AECOM

Finch West Light Rail Transit Maintenance and Storage Facility

Environmental Project Report

Part 1 of 2 - Main Report

July 2015

METROLINX
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Environment

Metrolinx

Finch West Light Rail Transit Maintenance and Storage Facility Environmental Project Report

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Revision Log

Revision #	Revised By	Date	Issue / Revision Description
0		July 31, 2014	
1	D. Brutto	October 2,2014	Incorporation of Metrolinx comments
2	D. Brutto	December 10, 2014	Incorporation of TAC (Toronto City Planning and Transportation Services) and Metrolinx comments
3	D. Brutto/F. Amirsalari	July 27, 2015	Incorporation of Ministry of Environment and Climate Change (MOECC) comments and Metrolinx comments

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Executive Summary

Introduction

AECOM, on behalf of Metrolinx, is undertaking an Environmental Assessment (EA) Study for the Finch West Maintenance and Storage Facility (MSF) for the Finch West LRT corridor. The EA is being conducted under *Ontario Regulation 231/08* following the Transit Project Assessment Process (TPAP).

The Finch West MSF (the Project) Site (**Figure ES-1**) is located on the north side of Finch Avenue West between Norfinch Drive and York Gate Boulevard, just east of Highway 400 and west of Jane Street in the City of Toronto. This site was selected as the preferred location for the MSF during a property search completed prior to the initiation of preliminary planning for this TPAP. The Project Study Area (**Figure ES-1**) includes a 1 km radius around the MSF Site.

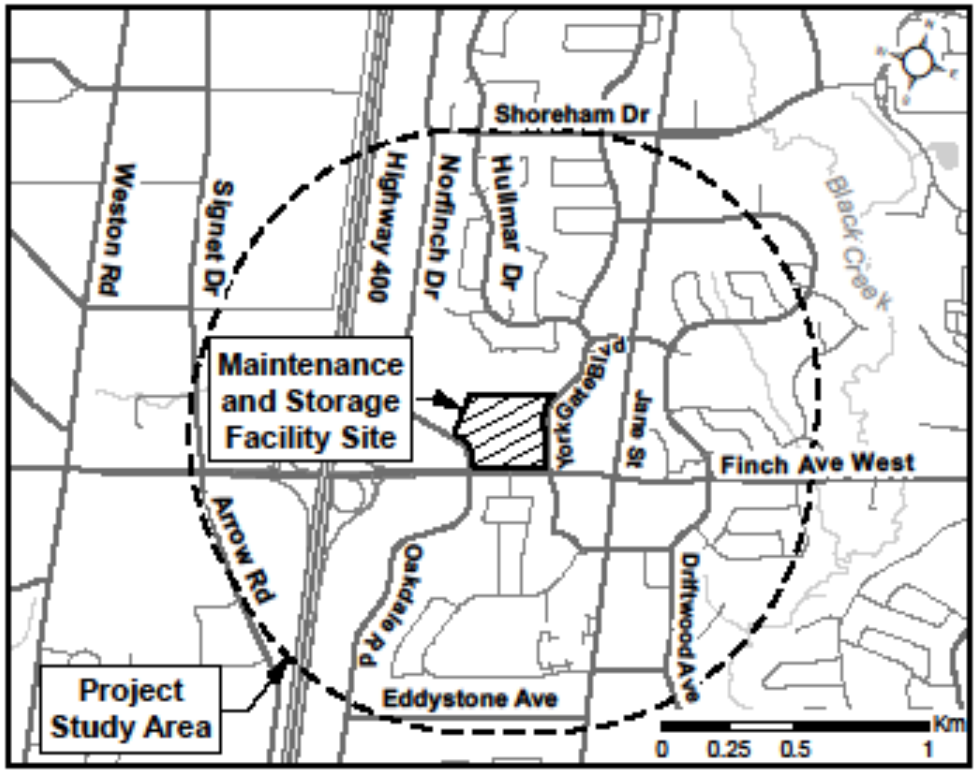


Figure ES-1: Finch West MSF Site and Project Study Area

The purpose of the Finch West MSF is to provide maintenance service and storage tracks for overnight storage of the new light rail vehicles (LRVs) servicing the Finch West LRT corridor and proposed future Jane Street LRT, and a main repair shop facility to maintain the new LRVs in a state of good repair.

The Finch West MSF (the Project) location within the context of the Finch West LRT corridor, as documented within the *Etobicoke – Finch West LRT Transit Project Assessment Study (TTC 2010)* is illustrated in **Figure ES-2** below.

Figure ES-2: Finch West MSF Location within the Finch West LRT Corridor

This Environmental Project Report (EPR) documents the TPAP undertaken for the Finch West MSF (the Project), specifically including the documentation of existing environmental conditions, anticipated effects of the Project on the environment, the associated mitigation measures, consultation undertaken, and future commitments. The Finch West MSF Planning Process timeline is illustrated in **Figure ES-3**.

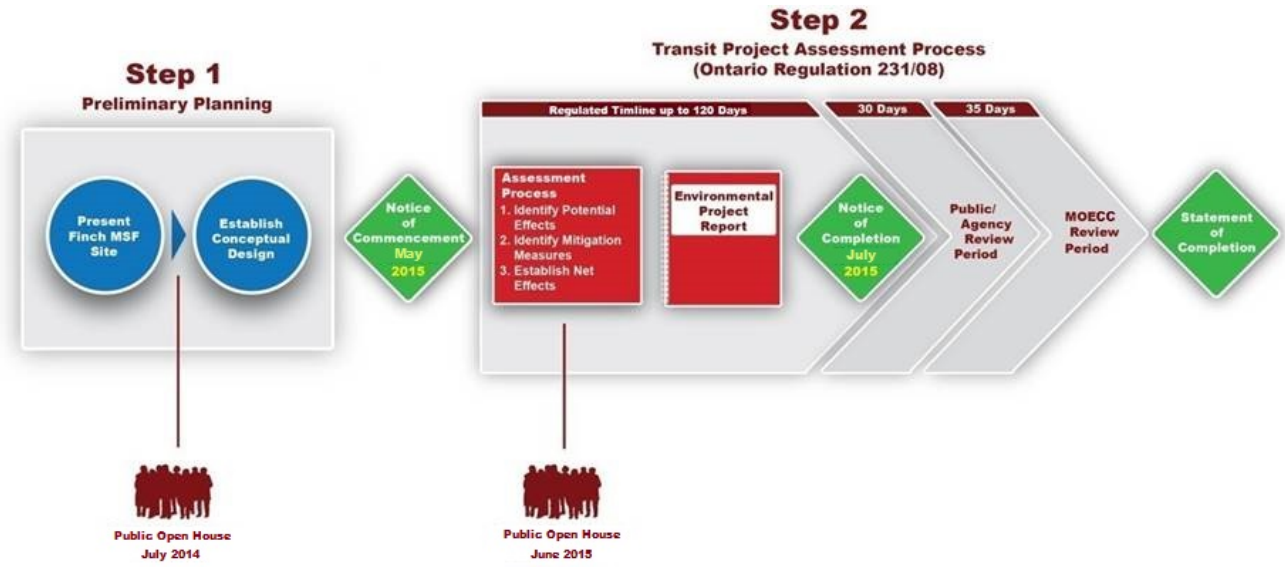


Figure ES-3: Finch West MSF Planning Process

Preferred Method of Carrying out the Transit Project

The Finch West MSF (the Project) is an integral and necessary component for the operation of the Finch West LRT corridor and overall Metrolinx LRT Program. The Finch West LRT corridor cannot operate efficiently without an MSF. As such, no other methods for carrying out this Transit Project were considered.

Alternative site layouts for the MSF were developed during the Preliminary Planning activities for the project. A recommended site layout was selected based on the results from the site layout selection process. The recommended site layout was further refined based on additional design specifications to arrive at the Preferred Design for the Finch West MSF site.

The Preferred Design for the Finch West MSF site is illustrated in **Figure ES-4**.

Elements of the Preferred Design

The Project will facilitate daily Light Rail Vehicle (LRV) storage, inspection, maintenance, painting, and other servicing functions for the new LRV fleet, which will serve the Finch West LRT corridor and potential future Jane Street LRT line.

The Project includes both the construction and operational phases of the elements of the MSF (see **Section 2.2.2** for the Project Works and Activities that comprise the construction and operational phases).

The Project is comprised of different elements as described below. Four main buildings will be located on site, including:

- Main Repair Shop Facility
- Maintenance of Way Building
- Operations Company Building
- Electrical Substation.

Other elements of the site will include outdoor storage track capacity for 60 LRVs, an outdoor storage yard, LRV Hand-Over platform, sanding silo, employee parking facilities, stormwater management features, and an LRV braking test track. There will also be storage capacity for up to 15 LRV inside of the Main Repair Shop Facility, allowing for a total site LRV storage capacity of 75.

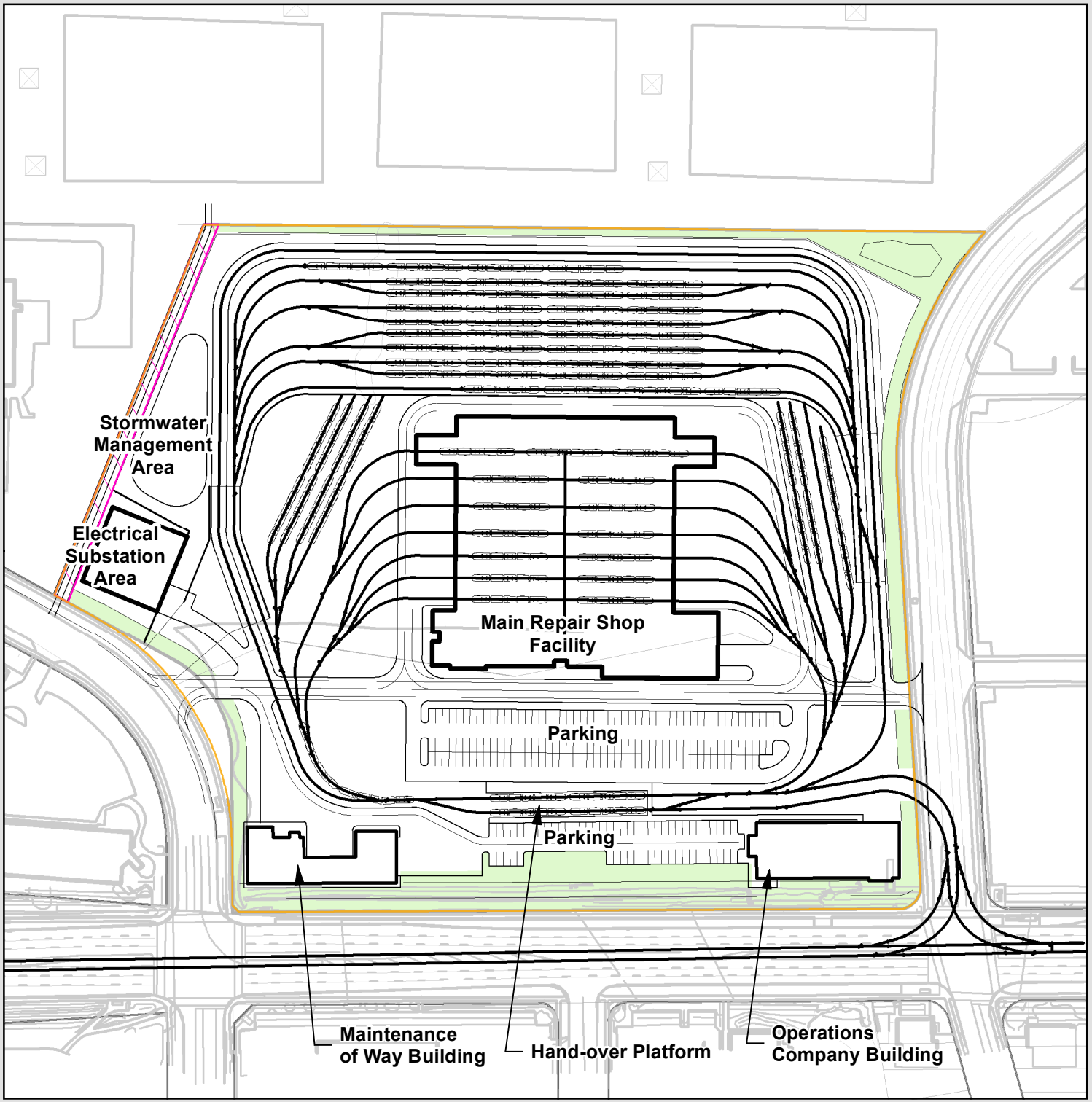
There will be approximately 350 employees at the facility working in three shifts with the majority of workers (approximately 200) on the day shift. The shift times will be at various times throughout the day (detailed assumptions shown in **Appendix H**), with corresponding end times approximately eight hours later.

In addition to the on site features, an off-site track connection to the Finch LRT Main Line will be provided within the existing York Gate Boulevard road right of way to allow for LRV access/egress.

Main Repair Shop Facility

The Main Repair Shop Facility will be a two-storey building featuring maintenance platforms on the ground floor and office space on the second floor. The following services will be performed at the Main Repair Shop Facility:

- Daily Inspection
- Daily Sweep and Dust
- Sand Replenishment
- Exterior Washing
- Interior Floor Wash
- Undercar Cleaning
- Compressed Air Blow-Down
- Component Repair
- Warehouse
- Wheel Truing.



Legend

- Property Limits for the MSF Site
- Light Rail Vehicle (LRV)
- LRV Track
- Multi-use Pathway
- Landscape Buffer

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Finch West Light Rail
Maintenance and Storage Facility (MSF)
Environmental Assessment

Preferred Design

July 2015

AECOM

Figure ES-4

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Maintenance of Way (MoW) Building

The MoW building will be a single-storey building with a semi-high bay roof to accommodate large trucks and a rolling gantry crane.

The MoW Building will function to service the following LRT system components:

- Track and Structures
- Signals and Communications
- Overhead Contact System (OCS) Servicing

Operations Company (OpsCo) Building

The OpsCo building will be a two-storey structure to provide a detailed program of rooms and spaces for operators (drivers) who will operate the LRVs on the LRT corridor.

Electrical Substation

The electrical substation will provide electrical power to the Finch LRT corridor as well as the Main Repair Shop, MoW and OpsCo Buildings.

General Site Access and Traffic Circulation

LRVs will enter and exit the facility from a location on York Gate Boulevard, to the north of the intersection with Finch Avenue West. This entrance will be signalized and signal operation will be co-ordinated with the adjacent signals on Finch Avenue West to ensure safe and efficient vehicular and pedestrian movements.

Automobile and truck traffic may enter the site via driveways allowing full movements off of both Norfinch Drive and York Gate Boulevard.

Impact Assessment of the Preferred Design

It is recognized that the construction and operation of the Preferred Design for the Finch West MSF will result in effects on the existing environment. **Table ES-1** provides details of the potential effects and their associated mitigation measures, net effects, and monitoring requirements to ensure minimal environmental impact. Consultation with stakeholders occurred prior to, and during key decision points in the TPAP and the outcome of consultation was considered throughout the impact assessment of the Preferred Design. Refer to **Section 5** of this EPR for further detail on consultation.

Table ES-1: Potential Effects, Mitigation Measures, Net Effects and Monitoring Requirements of the Preferred Design

Potential Effect	Mitigation Measures	Net Effect	Monitoring Requirements
Terrestrial Natural Heritage			
Permanent displacement of Eastern Meadowlark (Species at Risk) habitat	• As per the requirements of the *Endangered Species Act 2007*: - Register construction activities with the MNRF as a Notice of Activity in accordance with Ontario Regulation 242/08. - Upon registration via Notice of Activity with the MNRF, design a Habitat Management Plan for an alternative site(s) of an area no less than the disturbed habitat area where appropriate habitat can be created or significantly enhanced of equal area. ▪ The compensation or enhancement habitat may be situated anywhere in southern Ontario south or east of the Pre Cambrian Shield (Ecozones 6E and 7E). ▪ Within 12 months of the day construction activity has commenced, the work of creating or enhancing Eastern Meadowlark habitat must be completed in a manner that ensures the habitat meets the requirements outlined in O. Reg. 242/08 with respect to the types of vegetation it provides. - Following registration with MNRF via Notice of Activity, clearing of the site during the period May 1 to July 31 of any year may only proceed following completion of an avian survey documenting the absence of nests as per the requirements of the *Migratory Birds Convention Act*[1]. - The compensation or enhancement habitat must be managed for 20 years with specific site management, monitoring and maintenance requirements as outlined in the Habitat Management Plan. - The Habitat Management Plan will be maintained on file for a minimum of five years of annual monitoring, and will be provided to MNRF upon request.	• The permanent displacement of Eastern Meadowlark habitat from the subject site will be mitigated by implementing a Habitat Management Plan in accordance with O.Reg. 242/08. The compensation or enhancement habitat will be managed for a period of 20 years. Situating the compensation or enhancement habitat in a rural area or, at least more natural area than the current site will result in the long term protection of this species' habitat. Long term, the development of the MSF will result in a net positive impact on Eastern Meadowlark species in southern Ontario.	• The off-site Eastern Meadowlark compensation or enhancement habitat will be consistent with Ontario Regulation 242/08 requirements, which include the monitoring elements for five years after the habitat is created or enhanced, described in **Section 4.1.1.4** of this EPR.
Removal of all trees and other vegetation on the property	• Abide to City of Toronto policies on tree protection, that will include, and may not be limited to the following: - A Certified Arborist shall conduct an assessment of tree health, including a tree inventory to identify all trees 30 cm diameter at breast height (dbh) or greater. - Document tree protection measures for trees that can be retained on site survey plans. - Develop a compensation landscape plan for the removal of trees. - The compensation landscape plan will include planting at a minimum a 2:1 compensation ratio.	• Ultimately, a small number of trees ≥30 cm dbh and associated urban wildlife habitat will be lost. • The loss of trees ≥30 cm dbh from the MSF site and associated urban wildlife habitat will be offset by adhering to the requirements of the Tree Protection policies of the City of Toronto, ensuring the suitable landscape plan include the replacement of, or compensation for, the removal of trees.	• Landscape plantings on-site will be monitored until successful establishment is confirmed, in accordance with City of Toronto tree protection policies.
Removal of identified migratory birds nesting or associated vegetation cover on-site	• Pursuant to the *Migratory Birds Convention Act*, avoid vegetation removals during the typical nesting period of migratory birds, May1 to July 31 in any year. • Where destruction or disruption of these habitats during nesting periods is unavoidable between May 1 and July 31, proceed following a recent (typically within 7 days) assessment by a qualified biologist documenting the absence of nests. • The *Migratory Birds Convention Act* does not override the requirements of the *Endangered Species Act, 2007* with respect to the Eastern Meadowlark.	• The removal of identified migratory birds nesting or associated vegetation cover on-site will be minimized through the avoidance of vegetation removals during the typical nesting period, and/or proceeding in accordance with an assessment by a qualified biologist documenting the absence of nests.	• N/A
Aquatic and Surface Water			
Potential increase in quantity of storm runoff due to increase in the imperviousness of the site	• Comply with the *Water Resources Act* and MOECC (MOE) SWM Planning and Design Manual with respect to the quantity of water discharging into the sewer system. • Assess the capacity of the existing receiving storm sewer system and prepare a Stormwater Management (SWM) Plan for the site as part of the detailed design process in consultation with the City of Toronto and the TRCA.	• No adverse effects to aquatic and surface water quantity are anticipated with the implementation of the required mitigation measures.	• N/A
Potential for sediments (during construction) and other effluents, including accidental spills (during construction and operations) to enter the municipal sewer system	• Comply with the *Water Resources Act* and MOECC (MOE) SWM Planning and Design Manual with respect to the quality of water discharging into the sewer system. • Prepare a Stormwater Management Plan (SWM) for the site as part of the detailed design process in consultation with the City of Toronto and the TRCA. • In addition: - Develop an Erosion and Sediment Control Plan for the site during construction to meet applicable guidelines and criteria. The plan will consist of a multi-barrier approach to meet the requirements. - Develop Spill Prevention and Contingency Plans for both construction and operation: ▪ Personnel will be trained in how to implement the mitigation plans; ▪ Spills will be immediately contained and cleaned up in accordance with provincial regulatory requirements and contingency plans; ▪ A hydrocarbon spills response kit will be on site at all times during construction; and, ▪ Spills will be reported to the Ontario Spills Action Centre at 1-800-268-6060.	• No adverse effects to aquatic and surface water quality are anticipated with the implementation of the required mitigation measures.	• N/A
Geology and Groundwater			
Potential for reduction in groundwater recharge functions of the site	• Implement the following mitigation measures during detailed design/construction: - Where feasible, pave select parking and/or driveway areas with permeable pavement to facilitate infiltration and reduce runoff; - Maintain a portion of the site as landscaped areas to facilitate infiltration.	• The potential for reduction in groundwater recharge functions of the site will be minimized through the implementation of the identified mitigation measures. • Groundwater recharge function on-site will be maintained at near pre-development rates.	• N/A

