Programs);
   j. Employer Individualized Marketing Campaign; and
   k. Household Individualised Marketing Programs (Localised incentive initiatives).

2.2.1 MODAL SPLIT

The projection of multimodal trip generation is based upon the proposed development levels from the 2013 TIS report.

The mode split targets from the Downsview Area Secondary Plan (2010) were built upon the 2006 Transportation Tomorrow Survey (TTS) data. A new survey was conducted in 2011, updating the transportation trends. The modal split assumed in the 2013 TIS report used the updated 2011 TTS findings from the Allen District; this is shown in **Table 3**.

Table 3: Existing Modal Split based on 2011 Transportation Tomorrow Survey, Allen District

EXISTING (2011)	AM PEAK	PM PEAK
Modal split	100%	100%
Subway & Bus	25%	31%
Car	74%	68%
Bicycle	0%	0%
Walk	1%	1%

For the purpose of the current analysis, the Allen East District trip generation was calculated based on the modal splits taken from the approved Tippett Road Regeneration Area Study, as directed by City Staff. The Tippett Study was chosen as the proxy site due to the Tippett District's resemblance to the Allen East District - they are located in close proximity and share similar transit network configurations. **Table 4** summarizes the modal splits from the Tippett report that have been applied. The modal split for major land uses were informed based upon future modal split aspirations identified by City staff. **Table 5** summarizes the resulting trip generation for the Allen East District by 2031 using the Tippett Model of modal split for residential, office and retail; with institutional utilizing the TTS 2011 modal split for the Allen East.

Table 4: Modal Split based on Tippett Model

	MODE SPLIT		
Future (2031 Phase 4)	Residential	Office	Retail
Subway & Bus	30%	30%	35%
Car	55%	60%	50%
Bicycle	5%	5%	5%
Walk	10%	5%	10%

Table 5: 2031 Full Build Total Trip Generation based on the 2013 TIS

	RESIDENTIAL		OFFICE		RETAIL		INSTITUTIONAL (TTS)	
	Total Trips AM	Total Trips PM	Total Trips AM	Total Trips PM	Total Trips AM	Total Trips PM	Total Trips AM	Total Trips PM
Subway & Bus	41	62	380	365	63	114	27	44
Car	74	114	759	730	89	163	79	97
Bicycle	7	10	63	61	9	16	0	0
Walk	14	21	63	61	18	33	1	1
Total	135	207	1,266	1,216	179	326	108	142

The entire Allen District is anticipated to generate 1,001 and 1,104 private automobile trips in the AM and PM peak hours, respectively. The provision of the transit, bicycle and pedestrian connections in the Allen East District based upon the Tippett Model are expected to reduce auto traffic by 682 and 787 in the AM and PM peak hours, respectively.

2.3 AUTO AND BICYCLE PARKING

Parking and accommodation of cycling facilities remain an important aspect of the Allen East District, however there is further work needed to determine precise parking demands which will be determined within the rezoning application phase of each development. As specific development applications are submitted to the City, the parking supply will be outlined at that time, taking into account not only the specific users, but also the impacts that the subway extension, the Downsview Park GO Station, and disruptive technologies - such as driver-less cars - will have on parking demand in the future.

The Allen East District benefits from the Sheppard West Subway Station being located centrally within the area, and as such plays an integral role within the area's transit network, linking a number of communities to the city-wide subway system. The parking demand for the Allen East District is directly influenced by this proximity to higher order transit, which will encourage multimodal travel to, from, and throughout the District. The City requested a parking concept that is appropriate for a district level plan. The analysis outlined takes into consideration three main types of parking facilities:

1. Potential on-street parking locations;
2. Potential off-street parking locations; and
3. Identification of potential locations for car-share and bike-share facilities.

Key considerations in the identification of these locations for parking facilities to serve the district include:

- Adoption of the "Complete Streets" approach to proposed streetscapes and roadways, in accordance with City's guidelines;
- Identification of potential locations for parking facilities, such as structured parking, that will have the effect of minimizing local traffic and maximizing access to surrounding land uses; and
- Identification of locations with the potential to maximize the future uptake of car-share and bike-share to reduce motorized vehicle traffic in the District.

Within the Allen East Urban Design Guidelines, some of the cross sections include proposed on-street parking. For other roadways which currently do not identify on-street parking as part of the cross sections, on-street parking may be accommodated in the future, further to Staff review as part of future development review processes.

The City also asked for identification of such features as curb extensions and bump-outs to enhance the streetscape. These features will also improve the pedestrian experience by providing more space and reduced intersection crossing distances, and can provide space for bike-share facilities. The specific location for these features will be determined at the Plan of Subdivision and/or Site Plan stage in association with development applications, with input from the architect and in consultation with City staff. These features will provide space for bike-share facilities; locations for bike-share facilities will be identified on specific development sites and/or in public parking facilities.

2.3.1 BICYCLE PARKING REQUIREMENTS

Although the site area is not currently zoned according to By-law 569-2013, City staff directed CreateTO to utilize Zoning By-law 569-2013 Bicycle Zone 2 and Toronto Green Standard requirements. Short term bike parking denotes temporary secured parking allowing users to lock up bikes for short amounts of time, through the provision of infrastructure such as bike rings and outdoor bike racks. Long term bike parking is characterized as secured and weather protected infrastructure providing parking for longer or overnight parking, including bike lockers or gated access to interior bike parking. The short and long term bicycle parking by-law requirements are summarized in **Tables 6** and **7**.

Table 6: Short Term Bicycle Parking Requirements

LAND USE	MINIMUM BICYCLE PARKING RATE
Professional Office	3 + 0.15 Spaces /100 m^2
Specialty Retail	3 + 0.25 Spaces /100 m^2
Dwelling Unit	0.07 Space / 1 unit

Table 7: Long-Term Bicycle Parking Requirements

LAND USE	MAXIMUM BICYCLE PARKING RATE
Professional Office	2 + 0.13 Spaces /100 m^2
Specialty Retail	2 + 0.13 Spaces /100 m^2
Dwelling Unit	0.68 Space / 1 unit

The provision of bike share facilities within the Allen East District would further enhance the area as a multimodal hub, and is consistent with the TDM plan as outlined in Section 3. However, any expansion of the Toronto bike-share service is considered to be both a commercial and policy decision for the City as the Toronto Parking Authority owns and operates Bike Share Toronto.

2.3.2 ACCOMMODATING PASSENGER PICK-UP AND DROP-OFF ACTIVITY

In the Allen East District, passenger pick-up and drop-off (PPUDO) activity is expected to be focused near the transit station and key destinations such as major commercial developments. PPUDO is expected to be by personal vehicle, taxis and ride sharing services. In the future, autonomous vehicles are also projected to increase PPUDO activity generally. PPUDO activity is proposed to be accommodated on-street adjacent to the public plaza which is directly across from the subway station. It is noted that some street cross-sections have also been designed to accommodate these activities.

2.4 DOWNSVIEW MAJOR ROADS ENVIRONMENTAL ASSESSMENT VOLUMES

The Downsview Major Roads Environmental Assessment (2018) conducted by the City provides an updated assessment of the projected network volumes. **Table 8** compares the Downsview EA future traffic volumes and those developed by the Allen East District TIS Report. Comparing the Allen East District traffic volumes and the Downsview EA traffic volumes, we can conclude that there are varying differences between the identified volumes at each respective intersection. However, the volumes remain within acceptable levels of service with regards to lane capacities and operations.

Table 8: 2031 Traffic Volume Comparison

ROAD LINK	DOWNSVIEW EA VOLUMES AM (PM)		ALLEN EAST DISTRICT TIS VOLUMES AM (PM)	
Allen Road & Transit Road	NB left-through-right SB left-through-right EB left-through-right WB left-through-right	326 (499) 898 (687) 1010 (904) 957 (1248)	NB left-through-right SB left-through-right EB left-through-right WB left-through-right	212 (491) 553 (940) 1777 (1683) 1088 (1530)
Transit Road & Avenue B / Link #3	NB left-through-right SB left-through-right EB left-through-right WB left-through-right	733 (762) 751 (790) - 156 (167)	NB left-through-right SB left-through-right EB left-through-right WB left-through-right	813 (320) 598 (1131) - 298 (217)
Transit Road & Avenue E / Link #2	NB left-through-right SB left-through-right EB left-through-right WB left-through-right	609 (881) 602 (689) - 143 (165)	NB left-through-right SB left-through-right EB left-through-right WB left-through-right	406 (226) 519 (985) - 384 (196)
Transit Road & Avenue G / Link #1	NB left-through-right SB left-through-right EB left-through-right WB left-through-right	488 (898) 583 (491) - 642 (635)	NB left-through-right SB left-through-right EB left-through-right WB left-through-right	104 (90) 278 (831) - 356 (186)

JOEL SWIRSKY BOULEVARD SIGNALISATION

A signal warrant analysis was conducted for the intersection of Joel Swirsky Boulevard and Wilson Heights Boulevard, using volumes from the Allen East District Plan TIS to conduct the analysis. The signal warrant analysis concluded that signalization of the intersection was not warranted under 2031 conditions, representing full build-out. It is recommended that the intersection remain unsignalized, at this time.

ALLEN ROAD / SHEPPARD AVENUE CONFIGURATION

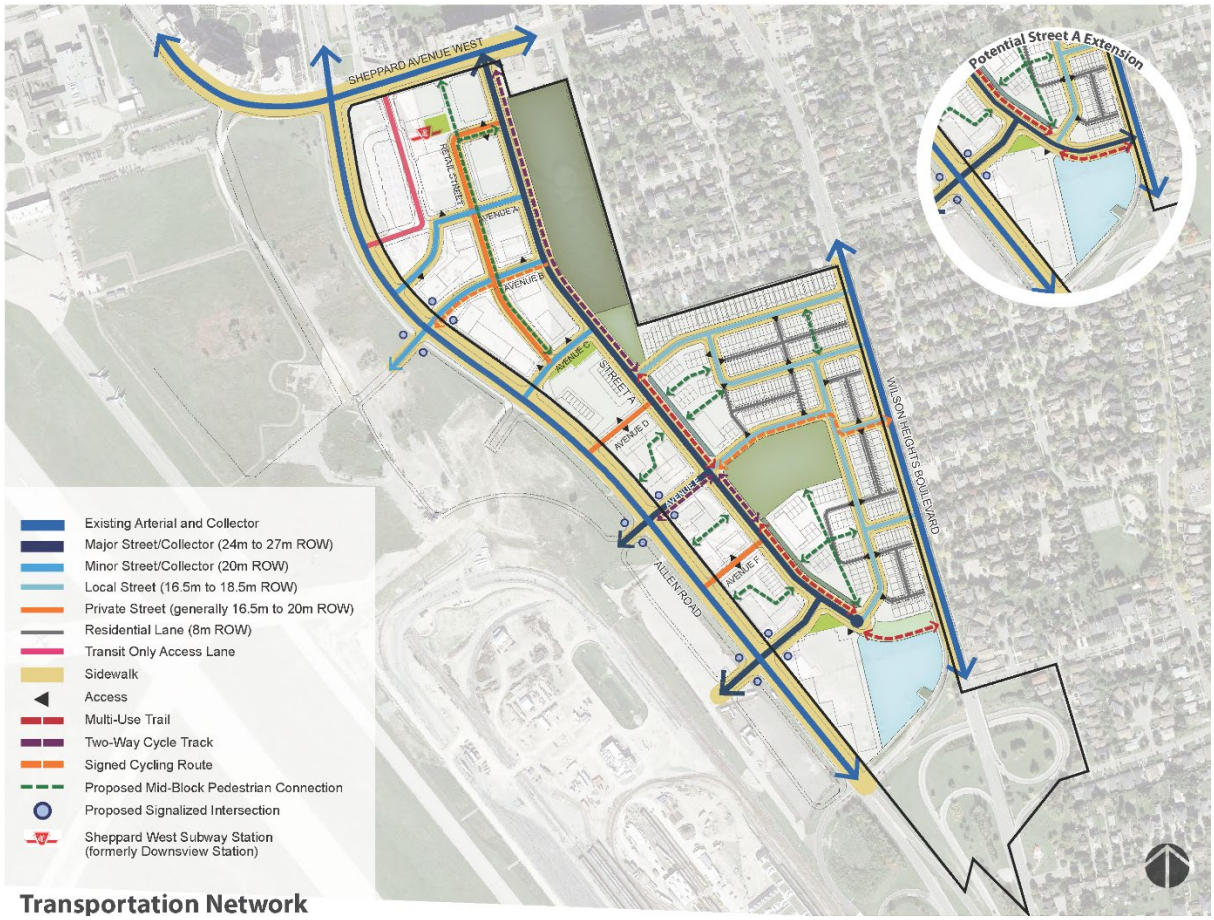
Our Transportation Impact Assessment of September 2013 had indicated that a double left-turn lane could be considered for northbound movement at the intersection of Allen Road at Sheppard Avenue West, to alleviate a projected poor Level of Service of "F" by the then-horizon of 2016. The northbound volumes in our 2012 counts were 77 right turns, 1181 through movements and 323 left turns, for the p.m. peak hour, which was found to be the critical time period.

New turning movement counts were conducted in 2019 for our Microsimulation and PPUDO Study (November 2019, attached as **Appendix C**). The northbound p.m. peak hour volumes were 272 right turns, 1,228 through movements and 326 left turns. This is only a minimal change from the 2012 counts for the through movements and left turns. Right turns did increase noticeably. These counts and our queuing analysis (which indicated that the 95th percentile northbound left turn queue would leave 100 m of unused storage) showed that conditions at the intersection had not reached the level projected in the 2013 TIS and that the key movements of concern from a queuing perspective are actually the southbound through/right and eastbound right. Given the lack of significant growth in the northbound left turn volumes over close to a decade, it is not recommended that the double left turn northbound be pursued, at this time.

2.5 MULTIMODAL NETWORK PLAN

The City requested documentation of a number of elements of the multimodal network plan for the District. The multimodal network plan reflects the inclusion of pedestrian and active transportation facilities throughout the development process. Further to the pedestrian network, the Development Framework plan outlines the potential street connections that are currently proposed in the Allen East District. These are provided in **Figure 2**.

Figure 2: Development Framework Plan including Active Transportation Facilities



2.5.1 PEDESTRIAN AND CYCLING CONNECTIONS

The City requested documentation of the type of pedestrian and cycling connections to be implemented and the phasing of these as part of the development.

The pedestrian connections are generally planned as sidewalks on each side of the street, with the width meeting or exceeding the City's standard of 2.1m for the pedestrian clearway. Connections to the subway station will be via the public road network. The configuration of the bus terminal does not permit pedestrian or cyclist access into Sheppard West Station from the south because access is restricted to TTC vehicles only for reasons of safety.

Cycling infrastructure has been defined in keeping with the function and design of each street in the network. The cycling infrastructure proposed for each street is defined in **Figure 2**.

2.5.2 RECOMMENDED TRANSIT ROUTES

The City requested proposals for transit routes through the community and a proposal for transit stops, based on best practices for transit access, as well as a review of walking distances ('ped sheds') to the subway station. It should be noted that transit routes and stops are subject to detailed planning and approval by TTC.

To address the questions of bus routings and transit priority on the streets that are expected to provide bus access to the subway station, WSP conducted both:

1. Bus turning movement counts at the three entrance and exit points from the bus terminal (Sheppard Avenue West, northbound right, eastbound right, northbound left, westbound left); and
2. 1 minute bus occupancy surveys for all 14 bus bays and lay-by areas.

These WSP bus counts were conducted on August 1, 2017 during the morning (6:30-9am) and evening peak period (3:30-6pm) in order to document the time and frequency of bus movements.

BUS TURNING MOVEMENTS

The bus turning movement results are summarized in **Table 9** below.

Table 9: Morning & Evening Peak Hour Bus Counts, Sheppard West Subway Station

HALF HOUR PEAK INTERVALS	SHEPPARD AVENUE WEST ENTRANCE					ALLEN ROAD ENTRANCE		
	TOTAL	NB Right	EB Right	NB Left	WB Left	NB Right In	NB Right-Out	SB Left
6:30-7:00AM	55	5	7	17	10	5	8	3
7:00-7:30AM	104	9	23	22	12	2	22	14
7:30-8:00AM	85	11	17	26	12	0	10	9
8:00-8:30AM	86	9	26	23	13	0	11	4
8:30-9:00AM	91	12	25	23	13	0	13	5
	TOTAL	NB Right	SB Right	NB Left	SB Left	NB Right In	NB Right-Out	SB Left
3:30-4:00PM	21	4	4	8	4	0	0	1
4:00-4:30PM	65	10	11	18	12	0	11	3
4:30-5:00PM	61	7	10	14	11	0	13	6
5:00-5:30PM	66	10	16	14	7	0	12	7
5:30-6:00PM	71	6	22	16	7	0	15	5

The turning movements reflect the combined sum of both TTC and YRT buses observed at the Sheppard West Station. At the Sheppard entrance, the majority of the turning movements were observed to occur at the signalized intersection on Sheppard Avenue West. However, all eastbound right-turn movements into the Station from Sheppard Avenue West and a small portion of the northbound right-turn movements exiting the Station onto Sheppard Avenue eastbound were observed to occur via the unsignalized western access driveway to the station.

In the morning peak hour, five (5) buses were observed making a northbound right-turn from the western access, with three (3) movements observed in the evening peak. At the southern entrance, all movements were observed to turn at the signalized intersection of Allen Road and the southern TTC Sheppard West Station access.

In the morning peak hours it was observed that the peak half hour interval was 7:00 a.m. to 7:30 a.m. with another second, smaller peak occurring from 8:30 a.m. to 9:00 a.m. In the evening peak hours, the peak half hour occurred between 5:30 p.m. and 6:00 p.m., however the entire period between 4:00 p.m. and 6:00 p.m. experienced high bus volumes.

BUS BAY UTILIZATION RATES

To ascertain the utilization of bus bays at the bus interchange, both east and west side bus bays as well as lay-by areas were monitored for usage every 60 seconds during morning and afternoon peak periods. The data yielded information on the approximate level of bay usage by both TTC and YRT. The utilization rates of each bus bay are summarized in the charts below, **Figure 4**.

BUS BAY UTILIZATION RATES POST SPADINA EXTENSION

With the opening of the Toronto-York Spadina Subway extension on December 17, 2017, bus service at the Sheppard West subway station has been revised to reflect the availability of extended subway service. We had conducted counts prior to the opening of the subway extension. At that point, the occupancy survey WSP conducted suggested most of the bays were being well utilised in the peak period. Since the opening of the subway extension, new counts (conducted February 5, 2019) indicate that the number of buses is estimated to have dropped some 24%; this would suggest there is now additional capacity at the interchange – the data is shown in **Figure 3**.

Figure 3 : Peak Bus Bay Utilization Pre and Post Toronto-Spadina Subway Extension

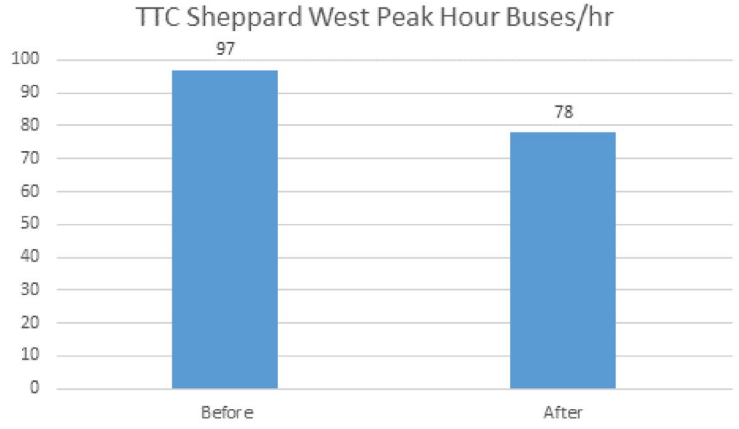
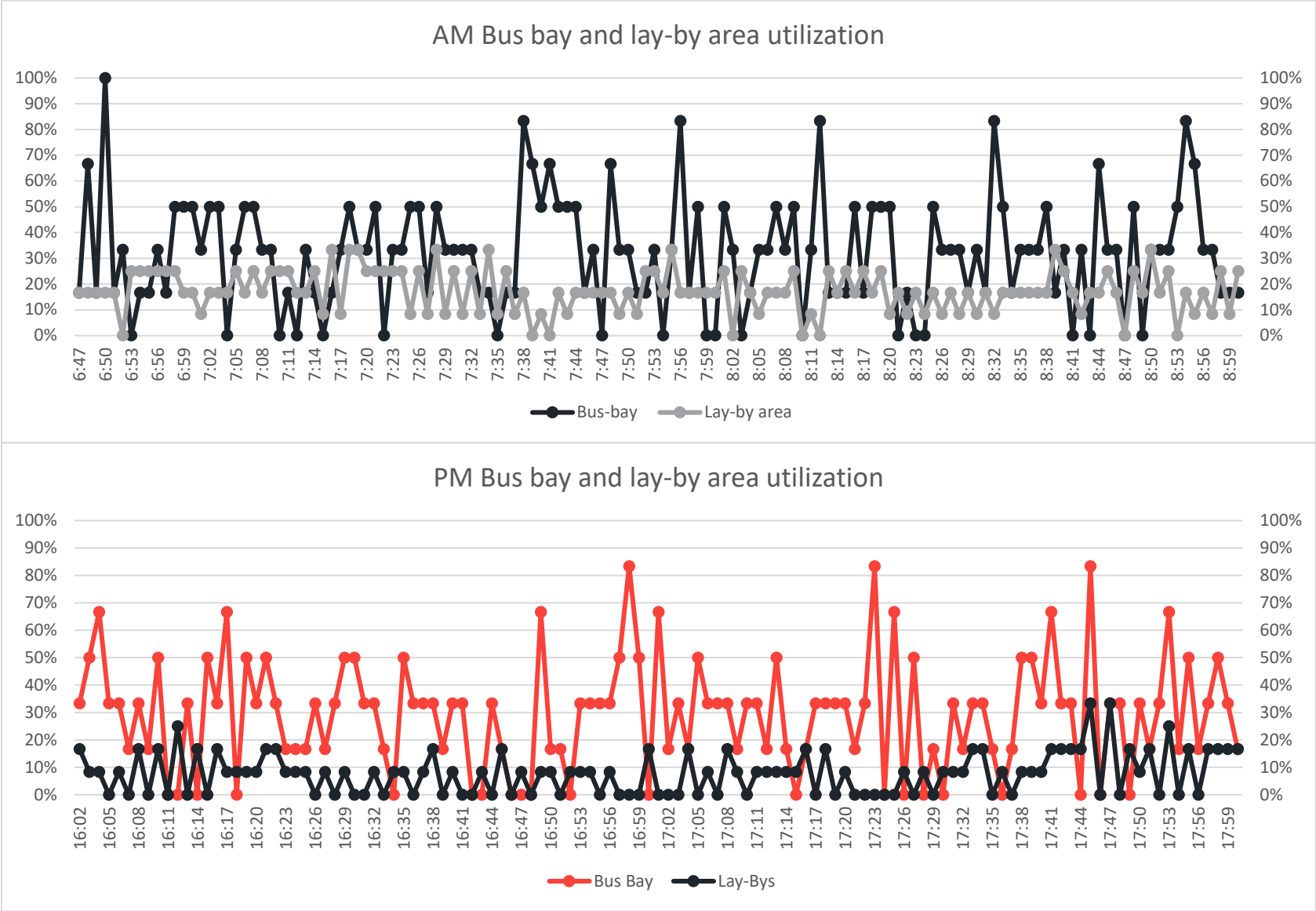


Figure 4: Bus Bay Utilization Rates



All bus bays were observed to have consistent use throughout the peak hours. The above charts show the utilization of each bus bay during peak hour periods in comparison to the other bays. Overall, the utilization is distributed somewhat evenly. The PM counts of Bays 1-6 show slightly more buses utilizing Bays 1, 2 and 3 as opposed to Bays 4, 5 and 6. A summary chart of which bus services were using each bay is also included below in **Table 10**.

