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2. Assessment of Alternative Facility Locations

This chapter summarizes the process followed as part of the UP Express Electrification Transit Project Assessment for assessing alternative paralleling stations and EMU Maintenance Facility locations in order to identify the recommended sites.

2.1 Background

2.1.1 2010 GO Transit Electrification Study (Pre-UP Express Electrification EA)

Prior to initiating the UP Express Electrification EA, the *2010 GO Transit Electrification Study* was completed by Metrolinx to examine the power supply and power distribution requirements of the entire GO network, including UP Express. This comprehensive study examined the impact of different rail technologies and involved review and comparison of the power supply and power distribution options to deliver electricity to a potential future electrified rail service.

The following summarizes the four key findings of the *2010 GO Transit Electrification Study*, which are further elaborated on below.

1. Recommended technology is a 2 x 25 kV autotransformer-fed system for the electrification of the GO Network.
2. To provide sufficient power supply and power distribution for electrification of the GO Transit network, seven traction power substations are required, as well as seventeen paralleling stations and four switching stations.
3. To ensure sufficient power load and to maintain high reliability of power supply, Traction Power Substations should be connected to Hydro One's 230 kV high voltage transmission network (refer to *Hydro One's Union Pearson Express Electrification Traction Power Substation Class Environmental Assessment – Draft Environmental Study Report*).
4. To limit the cost of high voltage transmission lines or cables, Traction Power Substations should be located as close as possible to existing Hydro One transformer stations and to the rail corridor.

2.1.2 Electrification Conceptual Design

Following completion of the *2010 GO Transit Electrification Study*, the decision was made by the Metrolinx Board of Directors to proceed with electrification of the Kitchener/Lakeshore corridors, beginning with UP Express as Phase 1, followed by Phase 2 - Kitchener and Lakeshore corridors. As a result, Metrolinx initiated the Conceptual Design for the Kitchener (including UP Express) and Lakeshore corridors, as well as the Environmental Assessment (TPAP) for Phase 1 – UP Express Electrification.

2.1.2.1 2012 Traction Power System Simulation Report

During the conceptual design phase, a traction power system simulation study was completed. The objective of the *Traction Power System Simulations Report* (LTK Engineering Services, 2012) was to perform computer- aided train operation simulations and traction electrification system load flow studies to evaluate electrification of the Kitchener/Lakeshore corridors, including:

- Simulation of electrification of the UP Express; and
- Simulation of electrification of the Lakeshore Line West Line up to proposed Lewis Road layover facility, the Lakeshore Line East Line up to Bowmanville, and the Kitchener Line up to proposed Baden layover facility.

The study findings and simulation results provided the basis for establishing the following:

- The number of traction power supply facilities (i.e., Traction Power Substations), and number and type of traction power distribution facilities (i.e., Switching Stations, Paralleling Stations) required for electrification of the Kitchener/Lakeshore corridors (including UP Express)¹; and
- The approximate geographic location/area for siting the required traction power supply and distribution facilities for UP Express electrification as Phase 1.

More specifically, the study established that paralleling stations (also referred to as autotransformer stations) would need to be installed approximately 8 – 12 km apart, typically with one or two autotransformers. The purpose of an autotransformer is to transform the voltage so that it can be distributed along the system and utilized by the electric trains at 25 kV.

Based on the analysis and modeling for UP Express, which included a power simulation load flow, **Table 2-1** summarizes the traction power distribution facilities, as well as traction power supply facilities required as part of electrifying UP Express, along with their respective general locations:

Table 2-1 Recommended Facilities and Locations - Traction Power System Simulation Study

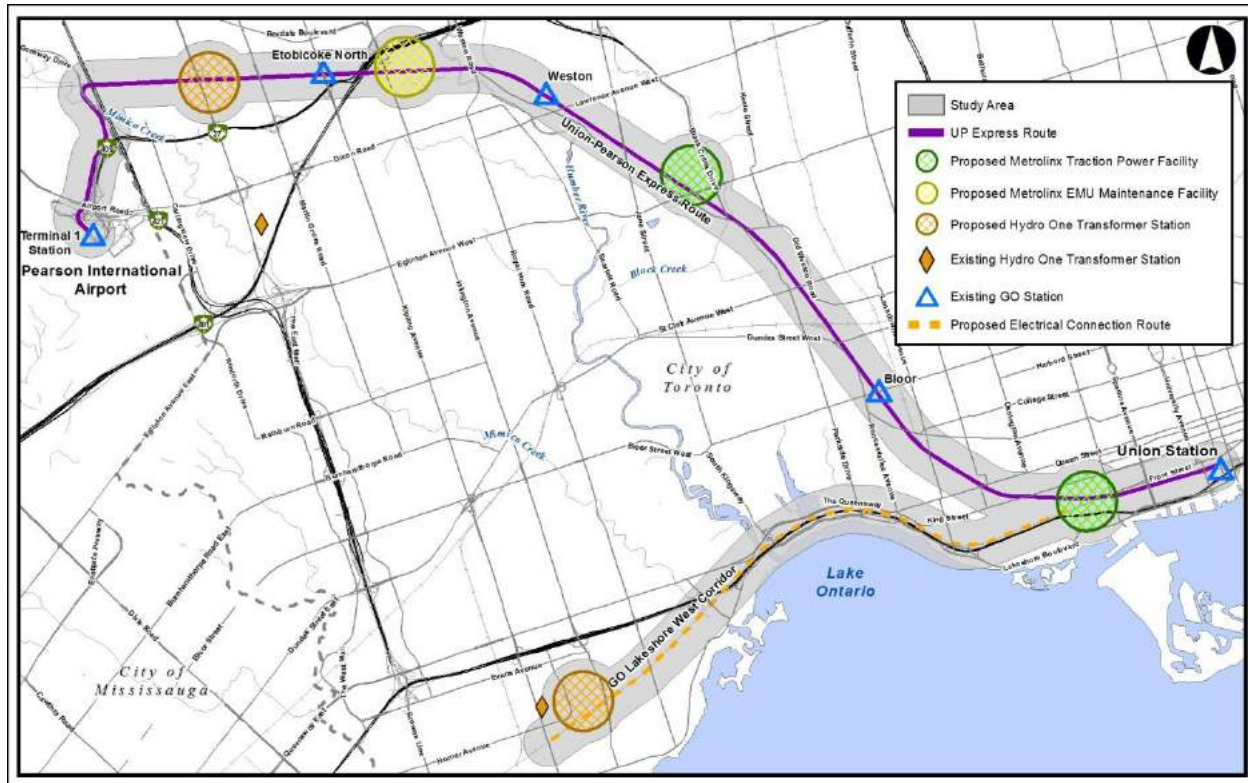
Facility Type	Recommended General Location
Traction Power Substation	Vicinity of the existing Richview Hydro One Transformer Station (southeast corner of Highway 27 and Dixon Road); Vicinity of the existing Horner Hydro One Transformer Station (Kipling Ave. just north of Horner Avenue).
Switching Station	Vicinity of Eglinton/Black Creek Drive along existing UP Express route on the Kitchener rail corridor.
Paralleling Station ²	Vicinity of Bathurst Street and existing UP Express route on the Kitchener/Union Station rail corridor.