1. *While the Migratory Birds Convention Act provides conditions for undertaking work in the breeding habitat of regulated species, the more restrictive* Endangered Species Act, 2007 *overrides those conditions with respect to regulated Species at Risk.*

Table ES-1: Potential Effects, Mitigation Measures, Net Effects and Monitoring Requirements of the Preferred Design

Potential Effect	Mitigation Measures	Net Effect	Monitoring Requirements
Potential effects to aquifers/ wells and groundwater quality	• A certain degree of temporary construction dewatering may be required where any buried infrastructure coincides with saturated, permeable sediments. A construction dewatering assessment will be conducted, prior to construction, to determine the need for a MOECC Permit To Take Water (PTTW) based on the results of forthcoming detailed subsurface hydrogeological and geotechnical investigations and review of engineering design details for the site development. • Groundwater quality samples will be collected prior to construction and will be evaluated in the construction dewatering assessment. If dewatering is required, pumped groundwater will be discharged into local municipal sanitary or storm infrastructure along Finch Avenue West, York Gate Boulevard and/or Norfinch Drive and be subject to prior quality review and approval by the City of Toronto. • Potential accidental spills that could occur on site and adversely affect the groundwater system will be mitigated as follows: - Prior to construction, contractors will develop and institute a Spills Prevention and Contingency Plan to use during construction; and, - Prior to operation, develop and implement a Spills Prevention and Contingency Plan to use during operation.	• Potential effects to aquifers/wells and groundwater quality will be minimized, if required, through the implementation of additional mitigation measures identified following detailed hydrogeological investigations, and by developing spill prevention and contingency plans. • No significant aquifer units were identified at surface or within the shallow subsurface at the site. According to previous studies, no active groundwater supply wells or groundwater users are present within the local area.	• A PTTW (if required) would include recommendations for monitoring during active construction dewatering for any potential adverse effects identified in the dewatering assessment during detailed design. Potential monitoring activities identified in the PTTW would include: pumping rate/volume monitoring, groundwater level monitoring and groundwater discharge monitoring (flow and quality).
Potential to encounter existing contaminated soils or groundwater during construction	• Develop a Soil and Groundwater Management Strategy prior to construction that would minimize adverse effects resultant from potentially encountering contaminated soil and groundwater on-site.	• Potential effects from encountering contaminated soils and groundwater during construction would be minimized through adherence to a Soil and Groundwater Management Strategy during construction.	• N/A
Socio-Economic Environment			
Potential effects to land use designations	• The development of the MSF site will conform with Metrolinx Design Excellence principles and applicable City of Toronto planning and design principles.	• No effects to existing land use designations are anticipated as a result of the MSF.	• N/A
Potential visual impact of facility construction	• Implement temporary security fencing along the site perimeter and night-time security lighting that is sensitive to adjacent residential and institutional land uses.	• The potential visual impact of facility construction will be minimized through the implementation of temporary security fencing and night time security lighting that is sensitive to adjacent residential and institutional uses.	• N/A
Potential visual impact of facility operation	• The Metrolinx Design Excellence Group will ensure that design guidelines for architecture, aesthetics and corporate identity considerations are implemented. • Specifically, design excellence for the site will include, and may not be limited to the following mitigation measures: - Provide screening and buffers from the street edge and adjacent properties using a combination of landscaping, fences and grading changes; ▪ Noise mitigation (i.e., barriers) incorporated into site design (as required) will include aesthetically pleasing design elements as a component of visual mitigation. These design elements may include transparent or semi-transparent barriers, artistic features or landscaping included in barrier design and implementation; - Provide a landscaped buffer at the site property lines, where feasible; - Security lighting for the MSF will be sensitively designed with respect to adjacent land use surroundings, including residential; - Provide appropriate facility identification and street related signage; - Facility adherence to the Toronto Green Standard; and, - Refine parking requirements, with the goal to further reduce. • To compensate for the loss of existing trees on-site, any trees found to be >30 dBh will be inventoried. Landscape plans will include planting at a minimum 2:1 compensation ratio.	• The visually sensitive receptors will have a partially obstructed and/or unobstructed view of the MSF following the implementation of the required mitigation measures. However, the implementation of the mitigation measures will act to minimize potential visual adverse effects by screening potential lower and mid-level views of buildings, portions of the Overhead Contact System (OCS), internal roads, parking, tracks and storage of the MSF while maximizing the potential for facility integration into the existing community fabric and the Finch Avenue West urban streetscape.	• N/A •
Potential for Changes to Living Conditions in the Community due to Project Implementation	• Implement recommended noise, vibration, air quality, visual, and traffic mitigation to avoid potential nuisance effects that may lead to resident dissatisfaction.	• The potential for effects to living conditions in the community as a result of the Project will be minimized through the implementation of the mitigation measures for air quality, noise and vibration, visual and traffic.	• N/A
Potential effects to use and enjoyment of property and outdoor spaces (e.g., Remberto Navia Sports Field and Finch Corridor Recreational Trail)	• Implement recommended noise, vibration, air quality, visual, and traffic mitigation to avoid potential nuisance effects that may lead to discomfort. No recreational land will be lost. • In addition, to facilitate greater recreational enjoyment, a dedicated right-of-way along the western boundary of the MSF site fronting the property line with Monsignor Fraser School between Norfinch Drive and the Hydro Corridor will be provided to accommodate a future multi use path connection.	• The potential for effects to the use and enjoyment of property and outdoor spaces will be minimized through the implementation of the required mitigation measures for air quality, noise and vibration, visual and traffic. Any effects on users of the Remberto Navia Sports Field and Finch Corridor Recreational Trail are expected to be negligible, ensuring the continued enjoyment of these public recreational facilities. • Long term, the provision of a multi-use pathway connection along the western boundary of the MSF site fronting the property line with Monsignor Fraser School will facilitate greater recreational enjoyment.	• N/A
Potential effects to Businesses	• Implement recommended noise, vibration, air quality, visual, and traffic mitigation to avoid potential nuisance effects that may lead to business patron discomfort. In addition: - Post signage alerting potential customers that businesses are still operating during construction works; - Compensate business owners for unanticipated temporary loss of access during construction, if required; and, - Metrolinx will continue to consult with the community regarding potential future intensification opportunities in the areas near the Finch West MSF Site throughout the design and construction phases of the project.	• Business access will be maintained during construction of the MSF. Unanticipated disruption to business access during construction would be compensated for as appropriate. Any loss of drive-by business due to traffic restrictions or diversions during construction may be offset by additional patronage from an increased local population during construction (i.e., on site construction personnel) and future operations personnel. Well-	• N/A

Table ES-1: Potential Effects, Mitigation Measures, Net Effects and Monitoring Requirements of the Preferred Design

Potential Effect	Mitigation Measures	Net Effect	Monitoring Requirements
		designed and appropriately-scaled buildings with an attractive streetscape will provide a catalyst for the revitalization of this segment of Finch Avenue West, increasing retail establishments, retail sales, and the general long-term economic health of the area.	
Potential effects to Institutions (e.g., Monsignor Fraser College, Hawthorne Place Care Centre, Oakdale Professional Medical Centre, Norfinch Medical Centre)	• Implement recommended noise, vibration, air quality, visual, and traffic mitigation to minimize potential disruption to nearby institutions including hotels, schools, and hospitals.	• The potential effects to institutions will be minimized through the implementation of the required mitigation measures for air quality, noise & vibration, visual and traffic. • Potential noise and vibration nuisance effects to Monsignor Fraser College will be minimized to the extent possible during detailed design of the facility, including MSF on-site mitigation and/or the potential movement of portable classrooms.	• N/A
Potential effects to community character or cohesion	• Implement recommended noise, vibration, air quality, visual, and traffic mitigation to minimize potential effects to community character or cohesion. In addition: - Ensure active transportation facilities (i.e., sidewalks, bike paths) are preserved through construction and operation; and, - Metrolinx will continue to consult with the community regarding potential future intensification opportunities in the areas near the Finch West MSF Site throughout the design and construction phases of the project.	• Potential effects to community character or cohesion will be minimized through the implementation of the required mitigation measures for air quality, noise & vibration, visual and traffic. • Although the current property is a vacant lot/greenspace, it is a private property that is unused by the community and significantly degraded. In combination with the Finch LRT, the MSF will bring positive effects to the community through increased employment and a potential increase in spending in the community, and a well-designed, attractive streetscape. Increased employment opportunities and urban aesthetics may encourage local economic regeneration. The construction and operation of the MSF will not result in any loss of sidewalks, ensuring that the existing pedestrian facilities/community connectivity is not affected.	• N/A
Potential effects to archaeological resources	• There are no areas of further archeological concern or archaeological resources, therefore, no mitigation measures are required.	• No effects to archaeological resources are identified.	• N/A
Potential effects to above ground Cultural Heritage Resources	• The study area does not retain above ground cultural heritage resources that warrant further investigation; therefore, no mitigation measures are required.	• No effects to above ground cultural heritage resources are identified.	• N/A
Noise and Vibration			
Noise effects on sensitive receptors during construction	• Develop a Construction Noise Management Plan to address the construction noise from this project. The Construction Noise Management Plan will include: - Detail a construction noise complaint process and action plan to address potential construction noise complaints; - Detail how construction equipment will meet guideline limits documented in NPC-115 and NPC-118; - Detail what measures are being taken to be compliant with City of Toronto noise By-laws; - Detail what noise control measures are being implemented; - Detail what actions are being taken to minimize the potential for noise complaints and noise impact on surround noise sensitive receivers; and, - Develop a monitoring/verification plan to demonstrate that the mitigation measures above are appropriate, functioning correctly, and that acceptable noise levels at noise sensitive receivers are maintained for the duration of construction. • Additional guidance to aid in the development of a Construction Noise Management Plan is provided in **Appendix C – Noise and Vibration Report**.	• Effects of noise during construction will be minimized through the implementation of a Construction Noise Management Plan.	• Noise and vibration monitoring is required to confirm that both construction and operational noise and vibration levels meet acceptable level limits. A noise and vibration monitoring plan will be developed during detailed design. See **Section 4.2.4.7** for detail.
Noise effects on sensitive receptors during operations	• An Environmental Compliance Approval (Noise) (ECA) application for the MSF will be prepared and submitted to the MOECC showing that the built facility meets MOECC NPC-300 requirements. Noise mitigation measures that will be implemented for the Preferred Design are summarized below and will be refined during detailed design, as required: - Main Maintenance shop / Main Repair Shop ▪ Close bay doors while wheel truing ▪ Specify shop compressors to have a maximum environmental sound power level of 90 dBA ▪ West facing doors ▪ Close bay doors during night time hours unless being used for the transiting vehicles, possible use of an automated quick close system. ▪ Open to a maximum of ¼ of the way during all other hours unless being used for the transiting vehicles, possible use of an automated quick close system ▪ East facing doors ▪ open at most 1/2 way during the night time hours unless being used for the transiting vehicles, possible use of an automated quick close system - Maintenance of way building ▪ Specify compressor to have a maximum environmental sound power level of 90 dBA	• Effects of noise during operation will be minimized through the implementation of an Operational Noise Management Plan. The MSF and associated elements of the Preferred Design for the facility will be in compliance with the NPC-300 guideline and MOEE/TTC Protocol.	• Noise and vibration monitoring is required to confirm that both construction and operational noise and vibration levels meet acceptable level limits. A Noise and Vibration Monitoring Plan will be developed during detailed design. See **Section 4.2.4.7** for detail.

Table ES-1: Potential Effects, Mitigation Measures, Net Effects and Monitoring Requirements of the Preferred Design

Potential Effect	Mitigation Measures	Net Effect	Monitoring Requirements
	▪ Bay doors during loud operations such as using impact wrenches or hammering sheet metal ▪ Close during night time hours ▪ Close half way and operate no more than 30 minutes out of any given hour during the daytime - Specify operations building 2 main AC units to maximum sound power level of 102 dBA - Include noise specifications for roof top equipment based upon final number, location, and capacities - Generators tested during daytime only, specified maximum sound power level of about 98 dBA - Attempt to keep turning radiuses greater than 1,000 ft. (~300 m) ▪ Make provisions for rail greasers for curves less than 300 m radius/radius less than 100 times the truck wheel base - Change maximum hourly deployment from 20/hr day, 20/hr evening, 50/hr night, to: ▪ 20/hr day ▪ 20/hr evening ▪ 30/hr night – this is for the morning deployment (currently forecasted at 50 in a single hour) to 50 over the course of an hour and forty minutes (1 every 2 minutes) - LRT vehicle speed on site limited to 10 km/hr - Distribute shunting of LRT vehicles as evenly as possible across site - Noise barriers as presented on **Figure 4-5** • An Operational Noise Management Plan will be prepared to address noise control for the operation of the Finch West LRT MSF. The Operational Noise Management Plan will: - Demonstrate that the facility meets MOECC noise guideline NPC-300; - Demonstrate that the facility meets municipal (Toronto) noise by-law requirements; - Detail a plan to submit an Environmental Compliance Approval (ECA) application to the MOECC; - Detail noise control measures being implemented at the facility; - Detail measurement/verification plan to confirm performance of the noise mitigation measures		
Vibration effects on sensitive receptors during construction	• Review the zone of influence for construction equipment (City of Toronto By-law 514) as part of the building permit application and revise, if necessary, during detailed design. Refer to **Appendix C – Noise and Vibration Report** for zone of influence radii for construction equipment. • Prepare a Construction Vibration Management Plan to address the construction vibration from this project. The construction vibration management plan will: - Detail how City of Toronto vibration By-law 514 requirements are being met; - Detail what actions are being taken to minimize the perceptible vibration impacts on surrounding sensitive receivers; - Detail vibration mitigation measures being implemented; - Detail construction vibration complaint process and action plan to address perceptible vibration complaints; - Develop a monitoring/verification plan to demonstrate that the mitigation measures above are appropriate, functioning correctly, and that acceptable vibration levels at sensitive receivers are maintained for the duration of construction; and, - Detail how vibration levels at buildings potentially housing vibration sensitive machinery (e.g., Norfinch Medical Centre, Oakdale Professional Medical Centre, and Humber River Regional Hospital) will be managed to acceptable levels, and how the levels will be monitored/verified for the duration of construction. • Additional guidance on vibration control methods and mitigation measures for inclusion in the Construction Vibration Management Plan is provided in **Appendix C – Noise and Vibration Report**.	• Building damage due to construction vibrations is not expected. The potential effects of vibration on sensitive receptors during construction will be minimized through the implementation of a Construction Vibration Management Plan.	• Noise and vibration monitoring is required to confirm that both construction and operational noise and vibration levels meet acceptable level limits. A Noise and Vibration Monitoring Plan will be developed during detailed design. See **Section 4.2.4.7** for detail.
Vibration effects on sensitive receptors during operations	• Vibration mitigation measures that will be implemented for the Preferred Design are summarized below and will be refined during detailed design, as required (refer to **Figure 4-6** for vibration control locations and **Table 4-13** for potential methods of vibration control): - Up to 15 vdB of attenuation would be required for track connections to the Finch West LRT Line at York Gate Boulevard and Finch Avenue West; - For onsite track connections (crossovers) within 113 m of the medical buildings on Finch Avenue West at Norfinch Drive and Pelican Gate, up to 12 VdB of attenuation at the closest track connection (crossover) would be required. The further the track connection (crossover), the lower performance required up to 113 m distance. Approximately 11 crossovers have been identified at this time. - Up to 3 VdB of attenuation (at the closest on-site track) is required for track within 89 m of the medical building at Norfinch Drive and Finch Avenue West. Approximately 200 m of track on-site would require vibration control. • The above vibration mitigation is based upon the typical performance of typical vibration control types for rail. Alternatives providing the minimum required reductions may also be acceptable. Vibration control requirements, including transition zones, and performance will be reviewed during detailed design. • Further, the following may decrease vibration requirements and should be reviewed during detailed design: - Lower speed limit for LRT vehicles traveling over track junctions along Finch Avenue West (currently modeled as posted speed limit of 60 km/hr); - Conduct force mobility measurements to determine the ability of the ground to transmit vibration; ▪ Some areas may have localized lower transmission characteristics and may decrease the vibration reduction requirements • An Operational Vibration Management Plan will be prepared to address the vibration impacts due to the operation of the MSF. The Operational Vibration Management Plan will: - Detail plan to incorporate vibration assessment into ECA application - Demonstrate that design will meet FTA vibration criteria - Detail vibration mitigation measures being implemented - Detail how performance and level limits at sensitive receptors will be verified/measured • Additional information on the contents of the Operational Vibration Management Plan is included in **Appendix C.**	• The potential effects of vibration on sensitive receptors during operation will be minimized through the implementation of an Operational Vibration Management Plan.	• Noise and vibration monitoring is required to confirm that both construction and operational noise and vibration levels meet acceptable level limits. A Noise and Vibration Monitoring Plan will be developed during detailed design. See **Section 4.2.4.7** for detail.