Table 10: Bus Bay Route Designation

WEST BUS BAYS	BUS ROUTE	EAST BUS BAYS	BUS LINES
Bay 1	Parc Downsview 101	Bay 7	VIVA orange
Bay 2	Sheppard West 84	Bay 8	84 Via Sheppard
Bay 3	Downsview 108	Bay 9	196 Via Sheppard
Bay 4	Alness 117	Bay 10	106 York University
Bay 5	Dufferin North 105	Bay 11	196 York Rocket
Bay 6	Faywood	Bay 12	107

In addition to the bus bays, there are also two bus lay-bys. In the bus bays it is common for buses to remain for more than 60 second intervals and also remain in the lay-by for upwards of 5 minutes at a time.

Based on the capacity of the facility, and with up to eight (8) bus routes servicing the facility at any one point in time, it was concluded that the current number of active bus bays (12) is warranted. The significant amount of lay-by area that is generally underutilised does present opportunities to reuse this space for other purposes, should the need arise. However, more detailed studies would be required (similar to our occupancy survey for instance, but with more surveyors) to ascertain more precisely the extent to which bays and lay-bys are being used (we included layovers for example in our survey, that are not reflected in the service plan).

PROPOSED TRANSIT ACCESS

The existing bus terminal facility at Sheppard West Station will remain until the transit station area is ready for redevelopment. Transit circulation will remain the same in both the interim phase and full build-out phase with a slight change from the current situation.

Buses will be entering and exiting the terminal through three different access points, depending on the bus route:

- A bus-only right-in/right-out access at Sheppard Avenue West, just east of Allen Road (the existing driveway);
- An access using Street A from the signalized intersection on Sheppard Avenue West, and entering/exiting the terminal through Avenue A, which will have a controlled access intersection to restrict vehicular access to the bus-only zone. Potential signalization of this bus terminal access intersection is subject to further study; and
- An existing bus-only access off Allen Road directly into the bus terminal, providing access to and from the north.

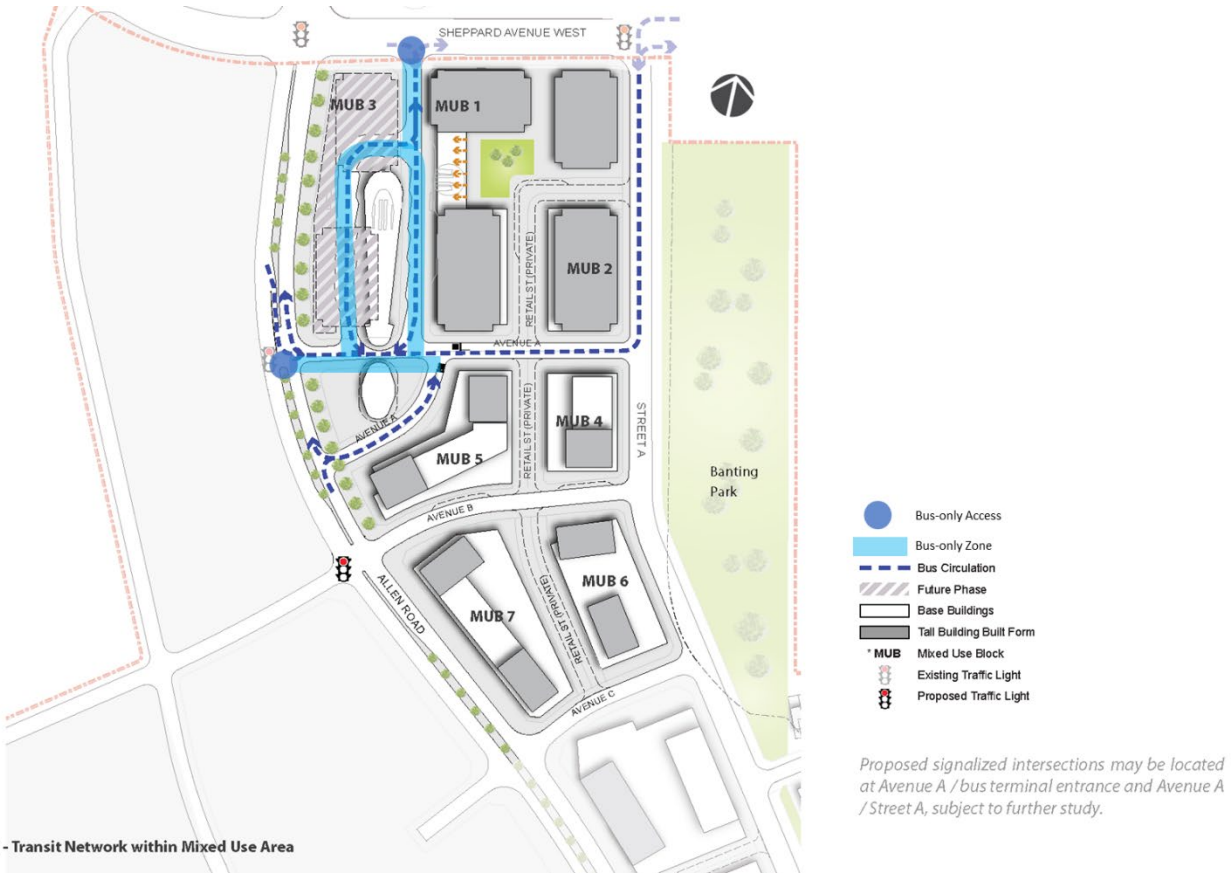
At the time of full build-out, the area will be intensified and the bus facility will likely be integrated into the ground level of any building that fronts onto Allen Road and Sheppard Avenue. The bus loop will also be accessed from Avenue A.

Pedestrian access to the transit facility will be provided both from the Allen Road side of the building as well as the internal street.

An entrance to the subway will be integrated into the atrium of any future building on this site with direct access to the urban plaza.

Figure 5 illustrates the proposed bus routes connecting to the Sheppard West subway station. These have been based on discussions and concurrence with the City and TTC, and are intended to provide for effective bus access in and out of the station for the various routes it serves.

Figure 5: Bus Access to Sheppard West Station

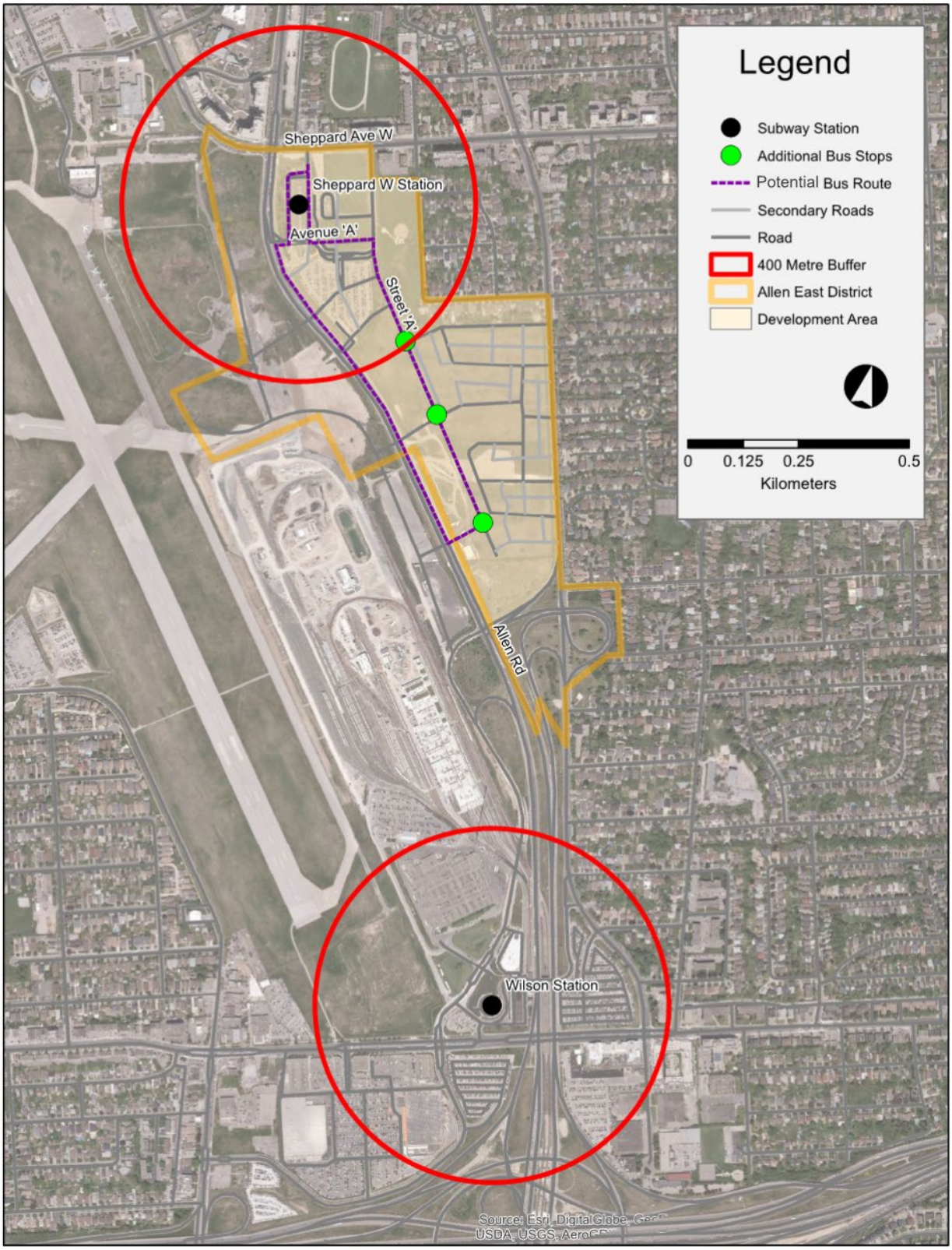


This plan for transit access is expected to provide priority for TTC buses. On Avenue A, the access to the terminal is proposed to be signalized as per the TTC request regarding priority for access, however it should be noted this is subject to further study. Traffic volumes projected on Street A and Avenue A do not indicate a need for transit-only lanes, as warranted by the 2013 TIS volumes. The street cross-sections have been designed to permit dedication of transit-only lanes if necessitated by the TTC in the future.

Potential Future Bus Routes

Based on a 400 metre walking distance from the Sheppard West Subway Station, the southern section of the study area falls outside of the walking catchment distance. This distance represents an approximate five minute walk and is consistent with the Ministry of Transportation's Transit Supportive Guidelines for the average distance transit users are willing to walk within an interconnected network. To serve this area, a bus route along Street A with three stops at major intersections has been proposed, subject to TTC planning and approval, (**Figure 6**). This will connect the Allen East District with the broader transit network and increase the attractiveness of transit. It should be noted that the creation of a north/south bus route along Street A (and integration with other existing or proposed routes) as well as appropriate numbers of stops, is a TTC responsibility, and it is assumed that TTC will determine how such a route segment would form part of its overall network in this area, in the future.

Figure 6: Walking Distance to Subway Stations / Potential Bus Route Segment



2.5.3 CONFIGURATION OF STREET A

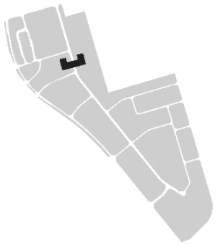
The City asked for a review of the configuration of Street A. Street A would have a four-lane cross-section, as shown in **Figure 7**. The cross-section reflects the City's guidelines for lane widths and the width of a pedestrian clearway for a total ROW of 27m as stipulated by the Allen East District Urban Design guidelines.

The potential need for transit priority on Street A for TTC buses was identified as a potential issue by the TTC and City staff. The volumes projected for Street A in the 2013 TIS (and repeated in **Table 11**) are well below the capacity of a four-lane street, and do not indicate a need for implementing transit priority. However, as development proceeds, the City and TTC should monitor traffic volumes and performance measures related to the transit service (service reliability and delay) to determine whether to designate the curb lanes as transit-only.

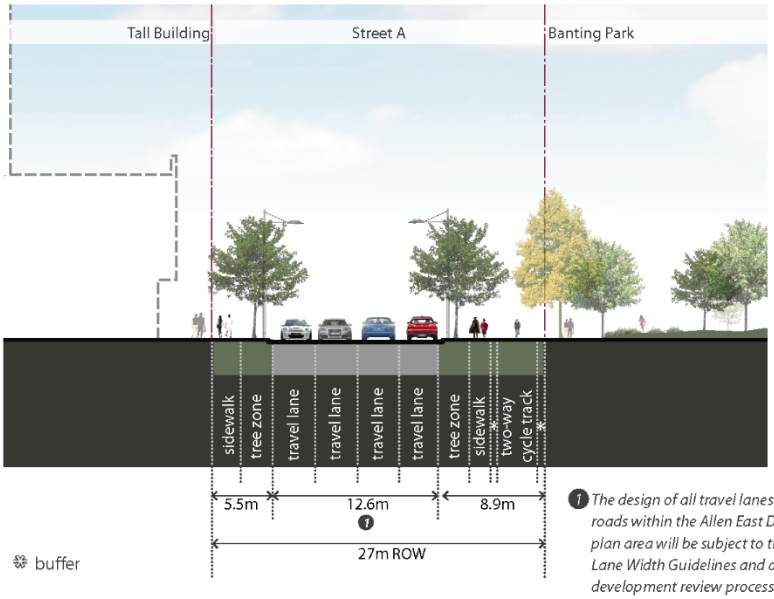
Table 11: Street A 2031 Total Traffic Volumes

STREET A	AM PEAK HOUR TRAFFIC VOLUMES	PM PEAK HOUR TRAFFIC VOLUMES
Northbound	301	540
Southbound	215	300

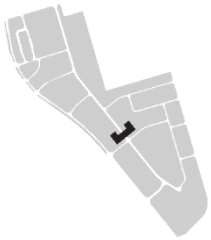
Figure 7: Proposed Configuration of Street A



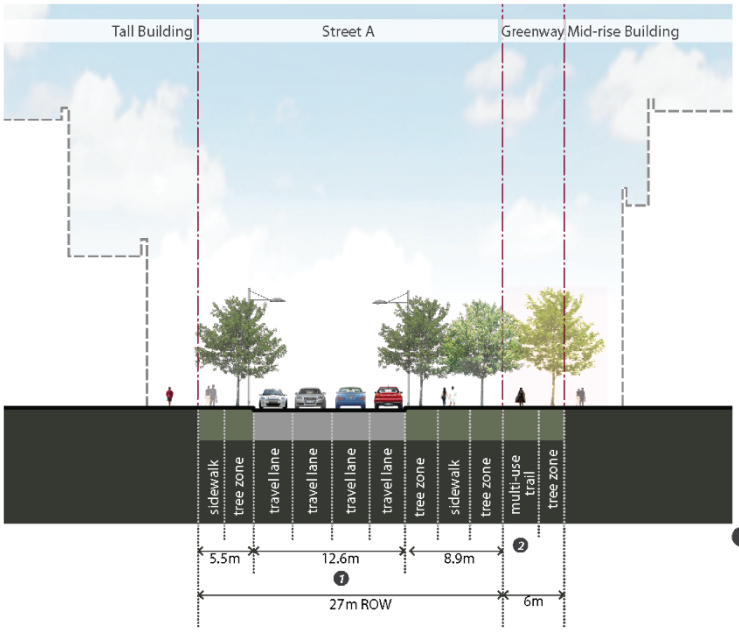
Street A: Mixed Use Area



1 *The design of all travel lanes for future roads within the Allen East District plan area will be subject to the City's Lane Width Guidelines and any future development review process.*



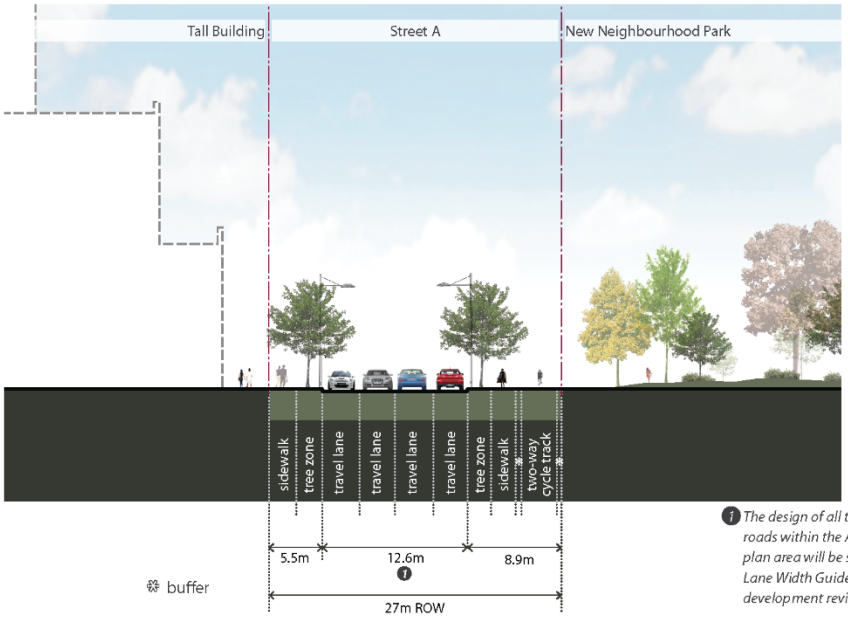
Street A: Apartment Neighbourhood



1 *The design of all travel lanes for future roads within the Allen East District plan area will be subject to the City's Lane Width Guidelines and any future development review process.*

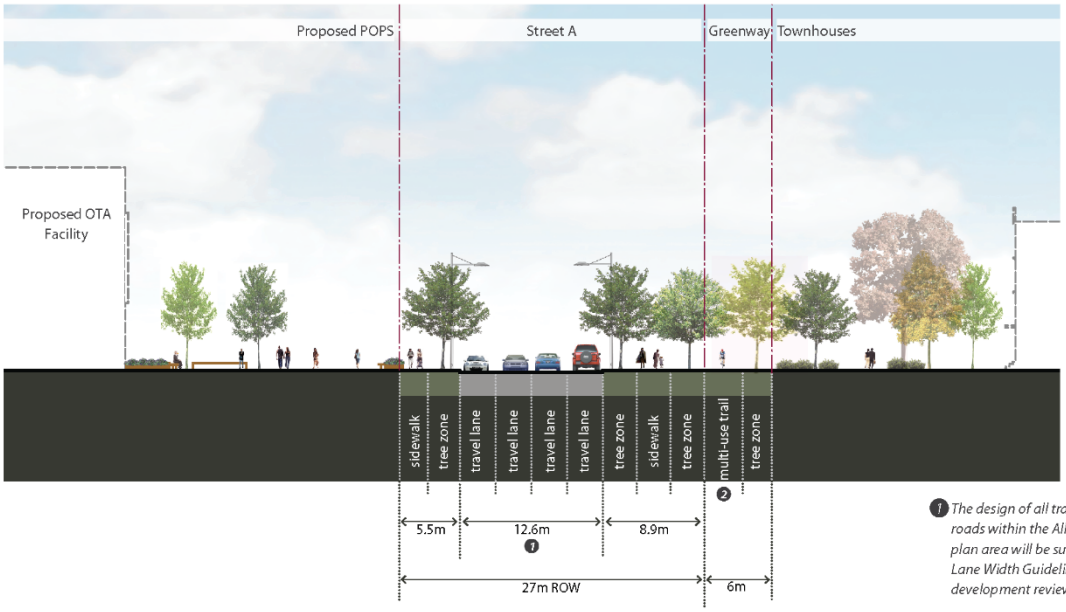
2 *Location of multi-use trail to be coordinated comprehensively with overall design of the streetscape.*

Street A: Apartment Neighbourhood and Neighbourhood



1 *The design of all travel lanes for future roads within the Allen East District plan area will be subject to the City's Lane Width Guidelines and any future development review process.*

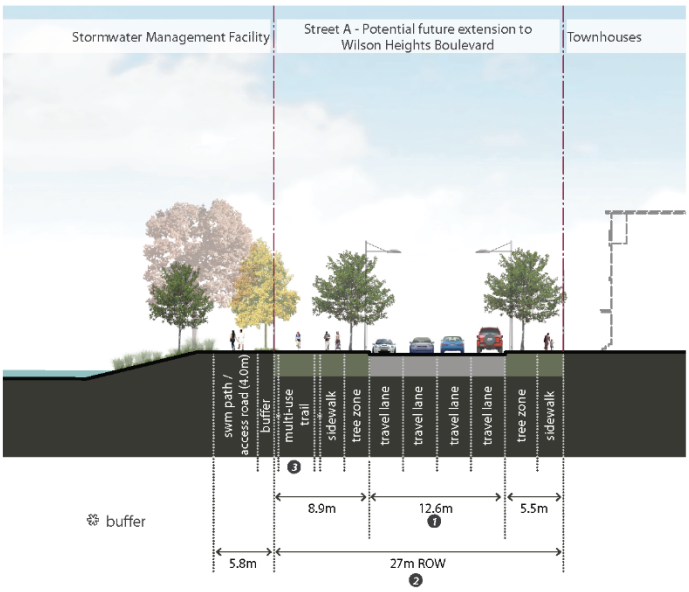
Street A: Apartment Neighbourhood and Neighbourhood

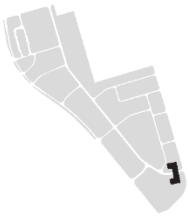


1 *The design of all travel lanes for future roads within the Allen East District plan area will be subject to the City's Lane Width Guidelines and any future development review process.*

2 *Location of multi-use trail to be coordinated comprehensively with overall design of the streetscape.*

Street A: Potential Future Extension and Neighbourhood





1 The design of all travel lanes for future roads within the Allen East District plan area will be subject to the City's Lane Width Guidelines and any future development review process.

2 The travel lane portion of the ROW will be constructed at such time when a Council Decision is made regarding the potential future extension of Street A to Wilson Heights Boulevard and removal of the ramps. In the interim, this portion of the ROW shall be sodded.

3 Location of multi-use trail to be coordinated comprehensively with overall design of the streetscape.

2.5.4 CONFIGURATION OF AVENUE A

The City asked for a review of the configuration of Avenue A. Avenue A's configuration is shown in **Figure 8**. The segment of Avenue A east of the bus terminal must be sufficient to accommodate both bus activity and vehicular movement related to the adjacent development (including some pick-up and drop-off activity – though this will primarily occur on the north/south internal street, which is closest to the subway access point) for a total ROW of 20m as stipulated by the Allen East District Urban Design guidelines.

The volumes projected for Avenue A in the 2013 TIS are shown in **Table 12**. Based on these volumes and those projected for Street A, it would be advisable to consider the signalization of the intersection of Street A at Avenue A in the long term, as development plans are firmed up through the Site Plan Approval process; the signalization would be subject to further study. This may be beneficial in facilitating schedule adherence for TTC bus services using these streets.