¹ Analysis completed to ensure the UP Express Electrification design is compatible with future electrification of the Kitchener and Lakeshore corridors.

² Paralleling stations are referred to as autotransformer stations in *Traction Power System Simulations Report* (2012).

Figure 2-1 depicts the general locations identified in the *Traction Power System Simulation Study (2012)* for traction power supply and distribution facilities in the vicinity of the corridor, and the initial project study area.

Figure 2-1 Initial Study Area: General Locations for Traction Power Facilities for UP Express



As part of the conceptual design phase, Metrolinx, in consultation with Hydro One, reviewed the two key findings from the *2010 GO Transit Electrification Study* and *Traction Power System Simulation Study (2012)* in the context of electrifying Phase 1: UP Express first, to confirm that the proposed power supply and distribution system type and configuration still applied:

- 1. Power Supply Source and Provider** – To ensure sufficient power load and to maintain high reliability of the power supply, traction power substations will be connected to Hydro One’s 230 kV high voltage transmission network.
- 2. Configuration of Traction Power Supply and Distribution Facilities** – Confirmation of the number, type and general location of Traction Power Supply and Distribution Facilities required for Phase 1 - UP Express (which would also support the future electrification of Kitchener and Lakeshore corridors).

Based on this review, it was determined that:

- One traction power substation (in the vicinity of the existing Hydro One Richview Transformer Station) can provide sufficient power to the electrified UP Express, i.e., two TPSs will not be required for Phase 1. As a result, the area in the vicinity of the Horner Transformer Station (along the Lakeshore West corridor) was removed from consideration.
 - Per Hydro One experience, their 230 kV system at the Richview Transformer Station has an estimated availability of more than 99%.
 - If two independent 230 kV feeders, each fed from a different source, are provided at the TPS near Richview, then the arrangement at the TPS near Richview (with two transformers) will provide a comparable level of availability and reliability for the electrified UP Express as would be available for the ‘two TPS scenario’ (each with one main transformer).
- The Switching Station in the vicinity of Eglinton/Black Creek Drive and UP Express route/corridor will be a Paralleling Station instead.
 - Switching Stations are required if there are two or more power sources (i.e., Traction Power Substations) operating. Under this scenario, the purpose of a Switching Station is to allow ‘switching’ from one TPS to another as the power source for sections of the railway. In cases where there is only one TPS providing power to the railway, there is no need for a Switching Station since there is no other TPS to switch power to.

Therefore, the traction power distribution facility requirements for UP Express consist of two paralleling stations: one in the vicinity of Bathurst Street/rail corridor, and one in the vicinity of Eglinton Avenue West/Black Creek Drive and the rail corridor. Accordingly, the following sections describe the assessment of specific siting options for the two paralleling stations.

2.2 Methodology for Assessing Alternative Facility Sites

The site assessment process for establishing the preferred UP Express facility locations was based on the following four steps:

- **Step 1: Identify Alternative Facility Sites**
- **Step 2: Evaluate Alternative Facility Sites**
- **Step 3: Identify Recommended Facility Sites**
- **Step 4: Confirm Preferred Facility Sites**

The process followed and results of carrying out each step are described within the respective sections below.

2.3 Identification of Alternative Paralleling Station Sites

With the general locations for paralleling stations established through previous studies (*2010 GO Transit Electrification Study, Traction Power System Simulation Study (2012)*) and subsequently confirmed during the Electrification Conceptual Design phase, the next step as part of the EA process was to identify specific properties within these general areas where the paralleling station facilities could potentially be located.

As a result, an approximate 1 km radius area was established in the vicinity of the recommended facility locations (see **Figure 2-1** above) in order to further assess the potential locations initially established through the simulation study and to identify additional viable siting options. A radius of approximately 1km was selected around the recommended locations as a conservative area within which alternative sites could be identified without adversely affecting the reliable operation of the system, and recognizing that minor changes in facility locations would not substantially affect the minimum system voltages as established in the *Traction Power System Simulation Study (2012)*.

Once this 1 km area was established, the following three criteria were applied in order to generate a list of alternative paralleling station facility sites:

- **Property size requirements:** The footprint size required for constructing a new paralleling station is anticipated to be 35m x 20m. Therefore, only properties that can accommodate a minimum footprint area of 35m x 20m were considered;
- **Proximity to UP Express route:** Paralleling station sites should be located in close proximity to the UP Express route/rail corridor in order to minimize real estate/easement requirements, maintenance requirements, potential utility conflicts associated with 25 kV feeders to be installed between the Paralleling Station and gantries; and
- **Vacant lots (preferred):** Ideally, vacant lots where no businesses are currently operating.

2.3.1 Alternative Sites for Paralleling Station in Vicinity of Bathurst St. and UP Express route/corridor

As a result of applying the above listed criteria, only one viable site was identified for the Paralleling Station in the vicinity of Bathurst Street and UP Express route/corridor (see **Figure 2-2**):

1. Alternative Paralleling Station Site #1 – 10 Ordnance Street

As a result, the site at 10 Ordnance Street was carried forward, and no further assessment was required.