Table ES-1: Potential Effects, Mitigation Measures, Net Effects and Monitoring Requirements of the Preferred Design

Potential Effect	Mitigation Measures	Net Effect	Monitoring Requirements
Air Quality			
Potential for nuisance dust and emissions during construction	• Implement a Dust Management Plan to comply with applicable regulations and standards during construction. • The following mitigation measures will be implemented to limit any emission impacts from diesel/gas powered construction equipment during construction: - Use electric-powered equipment where possible, or diesel powered construction equipment with stringent emissions standards; - Minimize idling time for all diesel/gas powered construction equipment; and, - Use well-maintained construction equipment.	• During construction, any net effect on air quality will be localized to the construction area for the duration of the construction activities. The potential off-site effects to air quality (nuisance dust and emissions) will be minimized through the implementation of a Dust Management Plan and measures to limit emissions from diesel/gas powered construction equipment.	• A Dust Management Plan (DMP) will be implemented to minimize dust concentrations at the fence line during construction.
Potential effects to local air quality during facility operations	• Particulate matter generated from the compressed air cleaning and sand dispensing system will be controlled with a ventilation/dust collection system. Painting will be conducted inside the paint spray booth equipped with an exhaust system and overspray filters which will control particulate matter emissions. Maintenance welding will be performed with mobile fume extraction units equipped with high efficiency filtration and exhaust inside the building. • An Application for Environmental Compliance Approval (Air) (ECA) will be prepared for the MSF during detailed design. • The following mitigation measures will be incorporated into the design and operation of the facility in order to reduce resultant air emissions: - All on-site roadways and parking lots should be paved to minimize the generation of road dust; - Emergency generators with more stringent air emission levels will be selected for procurement (i.e., generators conforming with EPA Tier IV emission standards or higher) which are required for compliance at the off-site receptors; - During operation, the emergency generators will be tested only one at a time; - Stack location for the paint booth exhaust will be at least 100 m from the nearest property line; - Paint Arrestor Pads will be installed in the paint booth and have a minimum of 95% particulate removal efficiency; - Stack locations for other process exhausts will be situated as far away from the property line as feasible; - Stack parameters (height, location, configuration, etc.) will be designed to ensure good dispersion (no rain caps), avoid re-entrainment of contaminant air into building and compliance with MOECC limits - Selection of welding material that is chromium-free or the material will contain the least amount of chromium compounds as possible for welding to ensure minimal hexavalent chromium emissions are generated during welding process; - Maintenance welding must be carried out with mobile fume extraction units equipped with high efficiency filtration with a minimal removal efficiency of 99% for particulate matter and metal fumes before exhausting inside the building; and, - Maintenance welding will only be performed for a maximum of 12 hours per day.	• Potential effects to local air quality during operations will be mitigated through the implementation of the measures described in the Air Quality Assessment Report, **Appendix D**, resulting in expected MSF emissions during operation being within applicable air quality criteria and within MOECC Standards and/or Guidelines.	• N/A
Traffic and Transportation			
Potentially lower road capacity available/increased travel times during construction	• A 25% traffic diversion to parallel arterial and collector roads will relieve traffic congestion on Finch Avenue West during construction and minimize any impact to travel times in the vicinity of the MSF. Travel demand modeling will be used during detailed design to refine diversion rates and methods.	• A potentially lower road capacity available during construction and resultant increased travel times will be mitigated by a 25% traffic diversion to parallel arterial and collector roads. Regular traffic patterns will resume when construction activities end.	• N/A
Potential effects to study area intersection operations, including at Finch Avenue West and Norfinch Drive during AM and PM peak periods during operation	• Prepare a Traffic Management Plan during detailed design that considers the impacts of LRV operation in the corridor during the peak hours. The primary operation of LRVs in and out of the MSF will occur at off-peak hours and have a minimal impact to vehicle traffic. • Refine the signal timing and LRV operating plan to minimize the impacts of both modes of transportation on the street networks.	• During operations, most of the study intersections will continue to operate at an acceptable overall LOS 'D' or better. Potential effects to intersection operations at Finch Avenue West and Norfinch Drive will be minimized by implementing a Traffic Management Plan and refining the signal timing and LRV operating plan during detailed design of the facility.	• LRV and traffic volumes will be monitored following the opening of the facility in consultation with the City of Toronto.
Potential safety concerns for future active transportation (bike lanes/sidewalks) along Finch Avenue West and York Gate Boulevard due to MSF LRV access/egress	• Incorporate signing, striping, and active devices (if appropriate) into the design as additional safety measures for cyclists in the vicinity of the MSF LRV access/egress locations.	• Potential effects to active transportation (safety) will be mitigated by incorporating signing, striping, and active devices (if appropriate) in the vicinity of MSF LRV access/egress locations.	• LRV and traffic volumes will be monitored following the opening of the facility. Mitigation measures for pedestrians/cyclists will be evaluated for their effectiveness and modified if appropriate.
Potential effects to existing TTC Bus Services	• Metrolinx and the TTC will re-assess bus service and routing requirements in the vicinity of the MSF site, including replacing the Finch 36+ route with the LRT service.	• Effects to TTC bus routes will be confirmed through future TTC/Metrolinx system planning and co-ordination.	• LRV and traffic volumes will be monitored following the opening of the facility in consultation with the City of Toronto.

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Appendices (Part 2)

1. Introduction

1.1 Project Overview

In March 2010, the Toronto Transit Commission (TTC) and City of Toronto completed a Transit Project Assessment Process (TPAP) study as prescribed in *Ontario Regulation 231/08* (O.Reg 231/08) made under the *Environmental Assessment Act* (EA Act), for the Etobicoke-Finch West Light Rail Transit corridor (Finch West LRT) (TTC, 2010). The Finch West LRT was designated as a Priority Project in the City of Toronto and TTC's Transit City Plan and has received funding through the Province's MoveOntario 2020 Program. The light rail transit (LRT) service supports existing and future ridership demands and provides economic benefits in several neighbourhoods along the corridor. Metrolinx's Regional Transportation Plan includes the Finch West LRT for implementation in the one to 15 year timeframe.

A related transit project, the focus of this report, is the Finch West Maintenance and Storage Facility (MSF). The Finch West MSF is the component of the Finch West LRT corridor that will provide maintenance and storage capacity for light rail vehicles (LRVs) servicing the Finch West LRT. The Finch West LRT corridor cannot operate efficiently without an MSF. Typical features of an MSF include an electrical substation, maintenance of way (MoW) building, storage for LRVs (including an Outdoor Storage Yard with capacity for LRVs and Main Repair Shop Facility with capacity for LRVs, that will also be used to service LRVs), and motor vehicle parking for employees.

The MSF is an integral and necessary component of an LRT corridor to store and maintain the LRV, however the Environmental Project Report (EPR) prepared during the TPAP for the Finch West LRT (TTC, 2010) did not include the MSF. Accordingly, this EPR documents the TPAP for the Finch West MSF.

1.2 Purpose of Project

The purpose of the Finch West MSF (the Project) is to provide maintenance service and storage tracks for overnight storage of the new LRVs serving the Finch West LRT corridor and proposed future Jane Street LRT, and a main repair shop facility to maintain the new LRVs in a state of good repair. Transit service for the community will be enhanced through the implementation of the Project and the overall Finch West LRT corridor.

This report documents the TPAP undertaken for the Finch West MSF, specifically including the documentation of existing environmental conditions, anticipated effects of the Project on the environment, the associated mitigation measures, consultation undertaken, and future commitments.

1.3 Project Site

The Project site is located in the northern portion of the City of Toronto, within the Black Creek Neighbourhood of Ward 8 (York West). The site is approximately eight (8) hectares (ha) in size and situated on the north side of Finch Avenue West between Norfinch Drive and York Gate Boulevard. The site is east of Highway 400 and west of Jane Street. The northern property limit is bounded by a high-voltage electrical corridor right-of-way and the northwest property limit is bounded by an adult education/continuing learning secondary school. The site is currently vacant and is owned by Metrolinx.

The Project Study Area includes a one kilometre radius around the Project site (MSF property). Where appropriate, the Project Study Area was further expanded or in some cases, reduced, by each technical discipline team to create a study area specifically suited to an environmental effects assessment for that specific discipline. The study areas for each of the environmental disciplines are described in the respective **Section 3** subsections. **Figure 1-1** below illustrates the Finch West MSF Site and Project Study Area.

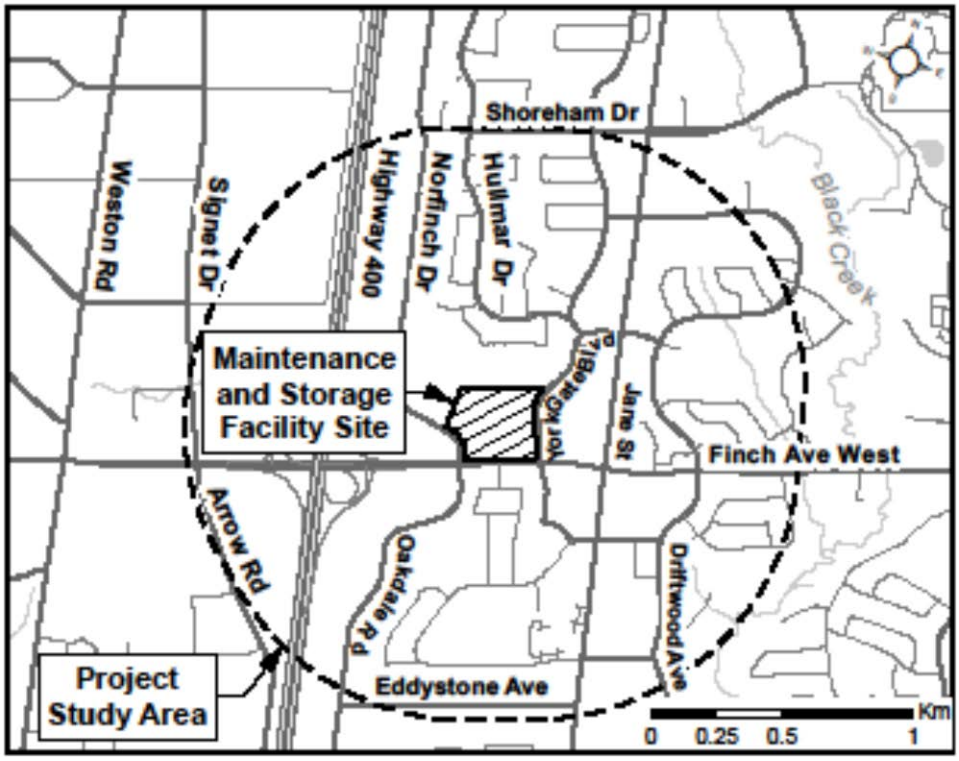


Figure 1-1: Finch West MSF Site and Project Study Area

Figure 1-2 below illustrates the Finch West MSF location within the context of the Finch West LRT corridor, as documented within the *Etobicoke – Finch West LRT Transit Project Assessment Study (TTC 2010)*.

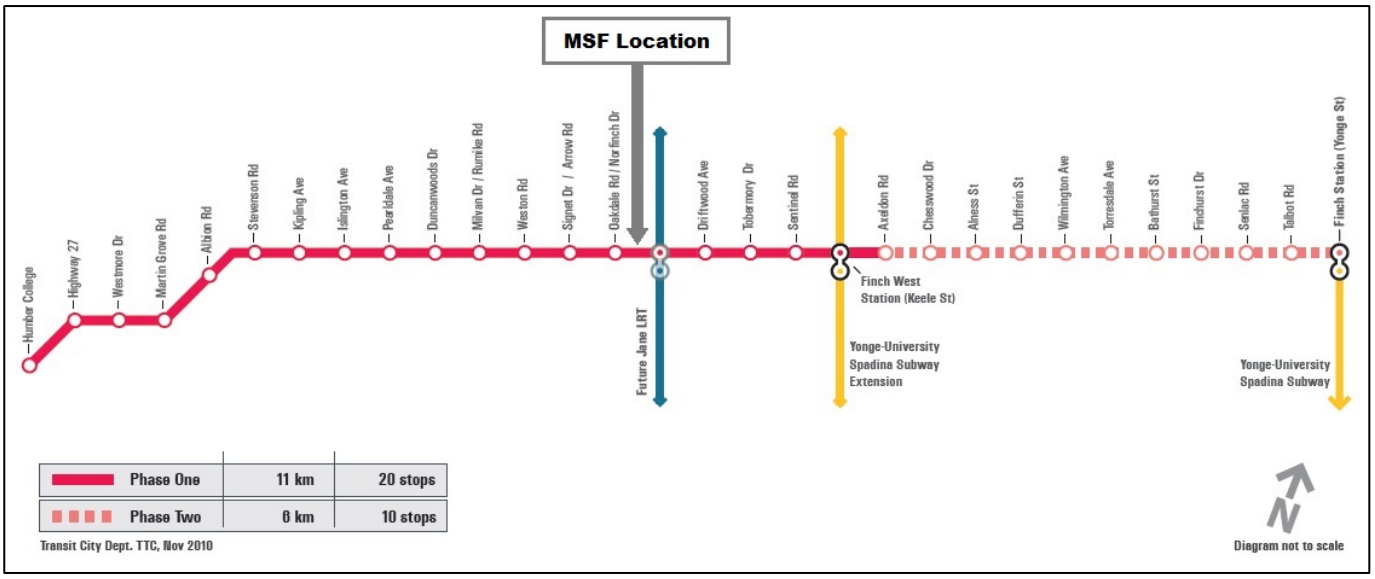


Figure 1-2: Finch West MSF Location within the Finch West LRT Corridor

1.3.1 Rationale for MSF Project Location

As part of the Transit City initiative, the TTC undertook a property search to identify potential locations to accommodate the MSF for the Etobicoke-Finch West Light Rail (now Finch West LRT). Several factors were considered in this site selection process that was completed prior to the Preliminary Planning Step for the MSF (see **Section 1.4.1**) as part of *O. Reg 231/08*. Generally, the criteria for site selection process included:

- Property Size
- Proximity to LRT Line
- Site Availability/Vacancy

In addition, it was preferable to acquire a single, vacant parcel of land rather than acquire multiple adjacent properties to amalgamate, and/or displace existing residences or businesses.

The following three sites were also considered and determined unsuitable for MSF development:

- **Southeast corner of Finch Avenue West and Weston Road**
  Unsuitable due to inadequate property size (~6 ha), access issues, existing traffic congestion, City development plans for the property, and deadhead (i.e., the facility would be at a location that does not maximize revenue and operating efficiency).
- **#122 and #130 Arrow Road**
  Unsuitable due to site access and traffic congestion that could arise from the existing Arrow Road bus garage, deadhead and connection track requirements, building demolition requirements, and potential need for environmental remediation based on existing uses of the site.
- **Finch Avenue West between CN Rail Corridor and Chesswood Drive**
  Unsuitable due to inadequate property size (~5.25 acres), deadhead and presence of active businesses.

Accordingly, only the site between York Gate Boulevard and Norfinch Drive on the north side of Finch Avenue West as illustrated in **Figure 1-1** was determined to be suitable and was chosen as the preferred MSF location for the Finch West LRT.

1.4 Finch West MSF Planning Process

This EPR was prepared in accordance with *Ontario Regulation 231/08 for Transit Projects and Greater Toronto Transportation Authority Undertakings* (Transit Projects Regulation). By following the TPAP for certain projects, the Transit Projects Regulation exempts the proponent (in this case Metrolinx) of the transit project from the requirements under Part II of the *EA Act*.

The TPAP is a proponent-driven, self-assessment process that provides a defined framework for the proponent to follow in order to complete the accelerated assessment of the potential environmental effects and decision-making within a 120 day regulated assessment timeline. Following the up to 120 day assessment period, the regulation provides an additional 30 days for public and agency review, and 35 days for the Ministry of the Environment and Climate Change (MOECC) review.

Proponents are urged to undertake introductory activities and consultation through a Preliminary Planning step (shown as Step 1 in **Figure 1-3**) prior to the commencement of the TPAP. Following completion of the Preliminary Planning Step, the proponent initiates the TPAP (Step 2 in **Figure 1-3**) by issuing the Notice of Commencement. It is at this point that the regulated 120 day timeframe commences.

A summary of the process used for the Finch West MSF, including the Preliminary Planning activities and the TPAP, is provided in **Figure 1-3**. Detail regarding each of these steps is provided in following sections.

1.4.1 Step 1: Preliminary Planning Activities

The Preliminary Planning step for this project involved the following main activities designed to lead to the issuance of the Notice of Commencement.

