3. PROJECT DESCRIPTION

The development of the project was based on a number of inputs:

- The studies described in Chapter 2;
- Design Criteria developed by the Toronto Transit Commission;
- The assessment of Existing and Future Conditions described in Chapter 5; and
- The Consultation Process described in Chapter 6.

The following chapters describe the proposed project.

3.1 Design Principles

During preliminary planning for the Eglinton Crosstown LRT, the following design principles were established:

- Must provide fast, reliable, frequent and comfortable transit service from a passenger perspective;
- Fully accessible to persons with mobility difficulties;
- Must achieve highest level possible of safety and security for both passengers and employees;
- Must be achieved with minimum environmental impacts; and
- Must incorporate excellence in urban design – pedestrian realm, facilities, amenities, and landscaping.
- Excellent passenger transfer facilities between LRT and subway stations, and between LRT lines - typically grade-separated from other vehicular traffic -- minimizing vertical and horizontal movement required by passengers when transferring between lines;
- Transfer stations to be fully accessible between inter-connecting lines;
- Surface passenger stops to be located and designed for easy passenger transfer to intersecting bus routes, and to provide safe, signal-protected access between the stops and surrounding land uses;
- Fare transactions to be done through proof-of-payment fare media and random-check enforcement; and
- Vehicles, stations, and infrastructure must allow for:
    - the highest possible level of, and ease of, maintenance;
    - the highest possible level of customer and employee security;
    - must be fully accessible for people of differing levels of mobility.

3.2 Operations Plan

3.2.1 LRT Service

The service objective is to provide a peak-hour maximum capacity of 8000 pphpd (person per hour per direction) with at least 40% of passengers being able to be seated at the peak-hour demand. The service is proposed to operate at least every 6 minutes at peak times regardless of demand. It is expected that these requirements will result in all facilities being designed to accommodate ultimate train lengths of approximately 90 metres (consisting of three 30 metres long LRT vehicles).

Initially the LRT Is not planned to operate 24 hours a day. During LRT operations, existing bus services along Eglinton Avenue will no longer exist. Some north-south buses that have a portion of their route travelling along Eglinton Avenue will continue to operate in short sections of the LRT corridor where necessary. In general, customers travelling east-west along Eglinton Avenue will be served by the LRT during normal operation hours as opposed to buses.

LRT operating headways will likely vary throughout the corridor. The tunnel portion of the LRT corridor will have turn back capability at both ends of the tunnel section to allow the LRT to operate with short turn service and provide shorter headways than on the surface sections. Headways on the surface section of the LRT also may vary depending on ridership demand.

Fare collection will be operated as proof of payment. This system will be implemented to avoid delays associated with traditional fare collection. Station and stop platforms will include ticket vending machines, which will also be used to facilitate transit transfers to subways and buses.

3.2.2 Bus Service

Parallel Bus Service

Members of the public have requested that parallel bus service be provide on Eglinton Avenue, in particular through the underground section of the Eglinton Crosstown LRT. The TTC determines bus routings based on customer needs and observed travel demands, which, in some cases, includes operating buses in parallel to a rapid transit line.

The average station spacing on the Eglinton Crosstown LRT between Keele Station and Laird Station is approximately 850 metres. This spacing is comparable to the station spacing of the Bloor-Danforth Subway, where parallel bus service is not provided today. Parallel bus service is provided on the Yonge Street at all times between Davisville and Finch Station (where some stations are 1600 metres apart), and at peak times south of Davisville (where the stations are approximately 650 metres apart on average) .

The need for parallel bus service will be determined through the TTC Service Standards process based on observed ridership patterns and specific community needs, relative to the additional cost of providing the service.

Feeder Bus Service

The bus operating plan for the Eglinton Crosstown LRT includes the following changes to the bus network:

- The 32C Eglinton West – Trethewey route will be shortened from its current terminating point at Eglinton West Station to the new terminal at Keele Station. This route will operate on Eglinton Avenue from Emmett Avenue to Keele Street.
- The 32D Eglinton West – Emmett route will be shortened from its current terminating point at Eglinton West Station to the new terminal at Keele Station. This route will no longer operate on Eglinton Avenue.
- The 47 Landsdowne will be rerouted along Eglinton Avenue from Caledonia Road to Croham Road to a new bus loop located adjacent to the Caledonia Station.
- The 51 Leslie and 56 Leaside routes will be combined and will operate on Eglinton Avenue between Laird Drive and Leslie Street. The portions of these routes that serve Eglinton Avenue from Laird Drive to Eglinton Station at Yonge Street will be eliminated.
- The 100 Flemingdon Park route will be shortened from its current terminating point at Eglinton Station to the new terminal at Don Mills Station. This route will no longer operate on Eglinton Avenue.
- The 54 Lawrence East route will be shortened from its current terminating point at Eglinton Station to the new terminal at Don Mills Station. This route will no longer operate on Eglinton Avenue.

3.3 Design Criteria

3.3.1 Transit Elements

LRT vehicles will be of modern European-style design with a length of approximately 30 metres. Trainsets will consist of two cars initially, with opportunity to expand to three cars when ridership levels warrant. The capacity of the LRT for planning purposes is 260 passengers for two car trainsets and 390 passengers for three car trainsets. Maximum operating speed is 60 km/hr; though vehicles will not be permitted to operate above the posted speed limit along Eglinton Avenue. The vehicle's average speed including stops is projected to be 28-31 km/hr in the west surface section, 22-25 km/hr in the east surface section and 32 km/hr underground.

Trains will be powered by electricity from overhead catenary wires. Train operations on the surface sections of the LRT corridor, both train control and opening/closing of doors, will be controlled by on-board staff. In the underground section of the LRT corridor, vehicles may be controlled by automatic train operation (ATO).

The LRT vehicles will be fully accessible to all riders, with low floor vehicles with level boarding from platforms. Boarding will occur on all doors to reduce time spent serving stops/stations. Doors will be located on both sides of the vehicle to accommodate centre and parallel platforms. Operator cabs will be located on both ends of the trainsets to permit operation in either direction without the requirement for turn around loops.

The track technology to be used is a combination of a continuously welded rail with a rubber sleeve that isolates the rail from the concrete. This elimination of rail joints combined with the isolating sleeve provides a smooth operation with limited noise and vibration that is no different than the noise levels of a busy street.

To develop a conceptual plan for the Transit Project Assessment, design criteria for both LRT alignment and roadway geometry were assumed. The criteria were developed based on the "*TTC - Design and Supply of the Low Floor Light Rail Vehicle – Technical Specification*" and the "*Transportation Association of Canada (TAC) – Geometric Design Guidelines*". Additionally, in January 2008, TTC developed a set of technical specifications named "Design and Supply of the Low Floor Light Rail Vehicle – Technical Specification" to replace the existing streetcars and to support the proposed Transit City network. This technical specification provides the vision for the future Toronto LRT network and the basic design criteria for the vehicles to be used. The design criteria are listed in **Exhibit 80.**

Exhibit 80: LRT Design Guidelines

Design Parameters	Proposed Standards
Maximum Operating Speed	60 km / h
LRT Right-of-way Width	7.4 m – Midblock
Median Width	TBD
Minimum Grade	0.5 %
Maximum Grade (LRT)	5.0 %
Minimum Curve Radius	25.0 metres
Platform Width	Side platform – 3.0 metres Centre Platform – 6.0 / 5.0 metres (desirable / minimum)
Platform Length	90 metres
Platform Area Grade	Desired – 0.0% (provided that adequate drainage can be provided) Maximum – 3.0%
Operating Height	Maximum – 6.7 metres from Top of Rail (TOR) Nominal – 5.5 metres from Top of Rail (TOR) Minimum – 4.0 metres from Top of Rail (TOR)

3.3.2 Road Elements

Due to the implementation of the LRT, existing roads along the Eglinton Crosstown LRT corridor will require modifications. **Exhibit 81** summarizes the road design criteria that were used during this study.

Exhibit 81: Roadway Design Criteria

Design Parameters	Proposed Standards
Posted Speed	60 km/h
Pavement Width	2 x 3.3 metres through lanes 2 x 1.6 m for delineated bicyle lane
Left Turn Lane	1 x 3.0 metres
Median	7.4 metres for LRT
Minimum Grade	0.5 %
Maximum Grade (Roadway)	5.0 %
Minimum Curve Radius	230 metres

Section 3.4.5 explains roadway modifications proposed as part of this project.

3.3.2.1 Bridge Structures

Structural assessments of the existing bridges have been carried out for the following load conditions:

Loads

Dead Loads:

The dead (fixed) loads include: deck, sidewalk, barrier walls, asphalt wearing surface, new LRT conventional trackbed and accessories or new LRT track with lightweight fill material.

Live Loads:

The live (moving) loads assessed include LRT Live Load and additional loads due to conventional trackbed and accessories; and LRT Live Load and additional loads due to lightweight trackbed and accessories.

Only primary loads noted were addressed in the preliminary evaluations to confirm feasibility of the proposed routing.

Other Loads

Other loads that need to be considered in the assessment of the bridge include wind and braking.

Additional analysis will be required during design to address local and other secondary loads including the following:

- Power supply will be provided through an overhead catenary system supported on poles attached to the bridge structure. The poles will induce local effects. Some local deck reinforcing may be required depending on the final configuration.
- Longitudinal track forces will be transmitted to the deck depending on the type of track fixation selected.
- Stray currents.
- Trackbed has been primarily assumed as a conventional reinforced concrete slab. Attachment to the bridge deck will be considered during design. Any local strengthening to assure load distribution would be addressed at that time.
- The LRT loading is comparable to current highway loadings and as such, causes only a marginal change to the loadings at underpass footings. It is noted however, that any roadway lowering to accommodate vertical clearance requirements may necessitate insulation of the existing footings.
- All structures were visually assessed to identify any conditions impacting structural integrity and evaluation methodology. No conditions of concern were identified. However, further review of the structure should be carried out at the time of design.

3.3.3 Typical Runningway at Surface

The Transit City program consists of seven LRT lines. Most of these corridors follow existing major roads where a 36 metre right-of-way is available. In these road corridors the preferred alignment for the LRT is to operate in the centre of the right of way. Centre lanes offer the following major advantages:

- The transit lanes do not block access to property or minor streets and in turn transit vehicles are not blocked by right-turning automobiles;
- LRT vehicles in centre lanes are more easily and more safely controlled at intersections when they are in the centre of the road rather than on either side; and
- A similar amount of right-of-way is required regardless of whether the transit lanes are on the side or in the centre.