Table 12: Avenue A 2031 Total Traffic Volumes

AVENUE A	AM PEAK HOUR TRAFFIC VOLUMES	PM PEAK HOUR TRAFFIC VOLUMES
Eastbound	283	455
Westbound	126	355

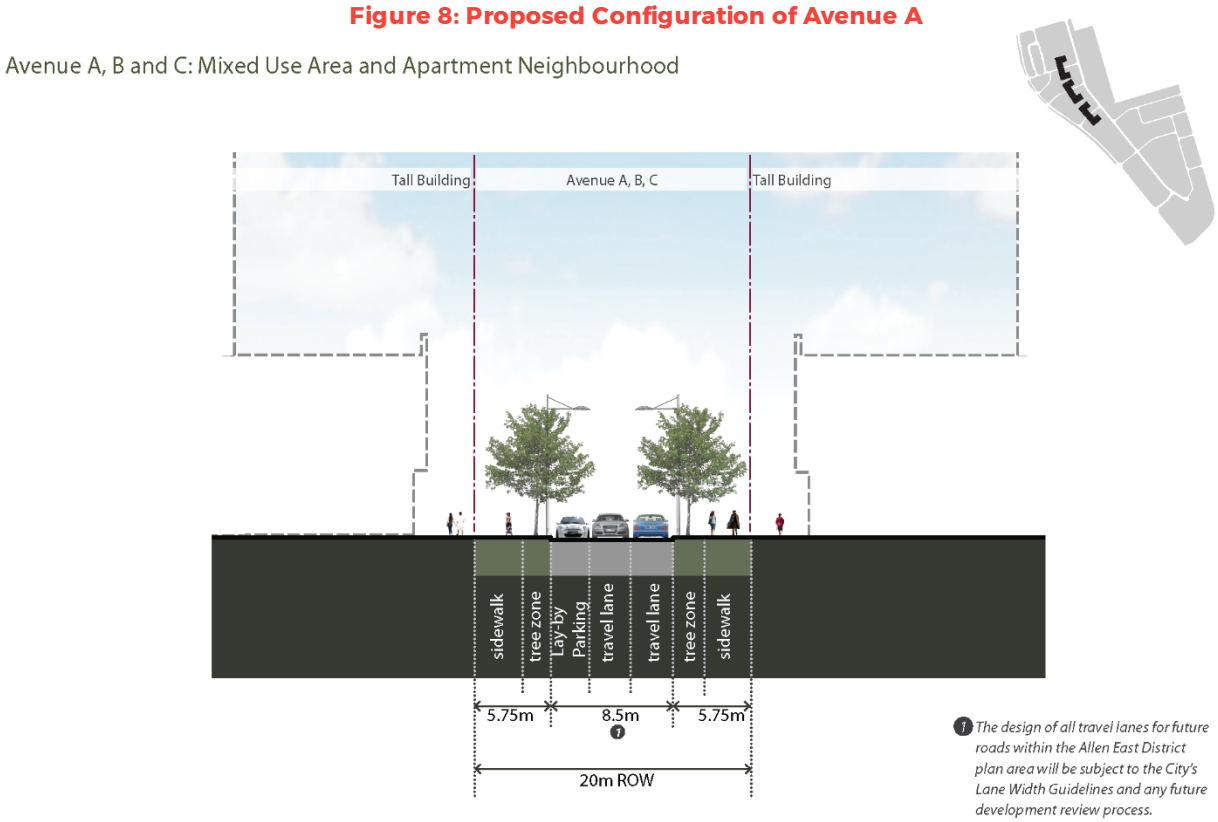
2.5.5 REVIEW OF CYCLING INFRASTRUCTURE BY STREET

The type of cycling infrastructure proposed on each street has been reviewed, based on adherence to the City's draft On-Street Bikeway Design Guide (June 2019) and the role of and projected volumes on each street (as per the 2013 TIS).

The review is documented as follows:

- Street A - includes a two-way cycle track within the right-of-way boulevard or multi-use trail within the greenway adjacent to Street A right-of- way. The proposed cycling infrastructure along Street A is on the east side of Street A and the configuration will vary by block based on changing condition of the street as it extends north-south through the District. The projected p.m. peak hour two-way volume is 810, as noted above, and thus the Annual Average Daily Traffic volume will be in the range of 8,100. While the City's guidelines do not specify a threshold traffic volume for this particular concept, this specific approach was developed through a collaborative planning process with Staff, based on considerations including the adjacency of the park to the east. Additionally, the low number of intersecting driveways on the east side of the street, compared to the larger number of street intersections on the west side, supports the concept of the two-way cycle track/multi-use trail on the east side – there will be far fewer vehicular conflicts. As well, the placement of the two-way cycle track/multi-use trail within the ROW boulevard or greenway will maximize the safety of cyclists adjacent to Street A and will provide connections to the surrounding planned and existing Active Transportation network. The proposed mid-block pedestrian connections are also planned to increase the walkability of the community and support increased use of the subway station;
- Avenue B – signed route. The projected p.m. peak hour two-way volume at full build-out is 600. Thus the estimated AADT is in the range of 6,000. While this volume is high, the character of the street and connectivity to the west side of the Allen Road indicate that designating this as a signed route is appropriate.
- Avenue E – two-way cycle track between Allen Road and Street A. This was labelled as Street D in the plan analyzed in the 2013 TIS. The projected p.m. peak hour two-way volume on Street D was 319. Thus the projected AADT would be in the range of 3,200. This is consistent with the proposed cycle track on the west side of the Allen Road, and would enhance safety and accessibility for riders continuing east or west. As a connection to the proposed multi-use trail/two-way cycle track on Street A, a cycle track on Avenue E would also help with continuity of the network on the east side of the Allen Road.

Figure 8: Proposed Configuration of Avenue A



3 CONCLUSIONS

The Allen East District Plan represents a culmination of sustained collaboration over an extended period between CreateTO and the City of Toronto on how to best implement the City's transportation vision for the Allen District. Through this plan, CreateTO is highlighting the diverse options of transportation available to residents, visitors and employees who will live and work within the Allen East District. Building upon the 2013 TIS, the Allen East District has a set of clear TDM initiatives based upon the Tippett Model's modal split that projects sizeable reductions in single occupancy vehicles generated by updated land use. These modal split aspirations are reflected through the inclusion of the Ecomobility hub directive, informed by the Consumers Next Report, which illustrates the tools, policies and guidelines that help CreateTO reach the modal split target for the Allen East District.

Through continued dialogue with City staff and the TTC, CreateTO will ensure that the Allen East District will incorporate the standards and guidelines required to satisfy the City of Toronto's expectations, including appropriate cycling facilities, pick-up/drop-off locations and transit connections. By identifying and accommodating the demands of the district within the planning process, both parking, traffic and active transportation, CreateTO fully supports the City of Toronto's growth targets.

The District Plan supports the following:

- The successful implementation of the Ecomobility hub concept directing future transit initiatives; coordinating pedestrian, cycling, transit and automobile traffic throughout the Allen East District;
- Establishment of the Allen East District's mode split targets, in line with other local targets, including the approved Tippett Road Regeneration Study;
- Provision of appropriate parking facilities as parking demand evolves through the phases of development of the Allen East District;
- Further commitment to Transportation Demand Management programs in reducing the number of single occupancy vehicles and supporting City of Toronto TDM targets; and
- Continued support for pedestrian and cycling through provision of continuous networks, as well as further measures of TDM to reduce single occupancy vehicle trip generation.

The Allen East District Plan complements the reports previously submitted, building upon previous recommendations with direction from City staff. The District Plan is informed and guided through meetings with City staff and TTC to determine the best practices related to the identified transportation goals by CreateTO, City staff and the recommendations of the 2013 Traffic Impact Study.

By incorporation of the Ecomobility hub development concept, CreateTO further incorporates the Transit Road EA with comprehensive active transportation network connections, pedestrian and cycling facilities, transit connectivity and a number of TDM soft measures aimed at diversifying the travel options available to future residents, visitors and businesses.

INTERSECTION CONFIGURATIONS AND SIGNALIZATION

Work conducted since our 2013 Transportation Impact Study has led to the conclusion that a second northbound left turn at the Allen Road / Sheppard Avenue intersection is not expected to be needed, at this time.

Future assessments should consider whether signalization of the intersection of Street A at Avenue A is needed. Signalization is proposed at the intersection of Avenue A at the southeast access to control for bus access into the terminal. This is also subject to further study.

TRANSIT

The District plan is further supported by the bus bay utilisation study, which assessed existing bus bay facilities and concluded they remain fully functional at this time. At future stages of design and approval, the number of bays should be reviewed in light of the extension of the subway line to the City of Vaughan and potential resulting changes in travel patterns as the area continues to develop.

The Plan has reflected detailed comments offered by Toronto Transit Commission staff, with the objective of maintaining effective bus operations at the Sheppard West Subway Station. The bus access plan reflects their requirements.

CYCLING FACILITIES

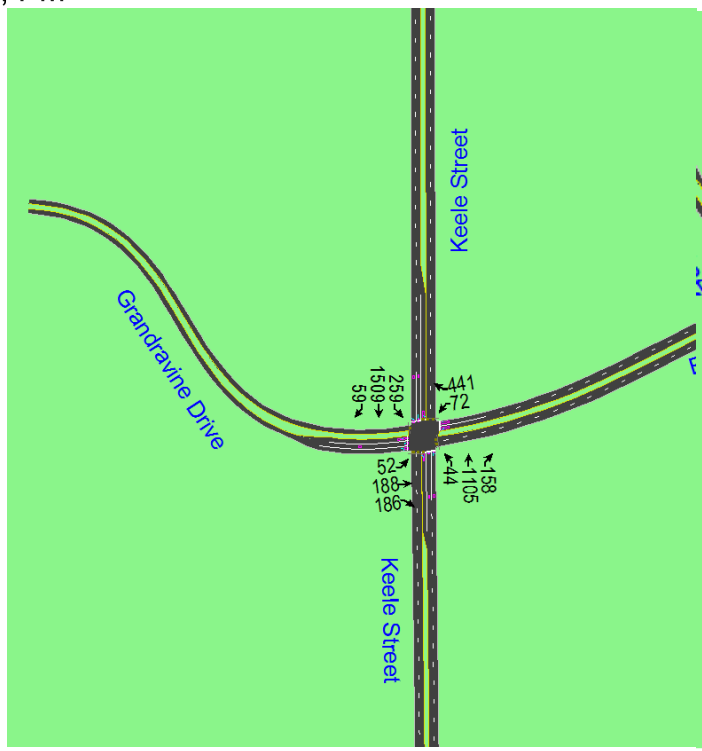
We have reviewed the proposed types of cycling facilities on each street in light of the projected volumes from the 2013 TIS, in relation to the City's guidelines for such facilities. The proposed facilities are concluded to be appropriate. Together they will form a cohesive network for effective movement within and to the District.

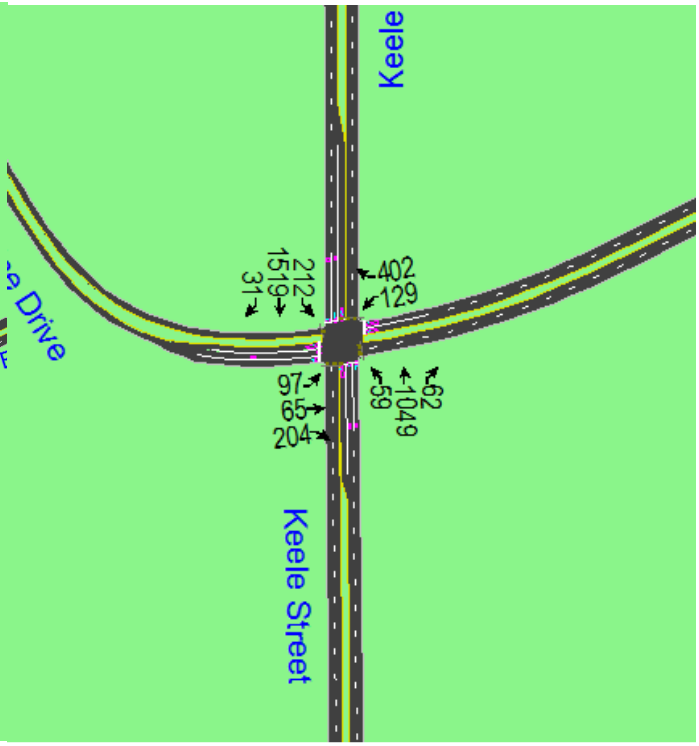
A

APPENDIX A: DOWNSVIEW MAJOR ROADS EA – 2031 TRAFFIC VOLUMES

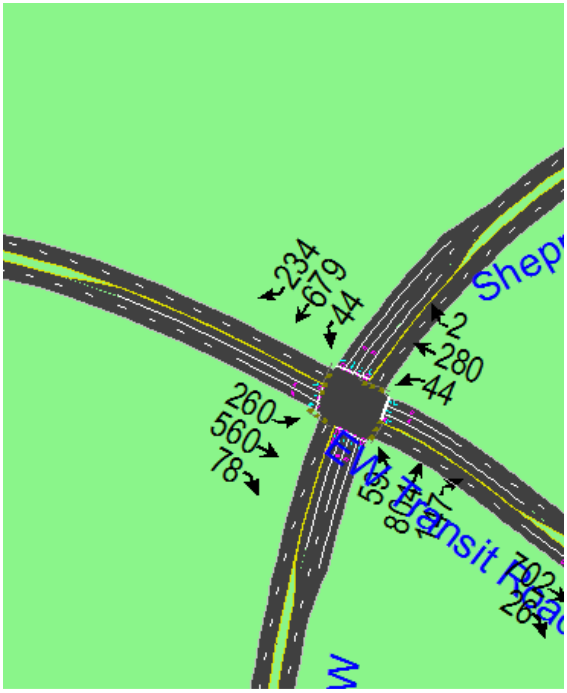
Keele & Grandravine / EW Transit Road

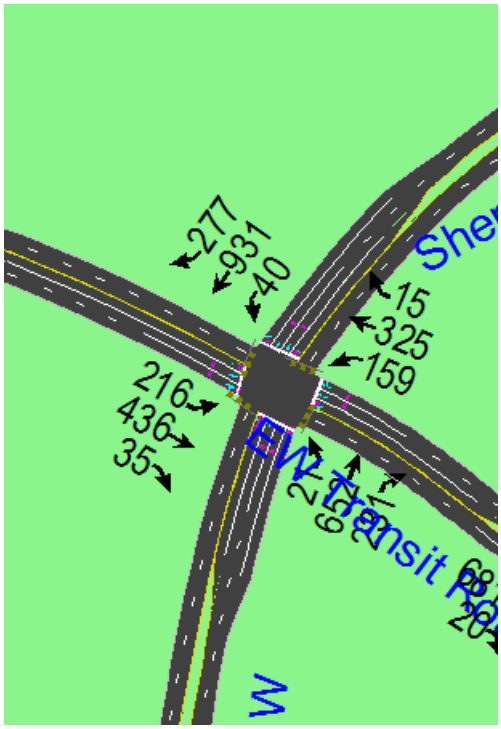
AM, PM



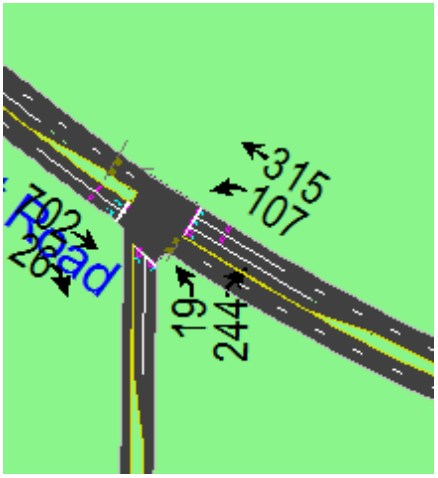


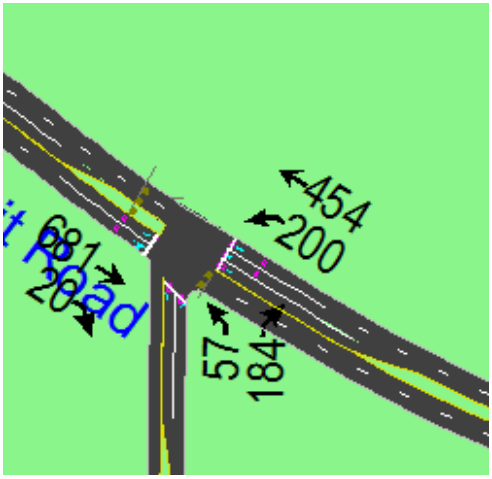
Sheppard & EW Transit Road





Local Road & EW Transit Road -





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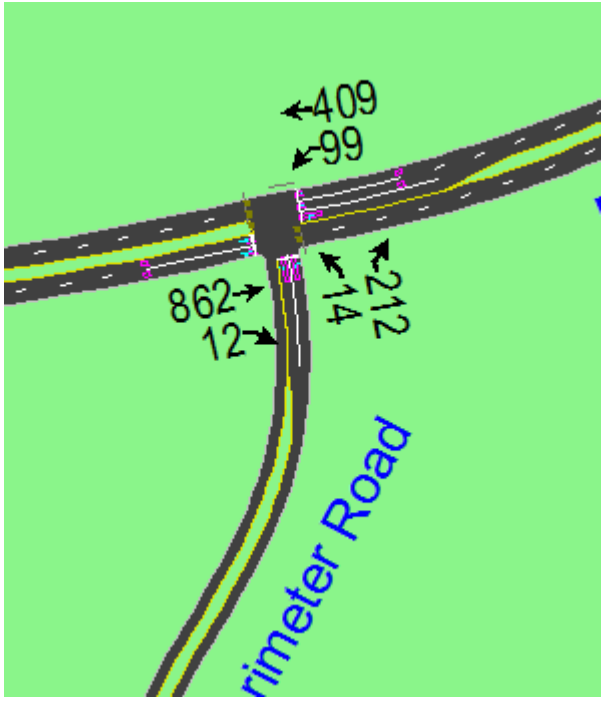
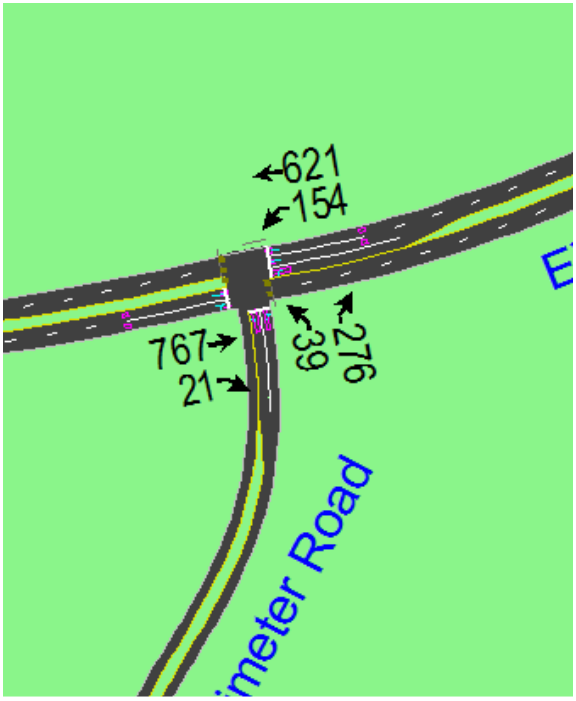
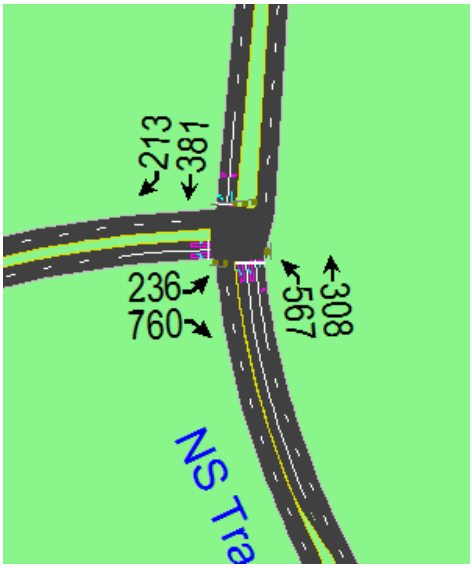
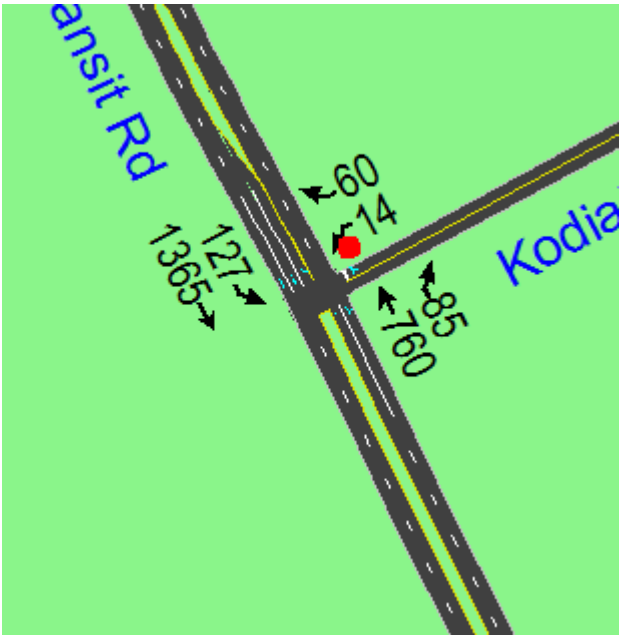


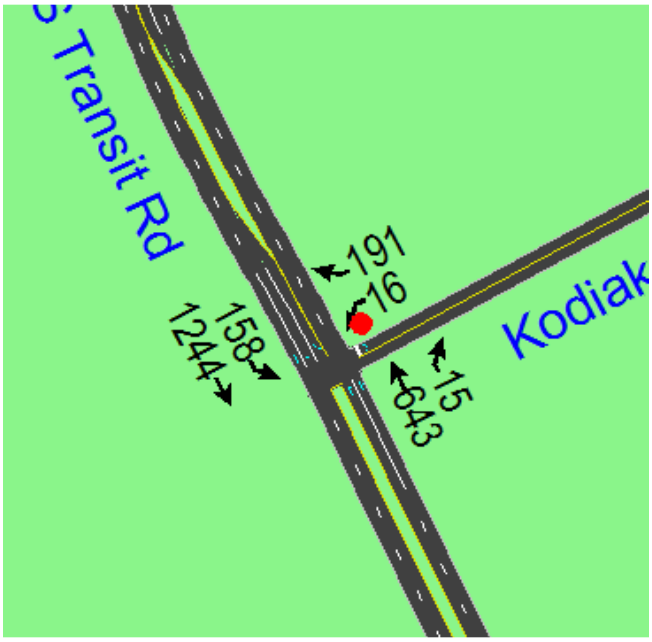


NS Transit Road & EW Transit Road -



Kodiak Cres & EW Transit Road -





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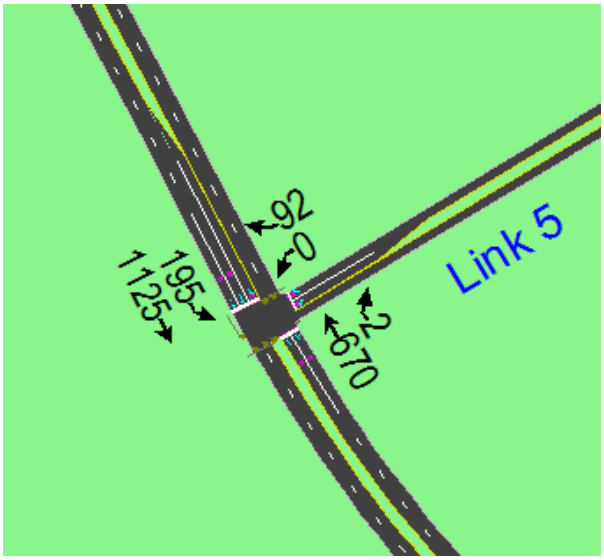