Figure 2-2 Alternative Sites for Paralleling Station in Bathurst Street and UP Express route/corridor



2.3.2 Alternative Sites for Paralleling Station in Vicinity of Eglinton Avenue West/Black Creek Drive and UP Express route/corridor

As a result of applying the above listed criteria, three alternative sites satisfied the criteria and were identified for the Paralleling Station in the vicinity of Eglinton/Black Creek Drive and UP Express route/corridor (see **Figure 2-3**):

1. Alternative Paralleling Station Site #1 – Southwest corner of Black Creek Drive and Eglinton Avenue West
2. Alternative Paralleling Station Site #2 - 3500 Eglinton Avenue West
3. Alternative Paralleling Station Site #3 – 955 Weston Road (at Weston Road and Bushey Avenue)

Figure 2-3 Alternative Sites for Paralleling Station in Vicinity of Eglinton Avenue West/Black Creek Drive and Rail Corridor



2.4 Evaluation of Alternative Paralleling Station Sites (Vicinity of Eglinton/Black Creek Drive and UP Express Route)

The three alternative sites identified for the Paralleling Station in the vicinity of Eglinton/Black Creek Drive and UP Express route/corridor were subsequently evaluated based on the following criteria (**Table 2-2**) in order to identify the recommended site.

Table 2-2 Evaluation Criteria for Paralleling Station Sites

Evaluation Criteria	Description
Natural Features	Consideration of sensitive natural features in the vicinity of the facility location.
Land Use/Social Features	Consideration of existing/planned land use in the vicinity of the facility location/consideration of social features (i.e., schools, daycares, etc.) in the vicinity of the facility location.
Cultural Features	Consideration of sensitive cultural/archaeological features in the vicinity of the facility location.
Technical - Property Availability	Consideration of property acquisition requirements.
Technical - Development Cost	Consideration of the cost to develop the site.
Technical - Site Accessibility	Consideration of access to the facility for maintenance purposes.

The following provides a discussion of the relative advantages and disadvantages of each siting option based on applying the criteria outlined in Table 2-2 above.

2.4.1 Alternative Paralleling Station Site #1 - Southwest corner of Black Creek Drive and Eglinton Avenue West

Natural Features

There are no aquatic features on this site, however Black Creek is in the vicinity of the site to the east.

Based on air photo interpretation, this site contains two vegetation communities: Cultural Woodlot and Cultural Meadow. Based on the relatively small size of the site, it is unlikely that it provides any specialized wildlife habitat or potential habitat for any Species at Risk.

Land Use/Social Features

The site is characterized as open space and is currently unoccupied. The surrounded by commercial land use to the north (consisting of a No Frills supermarket and associated parking lot), recreational land use (Keelestone Park) to the east, and a railway corridor to the west. There are residential land use areas on the other side of the railway corridor.

The closest social facilities to this Paralleling Station site are approximately 500m from the site, and comprise of the Keelesdale Junior Public School and the Keelesdale Day Care Centre to the northeast and the Dennis Avenue Community School to the west.

Permitted land uses zoned for this site include *public utility* and *transportation use*. Conditions for these uses are:

- Public utility: must be enclosed by walls and comply with the lot coverage, minimum building setback and maximum building height
- Transportation use: A building or structure used as a transportation use must comply with all zoning regulations for a building on that lot

Cultural Features

Review of the City of Toronto's heritage inventory did not reveal any previously identified heritage features on this site.

Technical - Property Availability

–This site is not currently owned by Metrolinx, which is considered to be a disadvantage since the property would need to be acquired in order to implement the Paralleling Station.

Technical – Development Cost

Since property acquisition would be required for this siting option, the development cost would be relatively higher than sites which are currently owned by Metrolinx.

Technical – Site Accessibility

There is access to a municipal street from this site.

2.4.2 Alternative Paralleling Station Site #2 - 3500 Eglinton Avenue West

Natural Features

There are no aquatic features on this site, however it is noted that Black Creek is in the vicinity of the site to the east.

Vegetation cover on the 3500 Eglinton Avenue West site is primarily characterized as shrubs and saplings which is common to disturbed habitats. The ELC classification for this vegetation community was determined to be Cultural Thicket. There is also a small patch of Deciduous Forest, however it does not provide specialized wildlife habitat or potential habitat for any Species at Risk.

Land Use/Social Features

This site is characterized as open space, surrounded by commercial land use to the south (consisting of a No Frills supermarket and associated parking lot), more commercial land use to the north, residential area to the west, and recreational land use to the east. The closest social facilities to this paralleling station site are Super Kids Day Care Centre and Hollis Child Care Centre, both about 400m to the west of the proposed switching station. However, the Hollis Child Care Centre is to be closed/relocated as part of the Eglinton Crosstown project in the near future.

The property at 3500 Eglinton Avenue West is currently open space and is zoned as *Employment Industrial (EI* under new City By-law, under appeal) and Strategic Industrial Employment (*SI* under former City By-law). Permitted uses with conditions for *EI* include public utility and transportation use. Conditions for these uses are:

- *Public utility*: must be enclosed by walls and comply with the lot coverage, minimum building setback, and maximum building height for the E zone if it is: a) an electrical transformer station; or b) a natural gas regulator station.
- *Transportation use*: A building or structure used as a transportation use must comply with all zoning regulations for a building on that lot.

Cultural Features

Based on the Stage 1 Archaeological Assessment carried out for the 3500 Eglinton Avenue West site (*Stage 1 Archaeological Assessment Report, December 2012*), this site does not have archaeological potential due to extensive and intensive disturbance. No further archaeological assessment is required.

The former Kodak lands are located at 3500 Eglinton Avenue West in the City of Toronto. Portions of the subject site were acquired by Kodak Canada Inc. as early as 1912 to serve as the company's manufacturing plant. Previously, Kodak Canada retained office space in downtown Toronto. However, by the second decade of the twentieth century, the company's operations had grown significantly and by 1914, Kodak Canada Inc. had acquired a full 48 acres on Eglinton Avenue. By 1925 there were over 900 employees working in seven buildings on the site which quickly became known as 'Kodak Heights', in part due to its proximity to the Black Creek valley and its siting on a high point of land and its location within the Mount Dennis neighbourhood, whose development is closely linked to the company's operations.

Until 2005, the 'Kodak Heights' site contained 12 industrial and office buildings. As of May 2012, only one structure remained on the site and which is known as Building #9 (which is to be conserved as part of the Eglinton Crosstown project).

Technical - Property Availability

The site is currently owned by Metrolinx, which is considered to be a significant advantage since the property would not need to be acquired in order to implement the paralleling station.

Technical – Development Cost

Since no property acquisition would be required for this siting option, the development cost would be relatively lower than sites which are not currently owned by Metrolinx.