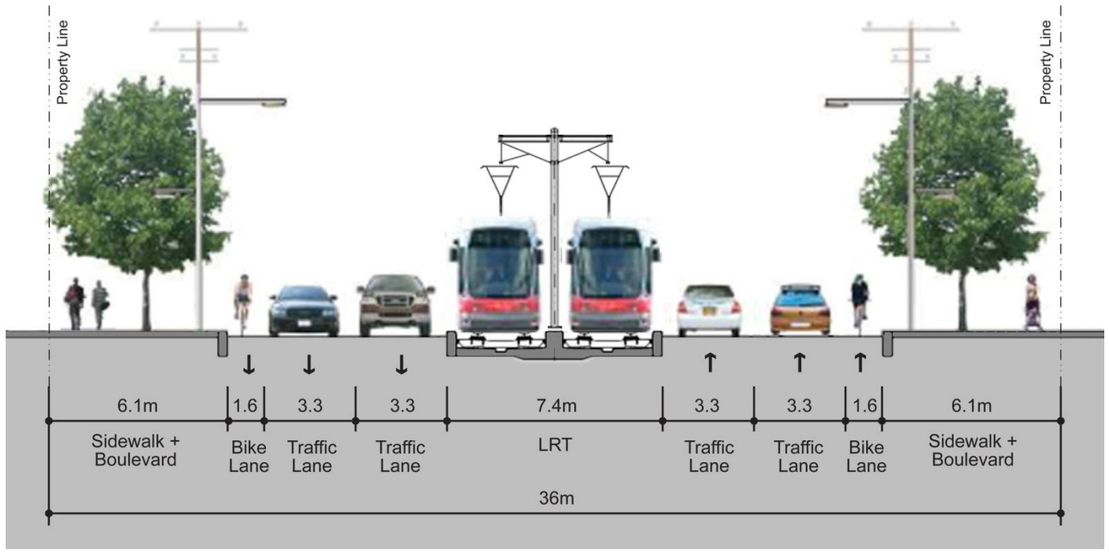
On the basis of these arguments a median corridor was selected as being the base alignment for the Eglinton Crosstown LRT. Special study areas investigated alignments outside the centre of roadway to see if the alignment provided any advantages in those cases.

A typical 36 metres cross section for mid-block section was developed as part of the overall Transit City program. The recommended cross section elements for midblock sections include:

- 7.4 metres dedicated LRT right-of-way with raised curbs for LRT tracks and median;
- 2 x 3.3 metres vehicular traffic lanes operating in each direction;
- 1.6 metres bicycle lane in each direction; and
- 6.1 metres boulevard, including the sidewalk, on each side of the street.

These elements result in a total cross section width of 36 metres.

Exhibit 82: Typical Mid Block Cross Section



3.3.4 Typical Surface Stops

While the actual dimensions may be subject to some minor modifications during design, the typical layout with far side platform along the LRT corridor for the preferred design solution include:

- 7.4 metres dedicated LRT right-of-way for LRT tracks and median;
- 3.0 metres station platform on the farside of the intersection;
- 3.0 metres left turn and u-turn lane on the nearside;
- 2 x 3.3 metres vehicular traffic lanes in each direction;
- 1.6 metres bicycle lane in each direction; and
- 3.1 metres boulevard, including the sidewalk, on each side of the street.

These elements result in a total cross section width of 36 metres. Depending on the overall available right-of-way width, streetscaping features could be provided where there is sufficient space.

Platforms will be approximately 90 metres long to accommodate three-car trains. In general, each surface stop will be furnished with a canopy and windscreen to provide passengers with protection from adverse weather. Surface stops will also provide other passenger amenities, including information panels, seating and self-service ticket vending/validation equipment. The proposed surface stops will be designed to be compliant with accessibility requirements including ramps proposed at the end of each platform near the intersection to connect to the crosswalks.

For the Eglinton Crosstown LRT, four stop types are proposed for the surface section. The stop type of each surface stop location was selected by considering the site geometry, traffic arrangement, LRT operations, and integration with existing and proposed infrastructure. The four types of stops provided are described below.

Farside Stops**:** (typical stop) are located beyond the intersection in the direction of travel. Farside platforms are provided at most locations where eastbound and westbound left turn lanes are permitted because they best conform to the intersection geometry and minimize the impact to adjacent property. Farside stops will consist of two 3 metre wide platforms on opposite sides of the intersection. **Exhibits 83 and 84** present a graphical presentation of this type of stop.

Exhibit 83: Typical Cross Section of a Farside Stop

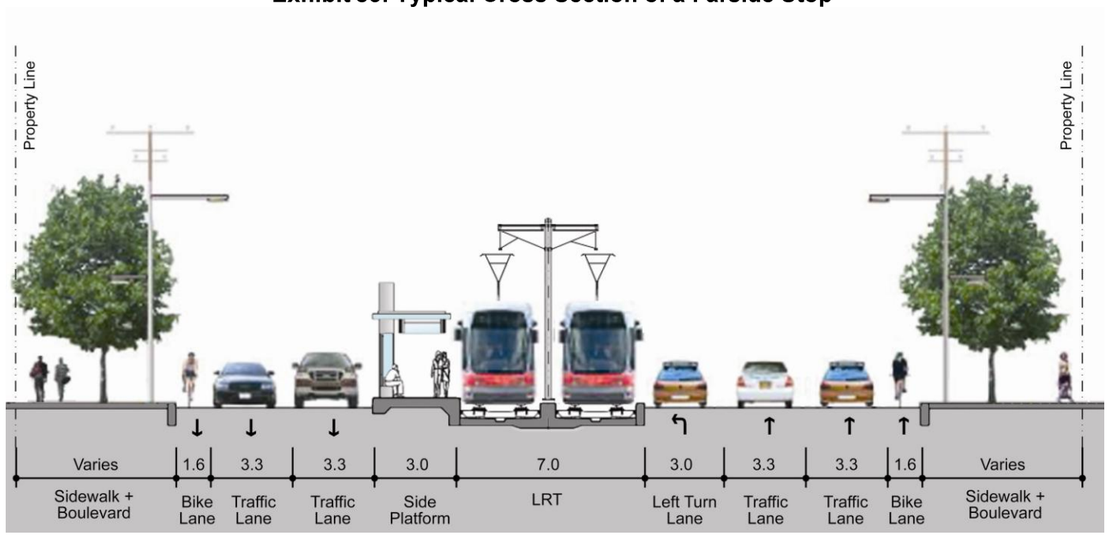
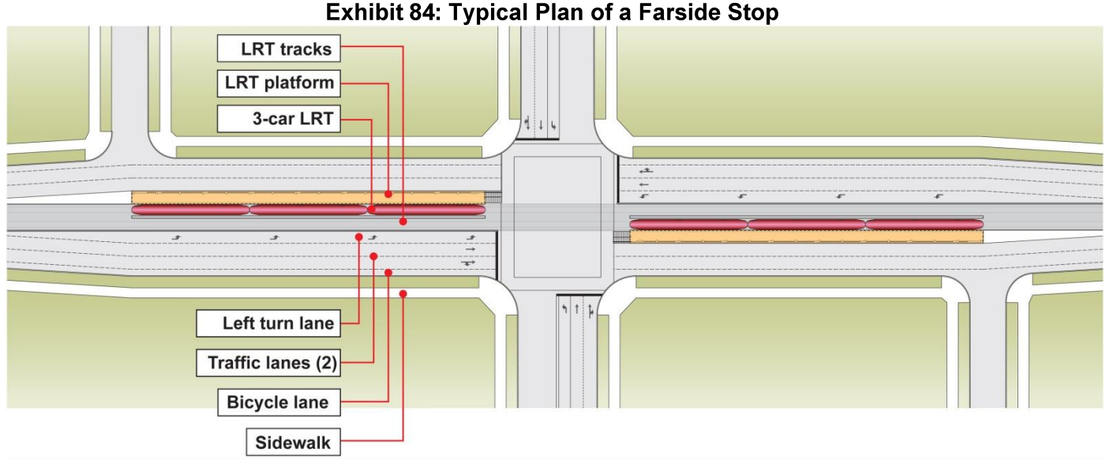


Exhibit 84: Typical Plan of a Farside Stop



Nearside Stops: are located before the intersection in the direction of travel. They are provided at major intersections where east and west left turns are prohibited. Nearside stops are provided at these locations because they do not require the LRT from double-stopping (i.e. stopping once at a red light, and then stopping again at the platform). Nearside stops will consist of two 3 metres wide platforms on opposite sides of the intersection. **Exhibits 85 and 86** present a graphical presentation of this type of stop.

Exhibit 85: Typical Cross Section of a Nearside Stop

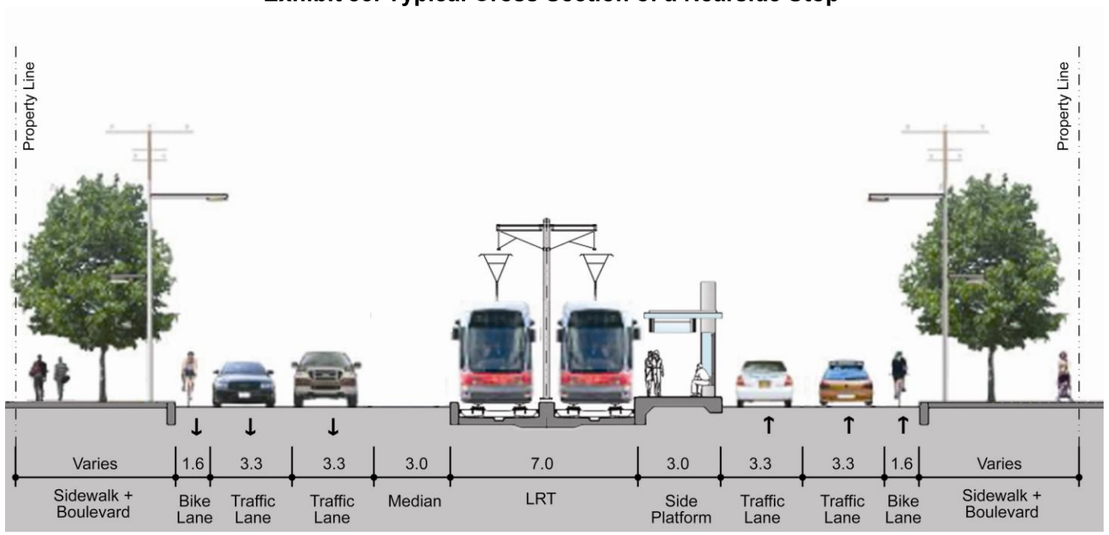
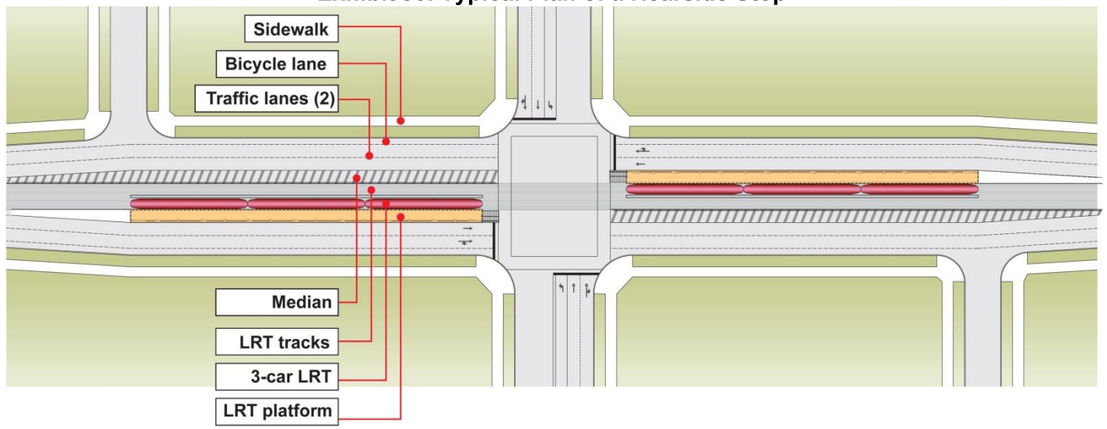