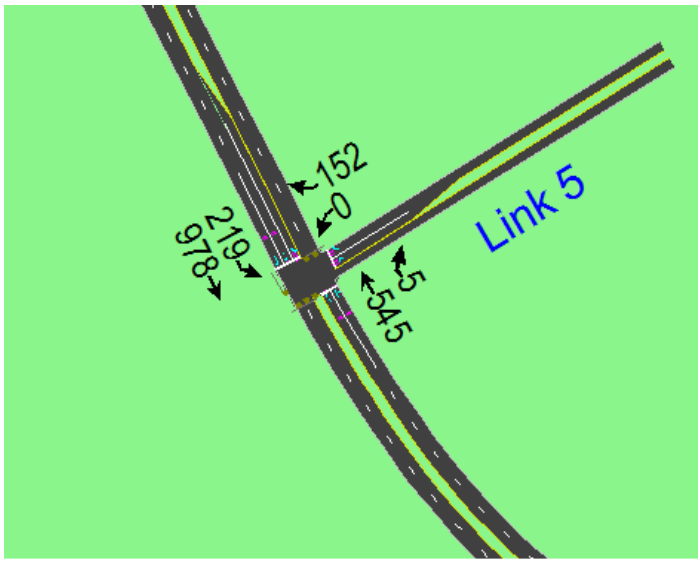

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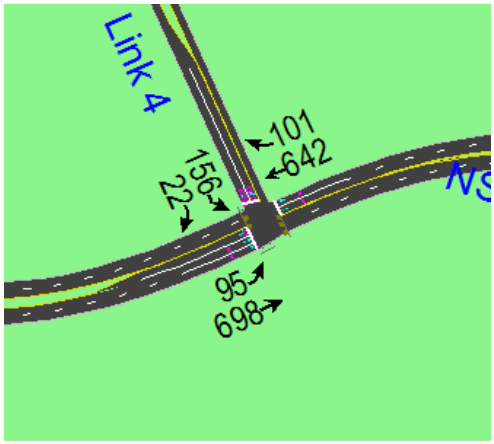

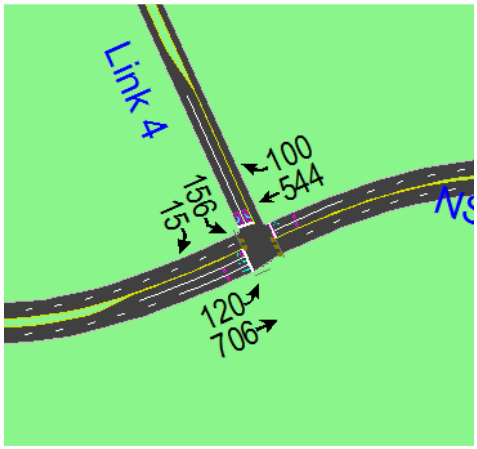

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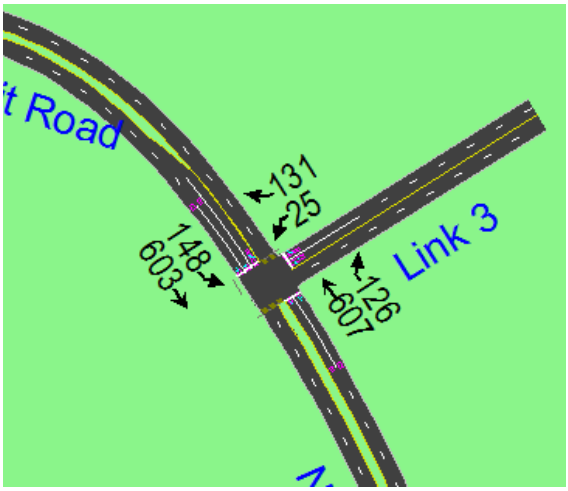

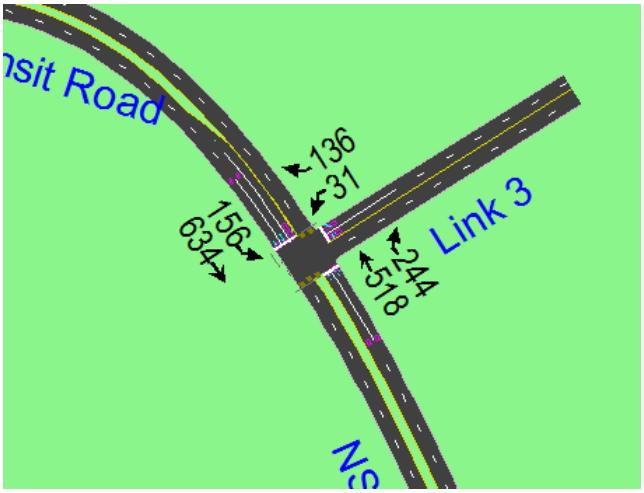

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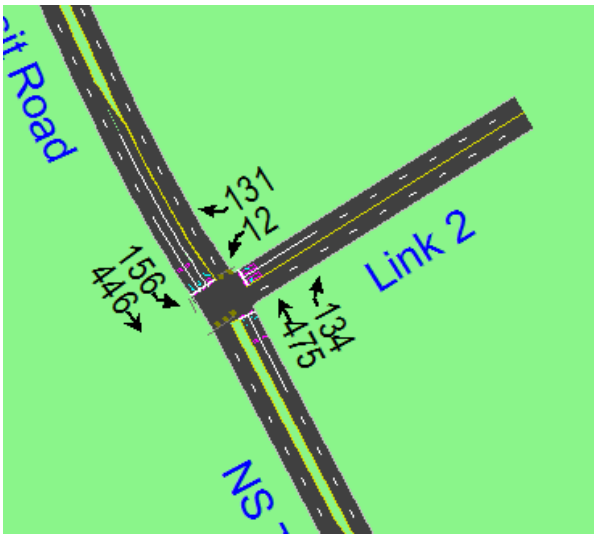

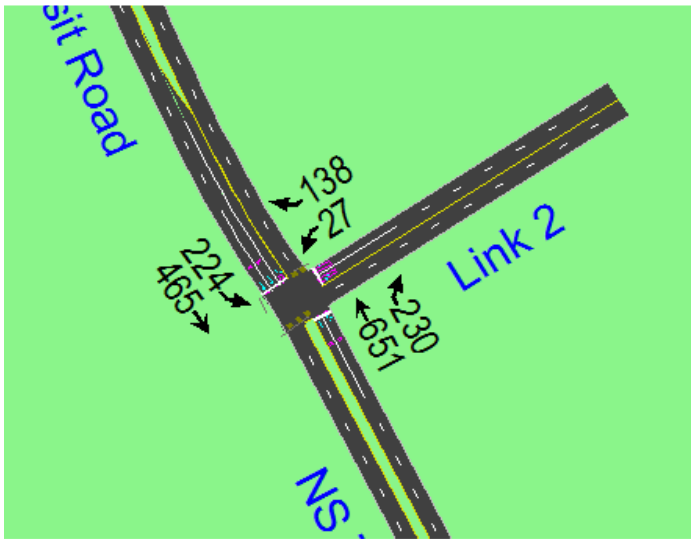

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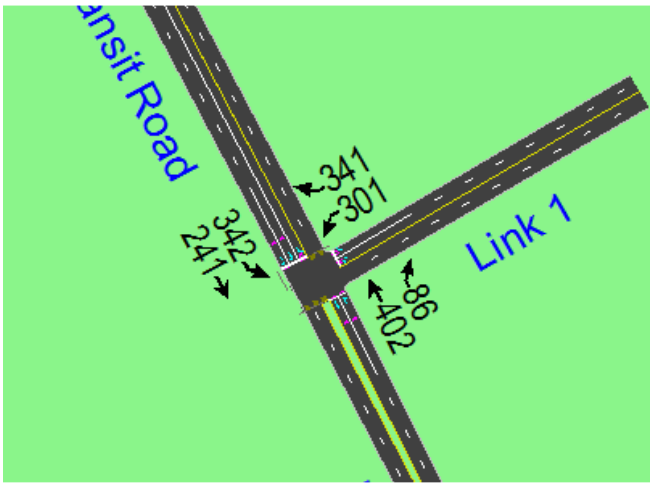
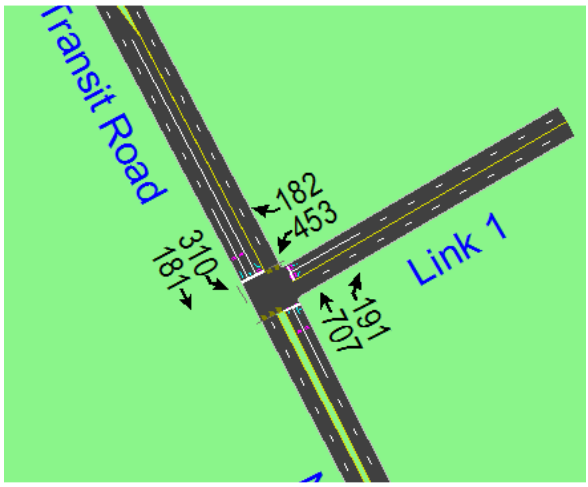




B

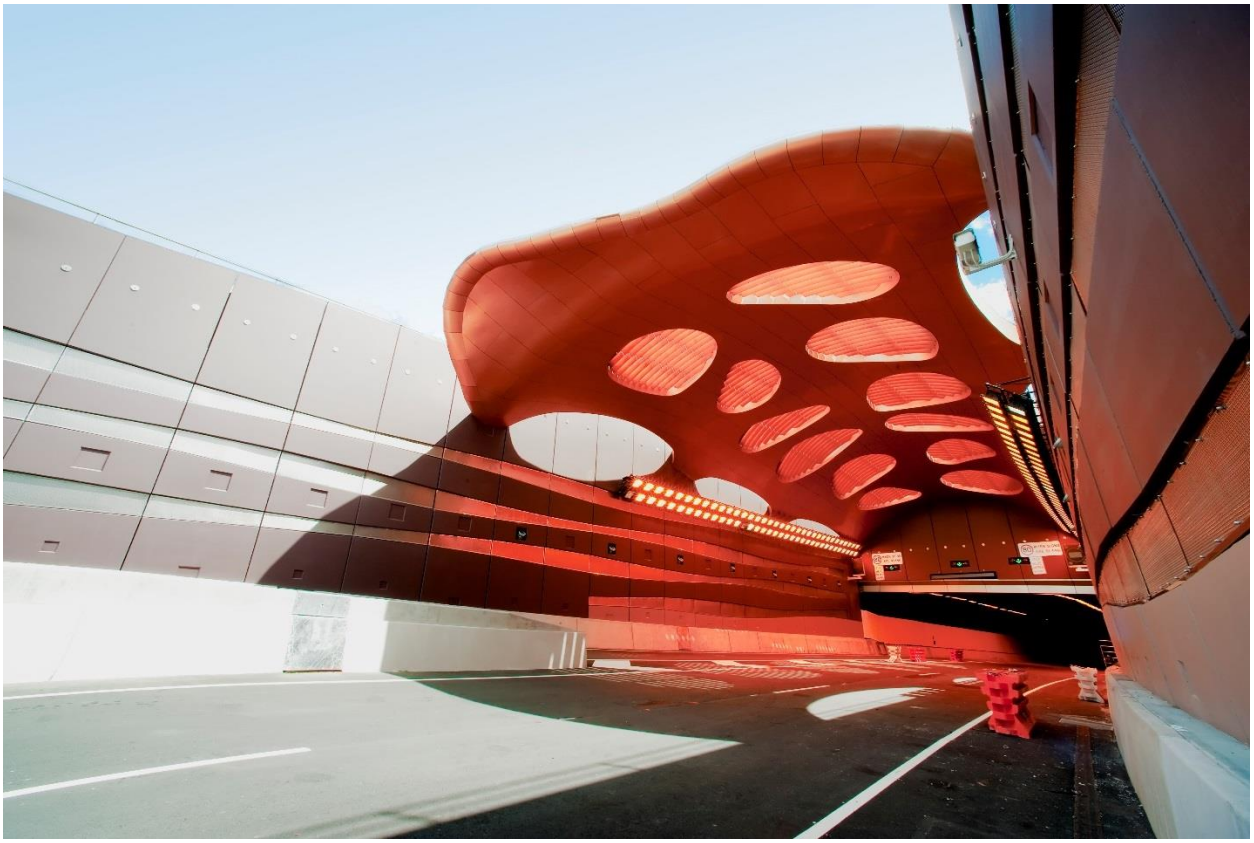
APPENDIX B: MICROSIMULATION AND PPUDO STUDY

CREATETO

ALLEN EAST DISTRICT PLAN
MICROSIMULATION AND PPUDO STUDY

NOVEMBER 08, 2019

DRAFT



ALLEN EAST DISTRICT PLAN

MICROSIMULATION AND PPUDO STUDY

CREATETO

TYPE OF DOCUMENT (VERSION)
DRAFT

PROJECT NO.: 07M-00013-10
DATE: NOVEMBER 08, 2019

WSP
100 COMMERCE VALLEY DRIVE WEST
THORNHILL, ON, CANADA L3T 0A1

TEL.: +1 905 882-4211
FAX: +1 905 882-0055 WSP.COM

November 08, 2019

CREATETO
Vice President – Land & Development Planning
CreateTO
200 King Street West, Suite 200
Toronto, ON
M5H 3T4

Dear Mr. Bonanni:

Subject: **Allen East District Plan**
Review of Bus Access and Pick-up/Drop-off Alternatives

WSP is pleased to present our report documenting the microsimulation analysis of the bus access alternative to Sheppard Avenue, as well as passenger pickup and drop-off (PPUDO) needs for the Sheppard West Subway Station, as part of the Allen East District Plan. The study addresses comments provided by the City of Toronto in response to the submitted 2018 Transportation Planning Addendum and the Toronto Transit Commission during working meetings held in 2018.

The microsimulation analysis of the dedicated bus access on Sheppard Avenue projects that there are some benefits to transit from the proposal, while acknowledging the traffic impacts. Queuing would be largely unaffected. The report documents an on-street proposal for the pick-up/drop-off facility which appropriately balances the needs of the development with that of users of the Station.

If there any questions or comments, please do not hesitate to contact us.

Yours sincerely,

Jim Gough, P.Eng.
Manager, Transportation Planning

WSP ref.: 07M-00013-10

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

1 INTRODUCTION

The objective of this report is to document the analysis of a potential alternative for bus access and pick-up/drop-off activity at Sheppard West Subway Station, reflecting comments received at the workshop with City and TTC staff which occurred in February 2019. To evaluate the possibility of this proposed bus-only access, the WSP project team completed a microsimulation analysis, which assessed the operational impact of implementing a bus-only signalized driveway on Sheppard Avenue West. The second component of the report was an assessment of existing PPUDO activity at the Sheppard West Subway Station and identification of a recommendation for the future PPUDO configuration in the Allen East District (**Figure 1-1**).

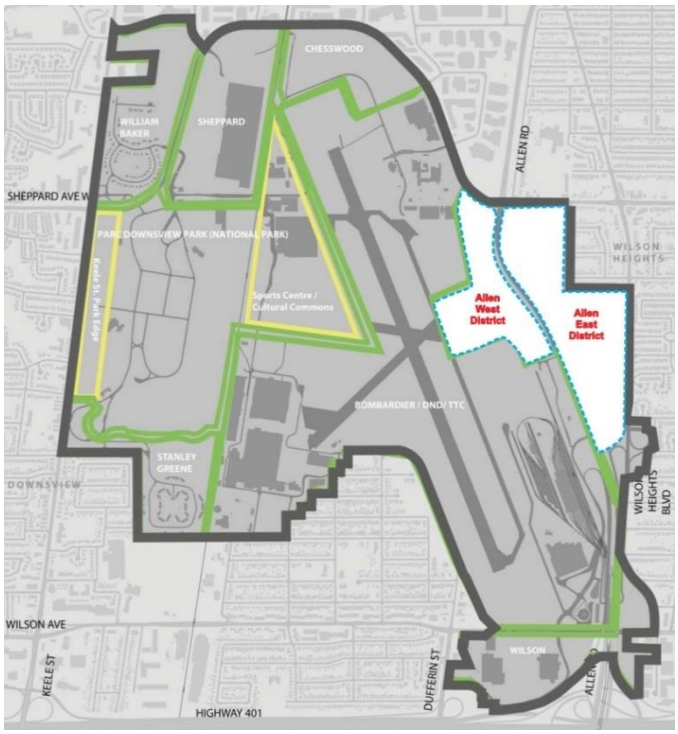


Figure 1-1: Allen District and surrounding area

1.1 PROPOSED DEVELOPMENT

The proposed development in the Allen East District considered in this study includes a total of 3,267 residential units, 450 detached single-family and townhouse units, 174,379 m2 of office floor area and 3,716 m2 of anchor retail space, and all assumed to be constructed by 2031. The proposed development in the Allen West District comprises a total of 2,100 residential units, approximately 102,193 m2 (1,100,000 sq. ft.) of office space, and some ground floor ancillary retail space, to be constructed by 2031.

The previously completed Traffic Impact Study (TIS) (2013) analyzed the full build out of the Allen East District Plan by 2031. This horizon year reflects the maximum permitted density levels in the approved Downsview Area Secondary Plan. The current proposed development and the development assumed in 2013 TIS are compared in **Table 1-1**. Directed by the 2013 Traffic Impact Study, the Allen East District plan provided a number of recommendations for improving the existing and planned road network. The recommendation of a dual NB left turn movement at Sheppard Avenue, and Allen Road was proposed as an interim measure to facilitate northbound turning volumes in conjunction with Transit Road's construction.

Table 1-1: Proposed Development

Land Use	2013 TIS	Current Development Proposed
General Office	1,877,000 sq. ft.	1,600,000 sq. ft.
High/Mid Rise Residential	3,600 units	3,267 units
Semi Detached and TH	450 units	450 units
Specialty Retail	40,000 sq. ft.	180,000 sq. ft.
Institutional	175,000 sq. ft.	-

1.2 STUDY PURPOSE

This study and microsimulation analysis was completed to address the written and verbal comments received from the City and the TTC at the February 2019 meeting. The primary goal of this study is to assess the feasibility of introducing bus-only full-movement access to the station at Sheppard Avenue West. The operational impact of the proposed access was completed using microsimulation software. The second goal of this report is to assess the existing Passenger Pick-Up and Drop-Off (PPUDO) facilities at Sheppard West Subway Station and review the configuration for a future PPUDO in the Allen East District. The result of the assessment will inform potential PPUDO scenarios, including spaces, configuration and location on the designated Retail Street. The finalised PPUDO scenario is then tested through a preliminary design to confirm the functionality of the chosen scenario.

The Sheppard West Subway Station is located in North York, on Line 1 Yonge-University Subway network. The station is situated on the southeast corner of the Sheppard Avenue West and Allen Road intersection. Sheppard West Station is accessible through two pedestrian entrances on Sheppard Avenue West, and two vehicle connections through the TTC Subway Station North Access Road with and through the signalised access to the TTC commuter parking lot. The subway station offers connections to nine bus routes which access the station's bus bays through three points; the first access road is the TTC Subway Station North Access Road, the second is the Right-in-Right-out driveway on Sheppard Avenue West and the third is the signalised bus-only access located south on Allen Road. This is shown in **Figure 1-2**.

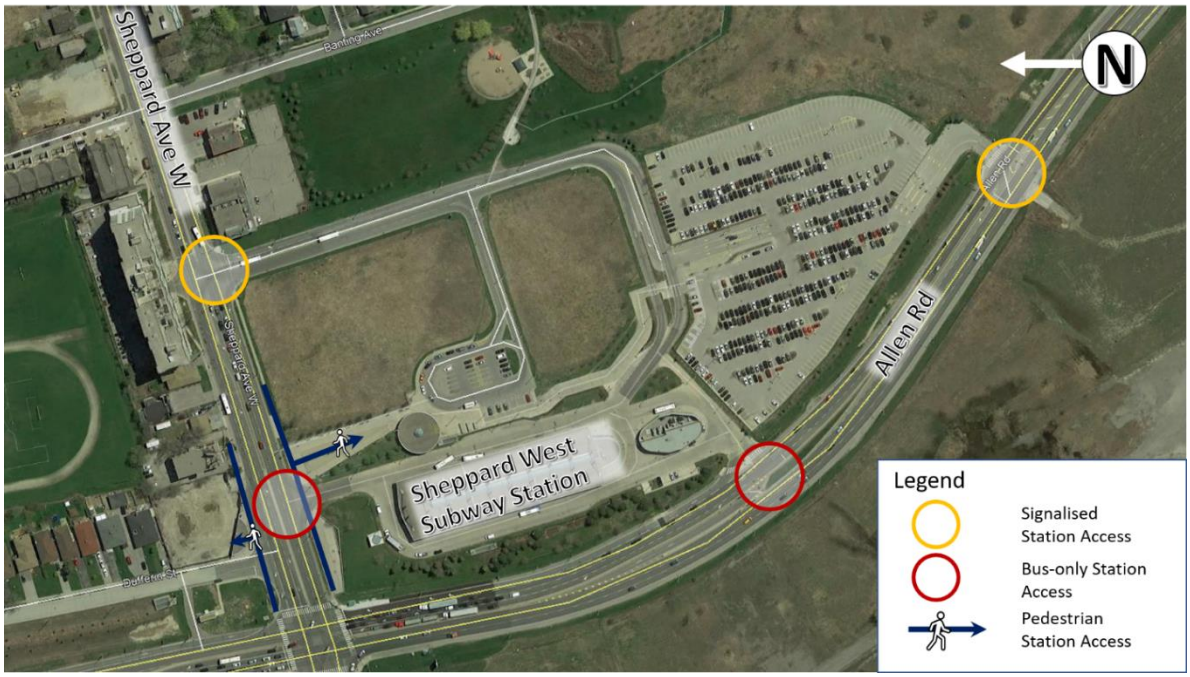


Figure 1-2 Sheppard West Station Existing Conditions

The Sheppard West Subway Station PPUDO is comprised of 24 short-term parking spaces, six barrier free parking spaces and approximately ten curbside spaces for private vehicles and taxis. The PPUDO is shown in **Figure 1-3**.

Figure 1-3: Study aspects

2 MICROSIMULATION

To assess the viability of the new bus-only full-movement signalized access proposed in the February 2019 memo, and highlighted in **Figure 1-3**, traffic microsimulation was conducted using PTV Vissim. Microsimulation was selected as the mode of analysis, because due to the proximity of the intersections and the complexity of the phasing plans, traditional traffic engineering software cannot completely capture the operations. The simulation focused on the intersection of Allen Road and Sheppard Avenue West, and the bus access. Synchro Studio 10 was used to summarize the operations of the adjacent intersections and provide information on the base operations.