Technical – Site Accessibility

There is access to a municipal street from the site.

2.4.3 Alternative Paralleling Station Site #3 - 955 Weston Road (at Weston Road and Bushey Avenue)

Natural Features

There are no aquatic features on this site, however Black Creek is in the vicinity of the site to the east.

In terms of terrestrial features, this site is an active construction site and contains no natural features. There is a small section of trees adjacent to the east side of the site that is classified as a Cultural Woodlot. Tree species include White Willow (*Salix alba*), White Ash (*Fraxinus Americana*) and Norway maple (*Acer platanoides*).

Land Use/Social Features

This site contains open space, however, it is surrounded by commercial and residential uses. The railway corridor borders the north-end of the site. The closest social facility to this site is Dennis Avenue Community School, about 500 m northwest of the proposed switching station.

Cultural Features

A field survey of the property was conducted. The property is bound by a chain link on all sides and was primarily used for material and construction equipment storage at the time of the survey. The field survey confirmed that no built structures are located within the property limits.

While the surrounding built environment and streetscape context continues to reflect these mid-century shifts in population and industry within the City of Toronto, the subject site, on account of its absence of built heritage resources and cultural heritage landscapes, does not contribute to or maintain the surrounding area's historical character or spatial relationships. While the property features a rail embankment, a review of site development history and on-going construction activities indicates that this feature has been modified over time. Although related to the adjacent rail corridor located outside the property limits, this land form has not been identified as a significant cultural heritage resource on account of its mid twentieth century modifications and recent alterations to accommodate an access road.

In general, the site may be described as an actively used construction zone that retains a remnant landscape feature, in the form of the rail embankment, which is associated with historic transportation networks. The site does not contain any significant built heritage resources or cultural heritage landscapes.

Technical - Property Availability

The site is not currently owned by Metrolinx, which is considered to be a disadvantage since the property would need to be acquired in order to implement the paralleling station.

Technical – Development Cost

Since property acquisition would be required for this siting option, the development cost would be relatively higher than sites which are currently owned by Metrolinx.

Technical – Site Accessibility

There is access to a municipal street from the site.

2.4.4 Summary of Advantages/Disadvantages

With respect to natural environmental considerations, from an aquatic perspective, it is anticipated that all three optional sites will be located greater than 30m from Black Creek, resulting in no adverse effects on fish/ fish habitat. From a terrestrial features perspective, none of the three optional sites provide specialized wildlife habitat or potential habitat for any Species at Risk. As a result, none of the three sites provides a significant advantage over the other from a natural environmental perspective.

In terms of the built/social environment, given its proximity to a residential area, Site #3 is disadvantaged compared to the two other siting options. However, based on the existing land use/social features in the vicinity of Sites #1 and #2, as well as consideration of the current zoning, neither of these two sites provides a significant advantage over the other.

In terms of the cultural environment, although Site #2 contains local heritage value due to the presence of Building #9 on the site, it is understood that Building 9 is to be preserved as part of the Eglinton Crosstown project. As a result, this was not considered a disadvantage associated with Alternative paralleling station Site #2. In addition, since the other two sites do not contain any significant built heritage resources, none of the three sites provides an advantage over the other from a cultural heritage perspective.

Based on the technical considerations outlined above, the 3500 Eglinton Avenue West site offers an advantage from a property availability perspective over Alternative Sites #1 and #3, as property acquisition would not be required.

Therefore, based on the assessment of the three paralleling station siting options, none of the three sites provides a significant advantage over another from either a natural, social or cultural environment perspective. However,

Alternative paralleling station Site #2 provides a significant advantage over the other two from technical perspective, as this site is owned by Metrolinx.

2.4.5 Recommended Paralleling Station Site

Based on the assessment described above and consideration of the advantages and disadvantages, the 3500 Eglinton Avenue West was identified as the recommended site for locating the Paralleling Station (see **Figure 2-4**).

Figure 2-4 Recommended Paralleling Station Site – 3500 Eglinton Avenue West



2.5 Identification of EMU Maintenance Facility Sites

Regular maintenance will need to be carried out on the new electrified rolling stock that will operate along the UP Express route. This includes preventative maintenance (e.g., replacing brake pads, measuring wheels, inspection of running gear, etc.), heavy maintenance (e.g., replacement of transformers and ac propulsion systems, etc.) and service maintenance (e.g., window cleaning, refill potable water, etc.). Therefore, the potential options for carrying out maintenance on the new electrified rolling stock and requirements to maintain the new electric infrastructure will be considered as part of the EA process.

Maintenance of the UP Express EMU trains and infrastructure will require a maintenance facility that can handle the needs of a small fleet of electric trains which will have limited daily maintenance windows. In order to maintain the dedicated fleet of electric UP Express trains, a maintenance shop and yard storage capacity will be required. With this in mind, a detailed assessment of the technical requirements and available siting options for an EMU Maintenance Facility was completed and documented as part of the Conceptual Design phase.

Based on this assessment, it was determined that there are two feasible options for maintaining UP Express EMU trains, as follows:

1. **Option A – Existing Willowbrook Rail Maintenance Facility (WRMF):** Maintain the new UP Express EMUs at the existing Willowbrook Rail Maintenance Facility (WRMF), with certain maintenance functions taking place at VIA Rail's Train Maintenance Centre (TMC). Under this approach, the UP Express EMUs would be maintained in a mixed diesel and electric train fleet environment.

Option A (WRMF) is an existing GO Transit shop and yard complex and it currently services, maintains and provides stabling for the GO Transit diesel push-pull train fleet. Under this scenario, the WRMF shop would need to be modified to be capable of servicing and maintaining the UP Express EMU trains.

Specifically, this would require:

- Provision of Access to WRMF via:
 - Electrifying and maintaining two of the four Lakeshore West (LW) mainline tracks between Bathurst and WRMF (including several bridge modifications along the LW corridor to accommodate electrification), *or*
 - Using a diesel locomotive to tow EMU trainsets between Union Station to WRMF (and vice versa). This option would save the cost of electrification between Bathurst and the WRMF; however, it would introduce operational complexity and inefficiencies as a diesel locomotive must be pre-positioned near Union Station to meet each out-of-service EMU trainset, couple onto the trainset and pull it back to the WRMF.
- Electrifying yard and yard lead tracks within the WRMF
- Significant modifications to WRMF (e.g., ensuring that WRMF PM Bays 3 and 4 have the required vertical roof clearances to support catenary wires, electrifying the shop tracks where the EMUs will be

maintained, modifying the doors to PM bays #3 and 4 to enable catenary to pass through the doors when shut, etc.)