Exhibit 86: Typical Plan of a Nearside Stop



Centre Stops**:** can be located on either side of the intersection. They are provided at locations where the site geometry (i.e. horizontal and vertical curvature) or track configuration (e.g. crossover tracks) make it disadvantageous to provide farside or nearside platforms. Centre platforms are also provided at junctions with existing or proposed infrastructure to better facilitate passenger transfers. Centre stops will consist of one 6 metre wide platform on one side of the intersection. **Exhibits 87 and 88** present a graphical presentation of this type of stop

Exhibit 87: Typical Cross Section of a Centre Stop

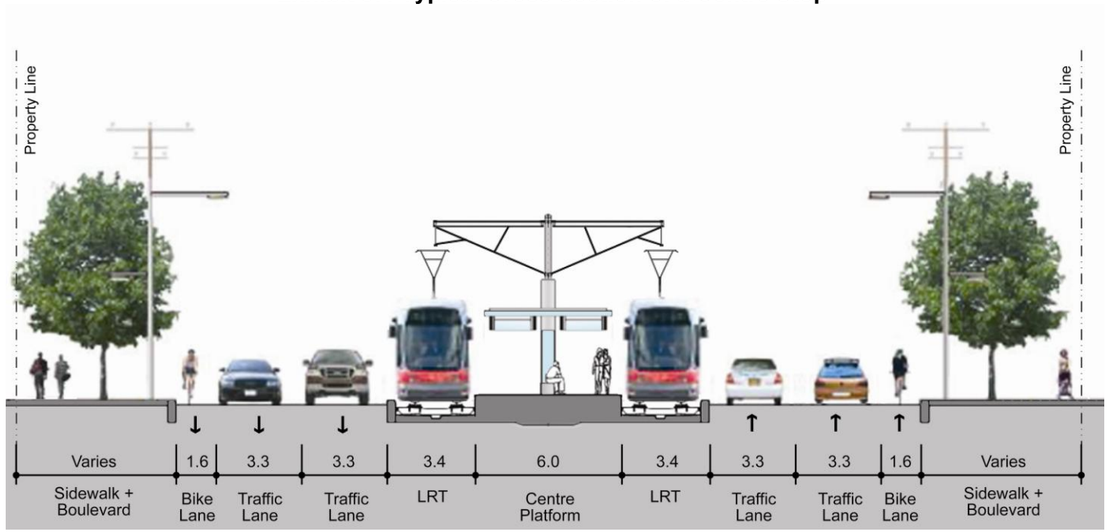
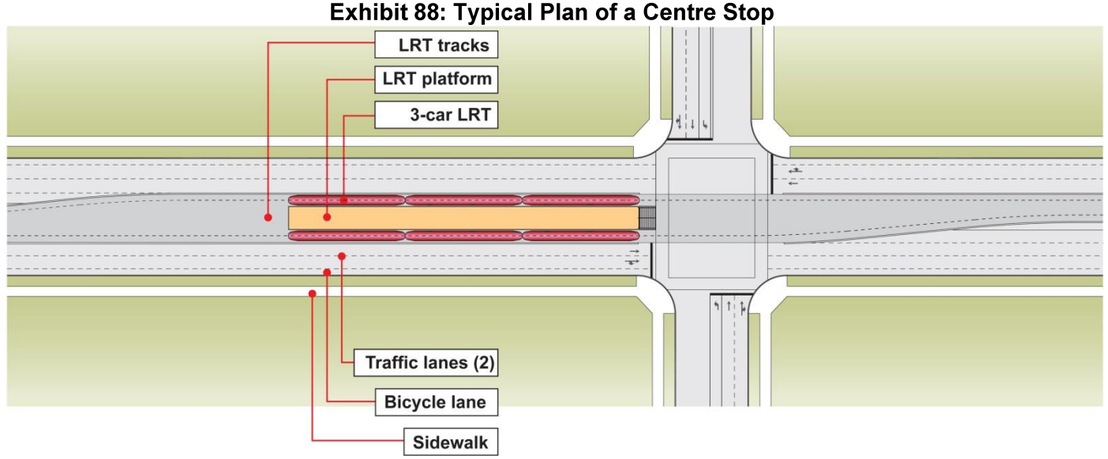


Exhibit 88: Typical Plan of a Centre Stop



Parallel Stops: can be located on either side of the intersection. They are provided at locations where the site geometry (i.e. horizontal and vertical curvature), track configuration (e.g. crossover tracks), and LRT track alignment make it disadvantageous to provide farside or nearside platforms. This application is applied in locations where it is disadvantageous to widen track centres to provide a centre platform. Parallel stops will consist of two 3 metre wide platforms on the same side of the intersection. **Exhibits 89 and 90** present a graphical presentation of this type of stop.

Exhibit 89: Typical Cross Section of Parallel Stop

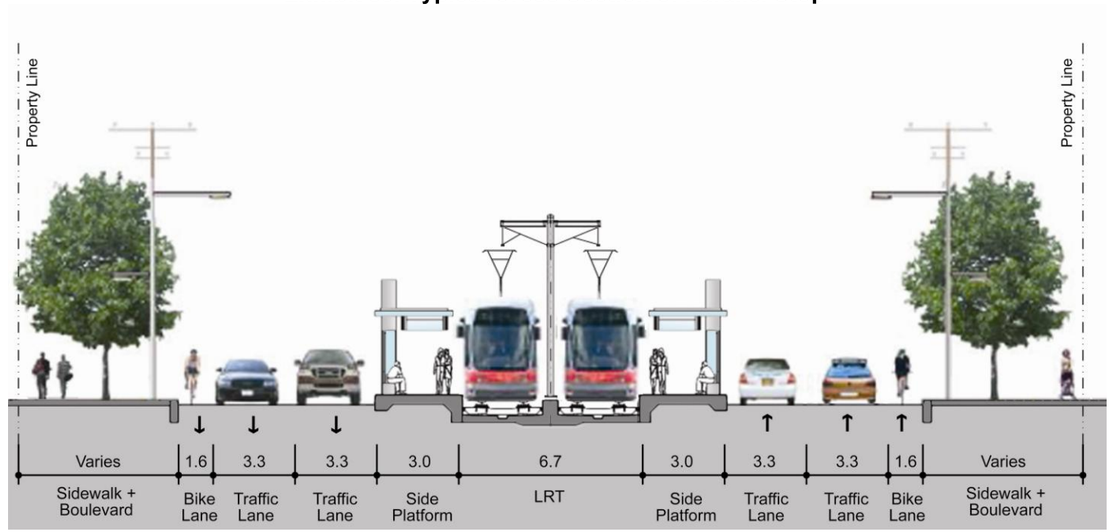
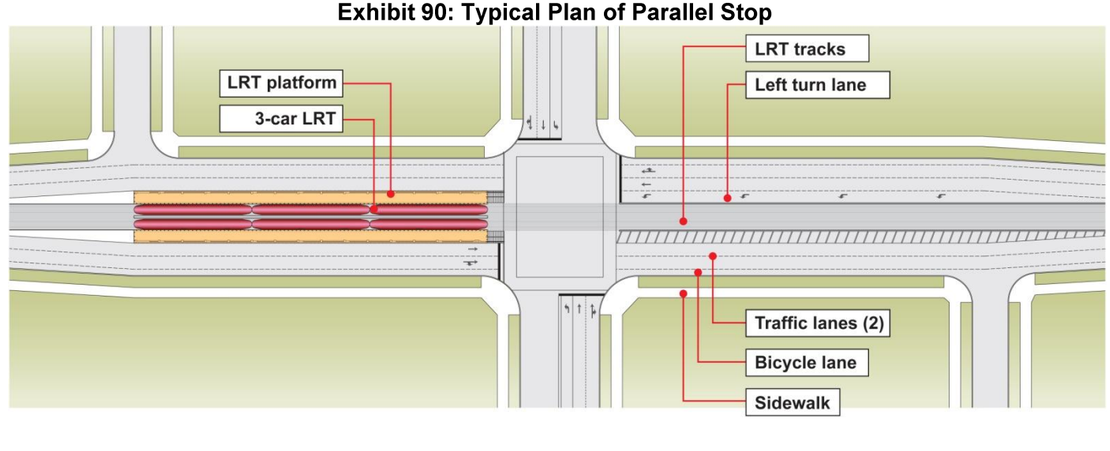


Exhibit 90: Typical Plan of Parallel Stop



3.3.5 Stations

At the street level, the typical underground station will generally include three station entrances, one main entrance, and two secondary entrances ideally located to the north and/or south of Eglinton Avenue and at either end of the station. Entrances serve as access and egress points for walk-in traffic along the underground LRT route.

Main entrances and secondary entrances are typically located to coincide with north-south bus routes and associated stops to provide a quick and convenient point of transfer. The main entrance will be accessible in accordance with TTC Easier Access standards. It will include an elevator, an escalator, and stairs. The secondary entrances will include only stairs (**Exhibit 91**). The stairs and escalator(s) will be oriented to provide a direct line of sight from the street level to the concourse level and vice-versa where possible. All entrances subject to site circumstances will have a glass enclosure along the entire perimeter to ensure visibility and daylight access. The entrances will connect the street level to the station concourse level, which includes an underground walkway. Elevator and escalator connections will be provided between the concourse level and the platform level **(Exhibit 91).**

At the concourse level, all LRT stations and stops will be proof of payment except at interfaces with existing subway stations (i.e. Eglinton West (Allen) Station and Eglinton (Yonge) Station). Ticket vending and validation machines will be located at the concourse level of LRT stations. At subway stations, the LRT will be accessed through existing subway paid entrances as well as new automated entrances at select locations.

All stations have a low-floor centre platform configuration which allows passengers to board and alight the LRT vehicles via a single platform between the two tracks. The platform width is 8.2 metres compared to a standard 10.3 metres subway platform and maintains the utilization of standard vertical circulation and cross-platform transfers subject to confirmation in during design.

The typical station box accommodates a 90 metres platform with a 40 metres service area at one end and a 20 metre service area at the opposite end resulting in a total station box length of 150 metres. Initially the LRT operation will consist of a 2-car trainset requiring a 60 metres platform. To protect for the ultimate 3-car train set the 90 metres platform would be constructed, but then temporary walls would be installed to create the initial 60 metres long platform. A 2.5 metres wide corridor would bisect the remaining 30 metres reserved portion of the platform leading to an additional secondary entrance. **Exhibits 91 and 92** show a typical station configuration. **Exhibit 93** shows an example of secondary station entrance.