Existing Environmental Conditions

An early activity within the Preliminary Planning step was to establish the existing environmental conditions on the site and within discipline-specific study areas. Each of the main factors of the environment (environmental factors) were assessed by practitioners using industry standard techniques. Studies were undertaken to document the existing conditions in the following environmental factor areas:

- Natural Environment
  - Terrestrial Natural Heritage
  - Surface Water and Aquatic
  - Geology and Groundwater
- Cultural Environment
  - Archaeology
  - Cultural Heritage
- Socio-Economic Environment
  - Land Use
  - Visual Character
  - Community Features
  - Noise and Vibration
  - Air Quality
- Traffic and Transportation

Another activity within the Preliminary Planning step involved the establishment and initiation of a comprehensive public and agency consultation program.

Stakeholder Consultation

One component of the program included individual meetings and/or correspondence with key stakeholders and agencies, including MOECC, Ministry of Natural Resources and Forestry (MNRF), Toronto and Region Conservation Authority (TRCA), the Ministry of Tourism, Culture and Sport (MTCS), and the City of Toronto. In addition, staff from City of Toronto Transportation Planning and Transportation Services were invited to participate in the Technical Advisory Committee (TAC). Regular meetings between the project team and the TAC were held in advance of consultation milestones, including each Public Open House described below.

Public Consultation

The public (including local residents) were consulted directly at a Public Open House and an additional community meeting. Notification of the Public Open House was provided through local newspaper advertisements and direct mailings to local residents, review agencies, interested stakeholder groups, and Aboriginal communities. The Public Open House provided an opportunity for members of the public to speak directly with Metrolinx and the project team. In this manner the public was introduced to the Project, and encouraged to provide comment on the assessment of existing conditions and methodology to be used in the assessment of the potential environmental effects associated with construction and operation of the facility. An additional community meeting was held with the Community Action Planning Group (CAPG) on Tuesday August 12, 2014 to provide information and gather input.

Detailed information on consultation activities is provided in **Section 5.**

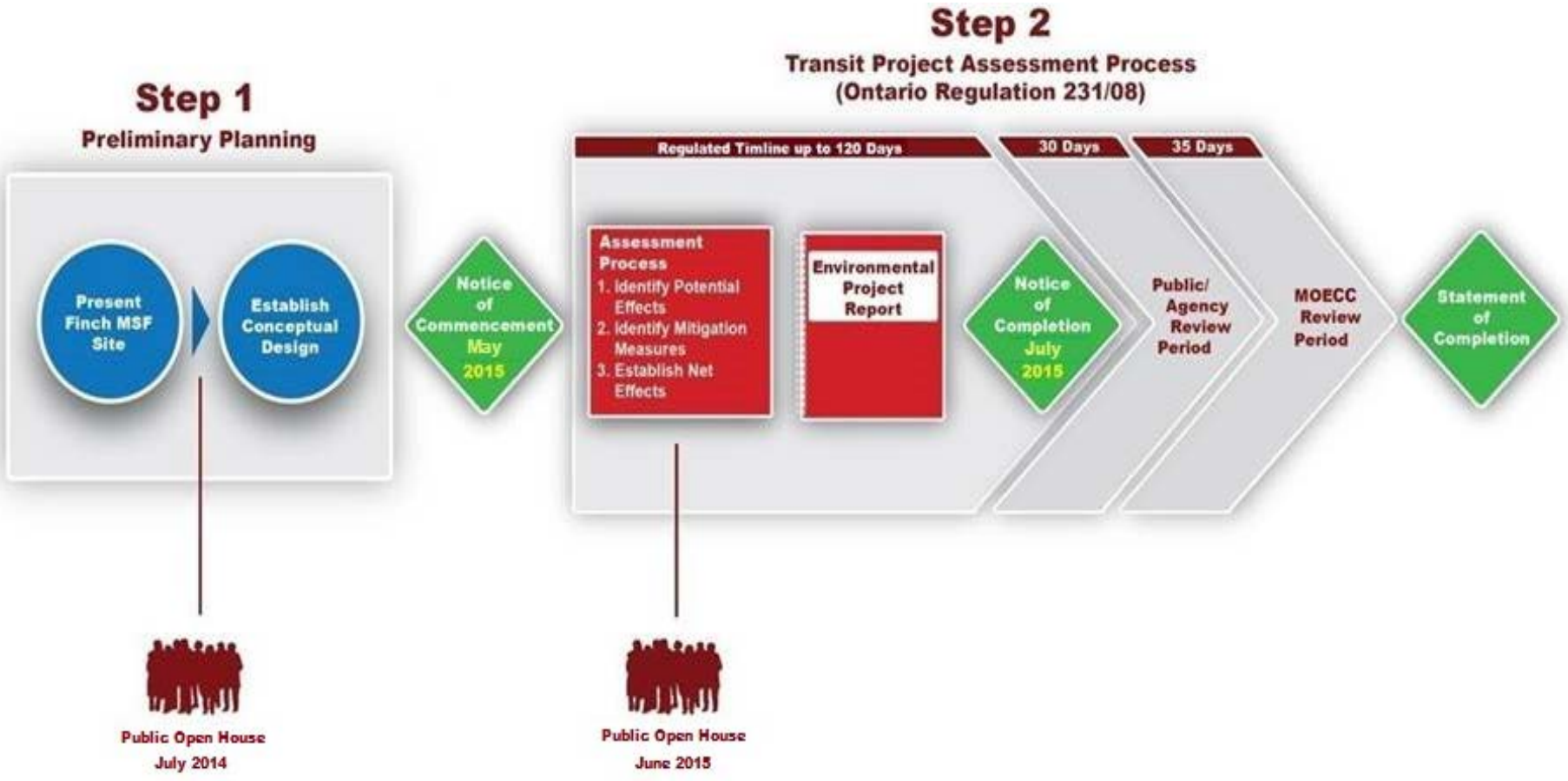


Figure 1-3: Finch West MSF Planning Process

1.4.2 Step 2: Transit Project Assessment Process

Metrolinx issued the Notice of Commencement on May 15, 2015 in order to commence the TPAP. The TPAP defines a series of activities that allows the TPAP to be completed within six months. These activities involved the following steps:

1. Contact with the MOECC
2. Issuance of the Notice of Commencement of TPAP
3. Assessment Process and Consultation with project stakeholders (public, regulatory agencies, Aboriginal communities and other interested persons). A second Public Open House as a follow-up to the first Open House held during pre-planning activities was held to present the Preferred Design and the proposed environmental mitigation measures.
4. Issuance of the Notice of Completion of the EPR (up to 120 days following the Notice of Commencement)
5. Provide 30 days for the public, regulatory agencies, Aboriginal communities and other interested persons to review the EPR
6. 35 days for the Minister of the Environment and Climate Change to review the EPR
7. Submission of Statement of Completion by proponent.

The submission of this EPR and the issuance of the Notice of Completion triggers the beginning of the 30 day public/agency review period. During this time, if members of the public, regulatory agencies, Aboriginal communities or other interested persons have concerns about this transit project, objections can be submitted to the Minister of the Environment and Climate Change. After the 30 day review period has ended, the Minister has 35 days within which his authority may be exercised as outlined below.

Whether there is a public objection or not, the Minister may act within the 35 day period to issue one of the following three notices to the proponent:

1. A notice to proceed with the transit project as planned in its EPR
2. A notice that requires the proponent to take further steps, which may include further study or consultation; or,
3. A notice allowing the proponent to proceed with the transit project subject to conditions.

The Minister may give notice allowing the proponent to proceed with its transit project but can only take action if there is a potential for a negative impact on a matter of Provincial importance that relates to the natural environment or has cultural heritage value or interest, or on a constitutionally protected Aboriginal or treaty right. If the Minister issues a notice to proceed with the transit project as planned, or if the Minister does not act within the 35 day period, Metrolinx will issue a Statement of Completion and proceed to detailed design and construction.

The TPAP will be completed when Metrolinx submits a Statement of Completion to the Director of the Environmental Assessment and Approvals Branch of the MOECC and the MOECC Regional Director, excluding any unforeseen circumstances that may require a change to the transit project. Metrolinx will submit the Statement of Completion under one of the following circumstances:

1. The Minister gives a notice allowing the proponent to proceed with the Project in accordance with the EPR
2. The Minister gives a notice allowing the proponent to proceed with the Project in accordance with the EPR, subject to conditions

3. The Minister gives a notice requiring further consideration of the transit project and subsequently gives a notice allowing the proponent to proceed with the Project in accordance with a Revised EPR; or
4. The Minister gives no notice within 65 days of the proponent giving the Notice of Completion.

The Statement of Completion will indicate that Metrolinx intends to proceed with the transit project in accordance with either:

- The EPR
- The EPR subject to conditions set out by the Minister; or
- The Revised EPR.

Metrolinx will also post the Statement of Completion on the Project website. Construction or installation of the transit project subject to the TPAP cannot begin until the requirements of the process have been met. Subject to these requirements, the transit project may proceed subject to any other required approvals.

1.5 Environmental Project Report

This Environmental Project Report (EPR) provides a comprehensive summary of each step in the assessment study, assessment of the site and an assessment of any effects and ways that such effects can be mitigated. Accordingly, the sections of the EPR are arranged as follows:

- **Section 2** – a final description of the Project, including a summary of the site layout selection process and description of the Preferred Design for the MSF Site.
- **Section 3** – the existing environmental conditions within the applicable environmental discipline study areas.
- **Section 4** – the impact assessment of the Preferred Design based on interaction of the Project with existing environmental conditions.
- **Section 5** – the consultation process undertaken during the study.
- **Section 6** – the additional permits, approvals and future commitments required to implement the project.

2. Project Description (Preferred Method of Carrying out the Transit Project)

The Finch West MSF (the Project) is an integral and necessary component for the operation of the Finch West LRT corridor and overall Metrolinx LRT Program. The Finch West LRT corridor cannot operate efficiently without a MSF. As such, no other methods for carrying out this Transit Project (the Project) were considered.

2.1 Site Layout Selection Process

Four possible alternative designs (site layouts) for the MSF were developed during the Preliminary Planning activities for the project. The four different site layouts were subsequently compared and evaluated with respect to the following environmental components:

- Natural Environment
  - Terrestrial Natural Heritage
  - Surface Water and Aquatic
  - Geology and Groundwater
- Cultural Environment
  - Archaeology
  - Cultural Heritage
- Socio-Economic Environment
  - Land Use
  - Visual Character
  - Community Features
  - Noise and Vibration
  - Air Quality
- Traffic and Transportation

A recommended site layout was selected based on the results from the site layout selection process. Please refer to **Appendix H** for a detailed description of the site layout selection process. The recommended site layout was further refined based on additional design specifications to arrive at the Preferred Design for the Finch West MSF site.

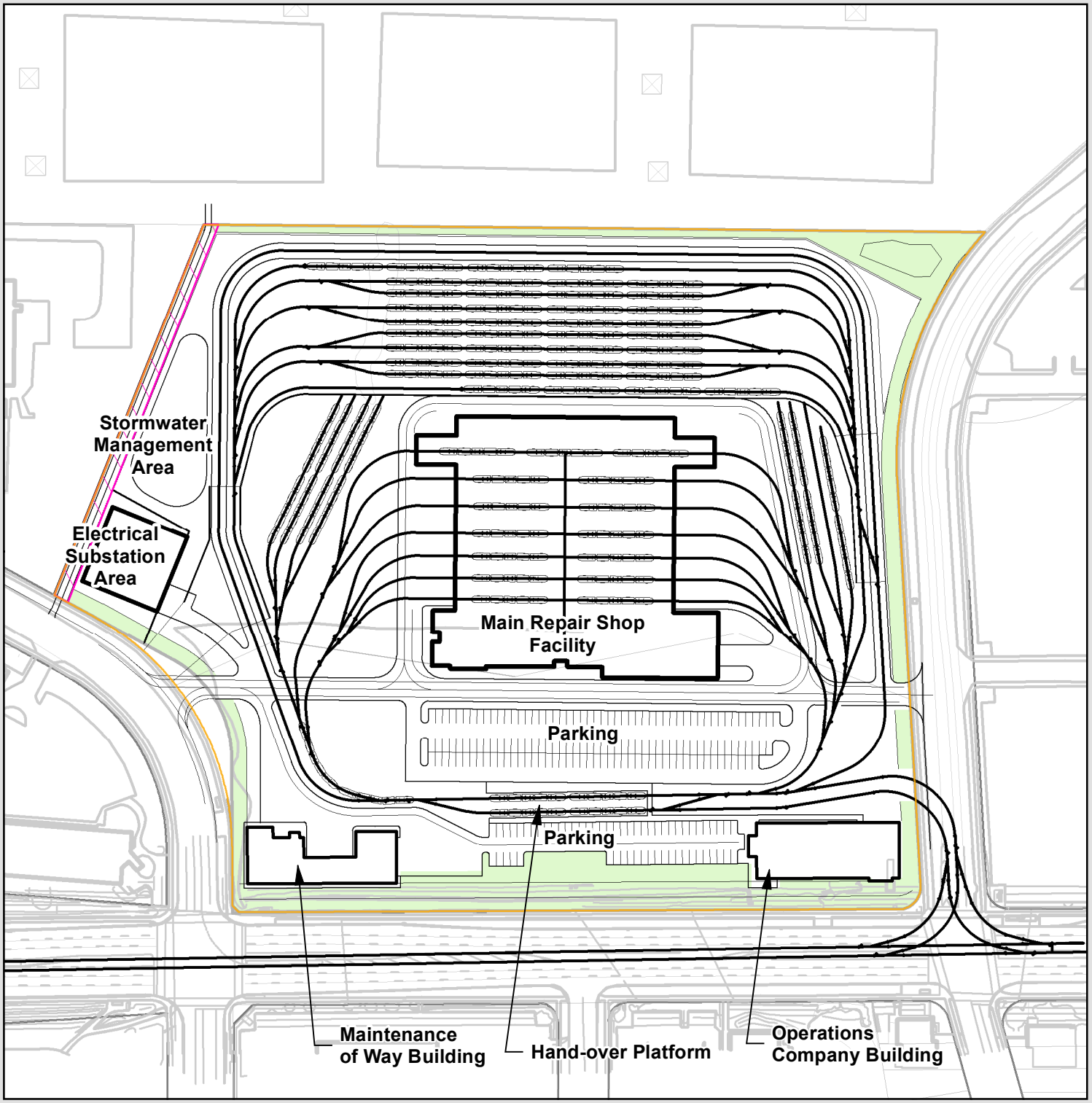
A final description of the transit project (Preferred Design) is provided in the sections below.

2.2 Preferred Design

The Preferred Design for the Finch West MSF site is illustrated in **Figure 2-1**.

Section 2.2.1 provides a detailed description of the elements that comprise the Preferred Design.

Section 2.2.2 provides further detail on the project works and activities associated with the construction and operational phasing of the elements that comprise the Preferred Design.



Legend

- Property Limits for the MSF Site
- Light Rail Vehicle (LRV)
- LRV Track
- Multi-use Pathway
- Landscape Buffer

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MTM 3Degree, NAD 27

Finch West Light Rail
Maintenance and Storage Facility (MSF)
Environmental Assessment

Preferred Design

July 2015

AECOM

Figure 2-1

Map Document: (P:\60318592\400-Technical\401 Environment\GIS\MXD\60318592_Preferred_Design)
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2.2.1 Elements of the Preferred Design

The Project will facilitate daily Light Rail Vehicle (LRV) storage, inspection, maintenance, painting, and other servicing functions for the new LRV fleet, which will serve the Finch West LRT corridor and potential future Jane Street LRT line.

The Project includes both the construction and operational phases of the elements of the MSF (see **Section 2.2.2** for the Project Works and Activities that comprise the construction and operational phases).

The Project is comprised of different elements as described below. Four main buildings will be located on site, including:

- Main Repair Shop Facility
- Maintenance of Way Building
- Operations Company Building
- Electrical Substation.

Other elements of the site will include outdoor storage track capacity for 60 LRVs, an outdoor storage yard, LRV Hand-Over platform, sanding silo, employee parking facilities, stormwater management features, and an LRV braking test track. There will also be storage capacity for up to 15 LRV inside of the Main Repair Shop Facility, allowing for a total site LRV storage capacity of 75.

There will be approximately 350 employees at the facility working in three shifts with the majority of workers (approximately 200) on the day shift. The shift times will be at various times throughout the day (detailed assumptions shown in **Appendix H**), with corresponding end times approximately eight hours later.

In addition to the on site features, an off-site track connection to the Finch LRT Main Line will be provided within the existing York Gate Boulevard road right of way to allow for LRV access/egress.

The following sections describe the key components and services for each element of the Preferred Design for the MSF Site.

2.2.1.1 Main Repair Shop Facility

The Main Repair Shop Facility will be approximately 11,100 metres squared (m^2); a two-storey facility featuring maintenance platforms on the ground floor and office space on the second floor:

- Ground Floor: ..... 9,800 m^2
- Second Floor: ..... 1,300 m^2

The repair shop portion of the facility will be one storey (with internal maintenance platforms and catwalks) and an average of 13.5 m in height. The office portion of the maintenance facility is to be one storey and 5 m high. The maintenance building is expected to be a drive-through type building with five to seven tracks leading to and from the facility, where various servicing and maintenance activities, scheduled inspections and unscheduled repairs will be performed on the LRVs. The Main Repair Shop will have the storage capacity for up to 15 LRVs.