- Modifications to VIA Rail TMC:
 - Because WRMF is currently at capacity, the adjacent VIA Rail TMC facility would need to be used to perform certain EMU train maintenance functions. Thus, the VIA TMC facility will require shop modifications to allow for electric train operations. At a minimum, this will include installing an electric train power pick-up at VIA's TMC to enable EMU train testing.
- Operations/Maintenance Considerations
 - The impacts of maintaining a small fleet of up to 21 cars disproportionate to its numbers.
 - Additional complexities arise from the introduction of electrified catenary running through the shop building and yard complex which requires alterations to current staff working procedures and train maintenance methods.

2. **Option B – New EMU Maintenance Facility:** Build a new UP Express EMU maintenance facility. This option entails building a new electric EMU maintenance shop and yard exclusively for the r UP Express EMU fleet. The EMU MF shop facilities would correspond to Metrolinx/GO Transit's Category A type maintenance shop. Based on a site search undertaken during the pre-planning phase, the property at 50 Resources Road was identified as the proposed location for a new EMU maintenance facility, as it satisfies three key criteria: i) the site is currently undeveloped, ii) the site is located along the rail corridor, iii) the site size can accommodate the required facilities, and iv) the site is owned by Metrolinx.

The new EMU maintenance facility would include the following main components:

- Storage yard for EMUs and electrification Maintenance of Way equipment
- Main shop building, including administrative/transportation offices, car inspection and repair areas, parts rooms, utility rooms
- Train washer (enclosed for all weather operation)
- OCS/Wayside Electrification sub-shop and related exterior tracks
- Train storage tracks
- Employee parking
- Yard roadways

In addition, operations/maintenance considerations associated with Option B (New MF) include:

Unlike Option A (WRMF), the new EMU maintenance facility will enable all train maintenance functions to be consolidated at one site and operated by a single, unified workforce. Having a single maintenance facility workforce to maintain the UP Express EMU trainsets will increase productivity, lower costs and vastly simplify logistics.

- The location of the new maintenance facility will allow UP Express trains to be launched into service in both directions, to UP Express Union Station and to UP Express Pearson Station in the morning, and back again at end of service.

- The new maintenance facility would provide space in the yard and in the administrative office for new EMU car acceptance testing and administration.
- The new maintenance facility eliminates the need move cars between the WRMF and the VIA Rail shops, which is necessary under Option A (WRMF). All EMU inspection, servicing and repair work will be done on the Resource Rd. site. Whereas, there is a need to split maintenance functions between two locations under Option A (WRMF).

Consideration of East Rail Maintenance Facility (under construction)

It is noted that a third option for maintaining the UP Express EMUs at the East Rail Maintenance Facility (ERMF) in Whitby (currently under construction) was also considered. The ERMF is being designed to accommodate future GO Transit electric trains as well as diesel push-pull trains.

However, this option was not considered feasible and therefore was not carried forward for further consideration for the following reasons:

- The ERMF option would require electrifying the tracks through Union Station and the Lakeshore East corridor to Whitby, which has significant cost and schedule implications related to implementation;
- The ERMF is a long distance (approximately 47km) from Union Station, which would entail significant train deadhead movements (i.e., empty train movements). As the train maintenance window for the UP Express EMUs each night is very limited (i.e., four hours), deadhead moves to/from Whitby daily would consume much of the limited train maintenance window; and
- High operating and maintenance costs.

As a result, the two EMU maintenance facility options (see **Figures 2-5** and **2-6** respectively), that were considered are as follows:

1. Option A – Existing Willowbrook Rail Maintenance Facility
2. Option B – New EMU Maintenance Facility (50 Resources Road)