Platform Level

Landing for two escalators (entraining/detraining), one set of stairs and one elevator is accommodated within the initial 60 metres platform, allowing 10 metres at either end of the platform. Station will be constructed to accommodate a 30 metres platform lengthening to be put in service when traffic increases and three car trains are required.

Fire Ventilation Requirements

Fire ventilation units are located at the concourse level at either end of the station box above the platform level service areas. The size and configuration of these units including associated ventilation shafts are subject to a separate study involving computational fluid dynamics (CFD), to be completed in the design phase.

Fire ventilation shafts will be incorporated into stations to balance air pressure within the tunnels and stations and to provide for emergency exhaust and fresh air supply in case of an underground fire. Generally, four fire ventilation shafts will be incorporated into the stations, with two ventilation shafts at either end of the station, each on opposite sides of the Eglinton Avenue. Certain site configurations have necessitated the consolidation of fire ventilation shafts to one side of the street, either at one end or both ends of the station. Fire ventilation shafts will generally be located outside of the Eglinton Avenue public-right-of-way, within the boulevard along side streets, on adjacent properties with open space (e.g. parking lots) and if no open space is available, on properties currently occupied by a low-level building.

For the purpose of this study, a 19 square metres ventilation shaft has been applied at each corner of the station box. The size is derived from ongoing fire ventilation projects on existing and proposed subway stations. The typical footprint of 3 metres by 6 metres may also be reconfigured subject to specific site circumstances. Fire ventilation shafts are typically 1 metre above street level and in certain circumstances may warrant a chimney-like structure.

Exhibit 91: Typical Station Cross Section

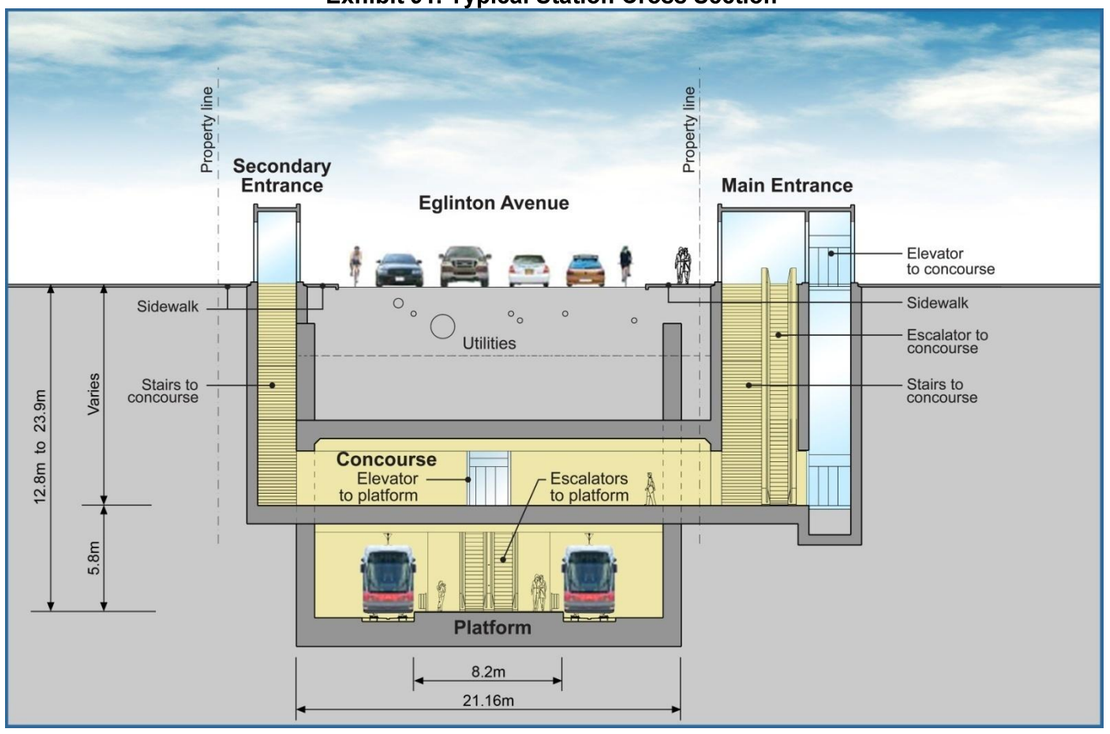


Exhibit 92: Typical Station Plan

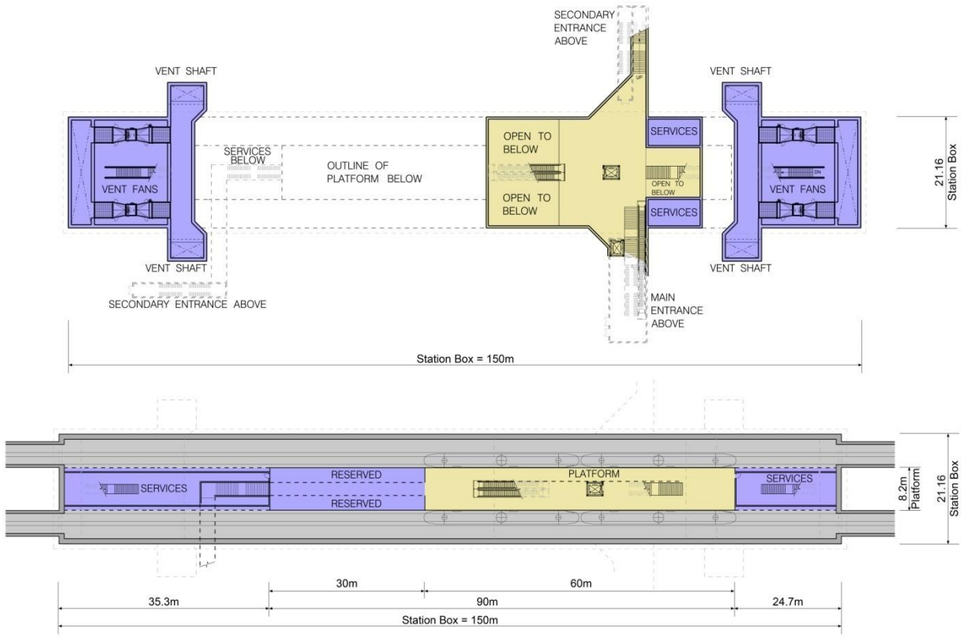


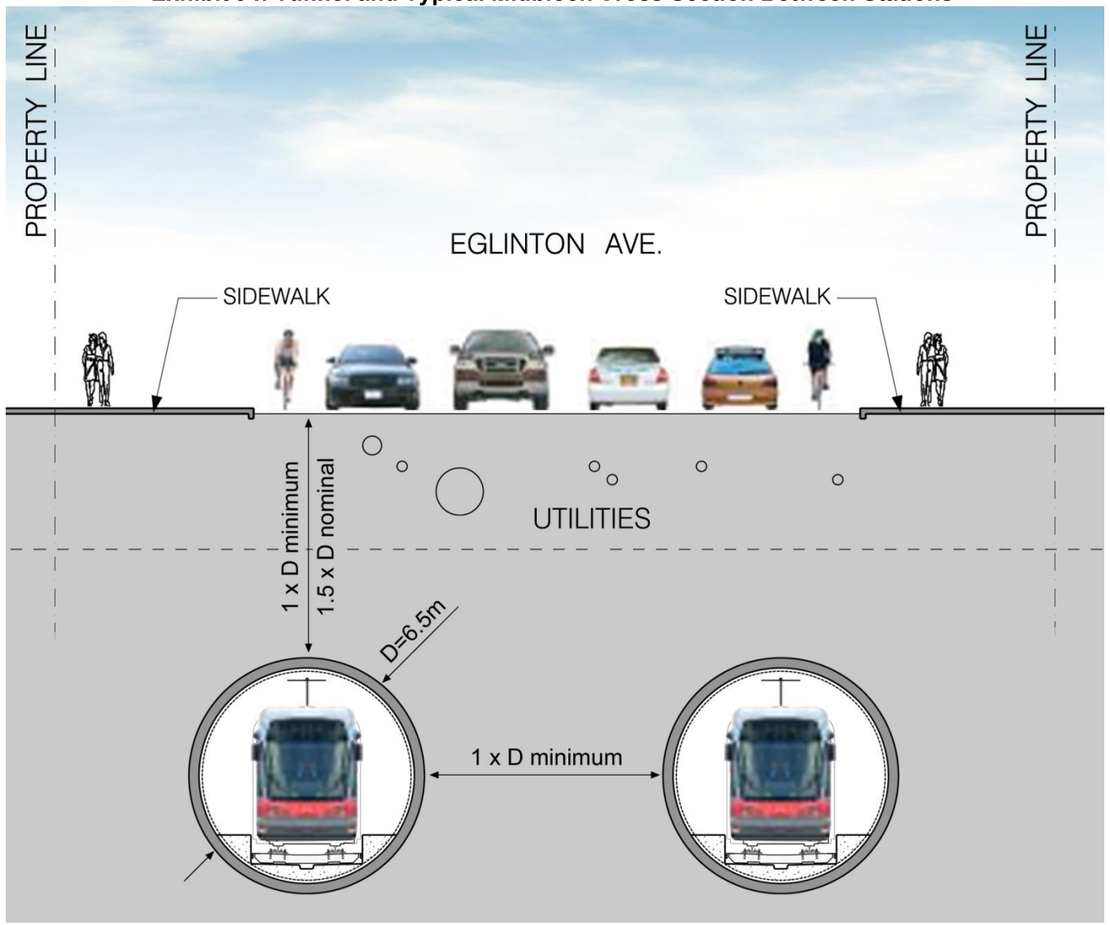
Exhibit 93: Secondary Entrance

3.3.6 Tunnels

The twin tunnel section of the project is located beneath the Eglinton Avenue roadway. Between stations, the tunnel can be designed to avoid as many utilities and subsurface obstructions as possible. The alignment of the tunnel section can be seen in Sheet Nos. 36-68 following Section 3.6.

Exhibits 94 and 95 present the typical tunnel cross section.

Exhibit 94: Tunnel and Typical Midblock Cross Section Between Stations



3.3.7 Special Trackwork

To allow the LRT vehicles to change direction for operational and emergency purposes, special track work is required. The types of special trackwork that are proposed within the corridor include crossovers and storage (pocket) tracks. Crossovers allow trains to transfer from one track to the other in order to change directions. All of the crossovers provide bi-directional capability. Storage (pocket) tracks provide a third track section between the two main line tracks with turn outs at one or both ends. This allows vehicles to be moved off of the mainline track to be stored during lower demand periods or when vehicles are disabled.