2.1 PROPOSED ACCESS CONCEPT

To present the microsimulation model and results, an access concept was created, and this can be seen in **Figure 2-1**. This configuration would allow for all movements to be completed by buses entering and exiting Sheppard West Subway Station. The access would be immediately to the east of the intersection of Allen Road and Sheppard Avenue West, at the location of the existing right-in-right-out driveway. The westbound left and eastbound right would only be permitted for transit vehicles (only transit vehicles could use the driveway). The signal phasing for this intersection would be connected with the existing intersection due to their close proximity, and the proposed phasing plan can be seen in **Figure 2-2**, with a description of each phase below:

- Phase A: Intersection 1: Eastbound and westbound advanced left turns, where the eastbound left is proposed to be protected only. Intersection 2: Eastbound and westbound are permitted, including the westbound left for buses.
- Phase B: Intersection 1: Eastbound and westbound through, westbound left is permissive. Intersection 2: Eastbound and westbound are permitted, including the westbound left for buses. All east-west pedestrian phases allowed.
- Phase C: Intersection 1: Westbound through, and westbound left protected phase re-introduced to assist clearing the queue in front of the bus access. Intersection 2: Northbound left and right protected, eastbound and westbound are held.
- Phase D: Intersection 1: Northbound and southbound advanced left turns. Intersection 2: Eastbound and westbound are permitted, including the westbound left for buses.
- Phase E: Intersection 1: Northbound and southbound through movements. Intersection 2: Eastbound and westbound are permitted, including the westbound left for buses.

One key aspect of this design is that for the westbound direction, vehicles would be allowed to block the intersection, as otherwise the queue for the westbound movements would be split unnecessarily. The purpose of Phase C is to insert a gap in the westbound traffic for outbound buses to make a left turn. Depending on the number of buses completing the movement, they may also be able to proceed through the main intersection. For this study, the transit phase was called every cycle, however if implemented it could be called on an as-needed basis.

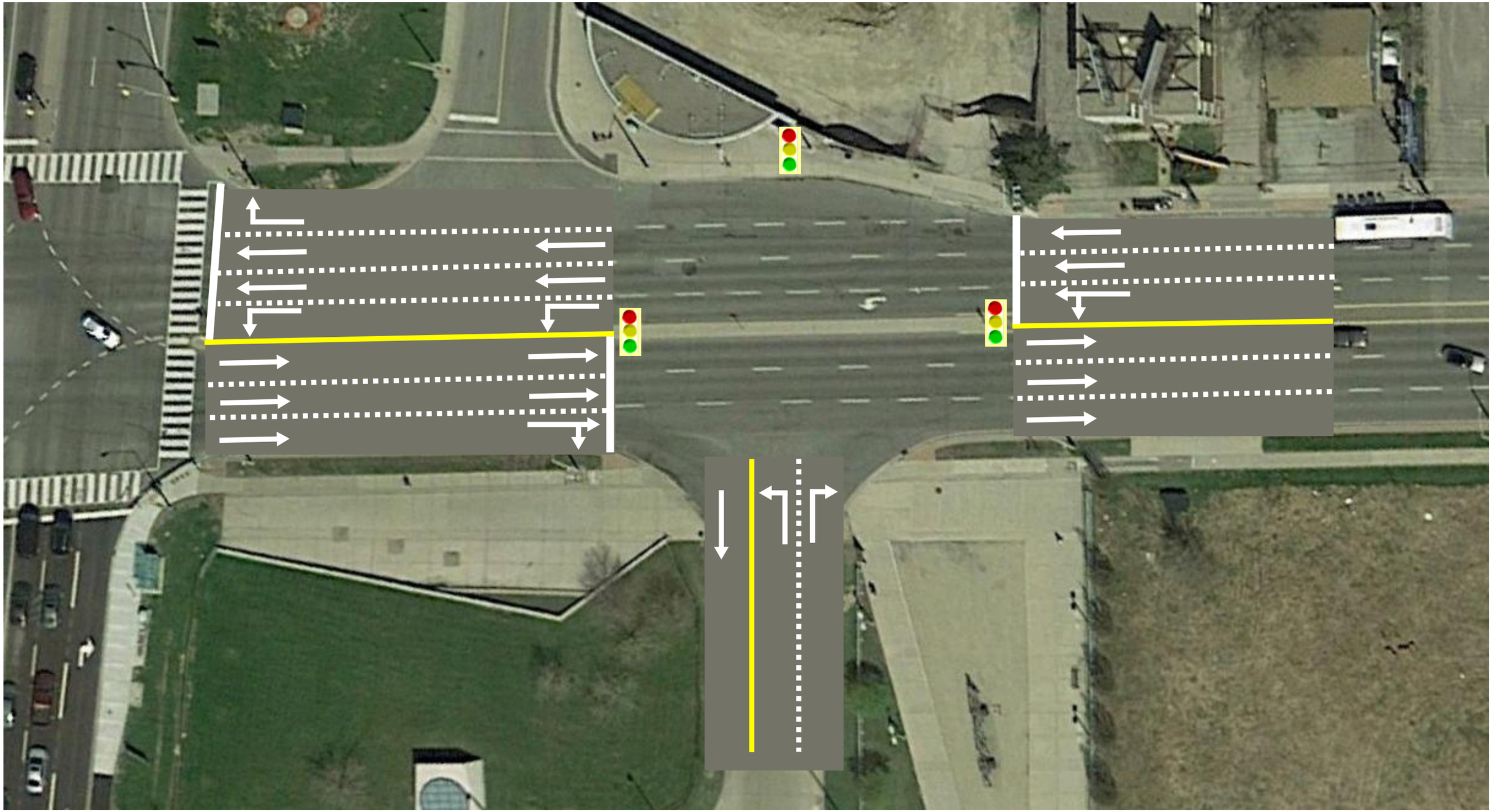
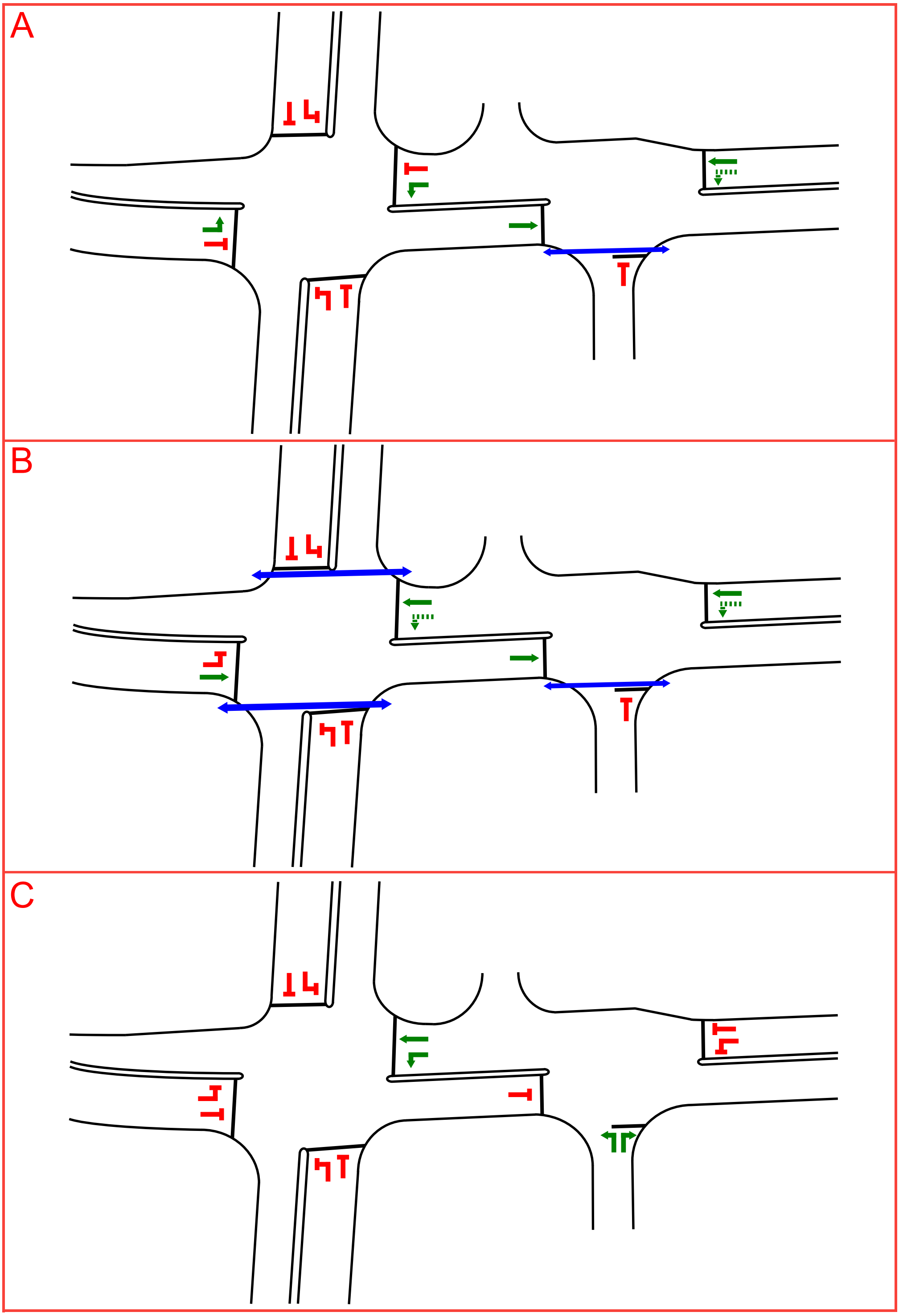


Figure 2-1
Proposed Access Configuration



Protected Movement

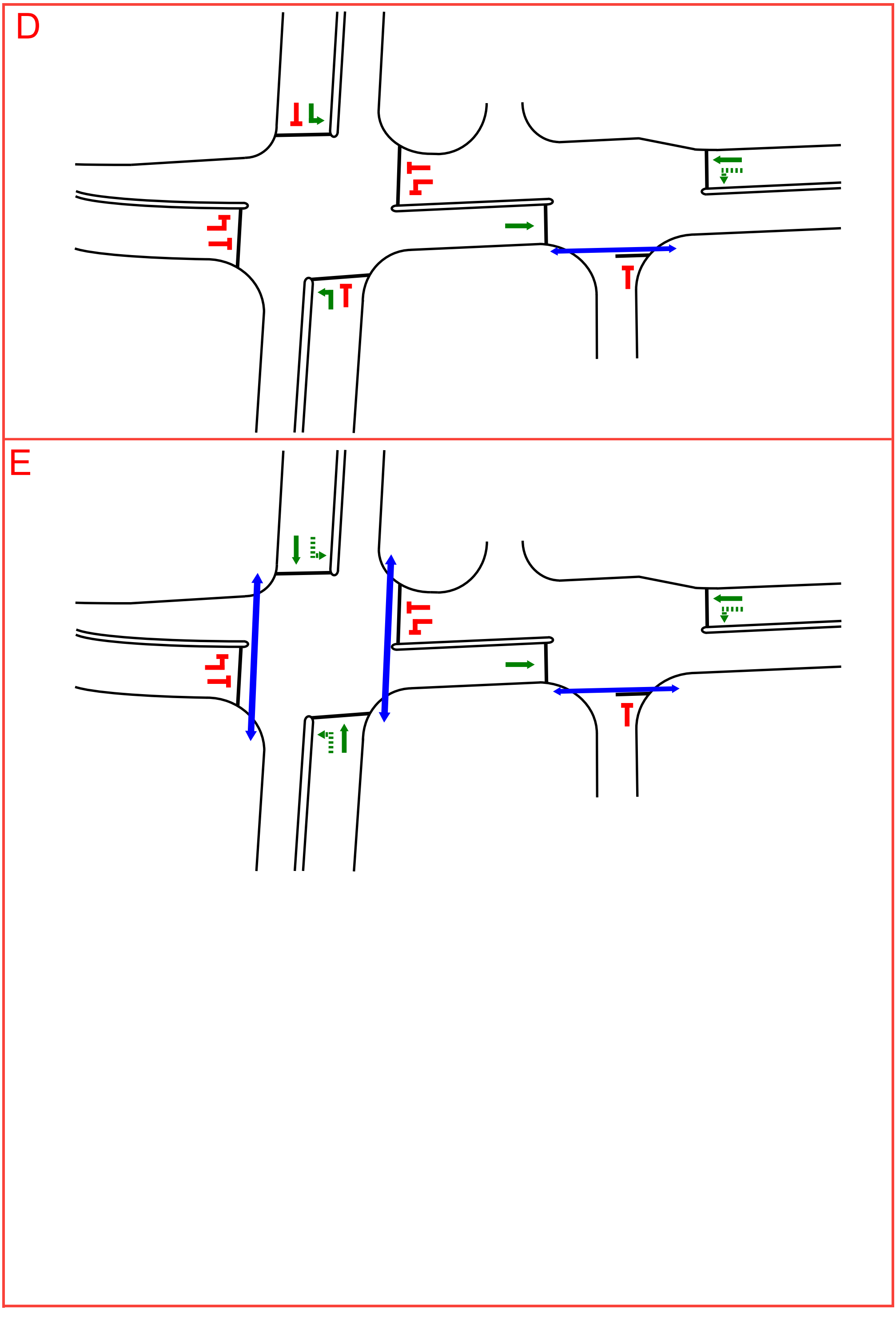
Permitted Movement

Stopped Movement

Pedestrian Movement

Figure 2-2A

Proposed Bus Access Signal Phasing



Protected Movement

Permitted Movement

Stopped Movement

Pedestrian Movement

Figure 2-2B

Proposed Bus Access
Signal Phasing

2.2 INPUTS AND ASSUMPTIONS

Both the microsimulation and Synchro analysis require traffic data; additionally the microsimulation model requires adjustments based on the vehicle data.

2.2.1 TRAFFIC DATA

Due to the age of the turning movement counts (TMCs) associated with the original study, Spectrum completed TMCs on behalf of WSP on Tuesday, September 10, 2019, from 6:30 a.m. to 9:15 a.m. and from 3:30 p.m. to 6:15 p.m., to capture the traffic activities during weekday a.m. and p.m. peak periods. **Figure 2-3** illustrates the existing traffic volumes for the analyzed intersections during the weekday a.m. and p.m. peak hours. The turning movement count reports are included in **Appendix A**.

For the future conditions, the values from the 2013 TIS were adjusted to create a revised volume scenario. The process to update the ultimate volumes was as follows:

- The future total 2031 volumes had the existing volumes (from 2013) subtracted from them;
- The newly collected existing volumes (2019) were added to the difference;
- If there were negative values, these values were reverted to the 2031 estimate from the original report;
- The volumes were balanced to account for any other changes.

The above approach allowed the changes in the base conditions to be captured, and has the advantage of implicitly capturing the local re-assignments that were completed in the original report, as well as the background traffic. This approach assumes that the same time period would be expected for completion as within the original study. subtracting the 2013 existing volumes, and then adding the updated existing 2019 traffic counts. The volumes for the future traffic conditions are illustrated in **Figure 2-4**.

In addition to updating the traffic volumes, the most recent signal timings were also obtained from the City of Toronto, these are also included in **Appendix A**.

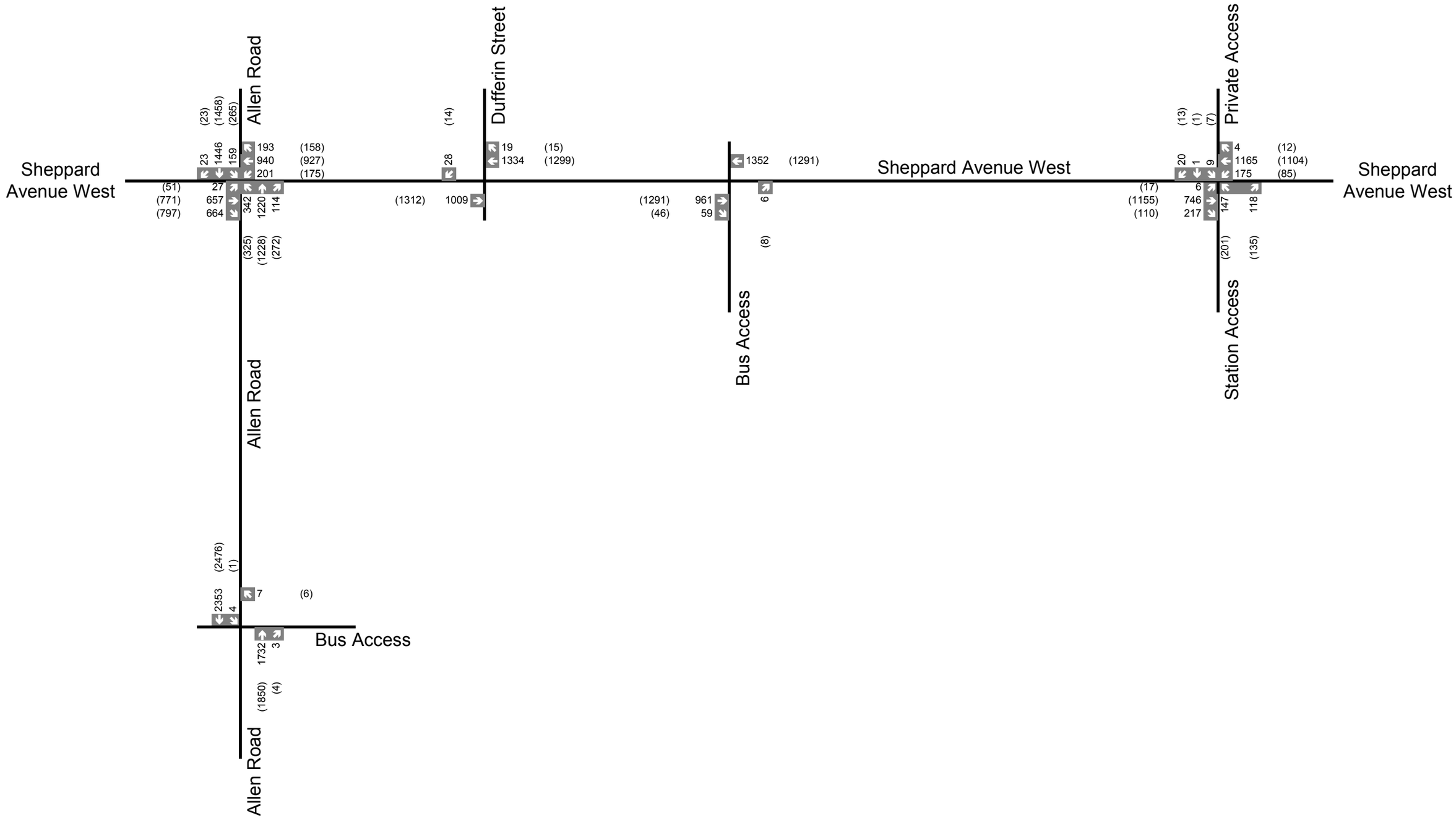
2.2.2 BOUNDARY ROAD NETWORK

The key boundary roads near the site are all under the jurisdiction of the City of Toronto.

Allen Road, which divides the Allen District to Allen East and Allen West, is a north-south major arterial road between Transit Road and Steeprock Drive/Overbrook Place. It is classified as an expressway south of Transit Road and ends at Eglinton Avenue. It becomes Dufferin Street north of Steeprock Drive/Overbrook Place. Allen Road has a six-lane cross section between its northern terminus and the Sheppard West TTC Station bus access intersection. The northbound curb lane (north of Sheppard Avenue and the segment near the Sheppard West TTC Station bus access) and the southbound curb lane (north of Rimrock Road) along Allen Road are designated as HOV lanes for TTC buses only. The posted speed limit along Allen Road near the site is 60 km/h.

Sheppard Avenue West, which bounds the Allen District to the north, is an east-west major arterial road. It has a four-lane cross-section in the vicinity of the site, with exclusive left-turn lanes at signalized intersections in the study area. The posted speed limit along Sheppard Avenue West near the site is 60 km/h.

The lane configurations for the study intersections for the existing conditions are illustrated in **Figure 2-5**. The lane configurations for the future conditions based on the previously present station access concept can be seen in **Figure 2-6**.