The following services will be performed at the Main Repair Shop Facility:

- **Daily Inspection**
  Each LRV will receive a daily inspection by the Rail Cars and Shops Department to ensure that the vehicle is fit for the next day's revenue service. These visual and functional checks of the unit interior and exterior, focus on high-wear and safety critical items such as wheels, brakes, doors, operator controls and communication systems.
- **Daily Sweep and Dust**
  Vehicle interiors will be cleaned every day in accordance with maintenance procedures. This activity involves removing all newspapers and loose debris, sweeping car floors, and dusting operator consoles and other specified surfaces.
- **Sand Replenishment**
  The sandboxes on the LRVs will be accessible via ports on the exterior and will be filled during normal service and cleaning procedures on a daily basis. The sand can be gravity fed to the vehicles and screw conveyors used as pumps. The sanding system consists of a bulk storage tower with multiple dispensers provided at each LRV servicing position along the length of the car or service track. The blower or filling equipment is on the sand delivery truck and is not part of the silo.
- **Exterior Washing**
  The LRVs are expected to be washed every seven to ten days.
- **Interior Floor Wash**
  LRV floors are washed inside the Main Repair Shop Facility on an as-needed basis, but usually every 11 to 17 days. Floor washing is performed on a dedicated wash track by facility operators.
- **Undercar Cleaning**
  Major undercar components such as trucks, traction motors, gear units and braking equipment will be steam-cleaned prior to scheduled periodic inspection. This function will be completed over a service pit inside the building. A steam cleaner/pressure washer with multiple outlets along the pit will be used for most cleaning operations. Compressed air will be available in the pit for supplemental cleaning of electrical/control boxes, and other undercar components.
- **Compressed Air Blow-Down**
  Compressed air cleaning of traction motors and selected roof-mounted components will be required for the new low floor vehicles. Consequently, the undercar cleaning bay will be outfitted to facilitate compressed air blow-down operations. Compressed air outlets will be provided along the length of the undercar cleaning pit as well as along the roof level access platforms. A ventilation/dust collection system will be provided to capture and control any blown dust generated during cleaning operations.
- **Component Repair**
  As part of the longer term maintenance procedures, a separate area is required to facilitate more extensive servicing tasks. These tasks generally revolve around repair and maintenance of the wheel-sets and other large components that cannot be easily removed from the vehicles without the aid of heavy lifting equipment. In order to accommodate this, a separate track outfitted with lifting hoists is required to enable the removal and replacement of these wheel sets. In addition, this service track will also require an overhead gantry crane that will be needed to lift and move larger heavier components such as roof top HVAC equipment from the vehicles.
- **Warehouse**
  In support of all of the servicing and repair activities, an on-site warehouse for the storage of both large and small parts and tools is required.

- **Wheel Truing**
  The wheel truing is done using a stationary in-floor wheel lathe that the vehicle either drives through or is pulled through very slowly. The material is removed from the wheel by the lathe using an extraction and high efficiency filtration system to minimize the release of fugitive air emissions. The material is then conveyed to and held in an enclosed container on the exterior of the building for periodic removals by truck.

2.2.1.2 Maintenance of Way (MoW) Building

The MoW building will be approximately 1,600 m^2, and will be a single storey building with a semi-high bay roof height of approximately 6 to 7 m to accommodate large trucks and a rolling bridge crane. The building will accommodate staff and services associated with maintaining the tracks, guideway zone and other LRT operating systems. This building does not require direct track access.

The MoW Building will function to service the following LRT system components:

- **Track and Structures**
  The maintenance and servicing of the track and structures along the main line. This includes snow management and other weather-related programs.
- **Signals and Communications**
  Communications infrastructure from integrated signalling system for train control on the guideway and within the yard and with the interface to the mainline for vehicles ingress and egress. Radio systems are a key element to communications throughout both the MSF yard and the on-street system.
- **Overhead Contact System (OCS) Servicing**
  Servicing and maintenance of the overhead vehicle power supply system within both the yard and the mainline. This includes the actual power lines as well as the supporting pole and cable infrastructure.

2.2.1.3 Operations Company (OpsCo) Building

The OpsCo building will be a two-storey structure, approximately 2,200 m^2 to provide rooms and spaces for operators (drivers) who will operate the LRVs on the LRT line.

Operations of the LRVs on the LRT line will be provided by a third party, who will function as the Operator of the LRT. They will occupy this separate, free-standing building on-site.

2.2.1.4 Electrical Substation Area

The electrical substation will be approximately 700 m^2 and 6 m high and will provide electrical power to the Finch LRT line as well as to the Main Repair Shop, MoW and OpsCo Buildings.

2.2.1.5 LRV Outdoor (Track) Storage Yard

An outdoor track storage area will be designed to accommodate up to 60 LRVs. The LRV Outdoor Track Storage Yard will include the highest on-site density of overhead contact system (OCS) support structures. The yard also includes a dedicated LRV Brake Test Track that will be used on for annual testing.

2.2.1.6 Outdoor Storage Yard

This area is for storing large, high value weather-proofed or otherwise impervious material that cannot be easily stored indoors and can withstand wide swings in temperature and humidity. Examples are large diameter cable reels; contact support structures, wire and other material; specialty track material; rail, ballast stone; signal heads, masts and other material; grade crossing material; and building materials.

2.2.1.7 Overhead Contact System

The overhead contact system (OCS) provides electrical power to the LRVs through overhead wiring. The wiring will be distributed over the tracks throughout the site, and will include support structures such as poles, portals, and cantilevers placed over the tracks on-site. As noted prior, the OCS components will be most concentrated on-site within the LRV outdoor storage yard.

2.2.1.8 Employee Parking

Approximately 200 employee parking spaces will be provided at the site. Additional parking will be provided near the OpsCo and MoW buildings. Truck loading facilities will be provided for all the maintenance buildings.

2.2.1.9 Stormwater Management Area

A pond is anticipated to be located within the site as the principal stormwater management facility to achieve the City of Toronto's stormwater quality requirements. The wet pond will be sized to achieve 80% average Total Suspended Solids (TSS) removal (MOECC Enhanced water quality). The exact size and location of the pond is subject to additional study during detail design.

2.2.1.10 LRV Hand-Over Platform

Due to future contractual arrangements on the project, LRVs are maintained by a different organization than that operating the vehicles on the corridor. An LRV needs to be checked and serviced for operation by one group and then passed over to the operators for a final safety check before entering into revenue service. A pedestrian-access platform is required on-site to allow for LRV transfer between operators and the LRV maintenance team. For contractual and functional reasons, this platform or handover area is located between the operations building and the LRV maintenance and storage buildings. The platform will consist of a raised area with shelters to permit the final acceptance inspections and formal handover of each LRV before entering revenue service on the corridor.

2.2.1.11 General Site Access and Traffic Circulation

LRVs will enter and exit the facility from a location on York Gate Boulevard, to the north of the intersection with Finch Avenue West. This entrance will be signalized and signal operation will be co-ordinated with the adjacent signals on Finch Avenue West to ensure safe and efficient vehicular and pedestrian movements.

Automobile and truck traffic may enter the site via driveways allowing full movements off of both Norfinch Drive and York Gate Boulevard.

The assumptions and methodology in the Traffic Impact Assessment in **Section 4.3** are based on the *Etobicoke – Finch West LRT Transit Project Assessment Study, Appendix C* (TTC, 2010) that designated a "high impact" traffic analysis and considered the roadway to be nearing capacity. The assumptions included in the traffic impact assessment are as follows:

- The base peak hour traffic volumes in the future remain the same, minus Finch West Route 36 buses. Additional traffic generated by new, large, approved developments (at the time of the analysis) has been added (per the *Etobicoke – Finch West LRT Transit Project Assessment Study Environmental Project Report*).
- Bus route 36D, is assumed to continue operating with the same headway as the existing schedule.
- Traffic previously executing left-turn movements into or out of driveways and unsignalized intersections along Finch West where those movements will be blocked by the LRT tracks, is rerouted to adjacent signalized intersections as U-turn movements.
- LRVs will proceed with the through movement of general traffic on Finch Avenue West.
- All vehicles turning left and U-turning from Finch Avenue West will only proceed with a "protected" green arrow traffic signal phase, to ensure the movements do not conflict with LRV flow.
- Pedestrian crossing timings (mainly in the north/south direction) are in conformance with City of Toronto standards.
- Vehicular traffic signal phases are optimized to achieve the most efficient balance of the remaining green time during peak hour traffic signal cycles.

2.2.2 Anticipated Project Works and Activities

A description of the initial project works and activities along with associated equipment requirement assumptions are provided in **Table 2-1**. These activities represent the relevant features of the Project in terms of potential environmental effects and serve as the basis for the assessment of such effects. The Project Works and Activities may be expanded or further refined as the Project progresses through various construction and operational phases. For the purposes of this EPR, it is assumed that all applicable law and environmental regulations will be observed; and good environmental practices will be implemented throughout all construction and operating activities (e.g., dust control, sediment and erosion control) to prevent adverse environmental impacts. Details on equipment amounts associated with Project Works and Activities during construction is provided in **Table 2-2**.

Table 2-1: Anticipated Project Works and Activities

Work or Activity	Description	Equipment Assumptions
Construction Phase		
1. Site Preparation	• Site preparation activities may involve: ▪ Mobilization of equipment and temporary facilities to the site ▪ Clearing and grubbing of vegetation ▪ Erection of temporary and permanent fences ▪ Installation of environmental management features.	• Site compaction equipment and general grading equipment
2. Site Servicing	• Site servicing involves relocation and/or extension of services and utilities onto the site, which may include both underground and aerial services and utilities (e.g., sewers, water, electrical, communication, gas, etc.). This activity may also involve installation of utilities within the site.	• Excavation equipment including backhoe, dump trucks, spoil removal equipment, jackhammers
3. Municipal Roadway Modifications	• Modifications to municipal streets and roadways will be constructed to facilitate entry and exit of LRV and automobile and service vehicles into and out of the site. • As applicable, modifications may include lane widening or addition of lanes; and traffic control devices.	• Asphalt removal equipment, pavement cutting equipment, excavation equipment, compaction equipment, concrete trucks, track panel placement
4. Excavation and Grading	• Excavation and grading activities may involve earthmoving and rock moving activities, as applicable. Excavated material will be accommodated on-site to the degree practicable, however, where necessary, surplus materials will be disposed of off-site. • Any off-site disposal shall be done in compliance with applicable law, including as it relates to contaminated material that may be encountered. • Any groundwater encountered in the work will be managed and disposed of also in accordance with applicable law.	• Site compaction equipment and general grading equipment dump trucks, spoil removal equipment • Groundwater pumping
5. Construction of Building(s)	• All buildings will be constructed using standard civil construction techniques. Foundations will be of poured concrete. Above-grade building elements will be of typical industrial construction and may include steel and concrete framing, architectural and steel panels, and concrete floor slabs.	• Foundation placement equipment • Pile driving, or augured piles, or rammed aggregate piers • Drill rigs
6. Construction of Ancillary Facilities	• Ancillary facilities may include electrical transformer/supply equipment, parking areas for automobiles and service vehicles, exterior yard facilities including lighting and yard control and signalling systems, and OCS.	• Flatbed trucks, cranes, concrete trucks • Backhoe, pavement excavation equipment • Steel reinforcement
7. Installation of Trackwork	• Trackwork will consist of the assembly of track, ties and fastenings at locations throughout the site and connections to the main line on Finch Avenue West. A brake test track will be constructed on site.	• Thermal welding • Tie placement (cranes, lifting equipment) • Ballast placement • Concrete pouring
8. Management of Stormwater	• All precipitation falling within the site will be managed as stormwater within a designed system of collection, conveyance, retention and discharge features. The system will be designed and operated in compliance with applicable standards and regulatory requirements. Surface flows within the site will be managed within the site to ensure discharge to off-site receivers (i.e., municipal storm sewers) is appropriate in terms of quantity and water quality.	• Site compaction equipment and general grading equipment • Groundwater pumping
Operations Phase		
9. Outdoor Storage Track Operations	• Operations associated with the Outdoor Storage Tracks will primarily involve routine and regular movement of LRVs, testing and exterior servicing of LRVs systems and components, and passive storage (i.e., parking) of LRVs.	• LRVs and maintenance vehicles (rubber tire) • Employee vehicles

Table 2-1: Anticipated Project Works and Activities

Work or Activity	Description	Equipment Assumptions
10. Building Maintenance Operations	• Interior maintenance operations will take place within the MSF building.	• Building operational features will include an overhead bridge crane (or similar) for handling of large components; turntables to rotate LRVs; car hoists; service pits; wash bays; paint bays; and a wheel truing track. Other functional areas in the building will house spare parts and tools, mechanical and electrical rooms, staff amenities.
11. Physical Presence of the MSF	• When complete and in operation, the MSF will exist as an industrial-type operation where a greenfield property had previously existed. LRVs as well as staff and service vehicles will travel to and from the site.	• Operational activities

Table 2-2: Anticipated Construction Activities and Assumed Equipment Numbers

Equipment Description	Equipment Associated with Construction Activities (Equipment)						
	Site Preparation and Utility Relocation Equipment	***Excavation and Grading Equipment***	***Building Construction Equipment***	***Track Installation Equipment***	***Piled Foundation Construction Options/Equipment***		
					Impact/Hammer	*Vibratory/Sonic*	*Drilled*
Excavator	1	2	1	1	-	-	-
Backhoe	2	2	-	-	-	-	-
Bulldozer	1	1	-	-	-	-	-
Grader	1	1	-	-	-	-	-
Skid Steers	2	2	2	2	1	1	1
Compaction Machine	1	1	-	-	-	-	-
Crane - Mobile	1	-	2	2	1	1	1
Ballast Regulator	-	-	-	1	-	-	-
Tamper Machine	-	-	-	1	-	-	-
Semi-Trucks/hour	2	2	2	2	2	2	1
Concrete Pump Truck	-	1	2	-	-	-	1
Concrete Trucks/hr	-	2	4	-	-	-	2
Dump Trucks/hr	4	2	-	-	-	-	1
Generator	1	1	1	1	1	1	1
Vibratory Roller	-	-	-	1	-	-	-
Impact Pile	-	-	-	-	1	-	-
Sonic or Vibratory Pile-driving Rig	-	-	-	-	-	1	-
Drill Rig	-	-	-	-	-	-	1

2.3 Project Schedule and Roles and Responsibilities

The construction of the MSF is anticipated to commence in 2017 and is expected to be completed prior to the operation of the Finch West LRT corridor in 2021. The construction staging details for the MSF will be determined through the development of a construction staging plan for the overall Finch West LRT corridor. The Project will be implemented in accordance with the Infrastructure Ontario Alternative Financing and Procurement (AFP) Project Delivery Model. Roles and responsibilities of implementing the Project per the AFP Model are as follows:

Infrastructure Ontario..... oversees the procurement process and awards the project contract to a successful proponent.

Metrolinx..... owner of the asset; oversees executed contract components and negotiates with the successful proponent for alterations/changes to the asset during the contract period.

Successful Proponent..... project (asset) design, construction, maintenance and financing.

3. Existing Environmental Conditions

This section provides a description of the existing environmental conditions on the Finch West MSF site, and where appropriate, the surrounding lands that together comprise appropriate discipline-specific study areas. This section has been divided into the following environmental factors:

- Natural Environment
- Socio-Economic Environment
- Cultural Environment
- Traffic and Transportation.

Descriptions of existing conditions will serve as the basis for considering effects resulting from implementation of the Project (Preferred Design). Supplemental data on the characterization of existing conditions can be found in corresponding Appendices as noted in the sections below.

3.1 Natural Environment

3.1.1 Terrestrial Natural Heritage

The Terrestrial Natural Heritage study was conducted in accordance with the following legislative requirements, where required:

- *Environmental Protection Act*
- *Canadian Environmental Protection Act*
- *Ontario Water Resources Act*
- *Migratory Birds Convention Act*
- *Endangered Species Act; and*
- *Species at Risk Act (SARA).*

A background information review of terrestrial natural heritage features and functions located within and in the vicinity of the Finch West MSF site was conducted using the following secondary sources:

- Ontario Ministry of Natural Resources: Natural Heritage Areas Application (MNRF, 2014)
- City of Toronto Online Maps (2014)
- City of Toronto Official Plan (Toronto, 2010)
- Ontario Breeding Bird Atlas Website (BSC, et al., 2006)
- Significant Wildlife Habitat Technical Guide (MNR, 2000)
- Ontario Ministry of Natural Resources (MNR) Species at Risk in Toronto Region (MNR, 2013)
- Communications with MNRF Aurora District (2014); and,
- Communications with Toronto and Region Conservation Authority (TRCA) (2014).

Secondary source information was compiled and analyzed in order to characterize the terrestrial ecosystems, vegetation and wildlife in the vicinity of the site. In addition, correspondence was initiated with TRCA and MNRF to confirm that the information presented is current and to request any additional relevant information.

3.1.1.1 Study Area

Based on the review of available secondary source information and identification of data gaps, the study area for Terrestrial Natural Heritage was confirmed to comprise the property limits of the Finch West MSF site (core study area) (see **Figure 3-1**), allowing for focused field surveys. Field surveys were limited to the site property limits as there are urbanized, built-up areas to the east, south and west of the site, and the area north of the site within the hydro corridor consists of soccer fields that are in regular use. Areas outside of the core Terrestrial Natural Heritage study area (MSF site) were considered under the secondary sources reviewed, with relevant information noted in the sections below.

3.1.1.2 Methodology

The following field surveys were undertaken within the study area:

Site Reconnaissance Survey

A site reconnaissance survey was conducted on April 23, 2014 by qualified biologists to ground truth existing background data and gather initial information pertaining to the terrestrial, aquatic and surface water conditions of the study area. The terrestrial component to this survey included an inventory of all trees present within the study area. AECOM biologists identified all trees to species level and categorized each tree into size classes based on measured diameter at breast height (DBH) of each tree. Representative photographs of the vegetation present in the study area are documented in **Appendix B**.

Breeding Bird Survey

Breeding bird surveys were conducted on May 26, 2014 and June 2, 2014 by qualified biologists to identify birds present within the study area during the breeding bird season. The first survey was completed between 7:45 and 9:15 am on a sunny, clear and calm day. The survey was conducted by slowly walking within the study area while listening to and observing birds through binoculars. All birds observed or heard were recorded and then marked on an air photo field map. A point count survey was completed for any observed bird Species at Risk (SAR), which consisted of a ten minute listening and observation period. UTM co-ordinates of the point count location were recorded.

The survey on June 2, 2014 was completed between 7:30 and 8:45 am under sunny, clear and calm conditions. The walking survey was completed in the same manner as the first survey, although no point count was conducted. All observations were recorded on an air photo field map and can be found in **Appendix B**.

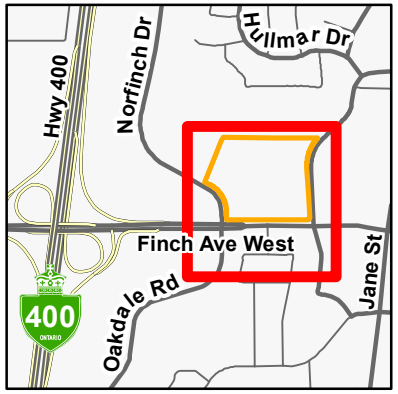
Vascular Plant Survey

An inventory of all vascular plant species observed within the study area was conducted April 23, 2014 and May 26, 2014. Plant species were considered rare if designated provincially as S1 (Critically Imperiled), S2 (Imperiled) or S3 (Vulnerable), or locally rare in the Greater Toronto Area (Varga 2000). Given the minimal vegetation cover in the study area, it was determined that an Ecological Land Classification (Lee et al., 1998) of vegetation communities was not required and that the tree inventory completed on April 23, 2014 in combination with the vascular plant survey was sufficient to characterize the terrestrial conditions of the study area.