Based on TTC design standards and consideration of the operational needs of the Eglinton Crosstown line, crossovers are located at least every 4 kilometres, at terminal stations and at the last stations in the tunnel section to facilitate line management and operating flexibility. In addition, storage capacity is to be provided for at least one train at or near all terminal stations.

3.3.8 Emergency Exit Buildings

Emergency exit buildings (EEBs) are provided to allow for evacuation of underground facilities in the event of an emergency. EEBs are equipped with emergency backup power and ventilation and form part of an emergency egress system that also includes a common stairwell vestibule between the twin tunnels, a series of stairways and a tunnel leading up to the surface level. At the surface level, EEB's are small buildings located along side streets immediately north or south of Eglinton Avenue to accommodate future streetscaping or other urban design initiatives along the Avenue. Each EEB requires 2 parking spaces for TTC maintenance staff and direct road access to the building by a fire pumper truck. In most locations, EEB's are located within the public right-of-way adjacent to parking lots or other open spaces. In some locations, property acquisition will be required.

Each LRT station located underground is equipped with an emergency or secondary access. Additionally, In accordance with NFPA 130 and TTC Standards DM-0102-03 / 4.2.1, emergency exit buildings have been provided along the underground segment where station platforms are more than 762 metres apart. Where stations are less than 762 metres apart and the distance to an exit does not exceed 381 metres, emergency exit buildings are not required.

Exhibit 95: Emergency Exit Building at Bessarion Rd. Along the Sheppard subway line

3.3.9 Traction Power Substations

Traction power substations (TPSS) are required to house the electrical distribution equipment necessary to supply electrical power to the LRT. The traction power network, including transformers, switches and circuits will supply adequate power at an acceptable voltage to the transit vehicles and will be designed to minimize stray current and voltage hazards.

A draft traction power plan titled "Transit City Traction Power Overview" was prepared by the TTC in March 2009 to outline the traction power substation requirements and the electrical demands for the Transit City program. The plan proposes nineteen (19) traction power substations along the Eglinton Crosstown LRT route, two of which are located outside the Eglinton Crosstown study area at Toronto Pearson International Airport and Kennedy Station. The average spacing proposed by the plan is 1.5 kilometres in the surface sections, 2.0 kilometres in the tunnel sections, and a substation being located at each end of the transit line. The mainline substations are tentatively sized at 1.5 MW which coincides with the smallest sized TPS presently operated by TTC. At transit route intersections, the substations are positioned to be able to serve both lines, and are proposed to be double capacity (3.0 MW). Traction power substations are typically located within the public right-of-way near proposed stops along the surface segment of the LRT corridor and combined with other station surface facilities along the underground segment of the LRT corridor.

3.3.10 Special Track Work

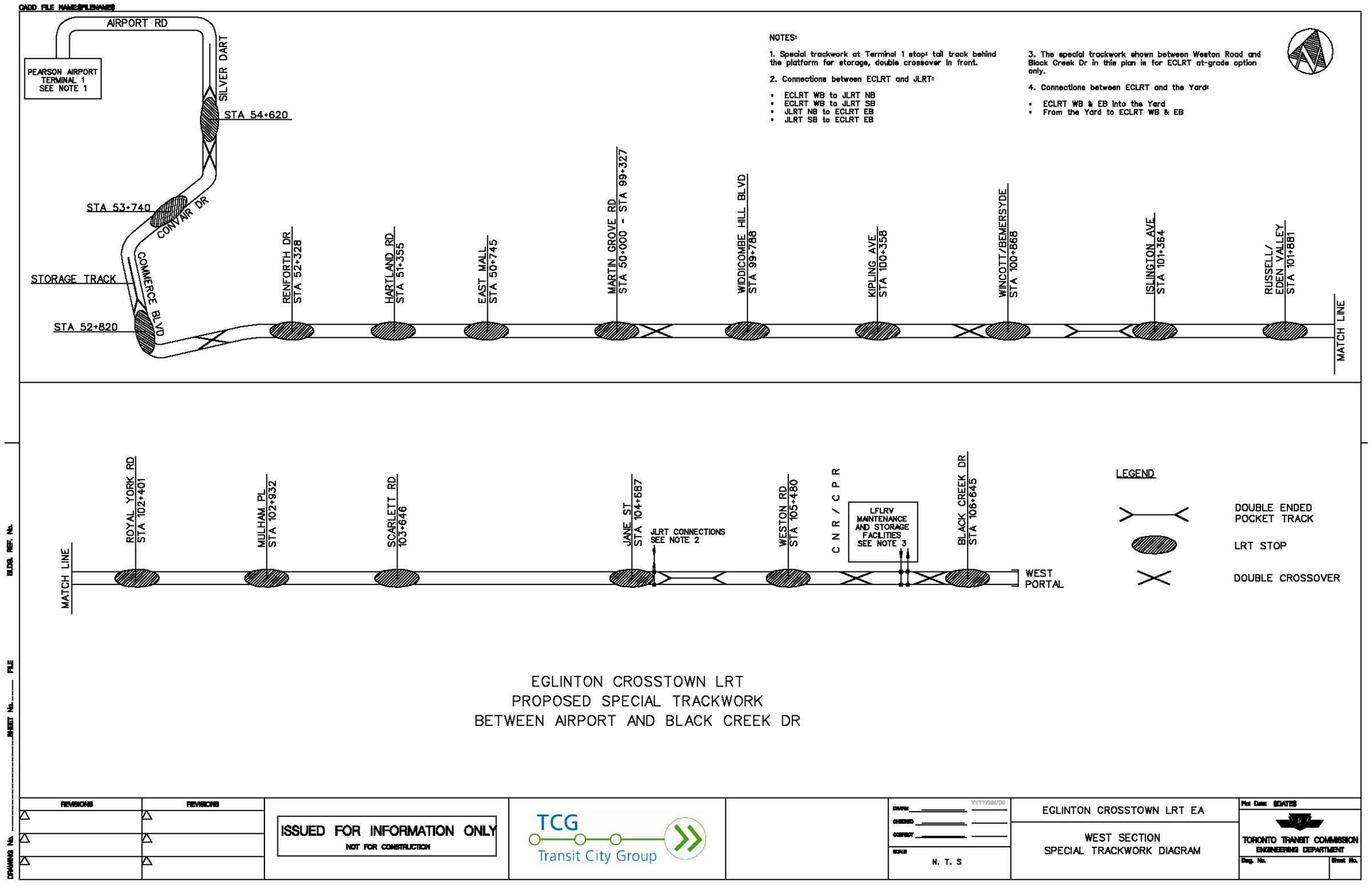
The locations of special track work are as follows:

- Silver Dart Stop – Single ended storage (pocket) track north of the platform;
- Commerce Stop – Single ended storage (pocket) track north of the platform, double crossover east of the platform;
- Martin Grove Stop – Double crossover east of the platform;
- Wincott/Bemersyde Stop – Double crossover west of the platform;
- Islington Stop – Double ended storage (pocket) track west of the platform;
- Jane Stop – Double ended storage (pocket) track east of the platform;
- Weston Stop – Double crossover east of the platform. This crossover provides operational flexibility on the west side of the Maintenance and Storage (pocket) Facility;
- Black Creek Stop – Double crossover west of the platform. This crossover provides operational flexibility on the east side of the Maintenance and Storage (pocket) Facility;
- Keele Station – Double ended storage (pocket) track west of the station, double crossover east of the station. Keele Station is the west terminus of the tunnel. The track work provided here allows short turn capability to operate the tunnel section at shorter headways;
- Allen Station – Double ended storage (pocket) track west of the station, double crossover east of the station;
- Yonge Station – Double ended storage (pocket) track east of the station, double crossover west of station;
- Laird Station - Double ended storage (pocket) track east of the station, double crossover west of station. Laird Station is the east terminus of the tunnel. The track work provided here allows short turn capability to operate the tunnel section at shorter headways;
- Don Mills Station – Double ended storage (pocket) track east of the station, double crossover west of the station;
- Pharmacy Stop – Double crossover east of the platform; and
- Kennedy Station – This is the east terminus of the Eglinton Crosstown LRT. Turn back capability will be provided as part of a separate project.

All special track work within the tunnel section will be built by cut and cover construction. A diagram showing locations of special track work is shown in **Exhibit 96.** The locations are also noted in the following sections where applicable in the station and stop descriptions.

All storage (pocket) tracks are proposed to be double ended with the exception of the Silver Dart Drive, which is the west terminus of the project.