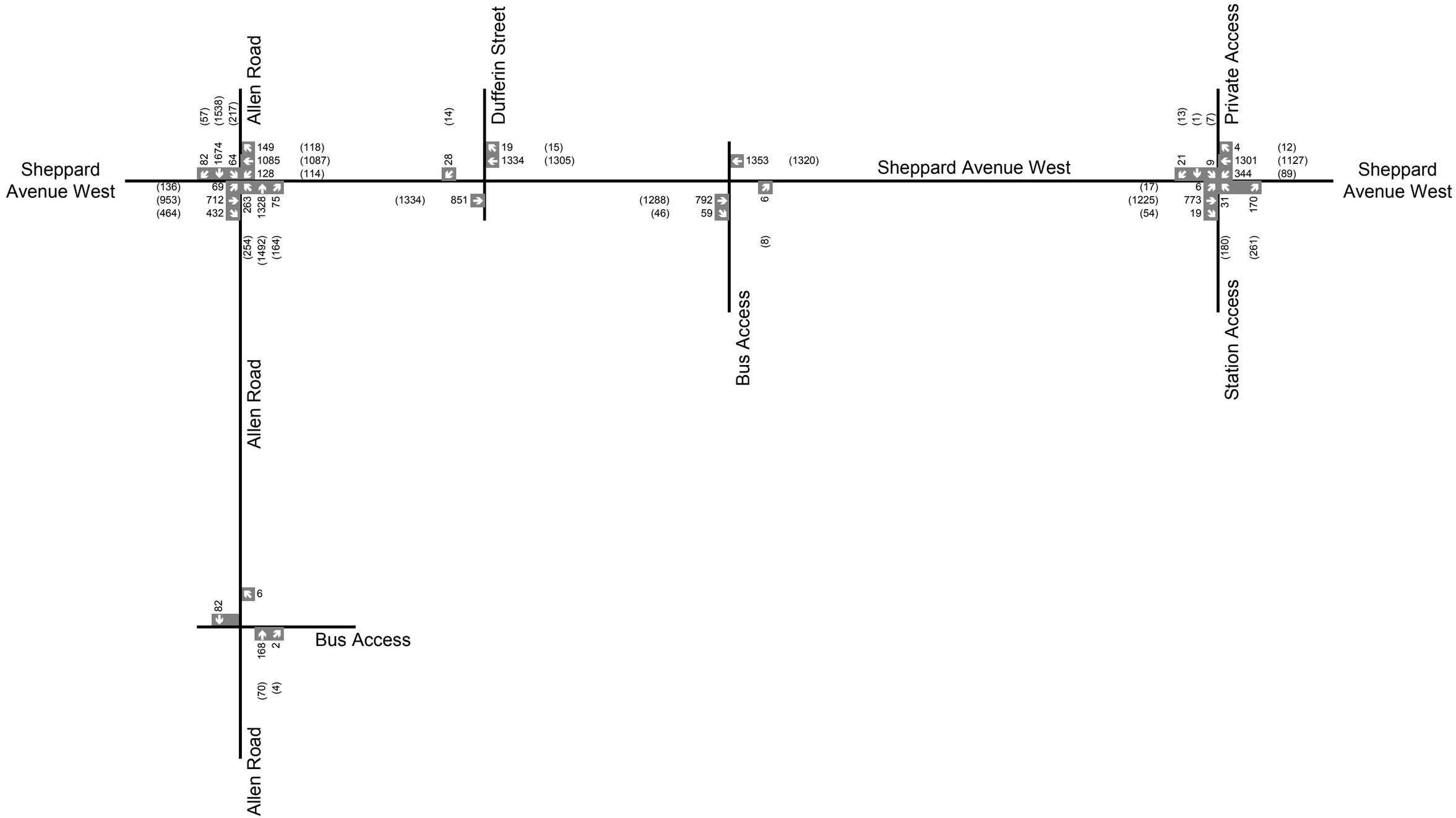
Legend

xx A.M. Peak Hour Traffic Volumes

(xx) P.M. Peak Hour Traffic Volumes

Figure 2-3

Existing Peak Hour Volumes by Movement



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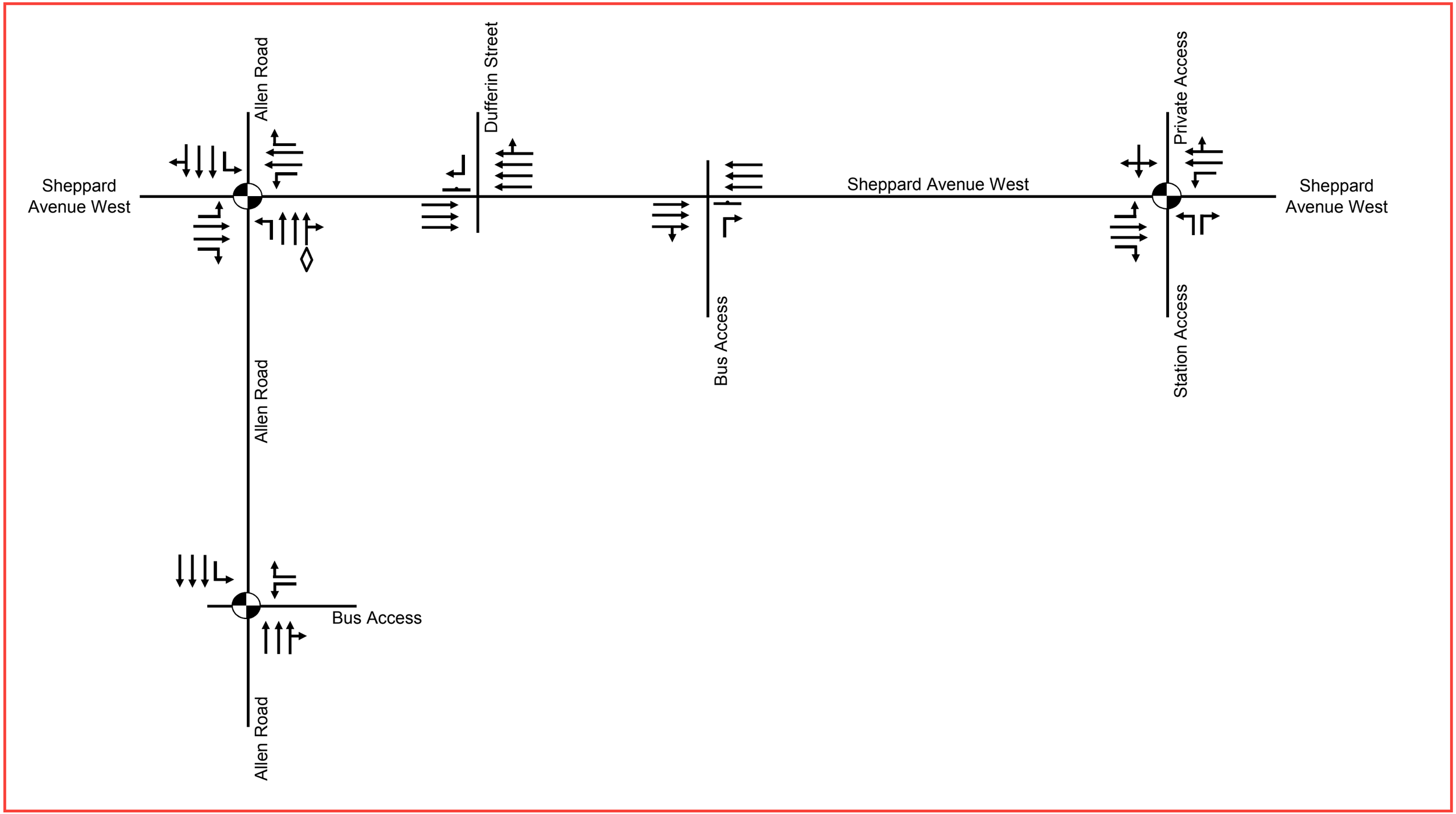
xx A.M. Peak Hour Traffic Volumes

(xx) P.M. Peak Hour Traffic Volumes

Figure 2-4

Future Peak Hour Volumes by Movement



Legend

Signalized Intersection

Stop-Controlled Approach

All-Way Stop Intersection

Figure 2-5

Existing Lane Configuration

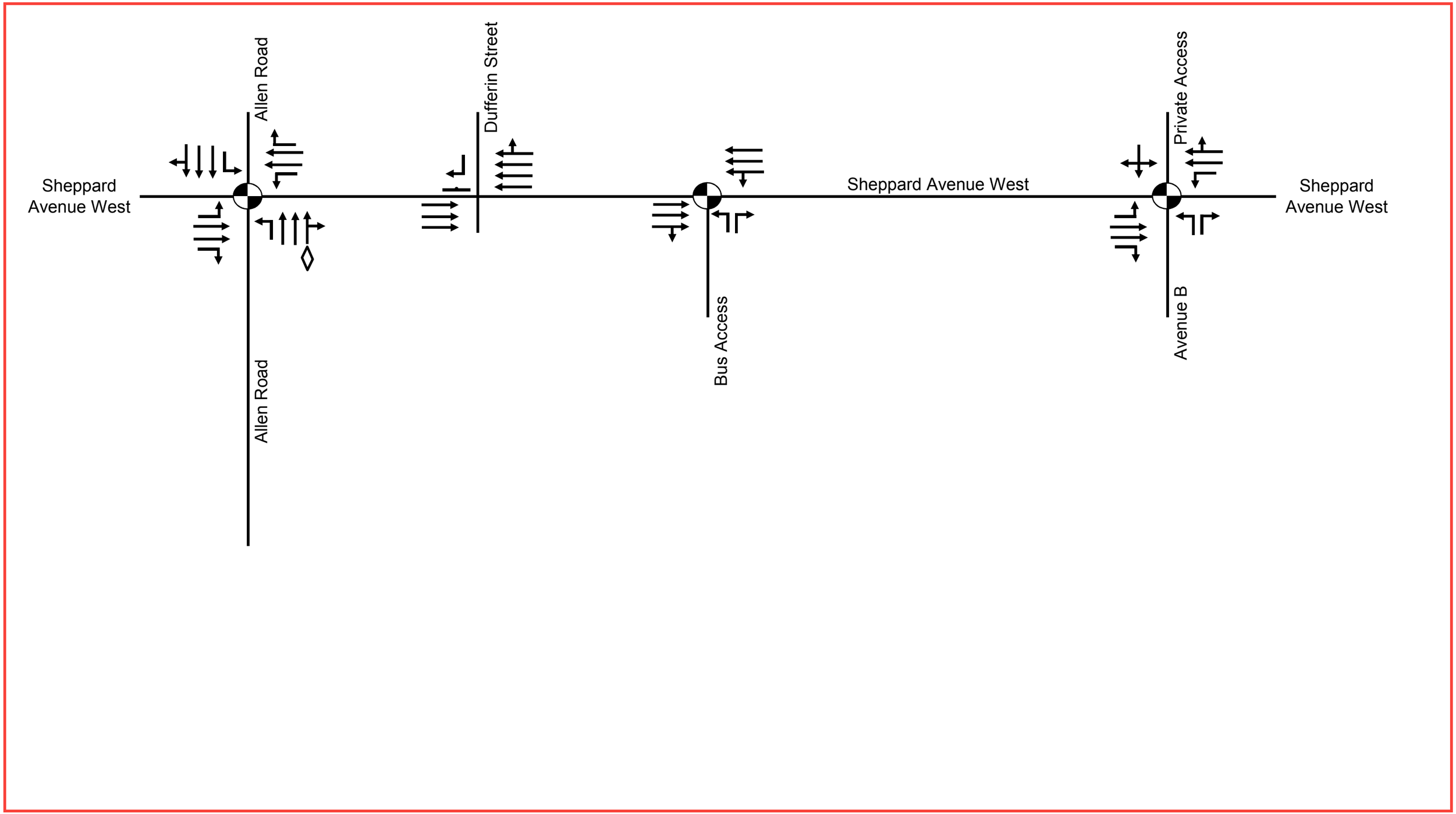


Figure 2-6

Future Lane Configuration

2.2.3 PUBLIC TRANSIT ROUTES

As Sheppard West was formerly a terminal station, there are many bus routes that serve this station. For this analysis, the bus routes were aggregated into travel paths, as although past the study area these routes serve different locations, within the study intersections, there is significant overlap. For the existing conditions, the travel paths as well as the routes they are composed of are summarized in **Figure 2-7**. The aggregated scheduled volumes by travel path are summarized in **Figure 2-8**. These volumes were compared against the recent TMCs, and it was found that the TMCs were consistent with the scheduled volumes, with minor variations. For the ultimate conditions with the proposed access in place the revised paths can be seen in **Figure 2-9**, and the corresponding volumes in **Figure 2-10**.

For the analysis, the Synchro analysis was completed with using the TMCs, and accounting for buses in the heavy vehicle percentage. For Vissim, the buses were handled as their own vehicle input, with more information in the following section.

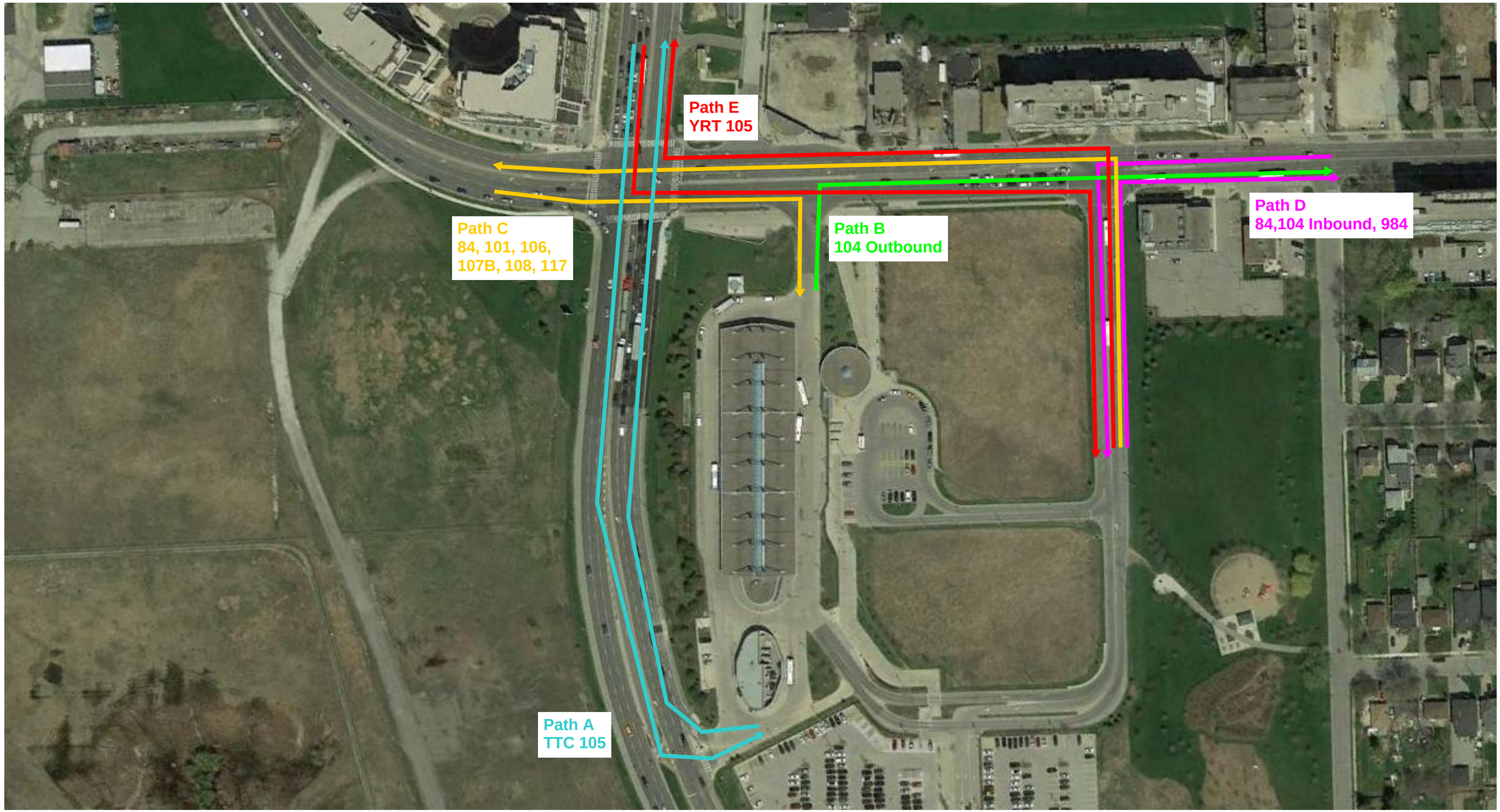
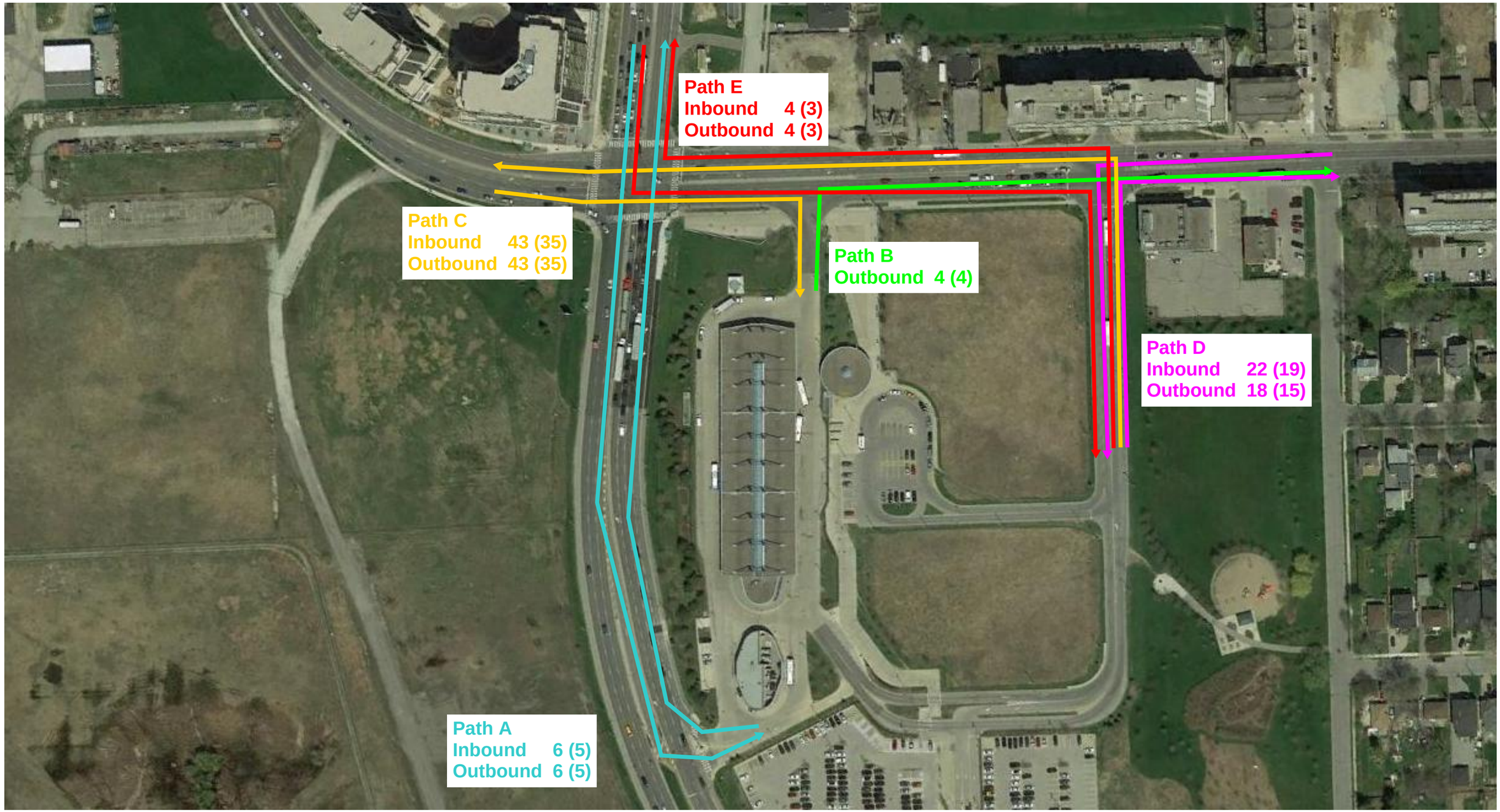


Figure 2-7
Existing Bus Travel Paths



Legend

xx A.M. Peak Hour Bus Volumes

(xx) P.M. Peak Hour Bus Volumes

Figure 2-8

Existing Bus Volumes by Paths

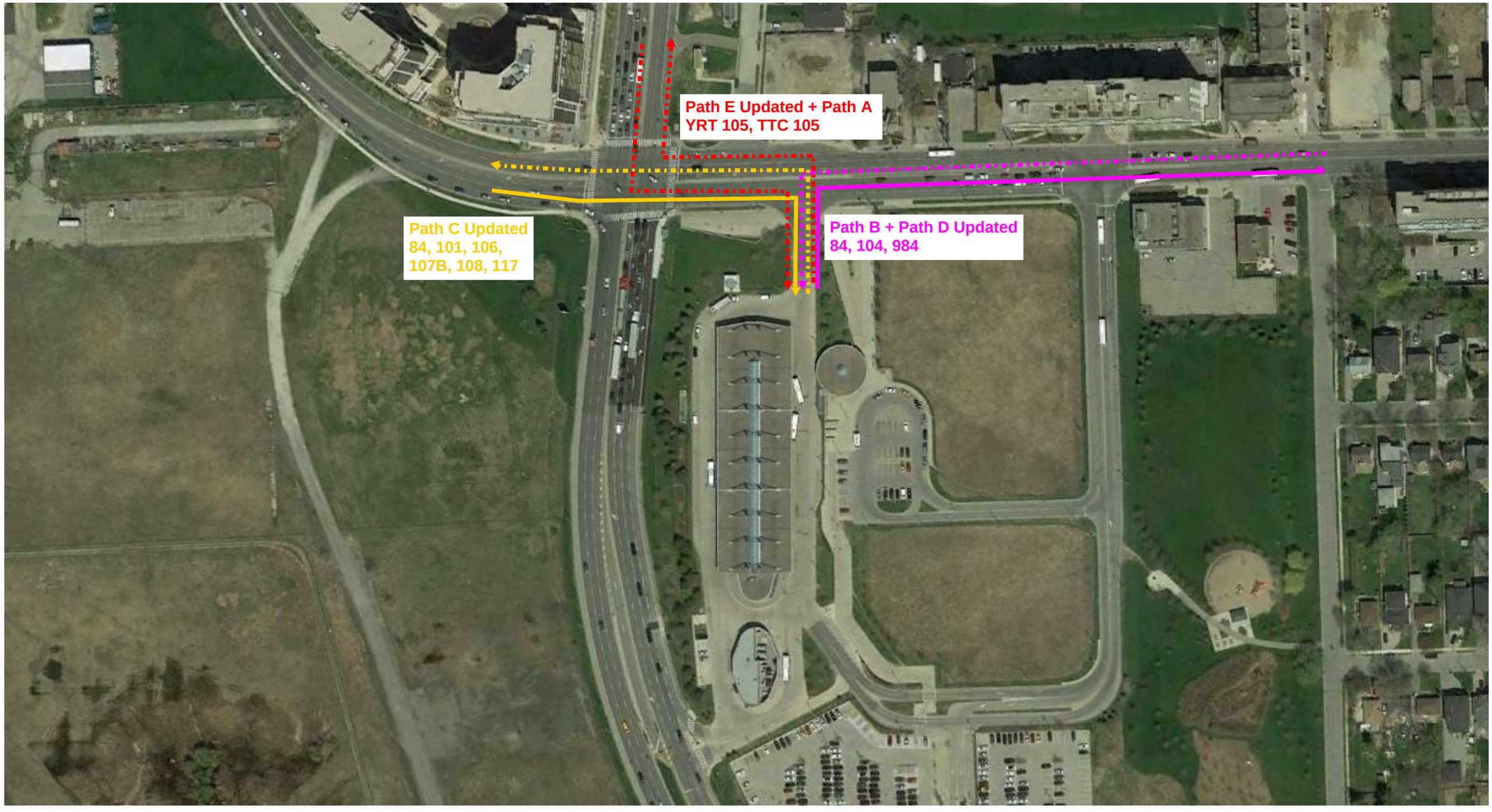
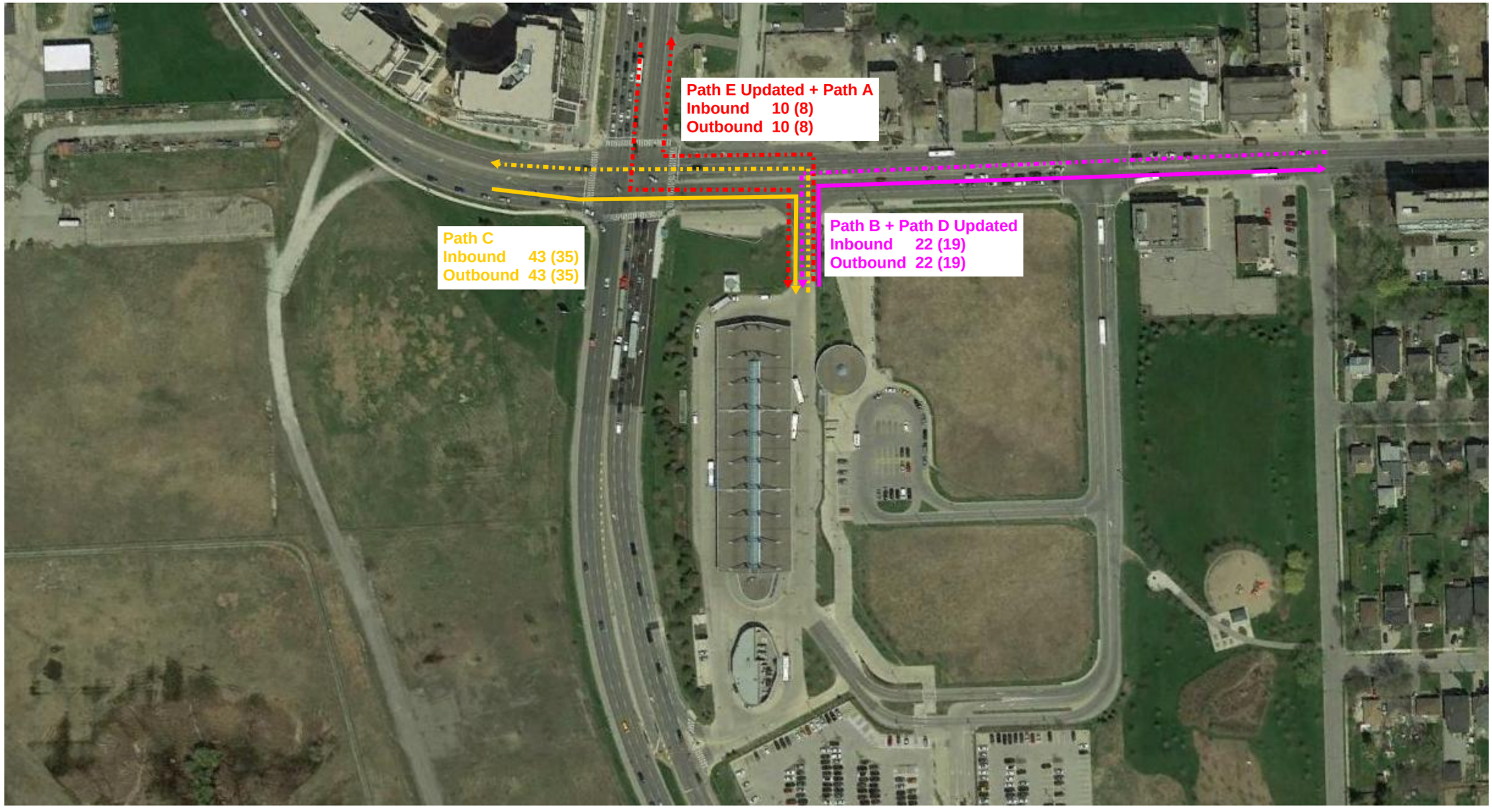


Figure 2-9
Ultimate Bus Travel Paths



Legend

xx A.M. Peak Hour Bus Volumes

(xx) P.M. Peak Hour Bus Volumes

Figure 2-10

Ultimate Bus Volumes by Paths

2.2.4 MICROSIMULATION PARAMETERS

In addition to the previously identified traffic data, the microsimulation analysis requires additional assumptions regarding the traffic, vehicle behaviour, and simulation settings. These assumptions are summarized in **Table 2-1**.