Tree Location	Common Name	Species Name	No. of Specimens in Size Class (DBH in cm)			
			<5	5-10	10-20	>20
A	Russian Olive	*Elaeagnus angustifolia*	6	1		
B	White Elm	*Ulmus americana*				1
C	White Elm	*Ulmus americana*				1
D	Manitoba Maple	*Acer negundo*		1		
E	Bur Oak	*Quercus macrocarpa*	2		4	8
	American Basswood	*Tilia americana*	2	3	3	4
	Manitoba Maple	*Acer negundo*			1	1
F	Common Crabapple	*Malus pumila*		1	2	
	White Elm	*Ulmus americana*			1	
G	Bur Oak	*Quercus macrocarpa*				1
H	Hawthorn Species	*Crataegus sp.*	3	7	2	
I	Hawthorn Species	*Crataegus sp.*	6	4		
J	Common Crabapple	*Malus pumila*		2		
K	Hawthorn Species	*Crataegus sp.*	5	10		
L	Common Crabapple	*Malus pumila*				2
M	White Elm	*Ulmus americana*		3		
N	Privet Shrub Species	*Ligustrum sp.*	1			

Legend

- CB — Single Catch Basin
- 400mm Corrugated Steel Pipe
- Occassional Surface Drainage
- Rubble
- Tree Locations
- Property Limits for the MSF Site



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Finch West Light Rail
Maintenance and Storage Facility (MSF)
Environmental Assessment

Natural Environment Study Area: MSF Site Reconnaissance

July 2015

AECOM

Figure 3-1

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3.1.1.3 Description of Existing Conditions

The following sections describe the existing terrestrial environment conditions within the study area as determined through a combination of background information review and field surveys.

Woodland and Other Vegetated Areas

Generally, the study area consists of a degraded cultural meadow with a few hedgerows present in the northwest part of the property (refer to **Appendix B** for photos). The hedgerows are largely comprised of Bur Oak (*Quercus macrocarpa),* American basswood (*Tilia americana*) and hawthorn species (*Crataegus sp.*). Isolated trees of American Elm (*Ulmust americana*), Common Crabapple (*Malus pumila*) and Russian Olive (*Elaeagnus angustifolia*) are scattered through the cultural meadow. The majority of the trees recorded are within the 5 and 10 cm DBH size class, although several large Bur Oak trees (> 20 cm DBH) are present within the hedgerow. Refer to **Figure 3-1** for a listing of recorded trees on the property.

A total of 43 plant species was observed in the study area (refer to **Appendix B**). Of these, 22 plants (51%) observed are native species, while the remaining 21 (49%) are non-native species. All of the native plant species are ranked as S5 (Common in Ontario) and no provincially rare plants with ranking of S1-S3 are recorded. Overall, the study area supports a low diversity of native plants and a high degree of invasion by non-native species. These conditions are indicative of a poor quality habitat. Despite the generally low diversity of native plants, two locally rare plants and a locally uncommon plant were observed, Silky Dogwood *(Cornus amomum)*, Variable Thorn (*Crategus macrosperma*) and Fowl Meadow Grass (*Poa palustrus*) respectively.

Wetlands

According to the *Natural Heritage Areas Application* (MNRF, 2014), there are no wetlands mapped within or in the vicinity of the study area. No wetlands were observed during the field surveys; however, small patches (less than 0.5 ha in size) of wetland species are associated with the small depressions in the cultural meadow where shallow pools of water have formed. Wetland plant species recorded near these wetter areas include Reed Canary Grass (*Phalaris arundinacea*), Hybrid Cattail (*Typha glauca*), Fowl Meadow Grass (*Poa palustris)* and Red-footed Spike-rush *(Eleocharis erythropoda*). MNRF correspondence also confirmed no known wetlands.

Wildlife Habitat

Breeding Bird Surveys recorded a total of 12 bird species in the study area (refer to **Table 3-1**). Refer to **Figure 3-2** for locations of observed bird species. Most of the bird species are common to urban areas and tolerant of disturbance. Red-winged Blackbirds (*Agelaius phoeniceus)* were the most abundant bird species and were observed throughout the study area, including in the cultural meadow, perched on isolated trees and in the hedgerow. One nest was observed in the southeast portion of the study area with hatched eggs inside. The nest belonged to a pair of breeding Mallards (*Anas platyrhynchos)* although no adults were observed at the time of the survey (refer to **Figure 3-2** for locations); a pair of Mallards was observed on site on each of April 23 and June 2, 2014. During the site reconnaissance survey conducted on April 23, 2014, one male Canada Goose (*Branta canadensis*) was observed displaying aggressive behaviour suggesting that a nest was present nearby.

Table 3-1: Breeding Birds Recorded in the Study Area

Protected under the *Migratory Birds Convention Act*	Common Name	Scientific Name	Number of Individuals Observed	
			May 26, 2014	***June 2, 2014***
Yes	**Killdeer**	*Charadrius vociferus*	3	4
Yes	**American Robin**	*Turdus migratorius*	4	6
No	**Red-winged Blackbird**	*Agelaius phoeniceus*	9	19
Yes	**Savannah Sparrow**	*Passerculus sandwichensis*	3	0
No	**House Sparrow**	*Passer domesticus*	2	1
Yes	**Eastern Kingbird**	*Tyrannus tyrannus*	2	0
Yes	**Song Sparrow**	*Melospiza melodia*	1	1
Yes	**American Goldfinch**	*Spinus tristis*	1	0
Yes	**Eastern Meadowlark**	*Sturnella magna*	1	2
No	**European Starling**	*Sturnus vulgaris*	2	18
Yes	**Mallard**	*Anas platyrhynchos*	0 (hatched nest observed)	2
Yes	**Canada Goose**	*Branta canadensis*	1	0

During the May 26, 2014 survey, one male Eastern Meadowlark (*Sturnella magna)* was observed singing on top of an isolated American Elm tree and then taking off and flying south before landing in the cultural meadow within the study area (refer to **Figure 3-2** for location). A pair of Eastern Meadowlark was observed during the June 2, 2014 survey; they remained exclusively in the westerly part of the property and may have been nesting as they tended to return to the same spot when disturbed.

Eastern Meadowlark is designated as a Threatened species in Ontario and protected under the *Endangered Species Act (ESA) 2007.* This species prefers to nest in large tracts of tall grasslands with a high proportion of grass that is of moderate height (12.5 to 35 cm), moderate to high forb density and a low cover of woody plants (Hull, 2003). Eastern Meadowlark is also known to breed in anthropogenic grassland habitats including hayfields, weedy meadows and pastures (COSEWIC, 2011). The current cultural meadow is approximately 8 ha in size and comprised of approximately 80% grass species that are 20 to 30 cm tall and dominated by Canada Bluegrass (*Poa compressa*) and Orchard Grass (*Dactylis glomerata*) with lesser amounts of Timothy (*Phleum pretense*), Reed Canary Grass (*Phalaris arundinacea*), and Awnless Brome (*Bromus arvensis*). The remaining 20% consists of forb species, including goldenrods (*Solidago species*), Cow Vetch (*Vicia cracca*) and Canada Thistle (*Cirsium arvense*). It is likely that this cultural meadow is mowed annually based on the height of the grass observed during the survey.

The majority of the cultural meadow is disturbed and littered with garbage, and subject to typical urban traffic-related noise. For these reasons, the cultural meadow within the study area is considered to be marginally suitable as breeding habitat for Eastern Meadowlark. In Canada, it is known that males generally arrive earlier than females by two to four weeks and try to establish their territories in potentially suitable breeding habitats wherein feeding, mating and rearing of young would occur (COSEWIC, 2011). The second survey on June 2, 2014 confirmed the presence of two specimens exhibiting nesting behaviour in marginal habitat.

Other incidental wildlife observations recorded during the site visits include one Meadow Vole (*Microtus pennsylvanicus*) and one Clouded Sulphur butterfly (*Colias philodice*). Several Meadow Vole nests were noted throughout the cultural meadow. Both of these species are abundant and common in Ontario.

No suitable amphibian breeding habitat was observed during the site reconnaissance survey or the breeding bird survey. The study area is isolated from any woodland present in the vicinity as it is bordered by busy roads on the west, south and east property boundaries, which do not facilitate amphibian movement. Furthermore, although pools of water were observed in the undulating depressions throughout the cultural meadow, they are considered too shallow to support breeding amphibians.

Legend

- Mallard Hatched Nest
- Flight Path
- Property Limits for the MSF Site

Breeding Bird Codes

Code	Common Name	COSSARO Status
KILL	Killdeer	N/A
SOSP	Song Sparrow	N/A
AMRO	American Robin	N/A
EUST	European Starling	N/A
EAKI	Eastern Kingbird	N/A
HOSP	House Sparrow	N/A
SASP	Savannah Sparrow	N/A
RWBL	Red-winged Blackbird	N/A
EAME	**Eastern Meadowlark**	**THREATENED**
AMGO	American Goldfinch	N/A

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Breeding Birds

July 2015

AECOM

Figure 3-2

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Species at Risk (SARs)

Rare species include species with designations by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), species listed as SARs in Ontario by the Committee on the Status of Species at Risk in Ontario (COSSARO), as well as provincially ranked S1 (critically imperiled) to S3 (vulnerable) species. Natural Heritage Information Centre (NHIC) rare species records were searched for within one kilometre of the study area using the *Make a map: Natural Heritage Areas Application* (MNRF, 2014). A total of five provincially rare species have been recorded in the vicinity of the study area, including Eastern Ribbon snake which is designated as Special Concern (refer to **Table 3-2**). All of these records are greater than 50 years old and are therefore considered to be historical records. As mentioned, the study area has undergone significant urban development in the last 50 years and is currently bordered by busy roads, parking lots, as well as commercial and residential buildings. The study area itself consists of a disturbed cultural meadow, isolated trees and hedgerows that do not support suitable habitat for any of these species.

Table 3-2: NHIC Rare Species Records

Common Name	Scientific Name	COSEWIC	COSSARO	S rank	Date
Eastern Ribbon snake	*Thamnophis sauritus*	SC	SC	S3	1913
American Gromwell	*Lithospermum latifolium*	-	-	S3	1904
Shining-branch Hawthorn	*Crataegus magniflora*	-	-	S3	1955
Bowman's-root	*Gillenia trifoliata*	-	-	SX	1902
Painted Skimmer	*Libellula semifasciata*	-	-	S2	Unknown

Recent records (2001-2005) were obtained from the *Ontario Breeding Bird Atlas* (BSC, et al., 2006) within one 10 x 10 km^2 area (ID 17PJ14) in which the study area is located. There are records of confirmed breeding evidence for four Threatened and two Special Concern species, as well as one record of probable breeding for Chimney Swift, which is designated as a Threatened species, in the vicinity of the study area (refer to **Table 3-3**).

Table 3-3: Species at Risk Bird Records from Ontario Breeding Bird Atlas (2001-2005) 10 km x 10 km square 17PJ14

Common Name	Scientific Name	COSSARO	Breeding Evidence
Chimney Swift	*Chaetura pelagica*	THR	Probable
Eastern Wood-Pewee	*Contopus virens*	SC	Confirmed
Bobolink	*Dolichonyx oryzivorus*	THR	Confirmed
Barn Swallow	*Hirundo rustica*	THR	Confirmed
Wood Thrush	*Hylocichla mustelina*	SC	Confirmed
Bank Swallow	*Riparia riparia*	THR	Confirmed
Eastern Meadowlark	*Sturnella magna*	THR	Confirmed

According to the *Conservation Ontario Aquatic Species at Risk Distribution Mapping* (TRCA, 2013), there are no watercourses mapped in the study area (see **Section 3.1.2**) and there are no mapped habitats for aquatic SARs in the vicinity of the study area.

A request was issued to the TRCA and MNRF for information regarding known records of SAR within or adjacent to the study area on May 22, 2014. Responses from both MNRF and TRCA on May 23, 2014 indicated that there are no known records of SAR in the vicinity of the study area.

In order to ensure a comprehensive understanding of all SAR potentially occurring within the study area, a list of Species at Risk known to occur within the Region of Toronto was also obtained from the *Species at Risk: What's at Risk in My Area? Internet tool* (MNRF, 2013). A habitat assessment for each SAR was conducted during the field investigation to determine whether the species has the potential to occur in the study area based on the presence of

its respective suitable habitat. A complete list of all of the potential SAR identified through the background review of secondary sources, including their preferred habitat descriptions and their assessments of potential occurrences in the study area, is provided in **Appendix B**. A total of 23 potential SAR were identified. Of these, the cultural meadow in the study area was determined to be marginally suitable habitat for only Bobolink and Eastern Meadowlark. No other SAR were observed in the study area during any of the surveys.

Designated Areas

According to the *MNRF Natural Heritage Areas Application* (2014), there are no Areas of Natural and Scientific Interest (ANSIs), Environmentally Significant Areas (ESAs), Provincial Parks or Conservation Reserves in the vicinity of the study area. The study area is located outside of the Oak Ridges Moraine and the Greenbelt region.

Summary of Terrestrial Natural Heritage Existing Conditions

The key findings of the existing terrestrial environment conditions within the study area are as follows:

- Generally, the study area consists of a degraded cultural meadow with a few and narrow hedgerows in the northwest corner. Hedgerows consist primarily of Bur Oak, American Basswood and hawthorn species.
- There are no wetlands, ANSIs, ESAs, Provincial Parks or Conservation Areas present within or in the vicinity of the study area.
- Despite the degraded conditions in the study area, this site provides habitat for several breeding bird species. Migratory birds and their nests are protected under the *Migratory Bird Convention Act (MBCA) 1994*.
- Two locally rare plants and a locally uncommon plant were observed, Silky Dogwood *(Cornus amomum)*, Variable Thorn (*Crategus macrosperma*) and Fowl Meadow Grass (*Poa palustrus*) respectively.
- Eastern Meadowlark was observed during the two breeding bird surveys conducted to date, during breeding season and exhibiting nesting behaviours. This species is designated as Threatened and is therefore protected under the *Endangered Species Act*.

3.1.2 Surface Water and Aquatic Environment

In addition to the secondary sources reviewed as part of the characterization of the terrestrial environment, the following secondary sources were reviewed to characterize the surface water and aquatic environment:

- Stormwater Management Criteria, 2012 (TRCA, 2012)
- Conservation Ontario 2013 Aquatic Species at Risk distribution mapping (TRCA)
- The Humber River Watershed Report Card 2013 (TRCA, 2013)
- Toronto Green Standard (December 2010)
- Toronto Wet Weather Flow Management (WWFM) Guidelines (November 2006)
- Finch MSF Project Handover Report (TTC, 2012).

3.1.2.1 Study Area

Based on the review of available secondary source information and identification of data gaps, the study area for surface water and aquatic features was focused within the property limits of the Finch West MSF site (study area) (see **Figure 3-1**). Existing conditions within the study area for the surface water and aquatic environment are framed in the context of the broader Humber River watershed, where appropriate, in the sections below.

3.1.2.2 Methodology

As mentioned, a site reconnaissance survey was conducted on April 23, 2014 by qualified biologists to ground truth existing background data and gather initial information pertaining to the aquatic and surface water conditions of the MSF Site (refer to **Figure 3-1**). The aquatic and surface water component included a characterization of surface water drainage patterns. The location of identified storm drain gutters was also recorded and photographed.

3.1.2.3 Description of Existing Conditions

The study area is located in the Humber River Watershed, which covers a drainage area of 911 km^2 and is the largest watershed under the jurisdiction of the TRCA (TRCA, 2013). The Humber River Watershed is further divided into five subwatersheds. The study area is located within the Black Creek Subwatershed, which is almost entirely developed (TRCA, 2008).

According to the City of Toronto Online Maps (2014), there are no watercourses mapped within the study area. The nearest watercourses to the study area are Black Creek and a tributary of the Humber River, which are located approximately one kilometre east and 1.7 km southwest of the study area, respectively. The study area is located outside of the TRCA Regulated Area limits associated with Black Creek and Humber River.

No watercourses or significant drainage patterns were observed in the study area. The topography of the area is generally flat with slightly undulating and uneven terrain where water tends to pool in the small depressions. A single catch basin and a 400 millimetre (mm) corrugated steel pipe is located in the northeast corner and southwest corner of the study area, respectively (refer to **Figure 3-1** for locations; refer to **Appendix B** for photos). Overland drainage generally tends to flow in a southwest direction towards the southwest corner of the study area, and eventually discharging into the Humber River.

3.1.3 Geology and Groundwater Conditions

Geology and groundwater conditions on and in the vicinity of the MSF site were characterized based on a review of the following resources:

- Report on Preliminary Geotechnical Investigation – Road Widening, Finch Avenue West LRT. (Coffey Geotechnics Inc., 2011)
- Report to Toronto Transit Commission: Geotechnical Investigation TTC Contract No. TC002 Finch Avenue West LRT (Decommissioning Consulting Services Limited, 2009)
- Phase I Environmental Site Assessment: Elderbrook Development Site, Finch Avenue West, Toronto, Ontario. (SNC-LAVALIN, 2011)
- Phase II Environmental Site Assessment: Elderbrook Development Site, Finch Avenue West, Toronto, Ontario. (SNC-LAVALIN, 2011)
- Published geologic mapping from the Ontario Geological Survey, and others
- Ontario MOECC Water Well Database (http://www.gw-info.net/ - Accessed June 4, 2014)
- Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (Table 3) (MOECC, 2011); and,
- Humber River Watershed: Scenario Modelling and Analysis Report (TRCA, 2008).

3.1.3.1 Study Area

The Geology and Groundwater study area is defined by the MSF site property limits. Refer to **Figure 3-3** for the Geology and Groundwater study area mapping and features. Existing conditions for Geology and Groundwater are framed in the context of regional conditions (e.g., on the scale of kilometres), where appropriate, in the sections below.