Exhibit 96: Special Track Work Diagram



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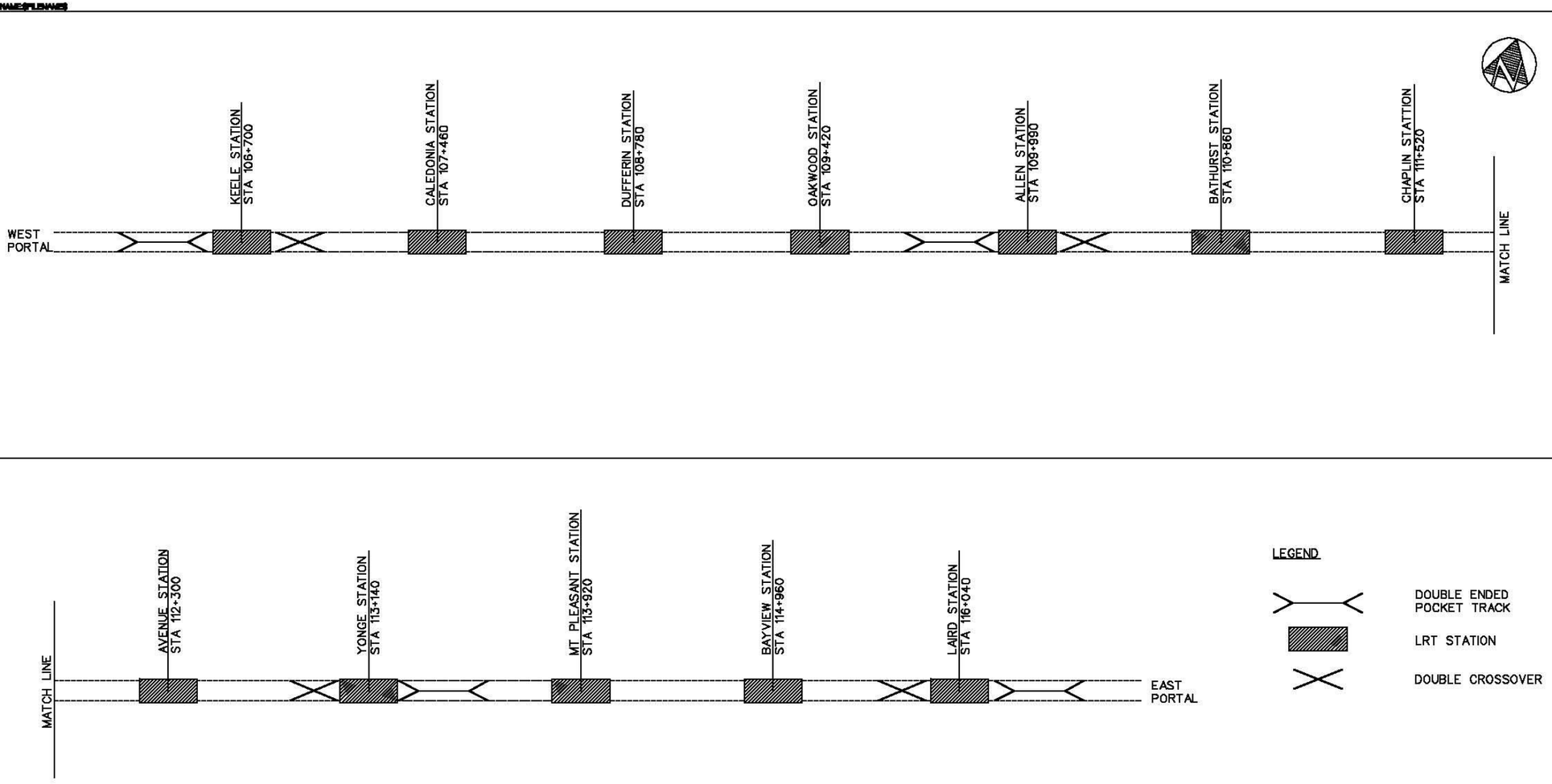
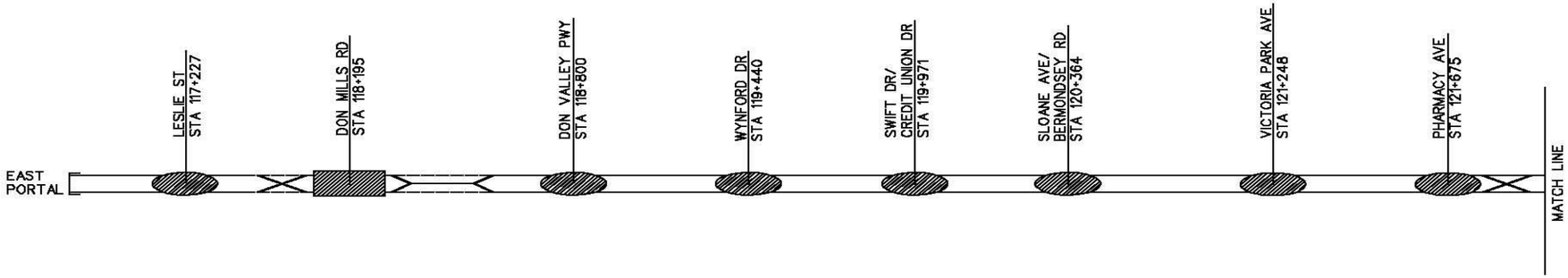


EGLINTON CROSSTOWN LRT
PROPOSED SPECIAL TRACKWORK BETWEEN KEELE ST AND BRENTCLIFFE RD

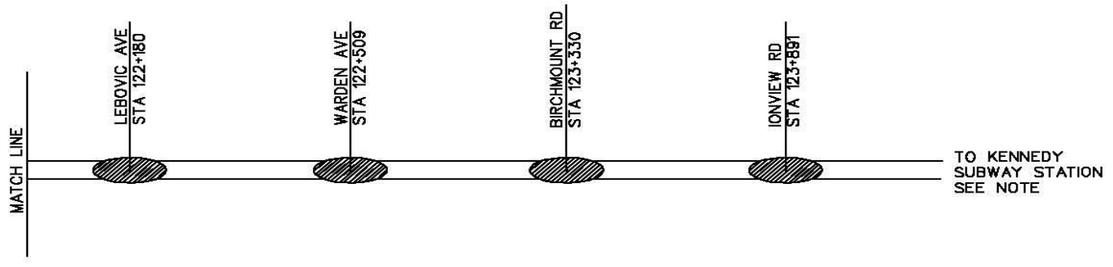
BLDG. REF. No. _____ FILE
DRAWING No. _____ SHEET No. _____

REVISIONS	REVISIONS					
		ISSUED FOR INFORMATION ONLY NOT FOR CONSTRUCTION	TCG Transit City Group		DRAWN / CHECKED / CORRECT SCALE: N. T. S	EGLINTON CROSSTOWN LRT EA UNDERGROUND SECTION SPECIAL TRACKWORK DIAGRAM	Plot Date: $DATE$ TORONTO TRANSIT COMMISSION ENGINEERING DEPARTMENT Dwg. No. / Sheet No.

CADD FILE NAME=(FILENAME)



NOTE: Special trackwork at Kennedy station - tail track behind the platform for storage and double crossover in front



LEGEND

- DOUBLE ENDED POCKET TRACK
- LRT STOP
- LRT STATION (UNDERGROUND)
- DOUBLE CROSSOVER

EGLINTON CROSSTOWN LRT
PROPOSED SPECIAL TRACKWORK
BETWEEN LESLIE ST AND KENNEDY RD

BLDG. REF. No. _____ SHEET No. _____ FILE _____
DRAWING No. _____

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TCG Transit City Group

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CHECKED _____
CORRECT _____
SCALE N. T. S

EGLINTON CROSSTOWN LRT EA

EAST SECTION
SPECIAL TRACKWORK DIAGRAM

Plot Date: (DATE)
TORONTO TRANSIT COMMISSION
ENGINEERING DEPARTMENT
Dwg. No. _____ Sheet No. _____

3.3.11 Emergency Exit Buildings

A total of six EEBs are proposed along the underground segment and are located between the following stations:

- Caledonia Road and Dufferin Street (EEB 1 at Little Boulevard);
- Allen Road and Bathurst Street (EEB 2 at Glen Cedar Road);
- Avenue Road and Yonge Street (EEB 3 at Eglinton Park/North Toronto Community Memorial Centre);
- Yonge Street and Mount Pleasant Road (EEB 4 at Dunfield Avenue);
- Mount Pleasant Road and Bayview Avenue (EEB 5 at Banff Road); and
- Bayview Avenue and Laird Drive (EEB 6 at Rumsey Road).

Exhibit 98 presents the location of Emergency Exit Buildings within the Eglinton Crosstown LRT corridor.

3.4 Preferred Design – Alignment Overview

The following sections provide a overview of the components of the project. The compoents described apply throughout the project and are not specific to any particular location.

3.4.1 Vertical Alignment

The Eglinton Crosstown LRT travels at the surface of Eglinton Avenue in the east and west sections and travels underground in a tunnel through the central section. In total, the length of the proposed project is approximately 33 kilometres. The west surface section begins at Silver Dart Drive near the Pearson International Airport and ends east of Black Creek Drive, with a distance of 12.2 kilometres. Just east of Black Creek Drive, the LRT enters a portal section and then continues underground to Brentcliffe Road, for an approximate distance of 10.3 kilometres. East of Brentcliffe Road, the LRT exits the tunnel section through a portal and travels at surface past the Leslie Stop. East of the Leslie Stop, the LRT enters a portal and proceeds underground at Don Mills Station. After passing Don Mills Station, the LRT surfaces through a portal and continues to Kennedy Station for a distance of 7.6 kilometres.

There is only one elevated section of the LRT corridor. It crosses Highway 401 north of Commerce Boulevard. This crossing will be strictly used for LRT and maintenance access only. Vehicle and pedestrian use will be prohibited.

The vertical tunnel alignment for the central section will be dependent on station depth, existing topography, maximum slope requirements and utility locations. The station depths to the platform level will range from 12 metres to 25 metres. The tunnels will have a minimum depth of cover of approximately 6 metres (one tunnel diameter). The tunnel alignment will travel beneath three operating heavy rail lines (e.g. the GO line west of Caledonia Road and the Spadina and Yonge subways).

3.4.2 Horizontal Alignment

The Eglinton Crosstown LRT horizontal alignment generally follows the centre of the existing Eglinton roadway. It deviates from the existing roadway beginning at the intersection of Commerce Drive and Matheson Boulevard and passes north over Highway 401 to Convair Drive in the Pearson Airport lands. In this section the LRT travels north of Matheson Boulevard through an undeveloped parcel, then proceeds along a proposed LRT bridge across Highway 401 to Convair Drive within the Pearson International Airport properties.

The tunnel alignment will be located within the Eglinton Avenue right-of-way. Between stations, the tunnels will be separated by a minimum pillar width (distance between tunnels) of one tunnel diameter.

3.4.3 Stop and Stations

Stations and stops are located based on a balance between good local access and speed of service. Closely spaced stations and stops provide excellent local access, but speed of the service will suffer if they are too close. Stops will be spaced approximately 670 metres apart on the west end surface sections, 850 metres apart on the underground sections, and 660 metres apart on the east end surface sections. Stations and stops will be located at major intersections where other TTC services (buses and subways) intersect Eglinton Avenue to provide convenient passenger connections to the existing transit infrastructure. Stations and stops will also be located across the corridor to provide access to existing residential neighbourhoods and commercial areas, and future developments.

A total of 41 stations and stops are being planned along Eglinton Avenue. This includes 28 surface stops and 13 underground stations.

Exhibit 98 is a key plan that shows all the LRT stops and stations.

Exhibit 97: Emergency Exit Buildings

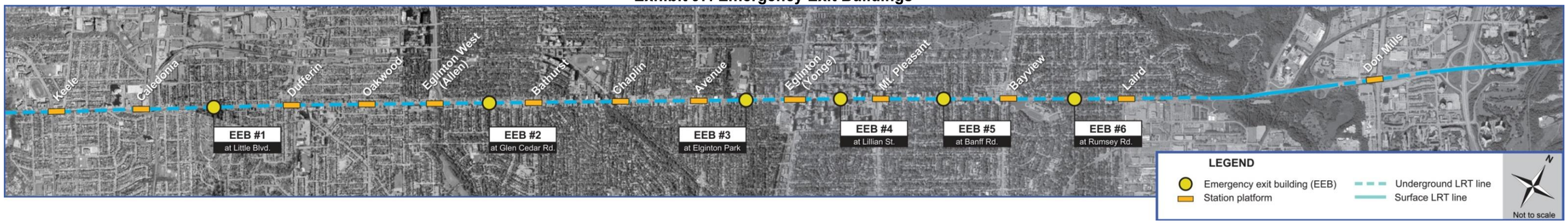
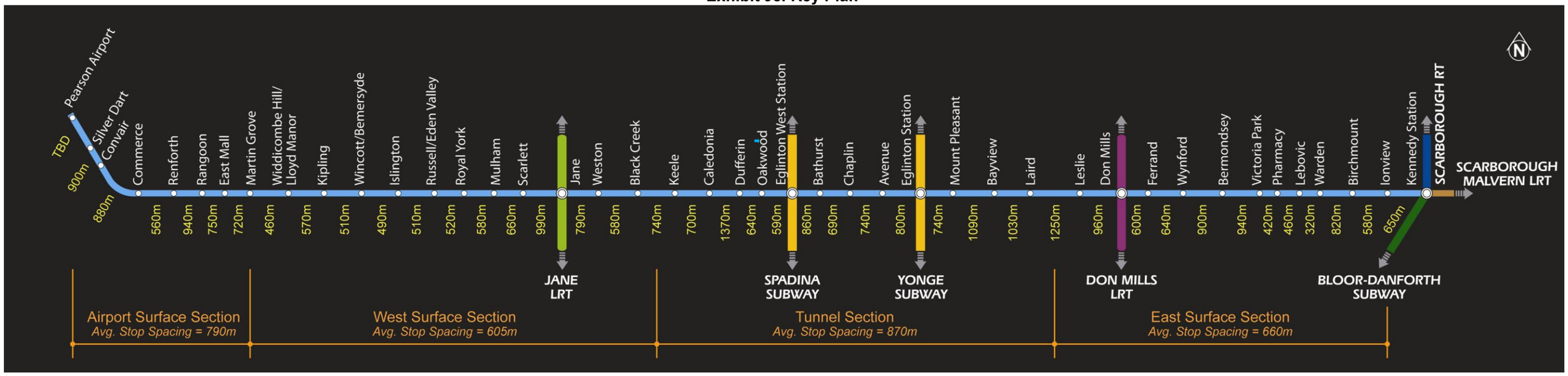


Exhibit 98: Key Plan



3.4.4 Bus Terminals

Off-street bus terminals are required at Keele Station (4-bus bays) and Don Mills Station (7-bus bays). As well, an off-street bus loop is required at Caledonia Station. These locations facilitate an interface between significant north-south routes of the feeder bus network and the LRT.