Table 2-1: Microsimulation Model Assumptions

Assumption	Justification / Rationale
Traffic Volumes	
The vehicle inputs were 97% private automobile and 3% heavy vehicles.	As transit vehicles were modelled as a standalone input, the percentage of heavy vehicles was recalculated, and it was found that on a per-movement basis the percentages of heavy vehicles ranged from 0-5%.
The vehicles were statically assigned based on the collected and forecasted turning movement counts.	Due to the relatively small size of the network, there was no chance that a static route would result in a vehicle taking a path that is not rational.
The bus routes were added to Vissim according to the travel paths indicated in the previous section.	As previously discussed, the bus routes were combined with a normalized headway for the purposes of the simulation.
Pedestrians at Allen Road and Sheppard Avenue West were split 50% on each side of the road.	As there is no direction associated with crossing pedestrians on TMCs, they were split 50% per direction to assess their impact on turning traffic.
Driver Behaviour	
Speed distribution of vehicles was assumed to be 60 km/h.	Based on the posted speed limit in the immediate study area.
Turning speeds were assumed to be 25 km/h for left turns and 15 km/h for right turns. The exception is for the eastbound right turn at Allen Road and Sheppard Avenue West which is 25 km/h.	These parameters result in more realistic turning behaviours, as without this parameter in the model, vehicles would turn at full speed. The turning speed was increased for the eastbound right due to the high turning volume and the expected increase in aggressiveness of drivers.
The default gap acceptance behaviour of vehicles in turning conflict zones was increased to 3.5 seconds.	Although not a one to one comparison with the critical gap in the HCM methodology, the default values in Vissim result in unrealistically high permissive left turn capacity. From a review of the TMCs, it was found that there was limited permissive left turns, and this adjustment aligned the simulation closer to reality.
Signal Timings	
Signal timings for the existing conditions were extracted from Synchro.	This allows for the microsimulation results to be more consistent with the Synchro results.
The future signal timing plan was set to max recall for all movements except for the northbound and southbound left turns.	Due to the relatively high bus volumes, the phasing plan would need to be called even if a bus was not on a detector in Vissim.
The future signal timing had a cycle length of 150 seconds.	This cycle length was adopted to give the best chance for buses to clear the access and the adjacent intersection.
Simulation	
10 simulation runs were conducted for the calculation of the results.	Based on a review of the results, it was found that the results were consistent and provided average values with low standard deviation.
900 seconds of warm-up time was completed before recording results for each run.	This allows the model to be populated with vehicles before the results are generated, and prevents vehicles travelling through the empty network from skewing the results.

2.3 EXISTING CONDITIONS

2.3.1 SYNCHRO RESULTS

The operation of the study intersections was analyzed using the Highway Capacity Manual 2000 (HCM) methodology, as implemented in Synchro 10. Queuing at intersections was analyzed using Synchro 10. The analysis assumes the existing lane configurations, heavy vehicle percentages and peak hour factors (PHF) determined from existing traffic count volumes. Signal timing plans for the study intersections were provided by the City of Toronto.

Table 2-2 provides a summary of intersection Level of Service (LOS) for the signalized intersections analyzed in the study area under existing conditions, for the weekday a.m. and p.m. peak hours. LOS definitions are provided in **Appendix C** and intersection capacity and queue analysis reports are provided in **Appendix D-1**.

Table 2-2 Existing Traffic Conditions, Signalized Intersections

Intersection Name	Intersection Type Movement	AM Peak Hour			PM Peak Hour		
		V/C	Delay (sec.)	LOS	V/C	Delay (sec.)	LOS
Allen Road at Sheppard Avenue West	**Signalized**	**0.96**	**50**	**D**	**1.06**	**59**	**E**
Eastbound Right	EBR	0.89	44	D	1.09	95	F
Westbound Left	WBL	0.86	60	E	0.86	60	E
Northbound Left	NBL	0.97	79	E	1.02	95	F
Northbound Through	NBT	0.94	53	D	1.02	75	E
Southbound Left	SBL	-	-	-	0.87	58	E
Southbound Through-Right	SBTR	0.97	60	E	0.89	49	D
Sheppard Avenue West at Station General Access / Private Access	**Signalized**	**0.60**	**15**	**B**	**0.67**	**19**	**B**
Northbound Left	NBL	0.80	69	E	0.84	70	E
Allen Road at Bus Access	**Signalized**	**0.68**	**2**	**A**	**0.68**	**2**	**A**

The critical thresholds used for movements for volume to capacity (V/C) ratio is 0.85 and for level of service (LOS) is E. Existing capacity analysis indicates that the signalized study intersections operate with acceptable overall LOS of D or better, with the exception of Allen Road at Sheppard Avenue West during the p.m. peak period.

Synchro indicated that the eastbound right was 9% over capacity; however, it should be noted that Synchro can underestimate the right turn capacity when there are vehicles turning left into the same link. The capacity is independent of the number of lanes, and it is expected that the number of right turning vehicles during the westbound protected left turn is higher than estimated. For the northbound movements, a v/c ratio of 1.02 would indicate that northbound vehicles are slightly more aggressive than calculated by Synchro, which is expected as this section of Allen Road is effectively its terminus.

The delays experienced at the Allen Road at Sheppard Avenue West intersection can be attributed to the cycle length of 130 seconds, causing vehicles to wait for long periods before their phase is served.

The estimated queue lengths (95th percentile) for the key movements during the study peak hours under existing traffic conditions are presented in **Table 2-3**.

Table 2-3: Existing Traffic Conditions – Queue Lengths Signalized Intersections

Intersection Name	Intersection Type Movement	Available Storage (m)	95th Percentile Queues (m)	
			AM Peak Hour	PM Peak Hour
Allen Road at Sheppard Avenue West	**Signalized**			
Eastbound Left	EBL	90	15	25
Eastbound Through	EBT	365	101	120
Eastbound Right	EBR	95	195	221
Westbound Left	WBL	140	68	59
Westbound Through	WBT	180	135	130
Westbound Right	WBR	70	16	14
Northbound Left	NBL	260	131	131
Northbound Through	NBT	260	228	227
Northbound Right	NBR	155	16	54
Southbound Left	SBL	75	43	92
Southbound Through-Right	SBTR	140	172	154
Sheppard Avenue West at Station General Access / Private Access	**Signalized**			
Eastbound Left	EBL	50	3	7
Eastbound Through	EBT	180	76	143
Eastbound Right	EBR	65	12	10
Westbound Left	WBL	35	23	14
Westbound Through-Right	WBTR	300	89	100
Northbound Left	NBL	-	54	73
Northbound Right	NBR	-	14	15
Southbound Left-Through-Right	SBLTR	-	9	8
Allen Road at Bus Access	**Signalized**			
Westbound Right	WBR	-	3	3
Northbound Through-Right	NBTR	-	64	69
Southbound Left	SBL	100	3	1
Southbound Through	SBT	-	0	0

The queuing analysis under existing conditions indicates that most of the movements will have their 95th percentile queue lengths less than that the available storage, with the exception of the following movements;

- Allen Road at Sheppard Avenue West eastbound right (EBR) during the a.m. and pm. peak hours; and
- Allen Road at Sheppard Avenue West southbound through-right (SBTR) during the a.m. and pm. peak hours.

The above queueing results were consistent with the previously completed field observations, where the significant right turning volumes for the eastbound direction resulted spillback to the through lane. The southbound queue was also observed passing through the intersection to the north in the field.

2.3.2 MICROSIMULATION RESULTS

The key items extracted from the microsimulation model were the following:

- **Volumes**: For each potential turning movement, data collection points collected the number of vehicles that passed during each simulation. This data was collected as a form of validation, as discrepancies between counted volume and the input data can indicate a coding error or capacity issue;
- **Average queue length**: For a single run it is the distance, in metres, that the queue extends back on average (the end of queue length is measured for each time step of the model and then averaged). When further aggregated it represents the average of 10 simulations and therefore the length that the queue is expected to reach half the time over the course of a peak hour;
- **Maximum queue length**: For a single run it is the distance, in metres, that the queue extends back at the further point for the entire simulation run. This can be due to regular signal operations or due to a vehicle weaving and blocking other vehicles. It represents the worst-case scenario, and may only occur once in the simulation hour. When aggregated it represents the average of all the maximum queues for each of the simulation runs;
- **Overall Delay**: The aggregate delay for each vehicle across the hour was recorded as a high-level measurement of performance, the lower this value is the better a given alternative is operating; and
- **Path Travel Times**: Several road segments were specifically identified to calculate the travel time for buses on a per-path basis. The travel time measurements were updated for the future paths to allow for a comparison to the base conditions.

A detailed summary of the volumes, queueing, and overall delay can be found in **Appendix E**. The travel times are covered in more detail in **Section 0**.

For the existing a.m. peak hour, the average volumes on a per movement basis closely reflected the input volumes, as can be seen in **Figure 2-11**.

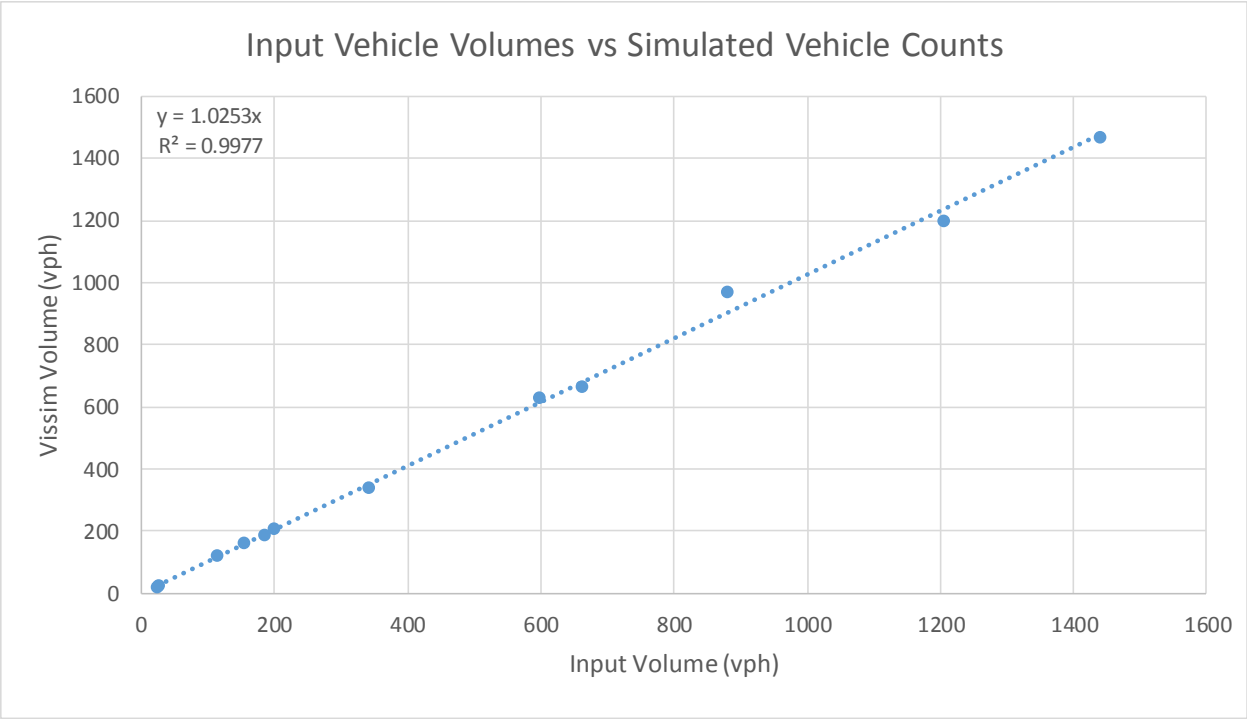


Figure 2-11: Input Volumes vs. Simulated Volume - Existing A.M. Peak Hour

As can be seen in the above figure, there is a nearly one-to-one relationship between the input volume and the counted volume in Vissim. This indicates that across the 10 simulation runs, generally every vehicle was served by the intersection. It should be noted that the simulated volumes are slightly higher than the input volumes, as the buses are counted, although the buses are not present in the input volumes, as discussed in the study assumptions.

For the p.m. peak hour, the volume comparison chart can be seen in **Figure 2-12**.

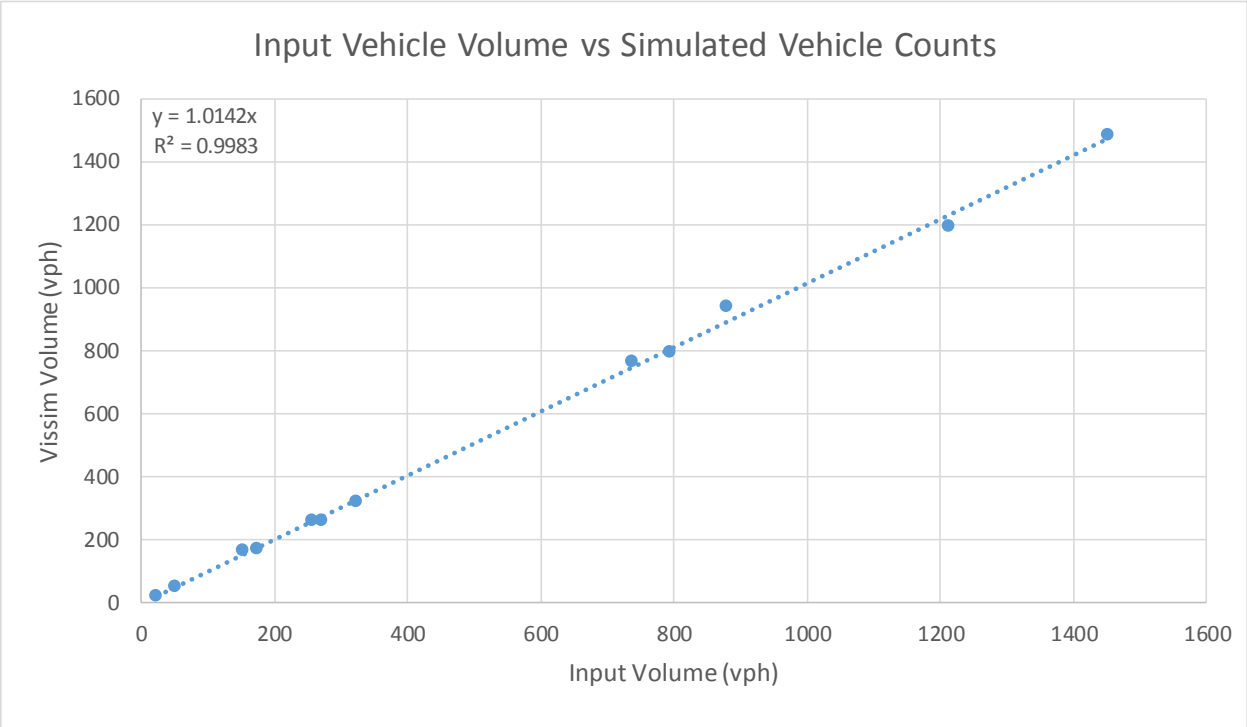


Figure 2-12: Input Volumes vs. Simulated Volume - Existing P.M. Peak Hour

Similar to the a.m. peak period, the counted volumes are correlated with the input volumes, however when running the simulation, not all of the vehicles were able to enter the study network due to blocking from upstream traffic. This was most prevalent for the northbound direction, although due to the warm-up period, there were vehicles in the network that made the correlation seen above possible. The impact of the northbound movement approaching capacity, which is consistent with the Synchro findings, can be seen in the queues.

For both the a.m. and p.m. peak hours, the approach queues were recorded. The results can be found in **Table 2-4** for the a.m. peak hour and **Table 2-5** for the p.m. peak hour.

Table 2-4: Summary of existing a.m. peak hour queues

Intersection	Lane Group	Storage (m)	Average Queue Length (m)	Maximum Queue Length (m)
Allen Road & Sheppard Avenue West	Southbound	140	46	154
	Westbound	180	55	173
	Northbound	260	65	193
	Eastbound	365	41	196

Table 2-5: Summary of existing p.m. peak hour queues

Intersection	Lane Group	Storage (m)	Average Queue Length (m)	Maximum Queue Length (m)
Allen Road & Sheppard Avenue West	Southbound	140	59	158
	Westbound	180	41	161
	Northbound	260	161	256
	Eastbound	365	91	285

As can be seen in the above tables, the average queue length shows that in the a.m. peak hour generally there are not significant issues with the capacity, as even the maximum queues (which may only occur once in the simulation that they were aggregated from) generally do not exceed the storage. However, in the p.m. peak hour, the northbound average queue is considerably higher, corresponding with the slight over-capacity identified at the study intersection.

Finally, the average vehicle delay for all vehicles across the simulation hour is 41 seconds per vehicle during the a.m. peak hour, and 56 seconds per vehicle for the p.m. peak hour. These values will be used in the ultimate section as a way to identify if there was a significant degradation in service for vehicles in the network, as the lower the delay is the better.

2.4 ULTIMATE CONDITIONS

2.4.1 SYNCHRO RESULTS

The future operation of the Sheppard Avenue West at the station access was analyzed using the Highway Capacity Manual 2000 (HCM) methodology, as implemented in Synchro 10. The signal timing was optimized with the required minimum phasing time and with cycle lengths preserved.

Table 2-8 provides a summary of intersection Level of Service (LOS) for Sheppard Avenue West at the station access for the weekday a.m. and p.m. peak hours. LOS definitions are provided in **Appendix C** and intersection capacity and queue analysis reports are provided in **Appendix D-2**.

Table 2-6 Ultimate Traffic Conditions

Intersection Name	Intersection Type Movement	AM Peak Hour			PM Peak Hour		
		V/C	Delay (sec.)	LOS	V/C	Delay (sec.)	LOS
Sheppard Avenue West at Avenue A / Private Access	**Signalized**	**0.60**	**12**	**B**	**0.63**	**18**	**B**

As shown in **Table 2-8**, the intersection is expected to operate at an overall LOS of B during the a.m. and p.m. peak hour. All turning movements are expected to operate at a V/C of 0.76 or better in the peak hours.

The estimated queue lengths (95th percentile) for the intersection during the study peak hours under future traffic conditions are presented in **Table 2-7**. As shown, the 95th percentile queues for all movements at the intersection do not exceed the available storage lengths.

Table 2-7: Ultimate Traffic Conditions – Queue Lengths

Intersection Name	Intersection Type Movement	Available Storage (m)	95th Percentile Queues (m)	
			AM Peak Hour	PM Peak Hour
Sheppard Avenue West at Avenue A / Private Access	**Signalized**			
Eastbound Left	EBL	50	4	6
Eastbound Through	EBT	110	97	137
Eastbound Right	EBR	65	0	5
Westbound Left	WBL	35	43	13
Westbound Through-Right	WBTR	300	101	92
Northbound Left	NBL	-	15	65
Northbound Right	NBR	-	18	56
Southbound Left-Through-Right	SBLTR	-	2	8

This intersection replaces the station access that was analyzed in the existing conditions, as the bus only access would allow this intersection to primarily serve the Allen Lands development. Even with the change in use, similar to existing conditions, this intersection operates well overall, although it should be noted that the traffic volumes and percent heavy vehicles has been revised for this intersection, as all bus traffic has been re-assigned to the access to the west. The signal timing was also optimized for the projected volumes. Additionally, the 95th percentile queue for the a.m. peak hour westbound through-right does not spill back to the proposed access, and the p.m. peak hour queue indicates that the access would rarely be blocked.

2.4.2 MICROSIMULATION RESULTS

The same information was extracted from the ultimate conditions model as for the existing conditions model. The detailed summary of the volumes, queueing, and overall delay can be found in **Appendix E** along with the summary of existing conditions.

The ultimate a.m. peak hour average volumes on a per movement can be seen in **Figure 2-13**.

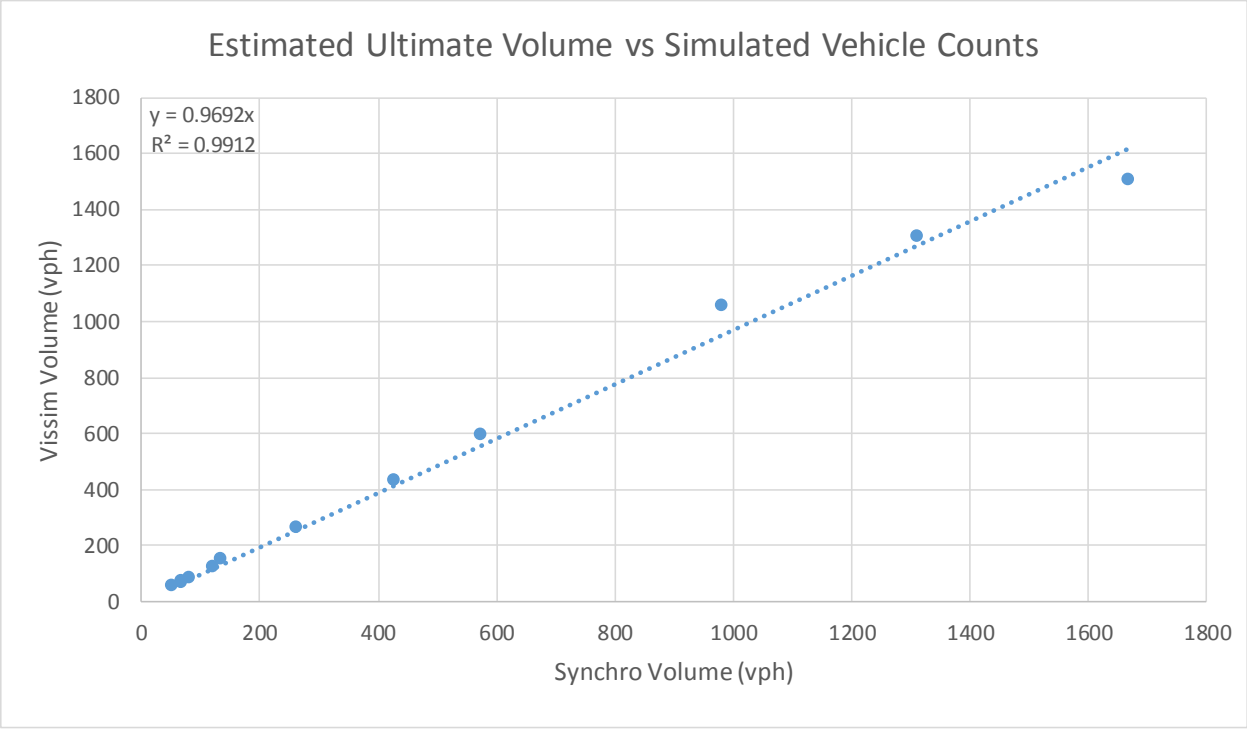


Figure 2-13: Input Volumes vs. Simulated Volume - Ultimate A.M. Peak Hour

In contrast to the existing conditions, the simulated volumes are slightly lower than the input volumes, as indicated by a slope of less than 1.0. Although not a large difference, the reduction does indicate more capacity issues than the existing conditions. This is to be expected, as with a cycle length of 150 seconds, vehicles will wait longer to be served by the intersection resulting in increased queueing and delays. Due to the increased delay, similar to the existing p.m. conditions, not all vehicles were able to enter the study network by the end of the simulation.