Figure 2-5 Option A – Existing Willowbrook Rail Maintenance Facility

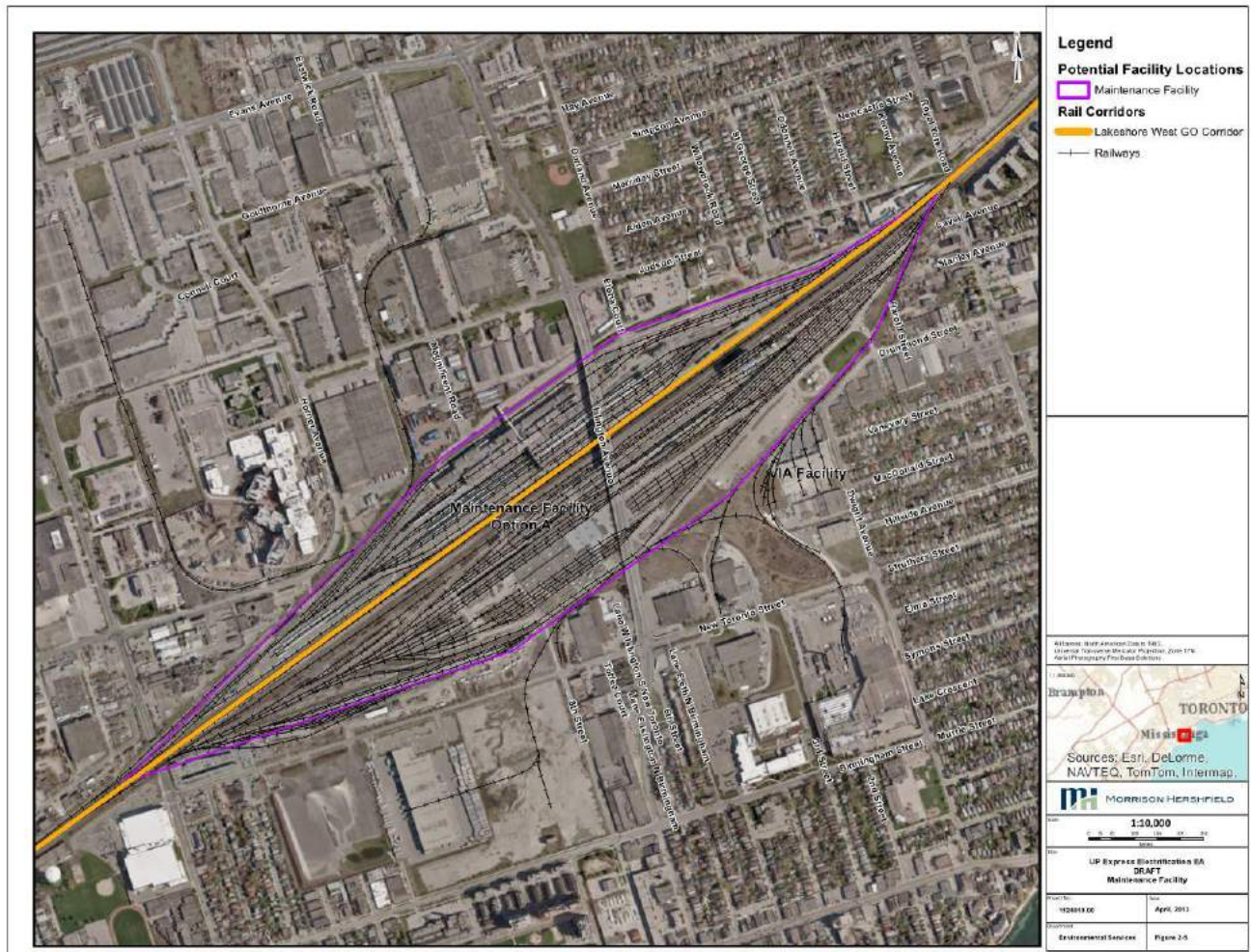
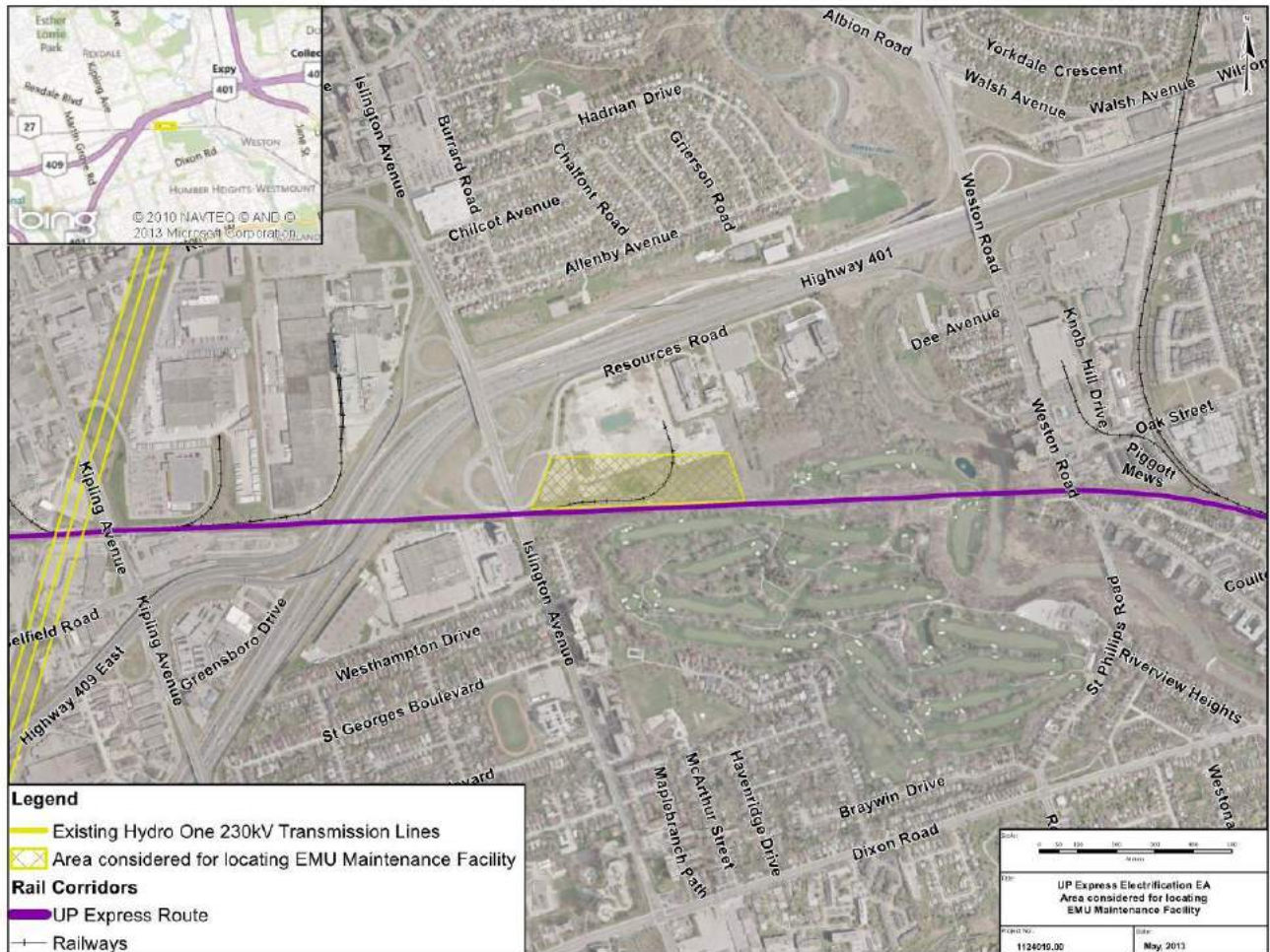


Figure 2-6 Option B - New EMU Maintenance Facility



2.6 Evaluation of EMU Maintenance Facility Sites

The following provides a discussion of the relative advantages and disadvantages of each maintenance facility option in the context of the same factors as outlined in **Table 2-2** (page 2-11) above.

2.6.1 Option A – Willowbrook Rail Maintenance Facility (WRMF)

Natural Features

Since Option A (WRMF) is an existing maintenance facility, an assessment of natural features on the site was not carried out.

Land Use/Social Features

Since Option A (WRMF) is an existing maintenance facility, an assessment of land use/social features on this site was not carried out.

Cultural Features

Since Option A (WRMF) is an existing maintenance facility, an assessment of cultural heritage features on the site was not carried out.

Technical – Property Availability

Since Option A (WRMF) is an existing GO maintenance facility; no property acquisition would be required.