3.4.5 Road Modifications and Traffic Management

In the west surface section there is primarily 2 lanes of traffic in each direction. The LRT will occupy the middle two lanes of traffic, and road widening will be required to accommodate the additional cross section. In the east surface section there is primarily 3 lanes of traffic in each direction, consisting of two general purpose lanes and one high-occupancy-vehicle (HOV) lane. The LRT will occupy the middle two lanes. The remaining two lanes in each direction will be provided for traffic as proposed by the Eglinton Crosstown LRT project. To make a more urban environment to meet the goals of Transit City, the proposed lane widths will be narrower than the existing. Therefore, widening in the east surface section will generally only be necessary adjacent to stop platforms.

In addition to road widening and other modifications to Eglinton Avenue, some intersecting roads and ramps require modifications. These modifications are required to facilitate proposed traffic operations and accommodate improved transit transfers and the modifications to Eglinton Avenue.

With the introduction of the LRT in the centre of the roadway on the surface, traffic operations will be modified. In the central section of Eglinton Avenue with the LRT operating underground there will be no changes to traffic operation.

Between signalized intersections, the LRT will travel in a transit only right-of-way in the centre of the street physically separated from vehicular traffic to enhance LRT operating speed, reliability and safety. Traffic movements across the dedicated LRT running way will not be permitted except at signalized intersections. Consequently, left turns to driveways and minor streets will no longer be permitted. Future accesses will only permit right-in and right-out turns. The only exception to the right-in/right-out operation may be for emergency services. In cases where an emergency services facility has direct access to Eglinton Avenue, consideration will be given to permitting lefts-in and lefts-out turns by way of a curb depression opposite the access of the emergency services facility. This would be supplemented by the necessary by-laws/signage to prohibit non-emergency vehicles from making these movements"

In an effort to ensure fast and reliable transit service, left turn movements will be restricted at some major intersections to provide more green time the LRT. To accommodate the vehicular left turn movements, U-turns have been proposed at adjacent signalized intersections. There are three variations to this scenario:

- Travellers will travel through the intersection to a signalized U-turn, return to the intersection and make a right turn.
- Travellers will turn right at the intersection, proceed to a signalized U-turn, and travel through the intersection.
- Travellers will use new or existing roads which divert their movement to an adjacent intersection.

The application of the variations has been applied as follows:

- At Martin Grove Road and Victoria Park Avenue, where all left turning traffic will be re-routed to new or existing roads;
- At seven intersections, where median U-turns are being recommended;
- At Kipling Avenue, Islington Avenue, Royal York Road, Scarlett Road and Birchmount Road, where median U-turns located on Eglinton Avenue will replace left turns onto north/south streets; and
- At Jane Street and Pharmacy Avenue, where median U-turns will replace left turns in all directions.

Exhibit 99 shows the recommended operation at the ten identified intersections as a result of the analysis. The operations are shown in the exhibits included in **Section 3.2.8.**

Exhibit 99: Recommended Intersection Operation

Cross Street	Vehicle Movements
Martin Grove Rd	• North-south movements remain at intersection • East-west through remain at intersection • East-west right and left turns rerouted to new connector roads to turn at new traffic signals on Martin Grove Rd
Kipling Ave	• North-south movements remain at intersection • East-west through and right turns remain at intersection • East-west left turns rerouted to u-turn at new midblock u-turn signals on Eglinton Ave
Islington Ave	• North-south movements remain at intersection • East-west through and right turns remain at intersection • East-west left turns rerouted to u-turn at new midblock u-turn signals on Eglinton Ave
Royal York Rd	• North-south movements remain at intersection • East-west through and right turns remain at intersection • East-west left turns rerouted to u-turn at new midblock u-turn signals on Eglinton Ave
Scarlett Rd	• North-south movements remain at intersection • East-west through and right turns remain at intersection • East-west left turns rerouted to u-turn at new midblock u-turn signals on Eglinton Ave
Jane St	• North-south through and right turns remain at intersection • North-south left turns rerouted to u-turn at new midblock u-turn signals on Jane Street • East-west through and right turns remain at intersection • East-west left turns rerouted to u-turn at new midblock u-turn signals on Eglinton Ave
Victoria Park Ave	• North-south movements remain restricted • East-west through and right turns remain at intersection • East left turns rerouted to turn right onto Eglinton Square, turn right onto Victoria Park Avenue, and proceed through Eglinton Avenue • West left turns rerouted to turn left at Eglinton Square, then

Cross Street	Vehicle Movements
	turn Left at Victoria Park Avenue
Pharmacy Ave	• North-south through and right turns remain at intersection North left turns rerouted to u-turn at a new traffic signal at Craigton Dr • South left turns rerouted to u-turn at an existing traffic signal at the Metro access • East-west through and right turns remain at intersection • East left turns rerouted to u-turn at a new midblock u-turn signal on Eglinton Ave • West left turns prohibited
Warden Ave	• All movements remain at intersection
Birchmount Rd	• North-south movements remain at intersection • East-west through and right turns remain at intersection • East-west left turns rerouted to u-turn at new midblock u-turn signals on Eglinton Ave

3.4.6 Bridge Structures

The bridge structures along the Eglinton Crosstown LRT corridor were reviewed to confirm the feasibility of providing a light rail transit right-of-way on the existing bridge structures. An assessment of horizontal and vertical clearances was coordinated for the bridges in the surface section of the LRT corridor. In addition, bridges were evaluated structurally in conformance with Section 14 of the Canadian Highway Bridge Design Code and reviewed to assess adequate room to fit the LRT.

Seven modifications are proposed to existing structures along the corridor. Bridge widenings are planned for Mimico Creek, Black Creek, West Don River and East Don River. The bridge over Wynford Drive will be removed and replaced by a signalized, four leg intersection. The pedestrian bridge located between Royal York Road and Scarlett Road will be removed and replaced by a pedestrian crossing at the new signalized intersection at the Mulham Stop. The culvert on Wilson Brook will be extended to the north for approximately 3.5 metres.

Underpass structures were reviewed geometrically to confirm the feasibility and constraints on the provision of the right-of-way through the structure.

3.4.7 Bicycle and Pedestrian Facilities

Bike lanes will be available throughout the surface section of the alignment with the exception of a segment from The East Mall to Jane Street and from Commerce Boulevard northward to the project limit near the Pearson International Airport. In the section from The East Mall to Jane, there is an existing bike path on the south side of Eglinton Avenue and the addition of new bike lanes would require the removal of established wood lots. Bike lanes will not be provided throughout the underground section of the alignment as no road alignment modifications are planned within this project.

3.4.8 Urban Design

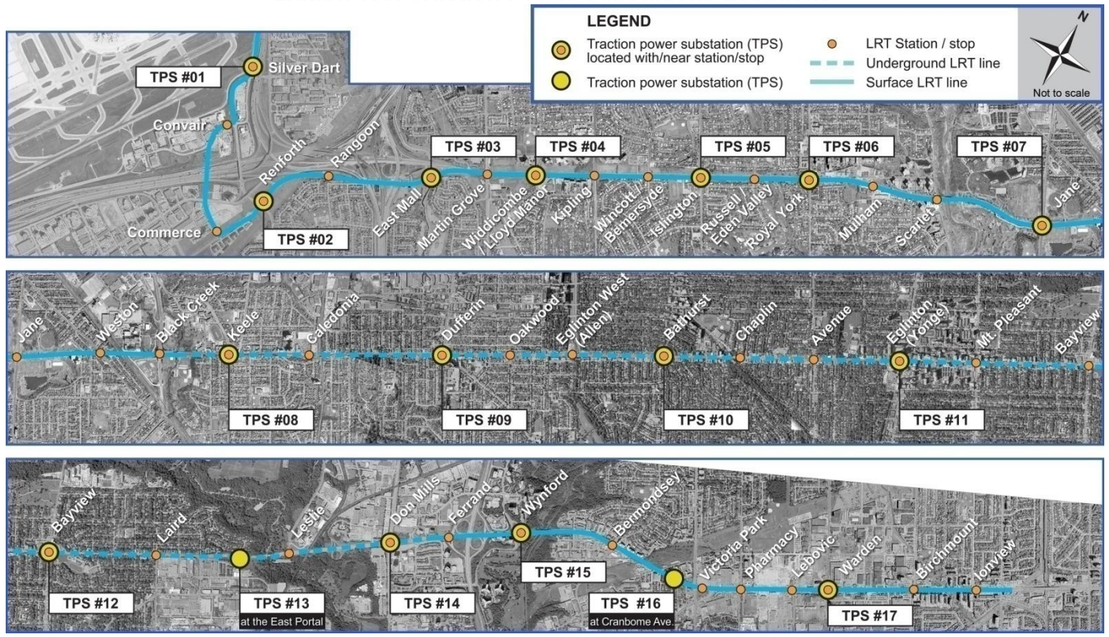
Urban design was not addressed as part of the scope of this Transit Project Assessment Process. Urban design, including layout and selection of elements, will be developed as part of the design stage. These elements with co-ordinated street furniture and landscaping will be incorporated into the project during the design phases. Tree planting in the Eglinton Crosstown LRT corridor will be determined during the design stage.