3.1.3.2 Description of Existing Conditions

Physiography and Topography

The site is located within the Peel Plain physiographic region, which is bounded to the north, east and south by the South Slope physiographic region and by the Niagara Escarpment to the west (Chapman and Putnam, 1984). The Peel Plain covers an area of approximately 800 km^2 and is characterized by a level to undulating tract of clay soils that extends across the central portions of the Regional Municipalities of York, Peel and Halton in a northeast – southwest orientation. This feature represents the bottom of former Lake Peel, which was formed by meltwater that collected between the glacial ice front to the east and the Niagara Escarpment to the west (Karrow, 1983). Where the varved clays deposited in Lake Peel are absent, soils are comprised predominantly of Halton Till, a silt to silty clay, clast poor till (OGS, 2000). Ground elevations within the Peel Plain range from approximately 150 metres above sea level (mASL) to 230 mASL, and gradually slope in a southeast direction toward Lake Ontario. Locally, the topography is relatively flat, with an elevation change of less than 5 m occurring across the site (see **Figure 3-3**).

Geology

Regional geologic mapping indicates that bedrock of the Georgian Bay Formation occurs beneath the site. Bedrock of this formation is described as shale inter-bedded with siltstone and minor limestone (Sharpe, 1980). Two MOECC water well records reviewed within one kilometre of the site report a depth to bedrock (shale) of 51.2 m below ground surface (BGS) (Well ID 6905174, located approximately 430 m east of the site – see **Figure 3-3**) and 39.3 mBGS (Well ID 6905175, located approximately 920 northwest of the site – not shown on **Figure 3-3**), respectively. These two water well records represent the only deep borehole data available near the site. Both of these records also report a 3 to 7 m thick layer of permeable sediments (sand and/or sand and gravel) at the overburden/bedrock interface. Above this basal granular unit, the overburden soils are reported as being predominantly fine-grained (clay).

The regional stratigraphic framework of the overburden sediments can generally be described as (from oldest to youngest): Lower Deposits, Newmarket Till, Oak Ridges Moraine Deposits and Halton Till (Sharpe *et. al*, 2002a and b). Based on the proximity of the site to the mapped extent of the Oak Ridges Moraine, soils of this formation are not expected to be present locally. The Lower Deposits are generally comprised of the Scarborough Formation (fluvial-deltaic sand aquifer) (Karrow, 1967; Eyles, 1997), Sunnybrook Drift (silt and clay aquitard, deposited at base of a glacially dammed lake) (Eyles, 2002) and Thorncliffe Formation (sand and silty sand aquifer, glaciofluvial in origin). The Newmarket Till is sandy silt to silty sand aquitard, deposited sub-glacially. The Halton Till is a silt to silty clay, clastic poor till aquitard, deposited sub-glacially. The presence, thickness and extent of these deposits varies locally. Regional surficial geologic mapping indicates that the site is largely underlain by Halton Till (see **Figure 3-4**); however, fine-textured (silt and clay) glaciolacustrine deposits also are mapped immediately to the west of the site (OGS, 2003).

Legend

- Boreholes
- Groundwater Monitoring MOE Well ID 7054187 Locations
- Topographic Contour (5m)
- Property Limits for the MSF Site

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Geology and Groundwater Study Area: Topography, Boreholes and Wells

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Figure 3-3

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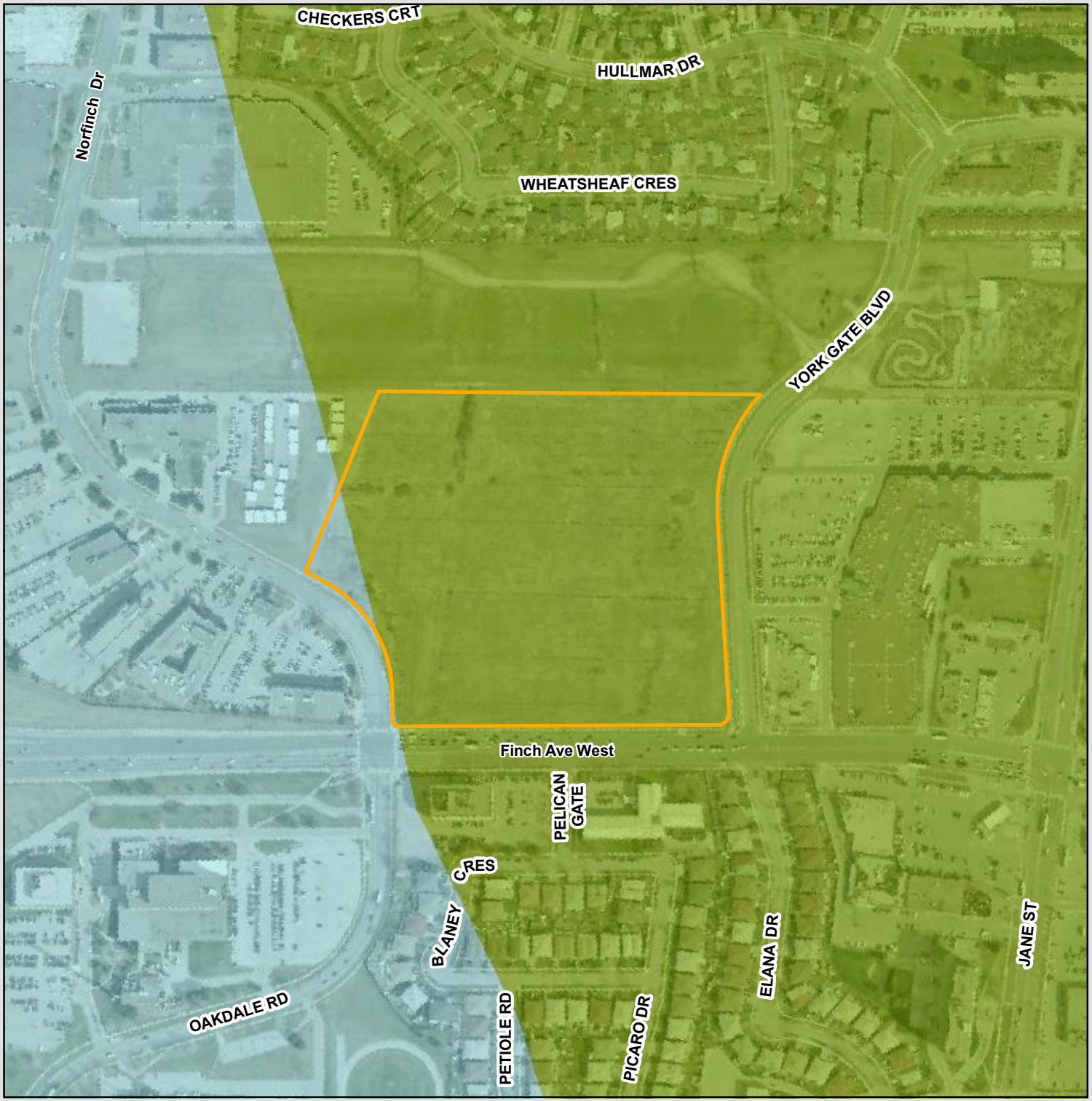

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Property Limits for the MSF Site

Surficial Geology

5b: Stone-poor, carbonate-derived silty to sandy till

8b: Interbedded flow till, rainout deposits and silt and clay

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Surficial Geology

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Figure 3-4

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During a Phase II Environmental Site Assessment (ESA) completed in 2011, 10 boreholes were drilled across the site to depths ranging from 4.6 m to 6.1 mBGS (SNC, 2011). Borehole locations are shown on **Figure 3-3**. Soils encountered during this drilling program included a surficial layer of clayey silt fill, underlain by sandy silt to clayey silt native (till) soils consistent with the Halton Till. The thickness of the surficial fill layer was reported to be relatively consistent within the boreholes at approximately 0.75 m, with exception of BH-108 located in the east-central component of the site where it was found to be about 3.1 m thick. A sand horizon was reported to occur within the till at BH-101 and BH-105, located in the northwest and central areas of the site, respectively. At BH-101, the sand unit was encountered at a depth of approximately 5.3 mBGS and extended to below the bottom of the borehole, whereas at BH-105 it was found to reside at a depth of approximately 4.6 m and be only about 0.3 m thick.

The MOECC water well record database contains one record for the site (7054187, **Figure 3-3**), which includes three monitoring wells installed to depths of 4.6 mBGS (2 wells) and 6.1 mBGS (one well). According to a Phase I ESA report prepared for the site (SNC, 2011), the monitoring well cluster is located in the southwest portion of the site (see **Figure 3-1** for location of each well). The record for of the wells describes the overburden as being comprised of silt till at all three locations.

Geotechnical drilling conducted for the TTC along Finch Avenue West as part of the overall Finch LRT Project included a borehole described as being 25.4 m west of Pelican Gate (BHF18-08, **Figure 3-3**). This borehole reported a sandy silt to silty clay till to a depth of 5.18 m (DCS, 2009). This is likely Halton Till. Similar drilling conducted for the TTC in 2011, showed that shallow sediments were silty clay (till) below fill in boreholes 116 to 121 (Coffey, 2011) (see **Figure 3-3**).

Hydrogeology

Based on a review of available borehole logs and MOECC water well record information, it is interpreted that the primary surficial overburden unit occurring locally is consistent with the Halton Till. The Halton Till is a major regional aquitard which possesses a low reported hydraulic conductivity ranging from 10^{-10} to 10^{-6} m/s (Sharpe *et al.*, 1996). Regionally, this glacial till deposit restricts groundwater flow and groundwater infiltration (i.e., recharge), confines deeper overburden aquifer units, and promotes runoff of surface water during even moderate rainfall events. Runoff is likely to greatly exceed recharge at this site.

A regional groundwater recharge estimate of 100 mm/yr is provided for infiltration through the local till soils in a TRCA modelling report prepared for the Humber River Watershed (TRCA, 2008). This is considered to be a reasonably approximate value for the till soils at the site. Groundwater discharge areas are not expected to occur locally, due to the presence of fine-grained till / fill soils at surface across the site. Based on the results of groundwater level monitoring completed at the site in 2011 (SNC, 2011), the shallow groundwater table is interpreted to reside locally at depths ranging between approximately 0.5 m and 1.5 m BGS.

On a regional basis, groundwater flow will be directed in a general southerly direction toward Lake Ontario. Locally, groundwater flow within the shallow subsurface likely will mimic surface topography and may include components of flow toward Black Creek, located approximately one kilometre to the east-southeast. The presence of granular bedding within sub-surface utility corridors may also serve to influence shallow groundwater flow patterns locally.

Based on the geologic materials identified, it is not expected that a significant regional aquifer is present within the shallow overburden soil underlying the Finch West MSF site. The site is located in an urbanized area that is serviced by municipal water and sewer (waste and storm) infrastructure. It is not anticipated that private groundwater supply wells are used locally as a primary source of potable or process water.

Soil and Groundwater Quality

A Phase I ESA was completed at the site in 2011 (SNC, 2011). The following information regarding the site was presented within the report:

- From at least the early 1950s to the 1960s, the site and surrounding properties either were forested or utilized for agricultural (crop cultivation) purposes.
- Commercial and residential development of surrounding properties began in the 1960s. This site is now surrounded by commercial properties to the east, south and west. A hydro corridor and outdoor recreational (soccer fields) facility is present to the north.
- Ground surface conditions were observed to be hummocky and overgrown. Historical air-photos indicate that potential soil mounds were present on the site during the 1970s and 1980s.
- During a site inspection completed as part of the Phase I ESA, gravel and asphalt piles were observed on the site along the Norfinch Drive property boundary and a truck trailer with wastes stored under it (metal fluorescent light casings, equipped with electrical connections; scrap wood and metal; clothing; food wrapping) was present in the southeast corner of the site.
- Three monitoring wells were observed on the site (MOECC ID 7054187) in the southwest portion of the site. The condition of the monitoring wells is not known.
- No soil or groundwater quality impacts were anticipated based on a review of current or historic land use activities adjacent to the site.
- The potential presence of imported soil and other materials represented a concern regarding the environmental condition of the site, due to their unknown origin.

The Phase I ESA recommended that a Phase II ESA be completed "*…to evaluate the quality of imported soil and any impacts to soil and groundwater on site*". Potential contaminants of concern identified by SNC included petroleum hydrocarbons (PHC F1 to F4), VOCs, polycyclic aromatic hydrocarbons (PAHs) and metals. Based on these recommendations, a Phase II ESA subsequently was completed at the site (SNC, 2011).

Investigative work completed during the Phase II ESA included the drilling of 10 boreholes at various locations across the site, as previously described and as shown on **Figure 3-3**. A temporary monitoring well was installed within each borehole to allow for the measurement of groundwater level data and to facilitate the collection of groundwater samples for laboratory analysis.

Subsurface soil quality also was evaluated through the collection of a minimum three samples from each borehole for laboratory testing. Subsurface soil samples were submitted for analysis of ICP metals, BTEX, PHC F1 to F4, PAHs, VOCs and/or pH based on the depth of sample collection.

Groundwater and soil samples collected from the boreholes of monitoring wells quality results were compared against the MOECC Table 3 (Full depth generic site condition standards in a non-potable groundwater condition) criteria for medium to fine-textured soil in an industrial/ commercial/ community land use setting, as described within the MOECC document, *Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act* (MOECC, 2004) and using the approach described within Ontario Regulation. 153/04. As requested by Metrolinx, the sample results also were compared against residential/parkland land use standards, as well as in consideration of the 2009 updated standard tables, which were scheduled to replace the 2004 standards in July 2011, shortly following completion of the Phase II ESA.

Based on the results of the Phase II ESA, the following results and conclusions were provided regarding the quality of soil and shallow groundwater across the site:

- The concentrations of all analyzed parameters in soil and groundwater were below the MOECC Table 3 standards for residential/ parkland property use (more stringent criteria than industrial/commercial/ community land use).

3.2 Socio-Economic Environment

The Socio-Economic Environment for this study includes the following environmental factors:

- Land Use Designations and Visual Character
- Community Features
- Noise and Vibration
- Air Quality

Potential effects (see **Section 4**) to existing conditions for Noise and Vibration, Air Quality and Land Use and Visual Character are closely tied to potential effects on Community Features[2] within the study area. Accordingly, effects to Community Features as defined in this study are most likely to affect local social and economic conditions (i.e., the Socio-Economic Environment). The inter-relationships of these environmental factors within the study area are described in further detail in the sections below.

3.2.1 Land Use Designations and Visual Character

The following secondary source information was reviewed to confirm the land use designations under the *Planning Act* that govern the site:

- Aerial Photography
- City of Toronto Official Plan (Toronto, 2010)
- City of Toronto Zoning By-law 569-2013
- Site-specific Official Plan and Zoning By-law policies
- City of Toronto Neighbourhood Profiles
- Finch MSF Project Handover Report (TTC, 2012)
- Finch MSF Preliminary Planning Review (Walker, Nott, Dragicevic, 2008).

For the visual assessment, photographs from key off-site viewpoints were taken to contextualize the site from permitted land uses and associated community features (see **Section 3.2.2.2**)

3.2.1.1 Study Area

The policies of the *City of Toronto Official Plan* and the regulations of the City of Toronto Zoning By-law 569-2013, and North York Zoning By-law No. 7625, as amended, govern the Project Site (MSF site) and performance standards for development thereof. Therefore, the study area for the land use designations consists of the MSF site. The study area for the visual assessment consists of the MSF site as seen from key viewpoints located within properties adjacent to the site. The study area is framed in the context of adjacent land use up to 500 m from the site limits where noted below.

2. *Effects to traffic existing conditions are also tied to effects on Community Features (see **Section 3.4** for traffic existing conditions and **Section 4.3** for Traffic Impact Assessment)*

3.2.1.2 Description of Existing Land Use Policy

The Official Plan policies applying to adjacent lands up to 500 m from the site limits are provided in the descriptions below to frame the development of the site within the adjacent neighbourhood policy context.

City of Toronto Official Plan, 2010

The Toronto Official Plan designates the MSF site as 'Neighbourhoods' on the northern portion of the site, and 'Mixed Use Areas' on the southern portion of the site (see **Figure 3-5**).

The Site is located within an 'Avenues' corridor (Toronto Official Plan, 2010). Section 2.2.3 of the Official Plan defines 'Avenues' as follows:

> *".important corridors along major streets where reurbanization is anticipated and encouraged to create new housing and job opportunities while improving the pedestrian environment, the look of the street, shopping opportunities, and transit service for community residents".*

Other policies within the Official Plan that may be considered most applicable to the MSF site development will include those pertaining to Public Realm (Sections 3.1.1.5 and 3.1.1.6), Built Form (3.1.2.1), Parking and Access (3.1.2.2), and Performance Standards (Section 4.5.2.e/f).