Technical – Development Cost

The rough order of magnitude cost associated with Option A (WRMF) which entails modifying the WRMF and the VIA Rail Train Maintenance Centre to become electric train compatible is estimated at \$172 million.

Technical – Site Accessibility

There is access to municipal streets from the WRMF site.

2.6.2 Option B - New EMU Maintenance Facility (Resources Road)

Natural Features

There are no aquatic features on or in the vicinity of this site.

Based on MH field investigations, this site contains minimal vegetation characterized by non-native grasses and field herbs, and does not provide any wildlife habitat function.

Land Use/Social Features

In terms of existing land use, this site is currently being used as a staging area. The site is surrounded by Resources Rd. to the west, the GO rail corridor to the south, and the Lowes retail store to the north. Commercial, residential, and recreational (Weston Golf and Country Club) land uses occur to the south, west and east of the site.

The closest social facilities to this site are Don Bosco Catholic Secondary School and School of Experimental Education, each about 700m south of the site on either side of Islington Ave.

With respect to current land use zoning on the Resources Rd. site, land at the site is zoned as *Class 1 Industrial (I.C1)* under former General Etobicoke Zoning Code V131. An amendment to Chapter 304 for the Etobicoke Zoning Code refers to 50 Resources Road, and states that ancillary maintenance facilities for a railway yard are prohibited. However as a Crown Agency, Metrolinx is not bound by zoning by-laws passed by municipalities under s.34 of the Planning Act and as such does not have a requirement to apply for and obtain zoning amendments. Notwithstanding this, Metrolinx will consult with, and have regard for, the City of Toronto's planning policies with regard to specific projects (or components thereof) and will comply with the City's requests when and where reasonable.

Cultural Features

The Resources Rd. site is currently being used as a construction staging area. The north limits of the site had been recently moved south (i.e., within the last year) to accommodate a new road alignment of Resources Road and the road access to the Lowes retail complex.

Throughout this entire area (north of the tracks) the land alteration has been so great that even the late twentieth-century landscape has been eradicated. There was no evidence of any previous landscape features or built features in this area. It appears that aerial mapping from 2011 shows a spur line located within the site, however a site survey confirmed that it no longer exists.

To the south of the tracks on the adjacent property it appears that the slope up to the golf course was established. Ongoing work showed that the stratigraphy was relatively undisturbed. A fence separates the golf course property from the railway lands and a tree line of established trees, which likely date to the establishment of the golf course in the first half of the twentieth century. North of the east end of the site area there has also been considerable land alteration and, at the time of the visit, the flat land above the slope at the eastern terminus had been modified to create parklands and two holding ponds. This area is also used as an access point for businesses and facilities along Highway 401.

No cultural heritage resources were identified on this site.

Technical – Property Availability

Since the Option B (New MF) site at Resources Road is currently owned by Metrolinx, no property acquisition would be required.

Technical – Development Cost

The rough order of magnitude cost to construct a new EMU maintenance facility is estimated at \$120 million.

Technical – Site Accessibility

There is access to a municipal street from the Resources Rd. site.

2.6.3 Summary of Advantages/Disadvantages

Based on the technical considerations outlined above as well as the operational and implementation considerations discussed above, the following is a summary of the key technical (including operational and cost) advantages and disadvantages associated with each option:

There were no technical advantages identified for Option A (WRMF), however several disadvantages related to operational and cost considerations were identified as follows:

- New Overhead Contact System (OCS) infrastructure would be required along the LW corridor between the WRMF and UP Express
- Bridges and overhead structures along the route between WRMF and UP Express mainline would need to be modified to support OCS and accommodate the vertical clearances with electrified tracks
- Property acquisition may be required in order to construct new OCS structures along the GO Lakeshore West corridor
- PM Bays 3 & 4 require electrification and modification
- New yard OCS infrastructure will be required in WRMF
- Introducing EMUs in a diesel train yard and shop introduces operational complexity
- The current WRMF shop and yard is capacity constrained
- The cost (capital and operating) of implementing Option A (WRMF) is higher than Option B (New MF)

Option B - New EMU Maintenance Facility offers several advantages from an operations and cost perspective:

- No new OCS infrastructure will be required beyond the limits of UP Express
- There is no need to modify the roadway bridges between Bathurst and WRMF, as the GO Lakeshore West corridor does not need to be electrified in order to implement Option B (New MF)
- The site is located immediately along the UP Express mainline, which provides easy access to the maintenance facility to support the UP Express operations
- Existing diesel GO Train maintenance at the WRMF will not be altered or affected
- The new EMU maintenance facility greatly minimizes costly deadhead train movements associated with towing EMU trains along the GO Lakeshore West corridor to and from the WRMF
- Having a separate purpose-built EMU MF dedicated to the EMU fleet (rather than combination of GO Transit diesel trains and EMU trains) simplifies maintenance and operating procedures which leads to greater work efficiencies (less complexity)
- The cost (capital and operating) of implementing Option B (New MF) is lower than Option A (WRMF)

In terms of disadvantages, the Resources Rd. site is considered to be somewhat constrained due to the trapezoidal shape of the property. The site does not support the optimal linear layout which would typically involve situating train washer tracks, shop building tracks, and yard stabling tracks in a linear sequence so trains could be washed, then assigned to either a shop service bay or to a stabling track. This type of layout supports more efficient train movements within the yard and shop complex, and reduces reverse train movements. Notwithstanding this, all of the required maintenance facility components can be accommodated within the Resources Road site.

Neither option provides a significant advantage from a natural environmental perspective, as these sites do not contain any natural environmental features.

Given the existing land use of Option A (WRMF) as a GO maintenance facility, this option provides a minor advantage over Option B (New MF), as the Resources Road site is currently undeveloped.

In terms of the cultural environment, neither site provides an advantage over the other from a cultural heritage perspective as there are no cultural heritage features resources associated with either site.