3.4.9 Traction Power Substations

A total of seventeen (17) traction power substations (TPS) are proposed along the Eglinton Crosstown LRT corridor at the following locations:

- Silver Dart Drive and Renforth Boulevard (TPS #01 at Silver Dart Stop);
- Renforth Drive and Eglinton Avenue West (TPS #02 at Renforth Stop);
- The East Mall and Eglinton Avenue West (TPS #03 at East Mall Stop);
- Lloyd Manor Drive and Eglinton Avenue West (TPS #04 at Widdicombe Hill Stop);
- Islington Avenue and Eglinton Avenue West (TPS #05 at Islington Stop);
- Royal York Road and Eglinton Avenue West (TPS #06 at Royal York Stop);
- Jane Street and Eglinton Avenue West (TPS #07 at Jane Stop);
- Yore Road and Eglinton Avenue West (TPS #08 at Keele Station);
- Dufferin Street and Eglinton Avenue West (TPS #09 at Dufferin Station);
- Bathurst Street and Eglinton Avenue West (TPS #10 at Bathurst Station);
- Duplex Avenue and Eglinton Avenue West (TPS #11 at Eglinton (Yonge) Station);
- Bayview Avenue and Eglinton Avenue West (TPS #12 at Bayview Station);
- mid-block along Eglinton Avenue West between Brentcliffe Road and Leslie Street (TPS #13 at Dufferin the East Portal);
- Don Mills Road and Eglinton Avenue West (TPS #14 at Don Mills Station);
- Wynford Drive and Eglinton Avenue West (TPS #15 at Wynford Stop);
- Cranborne Avenue and Eglinton Avenue West (TPS #16 at Victoria Park Stop); and
- Warden Avenue and Eglinton Avenue West (TPS #17 at Warden Stop).
- The traction power substation locations are shown in **Exhibit 100.**

Exhibit 100: Traction Power Substations Locations



3.5 Preferred Design – Description of LRT/Road Layout, Stops and Stations

The following section includes a detailed description of LRT/ road layout (including special cross-sections), bridge modifications, and stop and statons, bus terminals, running from west to east.

Drawings which show the full vertical and horizontal alignment, including the resulting road layout, stops, stations, emergency exit buildings, traction power substations and special trackwork are also organized running from east to west. These drawings (sheets) begin on page 112.

Exhibit 101 provides a summary of features for each surface stop. The level of detail provided in the text following the exhibit varies between the locations. However, greater detail is provided in corridor drawings presented from west to east following **Section 3.6**.

Exhibit 101: Surface Stops

Stop Name	Cross Street Name	Stop Type	Left Turns on Main Street	Left Turns on Cross Street
Airport to West of Tunnel				
Silver Dart	Renforth Drive	Centre – North side	Traditional.	Northbound left turns prohibited.
Convair	Convair Drive	Centre – North side	Traditional.	Traditional.
Commerce	Commerce Boulevard	Centre – North side	Traditional.	Traditional.
Renforth	Renforth Drive	Centre – East side	Traditional.	Traditional.
Rangoon	None	Centre	None.	None.
East Mall	The East Mall	Centre – East side	Traditional.	Traditional.
Martin Grove	Martin Grove Road	Centre – East side	Re-routed to new connector road.	Traditional.
Widdicombe Hill / Lloyd Manor	Widdicombe Hill Boulevard / Lloyd Manor Drive	Far Side	Traditional.	Traditional.
Kipling	Kipling Avenue	Near Side	Prohibited at intersection. Provided at downstream U-turn signals.	Traditional.
Wincott / Bemersyde	Wincott Drive / Bemersyde Drive	Far Side	Traditional.	Traditional.
Islington	Islington Avenue	Near Side	Prohibited at intersection. Provided at downstream U-turn signals.	Traditional.
Russell / Eden Valley	Russell Road / Eden Valley Drive	Far Side	Traditional.	Traditional.
Royal York	Royal York Road	Near Side	Prohibited at intersection.	Traditional.

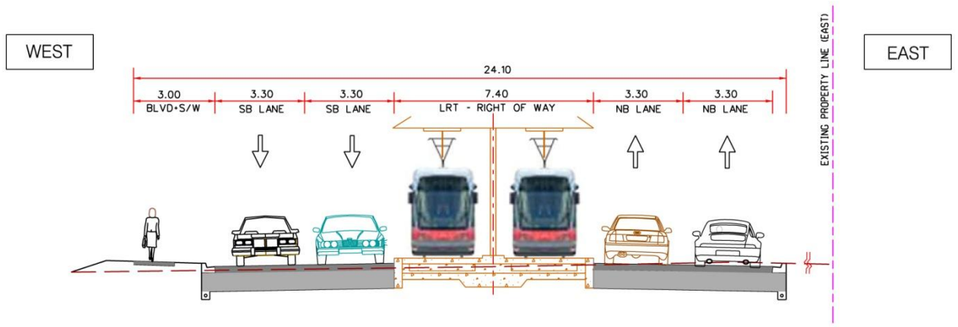
Stop Name	Cross Street Name	Stop Type	Left Turns on Main Street	Left Turns on Cross Street
			Provided at downstream U-turn signals.	
Mulham	Plant World Access	Parallel	Traditional.	Traditional.
Scarlett	Scarlett Road	Near Side	Prohibited at intersection. Provided at downstream U-turn signals.	Traditional.
Jane	Jane Street	Centre – West side	Prohibited at intersection. Provided at downstream U-turn signals.	Prohibited at intersection. Provided at downstream U-turn signals.
Weston	Weston Road	Centre – West side	Traditional.	Traditional.
Black Creek	Black Creek Drive	Far Side	Traditional.	Traditional.
East of Tunnel to Kennedy Station				
Leslie	Leslie Street	Far Side	Traditional.	Traditional.
Ferrand	Don Valley Parkway West Ramp	Centre – West side	Traditional.	Traditional.
Wynford	Wynford Drive	Centre – West side	Traditional.	Traditional.
Bermondsey	Bermondsey Road	Far Side	Traditional.	Traditional.
Victoria Park	Victoria Park Avenue	Centre – East side	Prohibited.	Prohibited.
Pharmacy	Pharmacy Avenue	Centre – East side	Prohibited at intersection. Provided at downstream U-turn signals.	Prohibited at intersection. Provided at downstream U-turn signals.
Lebovic	Lebovic Avenue	Far Side	Traditional.	Traditional.
Warden	Warden Avenue	Far Side	Traditional.	Traditional.
Birchmount	Birchmount Road	Far Side	Prohibited at intersection. Provided at downstream U-turn signals (Sinnott, and Lonview).	Traditional.
Ionview	Ionview Road	Far Side	Traditional.	Traditional.

3.5.1 Silver Dart Drive to Highway 401

3.5.1.1 Typical Cross-Section

The cross section from Silver Dart Drive to Highway 401 is similar to the typical LRT cross section with the exception of bike lanes. Bike lanes are not provided within this section. The typical cross section for this segment is shown in **Exhibit 102**.

Exhibit 102: Typical Cross Section at Silver Dart Drive



3.5.1.2 Silver Dart Stop

The Silver Dart Stop will be located at the intersection of Silver Dart Drive and Renforth Drive. The Silver Dart Stop is shown on Sheet No. 1. The northwest corner of this intersection is occupied by the Pearson International Airport. The northeast and southeast corners of the intersection are occupied by Highway 427. The southwest corner of the intersection is occupied by a rental car facility.

Stop Layout

The Silver Dart Stop will include one centre platform located on the north leg of the Renforth Drive at the Silver Dart Drive intersection due to the horizontal curve in the alignment south of the intersection, which precludes the ability to provide a stop platform at that location.

Road Layout and Traffic Operations

With the implementation of the Eglinton Crosstown LRT on Silver Dart Drive, southbound left turns will require a separate lane and phase. Given that there is currently no provision for northbound left turns, it is proposed that northbound left turns become prohibited at this intersection.

3.5.1.3 Convair Stop

The Convair Stop will be located on Convair Drive adjacent to the Greater Toronto Airports Authority (GTAA) Administration Building Parking Lot. The Convair Stop is shown on Sheet No. 4. A proposed traffic signal is required to permit full movement access across the LRT right-of-way, to provide access to the GTAA parking lot and to provide pedestrian crossing opportunities to the proposed LRT stop located east of the driveway. Currently, the northwest and northeast corners of this intersection are occupied by the GTAA office buildings and parking lots. The southeast and southwest corners of the intersection are an unoccupied parcel of land that is currently used as a staging area for construction.

Stop Layout

The Convair Stop will include one centre platform located on the north side of Convair Drive at the GTAA Parking Lot intersection. The centre platform is required due to the horizontal curve in the alignment south of the road crossing which precludes the ability to provide a stop platform at that location.

Road Layout and Traffic Operations

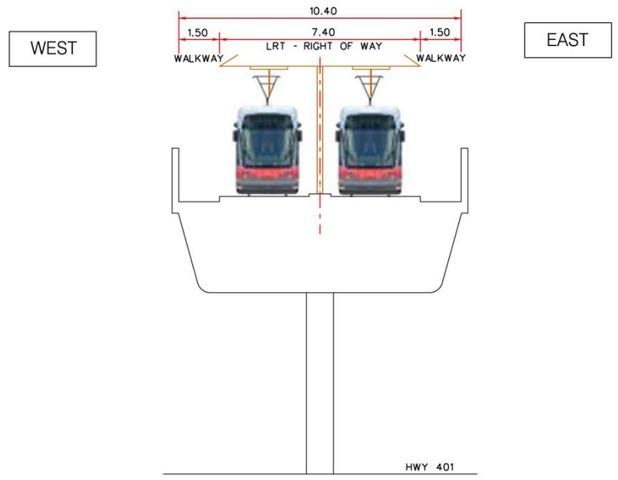
The proposed Convair Stop location is currently unsignalized. A traffic signal is proposed at this location to allow the LRT to pass in and out of the right-of-way, to provide controlled access to GTAA's main parking lot entrance and to allow pedestrians to reach the platforms. This proposed traffic signal will have a dedicated phase to allow the LRT to enter and exit the right-of-way which can be overlapped with the westbound traffic phase.

In terms of lane configuration, the preferred scenario includes one left turn lane, and two through lanes on the eastbound approach, one through lane and a shared through-right turn lane on the westbound approach. On the southbound approach, one dedicated through left turn lane and a dedicated right turn lane are included. Bicycle lanes will not be provided at this intersection.

3.5.2 Highway 401 Bridge Crossing

The proposed crossing over Highway 401 is proposed for LRT use only. The cross section for this segment allows for light rail vehicles in both directions and access on both sides for maintenance personnel. The proposed structure will be determined in the design phase. The typical cross section for this segment is shown in **Exhibit 103**.

Exhibit 103: Cross Section of Bridge Over 401



3.5.3 Highway 401 to Commerce/ Eglinton

3.5.3.1 Cross-Section

The Commerce Boulevard cross section is approximately 40 metres wide. The cross section in this area provides all of the elements of the typical cross section, and in addition provides a bus only contra-flow lane on the east side of the LRT. This lane is provided to facilitate the operational need of the proposed Mississauga BRT facility. The typical cross section for this segment is shown in **Exhibit 104**.