For the p.m. peak hour, the volume comparison chart can be seen in **Figure 2-14.**

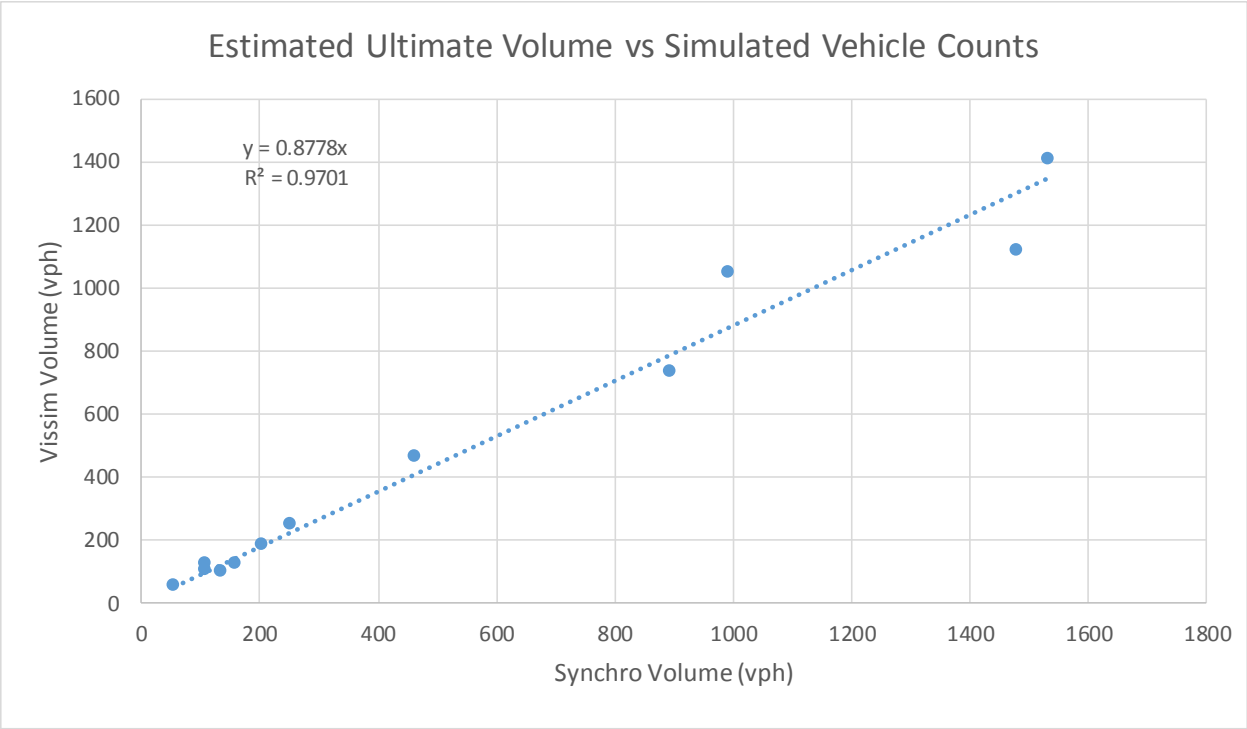


Figure 2-14: Input Volumes vs. Simulated Volume - Ultimate P.M. Peak Hour

In contrast to the other plots, the relationship between the recorded movements and the input vehicles is approximately 12% lower. This is due to the fact that the increased volume and cycle length results in an almost complete breakdown of the intersection in the northbound and southbound direction. Due to a lack of capacity many vehicles could not enter the network, as the links were effectively blocked by vehicles.

For both the a.m. and p.m. peak hours, the approach queues were recorded. The results can be found in **Table 2-8** for the a.m. peak hour and **Table 2-9** for the p.m. peak hour.

Table 2-8: Summary of ultimate a.m. peak hour queues

Intersection	Lane Group	Storage (m)	Average Queue Length (m)	Maximum Queue Length (m)
Allen Road & Sheppard Avenue West	Southbound	140	120	161
	Westbound	180	69	189
	Northbound	260	97	250
	Eastbound	365	37	143
Sheppard Avenue West & Bus Access	Eastbound	45	1	20

Table 2-9: Summary of ultimate p.m. peak hour queues

Intersection	Lane Group	Storage (m)	Average Queue Length (m)	Maximum Queue Length (m)
Allen Road & Sheppard Avenue West	Southbound	140	113	158
	Westbound	180	68	187
	Northbound	260	216	264
	Eastbound	365	253	310
Sheppard Avenue West & Bus Access	Eastbound	45	1	32

In all cases, the queues increased to some degree from existing conditions, which was expected due to the volume and cycle length increase, as well as the indication that the number of vehicles entering the network had reduced. One item to note is that at the signalized intersection of Sheppard Avenue West and the proposed full-movement access, the queue does not spill back into the adjacent intersection. This means that the outbound phase for the buses is sufficiently short as to not impact the main intersection by causing blocking. The change in the a.m. peak hour is marginal; the eastbound and northbound queues decrease, and all average queues are within the available storage. The average p.m. peak hour queues increase but remain within the available storage. The maximum p.m. queues either change marginally or decrease.

Finally, the average vehicle delay for all vehicles across the simulation hour is 70 seconds during the a.m. peak hour, an almost 50% increase from the existing conditions. During the p.m. peak hour, the average vehicle delay was 116 seconds, almost doubling the existing conditions delay.

2.5 BUS TRAVEL TIME ASSESSMENT

To account for the impact on transit vehicles, the travel time for buses was compared for the existing and ultimate conditions. This comparison captures both the impact of the change of access and the increased volumes associated with the planned Allen Lands development. The travel times were calculated on a per-path basis (consistent with the paths in **Figure 2-7** for existing and **Figure 2-8** for ultimate). These travel times were calculated using a combination of:

- Distance travelled from the station: Especially in the existing conditions, there is a base travel time associated with the bus leaving the station area and driving along the service road to access Sheppard Avenue West;
- Intersection wait time: The time spent waiting to be served at an intersection.

These values were either calculated based on distance travelled, extracted from the Synchro results, or measured directly from the microsimulation results.

Table 2-10: Inbound Travel Times comparison by bus path

Path	Scenario Travel Time					
	AM			PM		
	Existing (s)	Future (s)	Change (s)	Existing (s)	Future (s)	Change (s)
Path A	87	121	34	80	113	33
Path B	-	-	-	-	-	-
Path C	73	84	11	79	183	104
Path D	44	23	-21	48	25	-23
Path E	116	121	5	133	113	-20

Table 2-11: Outbound Travel Times comparison by bus path

Path	Scenario Travel Time					
	AM			PM		
	Existing (s)	Future (s)	Change (s)	Existing (s)	Future (s)	Change (s)
Path A	72	78	6	83	151	68
Path B	26	32	7	27	33	6
Path C	126	95	-32	121	104	-17
Path D	45	32	-12	45	33	-13
Path E	113	78	-35	103	151	48

As can be seen in the above tables, the travel time experienced by buses under the proposed access patterns varies as to whether there is an increase or decrease. This is due to the fact that buses leaving the station no longer have to travel along the loop and wait at the intersection to the west before proceeding through Allen Road and Sheppard Avenue. Most of the impact to the travel time was experienced when the vehicles were operating in general traffic, or if they were unable to proceed through both the bus access and the Allen Road / Sheppard Avenue West intersection. This can be seen in the outbound delay for the p.m. peak hour, where Path A and E both experience delays approximately equal to the cycle length.

The proposed access does provide the potential to reduce travel times, however it is highly sensitive to vehicle demands, as the operation of general traffic can reduce the gain from having a shorter travel path due to congestion.

2.6 CONCLUSIONS

In assessing these results, it is important to consider these within the framework of City of Toronto policies and priorities for mobility. The City places a high priority on sustainability and multimodal mobility. In accommodating greater intensity of development in appropriate locations within the City, choices need to be made as to whether to the criteria for decisions are based on existing conditions or the long-term vision. The City's Official Plan (Chapter 1) indicates that "Sustainability means focusing on long term horizons (such as 30 years ahead)". In the long term, what was once a terminal subway station will function more as a line-haul station, with less dependence on bus movements. Ongoing intensification of development throughout the City will also mean that traffic patterns will evolve; growth of inter-urban commuting traffic on arterials such as the Allen Road can be expected to level off or decline, as it is displaced by more local traffic generated in the City. This concept would "put transit first" at this station, in terms of giving buses priority over some vehicular movements.

The assessment of the revised bus access has been based primarily on the impact on bus travel times, and queueing for all vehicles. Key points with respect to the assessment are as follows:

- The Level of Service for the new bus access on Sheppard Avenue would be acceptable;
- Results with respect to bus travel times indicate that outbound buses would experience improvement during the morning peak; during the afternoon peak, buses travelling on Sheppard would experience an improvement, while buses travelling north on Allen Road would experience an increase. Inbound buses would experience some decreases; however, eastbound buses on Sheppard would experience an increase;
- Queuing at the Allen Road/Sheppard Avenue intersection is not projected to change significantly. The average queues remain within the available storage. The 95th percentile queues do not change significantly from the existing conditions;
- Delay at the Allen/Sheppard intersection would increase. However, the magnitude of the increase could depend on the cycle length chosen. Our assessment has been based on a 150-second cycle. It is also expected that some traffic would divert from this area, moderating the delay.

Additionally, it should be noted that this analysis was completed with the northbound curb lane on Allen Road and north of Sheppard as bus-only, although it could be used for general traffic to allow for the northbound direction of travel to have greater capacity, thereby improving operations.

In addition to the operational aspects, the geometry of the proposed access and signal head configuration would need to be considered due to the atypical proposed design and location of the signal. An example of a close proximity transit signal is to be constructed at the bus access at Don Mills bus Terminal associated with the Eglinton LRT.

In summary, this preliminary analysis of bus and traffic impacts indicate that there are positive aspects projects to result from this change in bus access, supporting the development of the Allen East District.

3 PPUDO REVIEW

CreateTO is pursuing a PPUDO configuration that will accommodate personal vehicles, taxis and ride-sharing services on-street adjacent to the public plaza, which is being planned directly across from the subway station. The goal is to create a more urban form of development and activity, with PPUDO functions accommodated on-street. It is noted that some street cross-sections have also been designed to accommodate these activities. In support of this PPUDO design and in response to comments received, CreateTO has continued to monitor PPUDO activity.

The following section details the results of the initial site survey, which occurred earlier in 2019, and the subsequent site surveys conducted resulting from the City and TTC workshop. The project team reviewed vehicle activity throughout the Sheppard West Subway Station PPUDO and recorded the volumes observed during the morning and afternoon peak periods on a typical weekday.

3.1 SITE VISIT OBSERVATIONS

On Tuesday, February 5th, 2019, the project team undertook a site of the Sheppard West Subway Station PPUDO area. The initial site visit was conducted during a typical weekday during the a.m. peak hour (7:30 – 8:30 a.m.) and p.m. peak hour (5:00 – 6:00 p.m.).

During the a.m. peak, staff noted that there was on average 5 vehicles occupying the idling spaces and that there were 3 taxis within the circulation lane. During the morning peak, the PPUDO area was primarily used by passengers being dropped off. All vehicles entering the area exited within 1 to 5 minutes of arrival.

Figure 3-1 Sheppard West Station PPUDO AM Peak, Tuesday February 5th, 2019

During the p.m. peak, staff noted that on average there were 16 vehicles occupying the idling spaces and that there were 4 taxis within the circulation lane. The PPUDO area experienced higher utilization during the p.m. peak compared to the a.m. peak. All vehicles entering the area exited within 2 to 5 minutes of arrival. The PPUDO area was also being used as a platform for rideshare users in the p.m. peak.

Figure 3-2 Sheppard West PPUDO PM Peak, Tuesday February 5th, 2019

3.2 UTILIZATION SURVEYS

WSP undertook utilization surveys of the existing PPUDO lot during the weekday a.m. peak (7:00 – 9:00) and p.m. peak (4:00 – 6:00) periods on Thursday, October 17, 2019, and Thursday, October 24, 2019. The lot was divided into two areas, curbside and short-term parking, to ensure the varied activity was accurately represented. The data obtained was then divided into 15-minute intervals to determine the peak utilization for each interval. The data is summarized in **Table 3-1**.

Table 3-1: Observation Survey Results

Start Time	Thursday, October 17, 2019			Thursday, October 24, 2019		
	Curbside	Short-Term Parking	Total	Curbside	Short-Term Parking	Total
MORNING PEAK PERIOD						
8:00	8	15	**23**	7	16	**23**
8:15	6	17	**23**	9	16	**25**
8:30	5	15	**20**	9	12	**21**
8:45	4	15	**19**	9	12	**21**
9:00	8	17	**25**	8	15	**23**
9:15	10	20	**30**	8	17	**25**
9:30	10	20	**30**	9	21	**30**
9:45	7	17	**24**	6	20	**26**
AFTERNOON PEAK PERIOD						
4:00	9	13	**22**	9	16	**25**
4:15	9	19	**28**	9	19	**28**
4:30	10	21	**31**	10	24	**34**
4:45	8	26	**34**	9	26	**35**
5:00	10	23	**33**	10	23	**33**
5:15	10	20	**30**	10	18	**28**
5:30	10	21	**31**	10	21	**31**
5:45	8	20	**28**	8	20	**28**

Sheppard West Subway Station has historically operated as a commuter station, providing suburban communities with a single point of access to Line 1. With the extension of Line 1 to the City of Vaughan, commuters are now provided with a wider range of stations at which to pick up and drop off passengers. The PPUDO is well utilized during the morning and evening peak periods. As expected, the overall peak occurred in the afternoon, as there are typically more pick-ups as opposed to drop-offs in the afternoon, resulting in higher dwell times. The peak occurred in the 4:45-5:00 p.m. interval with a total of 35 spaces occupied - nine curbside spaces and 26 short-term parking spaces.

The survey results also revealed that the peaks are sustained for only a short window of time each day; once the peak traffic has been cleared, PPUDO activity starts to decrease. The curbside activity is fairly constant, in the range of 8 to 10 spaces during the p.m., whereas the short-term parking falls off after 5:00 p.m. by 20 percent or more.

The peak utilization for each surveyed period, detailed in **Table 3-2**, determined an overall utilization of less than 90 percent.

Table 3-2: PPUDO Utilization

Start of Time Interval	Thursday, October 17, 2019			Thursday, October 24, 2019		
	Curbside	Short-Term Parking	Total	Curbside	Short-Term Parking	Total
Supply	10	30	**40**	10	30	**40**
Morning (spaces)	10	20	**30**	9	21	**30**
Morning (utilization)	100%	67%	**75%**	90%	70%	**75%**
Afternoon (spaces)	8	26	**34**	9	26	**35**
Afternoon (utilization)	80%	87%	**85%**	90%	87%	**88%**

However, it should be noted that several vehicles were observed to be parked in the short-term parking area for the entire survey period, essentially treating it as long-term parking. Vehicles without accessibility permits were observed utilizing the accessible spaces. Drivers are not discouraged from misusing the PPUDO lot as TTC staff do not regularly enforce the signed restrictions. The "real" utilization level is concluded to be less than the values shown in Table 3-3.

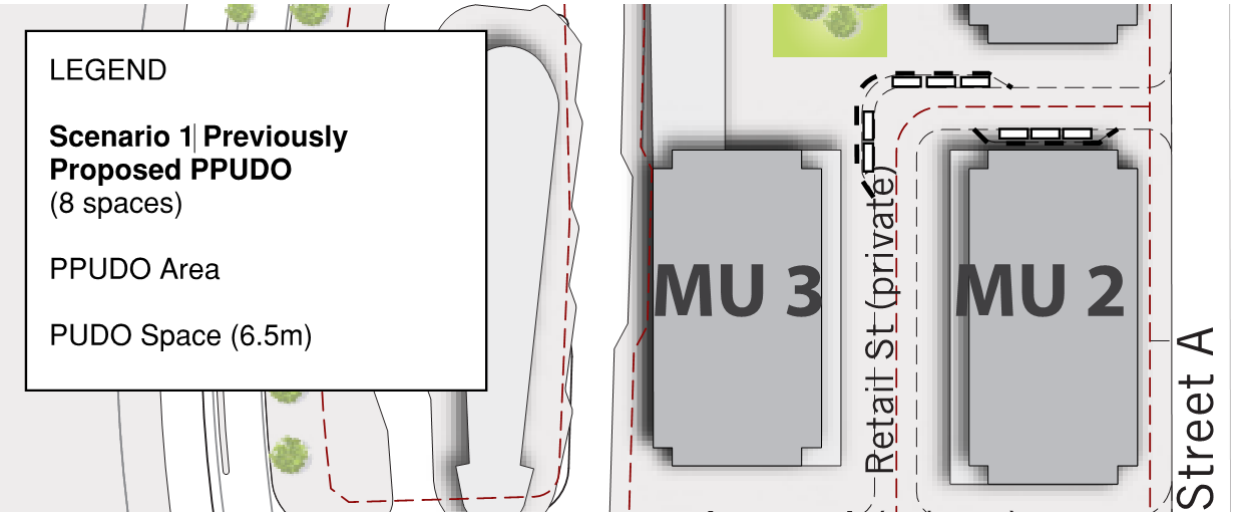
The revised PPUDO will focus on a mobile design approach for access to Sheppard West Station. This approach would remain consistent with the City of Toronto's vision for a multi-modal transit system while integrating with the surrounding planned development of the Allen East District.

3.3 PPUDO CONCEPTUAL DESIGN

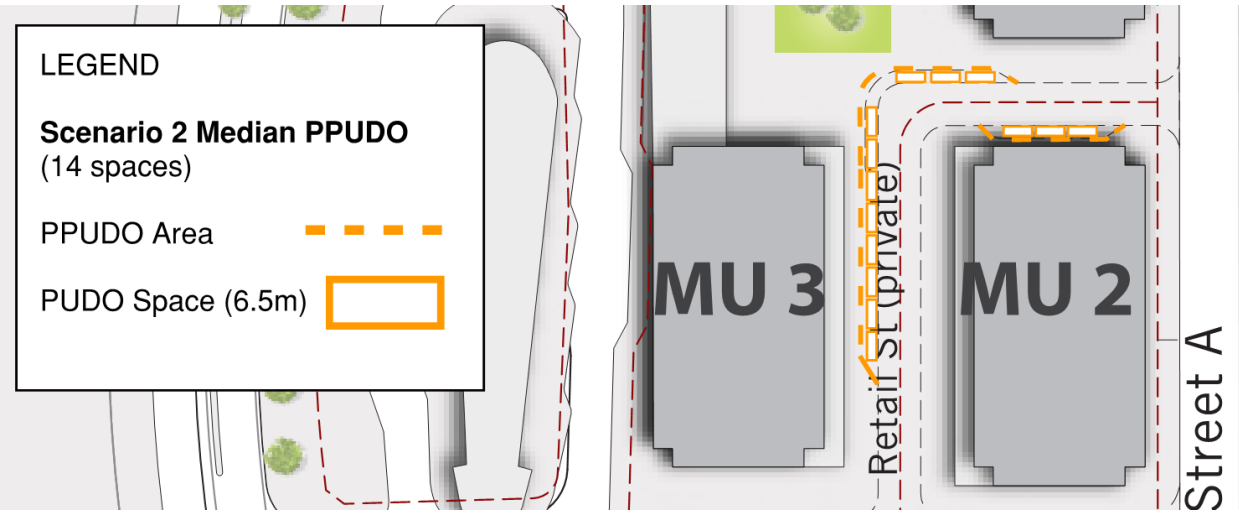
Upon completing the utilization assessment of the existing PPUDO facilities at the Sheppard West Station, the project team developed a conceptual design for the proposed PPUDO configuration for future conditions. The conceptual layout was developed to accommodate on-street or curbside demand in accordance with the City goals of complete street design and safer network operations. The result of the observation studies the project team developed three scenarios that balance PPUDO demand, complete street principles and the developed cross-sections.

The following scenarios were developed and informed by the observational study, which identified the daily demand during a typical weekday peak period. Each scenario strives to provide a PPUDO area that integrates with the surrounding built environment. As the existing PPUDO area is primarily utilized during the morning and afternoon peak hours, this integrated PPUDO approach will ensure that underutilization of spaces is minimized throughout the day.

Scenario 1 – Previously Proposed PPUDO – Maintain previously proposed PPUDO along the Retail Street, which can accommodate approximately eight vehicle PPUDO spaces (6.5 m).



Scenario 2 – Median PPUDO – Extend the PPUDO area by approximately 40 meters on the west side of the Retail Street to accommodate approximately 14 PUDO spaces (6.5 m).



In determining the preferred scenario, the following factors have been taken into account:

- The ability of the street network to physically accommodate the PUDO spaces
- The need for loading and drop-off facilities for the buildings on the Retail Street
- The long-term vision for the area, as a mixed-use community. This is a change from the current auto-focused suburban terminal function of the Station
- The observations of vehicles (primarily taxis) using the existing PUDO as long-term parking

Currently the PUDO operates in a largely unconstrained manner, with apparently minimal enforcement. Change is needed to accommodate the development and create the environment for a multimodal access system.

Scenario 1 is not expected to provide adequate capacity, and hence it could result in problematic conditions on other area streets, with numerous vehicles attempting to find space. Scenario 2 strikes a more effective balance between the existing unconstrained demand and the goals for the development.

3.4 PRELIMINARY DESIGN

Scenario 2 was chosen as the solution which would facilitate some existing PPUDO demand while remaining consistent with the Allen East District's urban design approach. This approach is consistent with the City of Toronto's perspective regarding redeveloped and new transit stations. Scenario 2 is reflective of higher-density living while providing sufficient capacity for legacy PPUDO activity for the Sheppard West Subway Station.

With the selection of the preferred PPUDO design scenario, the project team developed a preliminary design to ensure that the preferred scenario can function properly and would be in line with the City of Toronto design standards. Appendix F shows the preliminary design of the proposed PPUDO scenario.