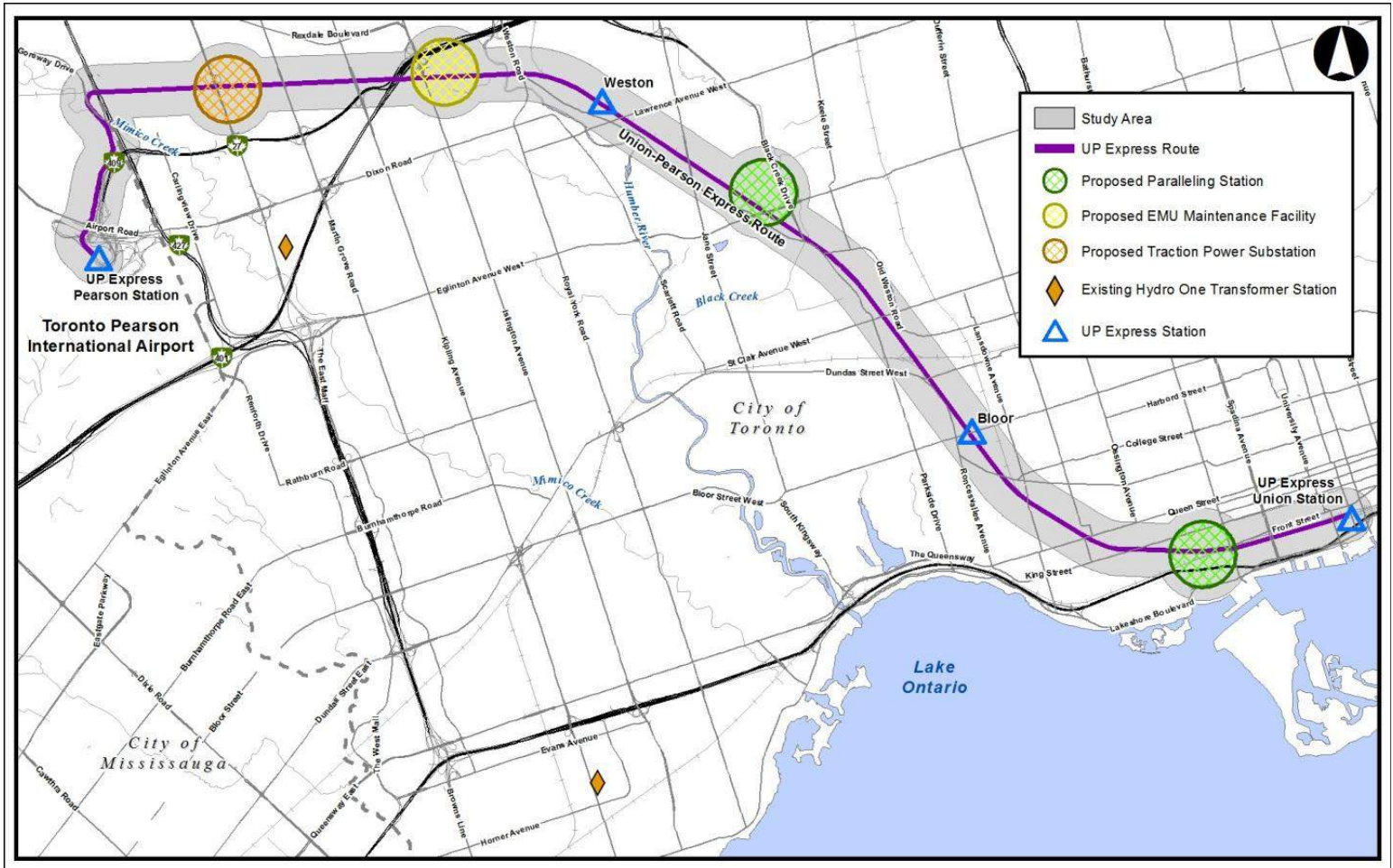
2.6.4 Recommended EMU Maintenance Facility Site

Based on the assessment described above and consideration of the advantages and disadvantages, the recommended option is to build a new EMU maintenance facility at the 50 Resources Road site.

2.7 Updated Study Area

Since the area in the vicinity of the Horner Transformer Station as well as the EMU maintenance facility option at Willowbrook were both removed from further consideration (as outlined in **Section 2.1.2.1** above), the portion of the original project study area along the Lakeshore West corridor from approximately Willowbrook to UP Express Union Station was eliminated. Accordingly, the updated study area is illustrated in **Figure 2-7**.

Figure 2-7 Updated Study Area



2.8 Consultation on Alternative Facility Sites

The alternative paralleling station facility sites and EMU Maintenance Facility options for the UP Express electrification project were presented to the public as part of the June 2013 Public Open Houses for comments and feedback.

The majority of the comments received were not opposed to the alternative facility sites, but were more related to: criteria applied to determine recommended facility locations, clarification on siting options/locations, property ownership, etc. **Table 8-1** (in Chapter 8 – Consultation) of this EPR provides a detailed summary of these comments and how they were considered by Metrolinx.

However, there was one specific suggestion made in relation to an additional alternative siting option for the 3500 Eglinton Avenue West Paralleling Station as follows:

- Consideration of the existing Toronto Hydro Substation Yard at Old Weston Road south of Junction Road (at the northwest corner of the Junction diamond).

As a result, this optional site was comparatively evaluated against the recommended paralleling station location at 3500 Eglinton Avenue West, with the results confirming 3500 Eglinton Avenue West as the recommended paralleling station location for the following key reasons:

Proximity to Rail Corridor and Property Size Requirements:

Although the Old Weston Road site is located in close proximity to the existing rail corridor (UP Express route), the site has very limited space to accommodate a standard and reliable paralleling station facility design, compared to the Kodak site.

Technical and Cost

As a result of the space constrained site at Old Weston Road, complex engineering solutions would be required in order to implement the facility such as: locating heavy equipment (e.g. autotransformer) underground which would make the equipment very difficult to maintain throughout the operational phase. In addition, since the size of the site is constrained, the facility equipment would need to be stacked and enclosed in a building. This type of design is not typical as it is less reliable and significantly more costly than the more standard, proven design proposed for the paralleling station at Kodak which reflects the optimal configuration of equipment on the site.

Property Availability

The Old Weston Road site is not owned by Metrolinx. Therefore, development of the site would be more costly compared to the Kodak site which is currently owned by Metrolinx.

2.9 Confirmation of Preferred Paralleling Station Sites and EMU Maintenance Facility Site

Following consideration of the comments/feedback received, the recommended location for the Paralleling Station at 3500 Eglinton Avenue West and new EMU Maintenance Facility at the 50 Resources Road were confirmed as the preferred sites and subsequently carried forward to the impact assessment stage. In addition, as previously mentioned, the Ordnance Paralleling Station site was also carried forward.