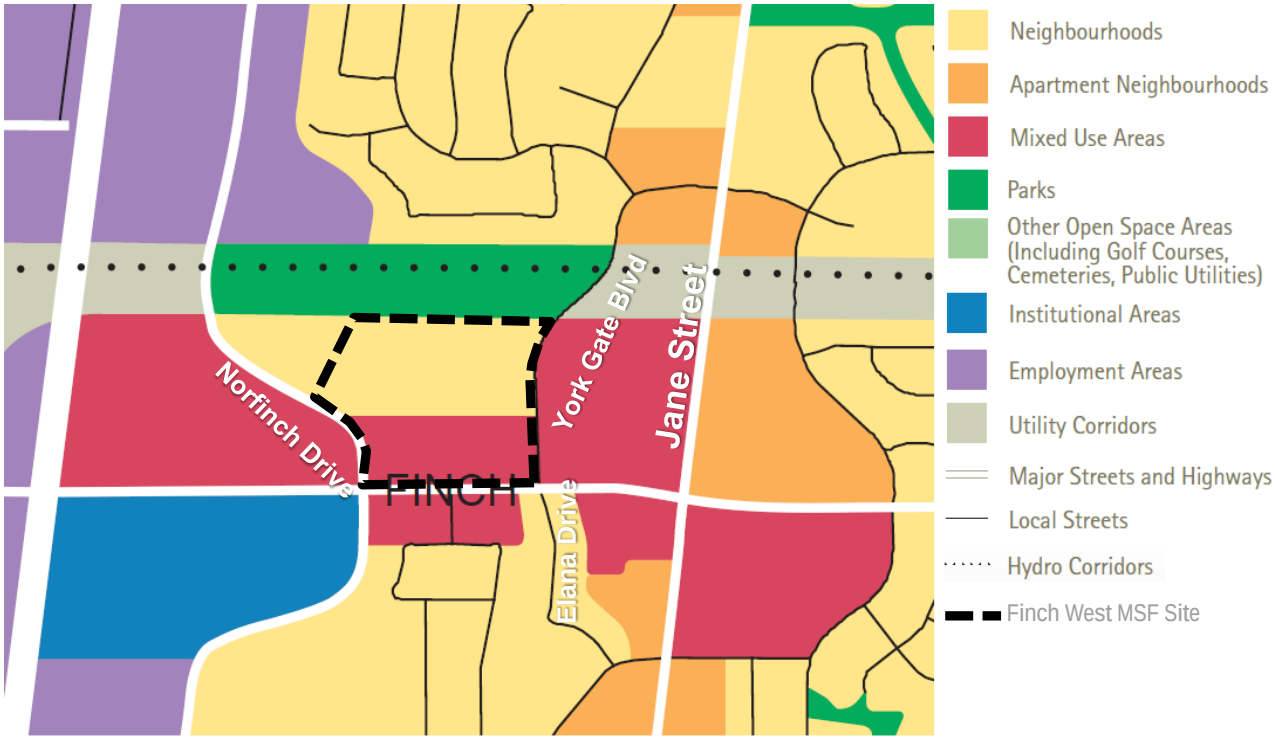


Figure 3-5: Land Use Designations: City of Toronto Official Plan

City of Toronto Zoning By-Law 569-2013

On May 18, 2011, Toronto City Council repealed the former city-wide Zoning By-law 1156-2010, directing staff to meet with all By-law appellants and return to Council with a revised version. Subsequently, City of Toronto Zoning By-law 569-2013 was enacted by Toronto City Council on May 9, 2013.

Within the City of Toronto Zoning By-law 569-2013, the MSF site is defined as a RA (Residential Apartment) Zone, with a provision to refer to a prevailing City of Toronto By-law 1099-2006 (Ontario Municipal Board (OMB)).

Accordingly, City of Toronto By-law 1099-2006 (OMB) amends the former City of North York Zoning By-law No. 7625, and permits land uses on the site in accordance with the RM2 and RM6 zoning categories. Both the RM2 and RM6 zoning categories permit mainly residential type uses.

With the above in mind, the *Finch MSF Project Handover Report* (TTC, 2012) was reviewed. According to the Report, an LRV Maintenance Facility and Yard, is deemed to be an "Essential Service" under the former North York Zoning By-law 7625, and may be permitted on the site as zoned RM2 and RM6. This was confirmed by the City of Toronto Building Department through a permitted use review (Walker, Nott Dragicevic, 2008).

Adjacent Land Use Designations

According to the City of Toronto Official Plan, a 'Parks' designated area is located to the north, and directly adjacent to the site. On the west side of Norfinch Drive, directly west of the site, the OP defines a 'Mixed Use Area'. 'Mixed Use Areas' are also located on the south side of Finch Avenue West and east side of York Gate Boulevard, also adjacent to the site. An 'Institutional Area', which permits major health, educational, governmental, and cultural facilities along with other recreational and religious facilities can be found in the southwest quadrant of the Finch Avenue West and Norfinch Drive intersection, immediately southwest of the site. A 'Neighbourhoods' area extends southeast of the site from Finch Avenue West along Elana Drive.

Slightly further afield, the following permitted land uses are present:

- 'Neighbourhoods', north of the existing hydro corridor, and south of the 'Mixed Use Area' on the south side of Finch Avenue West
- 'Apartment Neighbourhoods', allowing medium-high density residential use, retail, and local parkettes, can be found slightly further northeast, southeast, and east of the site
- 'Employment Areas', generally permitting industrial and commercial type uses, including warehouses and manufacturing facilities, can be found further northwest and southwest of the site
- Highway 400 is immediately west of the 'Mixed Use Area' on the west side of Norfinch Drive
- The southwest and southeast quadrants of the Jane Street and Finch Avenue West intersection, southeast of the site, include a 'Mixed Use Area' composed of existing strip malls.

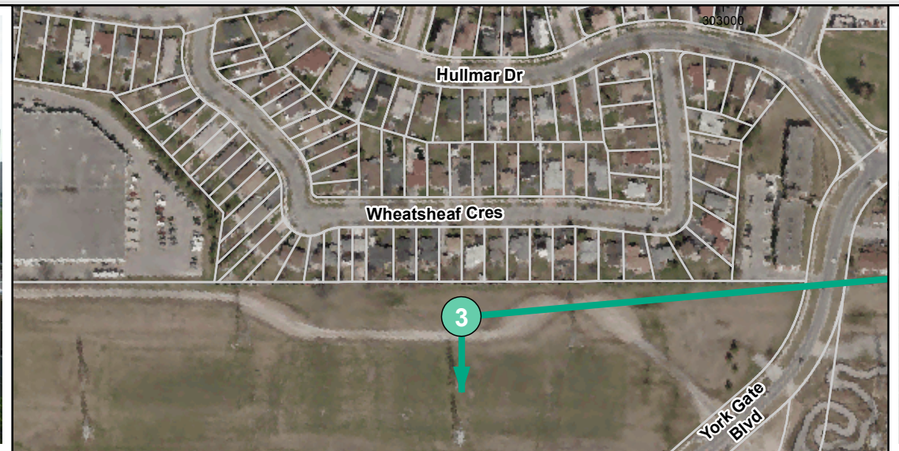
Of note, the Parks and Other Open Space designations to the north of the site permit a variety of public uses, including public transit.

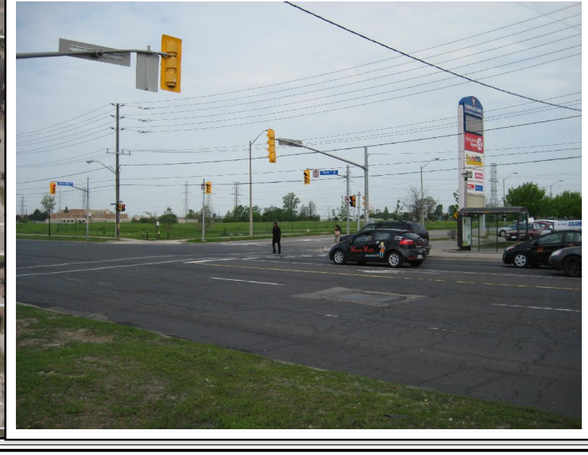
3.2.1.3 Description of Existing Visual Character

The visual character of the site was determined from the following key viewpoints as illustrated in **Figure 3-6**.

- **Key Viewpoint #1: Looking Northeast**
  - Elevated, from an existing medical building on the northwest corner of the Finch Avenue West and Norfinch Drive intersection
  - Street level, from the northeast corner of the Finch Avenue West and Norfinch Drive intersection.

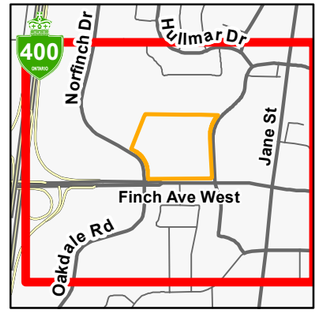
  From this viewpoint, the length of the MSF site is visible, and the hydro corridor and existing apartment buildings are visible in the background. A significant amount of litter in the vicinity of the sidewalk at the southwest corner of the site is also visible.





Legend

- Key Viewpoints
- Property Limits for the MSF Site
- Parcels



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Finch West Light Rail
Maintenance and Storage Facility (MSF)
Environmental Assessment

Existing Visual Character for the MSF Site

July 2015

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Figure 3-6

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- **Key Viewpoint #2: Looking East**
  - Elevated, looking from hotel on the west side of Norfinch Drive in the vicinity of Monsignor Fraser College

  From this viewpoint, the MSF site is visible, including clearly visible existing hedgerows on site. Temporary classrooms as part of Monsignor Fraser College are also visible in the foreground. The hydro corridor, York Gate Mall, and existing apartment buildings are all visible in the background.

- **Key Viewpoint #3: Looking South**
  - Ground level, from the property boundary of existing residences north of the adjacent Hydro Corridor

  From this viewpoint, the MSF site is visible, leaving an unobstructed view of the existing medical buildings on the south side of Finch Avenue West in the background. The hydro corridor, multi-use trail, and some soccer fields are all visible in the foreground.

- **Key Viewpoint #4: Looking Northwest**
  - Street level, from the intersection of Elana Drive/York Gate Boulevard/Finch Avenue West

  From this viewpoint, the MSF site and the hedgerows on-site are visible in the background. Signalized intersection features, other utilities, and retail signage associated with York Gate Mall are all visible in the foreground.

- **Key Viewpoint #5: Looking North**
  - Street level, from Pelican Gate in the vicinity of a retirement residence.

  From this viewpoint, the MSF site (including the on-site hedgerows) is visible in the background, as well as the adjacent Hydro Corridor. Some utility structures and medium sized street trees along the north side of Finch Avenue West are also visible in the foreground.

Summary of Existing Visual Character

Overall, the existing site is a relatively flat (approximately 3 to 5 m elevation change, sloping downhill in a general northeast to southwest direction), open field including sparse and/or disturbed on-site vegetation. Additionally, the site is littered with garbage that can be viewed from adjacent pedestrian sidewalks. Immediately north of the site is an existing 44 kV hydro corridor with towers that are approximately 30 m tall. Due to the lack of on-site development (i.e., existing buildings) and on-site vegetation, and gradual minor elevation change, the views across the site to adjacent land uses are relatively unobstructed from most viewpoints. A few large trees in the north-central portion of the site may partially obstruct views in that location.

The key viewpoints were developed in consideration of the potentially most sensitive receptors from a visual perspective, and to assist other technical disciplines for the proceeding impact assessment. Key viewpoints were also subject to refinement as a result of consultation, and used in the production of conceptual renderings for the purposes of the visual impact assessment (see **Section 4.2.2**). Additional photos of the site can be found in **Appendix B**.

3.2.2 Community Features

This section characterizes the presence and location of community features that may have potential to be affected by the construction and operation of the Finch West MSF site. This community features characterization was

prepared using secondary sources and information gathered during desktop research, which was verified and expanded upon during a field reconnaissance visit. Community features can be characterized as:

- Residences (including demographic info)
- Businesses (Retail and Commercial)
- Institutions (schools and day care facilities, hospitals, care homes or health facilities, religious buildings/places of worship (including cemeteries)
- Indoor and outdoor recreation facilities

Where active, community groups and business groups also contribute to the community features.

The secondary sources reviewed included:

- Aerial photography
- City of Toronto Site plans
- City of Toronto Website
- Property ownership data
- Statistics Canada Ward Profiles
- City of Toronto Neighbourhood Profiles
- Tourism Toronto and other community and business group websites.

An assessment to determine the presence of existing utilities and municipal services within the MSF site was also completed.

3.2.2.1 Study Area

The community features study area is presented in **Figure 3-7** below. The study area includes community features adjacent to an area bounded by Norfinch Drive to the west, Jane Street to the east, Finch Avenue West to the south, and within or adjacent to the hydro corridor to the north. This study area was chosen because it includes those properties adjacent to open spaces and major roads in the vicinity of the site that are most likely to be affected by project construction and operations (e.g., receptor points for noise or dust, or traffic related impacts, including potential lane closures). The study area for the assessment of existing utilities and municipal services was limited to the MSF site.

Field Investigations

A field visit was conducted on May 27, 2014 to verify the findings of the study area secondary source review.

3.2.2.2 Description of Existing Conditions

Demographics

The MSF site is located within the neighbourhood of Black Creek in the ward of York West (Ward 8). This ward has an increasing population (an increase of 4.4% between 2006 and 2011) and has a lower median age than that of Toronto (33 years compared to 39). This community has a higher than average amount of lone parent families (36% compared to 21% for all of Toronto) and a lower than average number of households where the mother tongue is English (44% compared to 51%). Other than English, the most commonly spoken languages are Spanish and Italian (City of Toronto, 2014). Within the community of Black Creek, Vietnamese and Spanish are the most common non-official mother-tongue languages (City of Toronto, 2013). The most commonly found private dwellings are apartments of more than five storeys.

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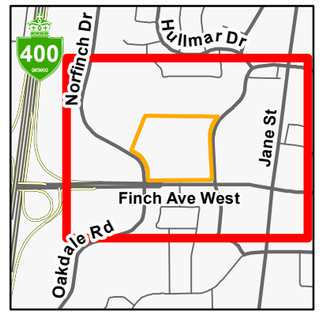
Wheatsheaf Cres
Hullmar Dr
York Gate Blvd
Stong Crt
Norfinch Dr
San Roccoway
San Romanoway
Jane St
Finch Ave West
Pelican Gate
Blaney Cres
Oakdale Rd

Legend

- Property Limits for the MSF Site
- Community Features Study Boundary
- Parcels



* Study area includes all socio-economic features within and adjacent to Boundary

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Community Features Study Area

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Figure 3-7

Community Groups

There are a number of community groups and facilities within the Black Creek community including the Black Creek Community Health Centre, the Jane/Finch Community and Family Centre, Vietnamese Association of Toronto and Y-Connect Youth Services (www.jane-finch.com). These services and groups are committed to helping and improve the quality of life for those living in this area.

Business Groups

There is currently no designated Business Improvement Area (BIA) in the study area. Emery Village BIA, which is located to the west of Highway 400, generally including the lands between Wilson Avenue and Steeles Avenue, is adjacent to the study area. Emery Village BIA is the largest BIA in the City of Toronto, employing over 25,000 full and part-time employees (City of Toronto, 2014). Key concerns raised by this group include modifications to traffic and travel through the area west of Highway 400 as a result of the Finch LRT that are perceived to create both short and long term implications for businesses along the future LRT route.

Residences

There is a row of homes located to the north of the site on Wheatsheaf Crescent as well as a high rise apartment building at the corner of Jane Street and Finch Avenue West. The residential area found to the south of the site is accessed via Pelican Gate and Elana Drive. None of these homes front onto any of the major thoroughfares, however there are two homes at the intersection of Elana Drive and Finch Avenue West that side onto Finch Avenue West. The aforementioned apartment building is located at a busy intersection but is set back from the road on a grass lot. The homes on Wheatsheaf Avenue back onto the City of Toronto's Remberto Navia Sports Field and the Finch Hydro Corridor trail.

Socio-Economic Features Inventory

Table 3-4 below lists the business, institutions, and recreational features (socio-economic features) in the study area and their approximate distances from the MSF site property boundary. The existence and location of all features have been verified by a site visit.

Table 3-4: Socio-Economic Features Inventory

Map #	Name of Feature	Type of Feature	Details	Approximate Distance from MSF Property Boundary (m)
1	Norfinch Medical Centre	Institutional	Family doctors	70
2	Tastee Foods	Retail	Café/restaurant	45
3	Leisureworld Caregiving Centre	Institutional	Senior long term care home	100
4	Holiday Inn Express	Commercial	Hotel	130
5	Toronto Police 31 division	Institutional	Police Station	165
6	Best Western Hotel	Commercial	Hotel (formerly Travelodge)	235
7	Comfort Inn Toronto North	Commercial	Hotel	275
8	Monsignor Fraser College – Norfinch Campus	Institutional	Alternative and Adult Secondary School, includes Norfinch Adult Education Centre. Part of the Toronto Catholic District School Board.	150
9	Dorplex	Industrial	Manufacturers of residential doors.	330
10	Canadian Linen and Uniform Service	Industrial	Providers of uniforms and linens to hospitality and healthcare industry.	200
11	Finch Corridor Recreation Trail	Recreational	Multi use recreation trail	120
12	Remberto Navia Sports Field	Recreational	City-operated sports field, includes soccer pitches.	55

Map #	Name of Feature	Type of Feature	Details	Approximate Distance from MSF Property Boundary (m)
13	Yorkgate Mall	Retail	Mall – major retailers include No Frills, Designer Depot and LCBO.	145
14	Y-Connect Youth services - Griffin Centre	Institutional	Counselling and support services for youth aged 15-24 in Jane & Finch area.	380
15	Esso	Commercial	Gas station	210
16	Jane Finch Mall	Retail	Plaza, includes Shoppers Drug Mart, Tim Hortons, McDonald's and Price Chopper.	410
17	Petro Canada	Commercial	Gas station	235
18	Norfinch Shopping Centre	Retail	Plaza, includes Subway, Pizza Hut and Mac's Milk	145
19	Hawthorne Place Care Centre	Institutional	Long term care home – also referred to as Yorkview Lifecare Centre	60
20	Oakdale Professional Medical Centre	Institutional	Multi-tenant medical building, includes diagnostic laboratory, dentist, family doctors and pharmacy.	60
21	Humber River Hospital	Institutional	Acute care hospital, includes emergency department.	225

Figure 3-8 shows the location of the identified features within the study area and in relation to the Finch West MSF site and surrounding residential areas.

Summary of Existing Socio-Economic Features

A number of commercial, institutional and retail buildings are located in the vicinity of the MSF site.

The Humber River Hospital is a significant feature with a substantial footprint to the southwest of the MSF site. Access and egress for emergency vehicles will need to be considered to avoid increased response times.


Humber River Hospital

Hawthorne Place Care Home – Finch Avenue


Monsignor Fraser College

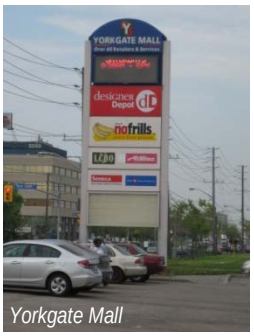
Other institutional buildings are located within the immediate vicinity of the hospital with care homes on Finch Avenue West and Norfinch Drive as well as a number of other medical offices such as family doctors, dentists and pharmacies.

The area along Norfinch Drive contains mostly commercial buildings including a number of hotels and commercial units. Also on Norfinch Drive is the Monsignor Fraser College, which is found directly to the northwest of the site and will share a boundary with the MSF site.

Remberto Navia Sports Field

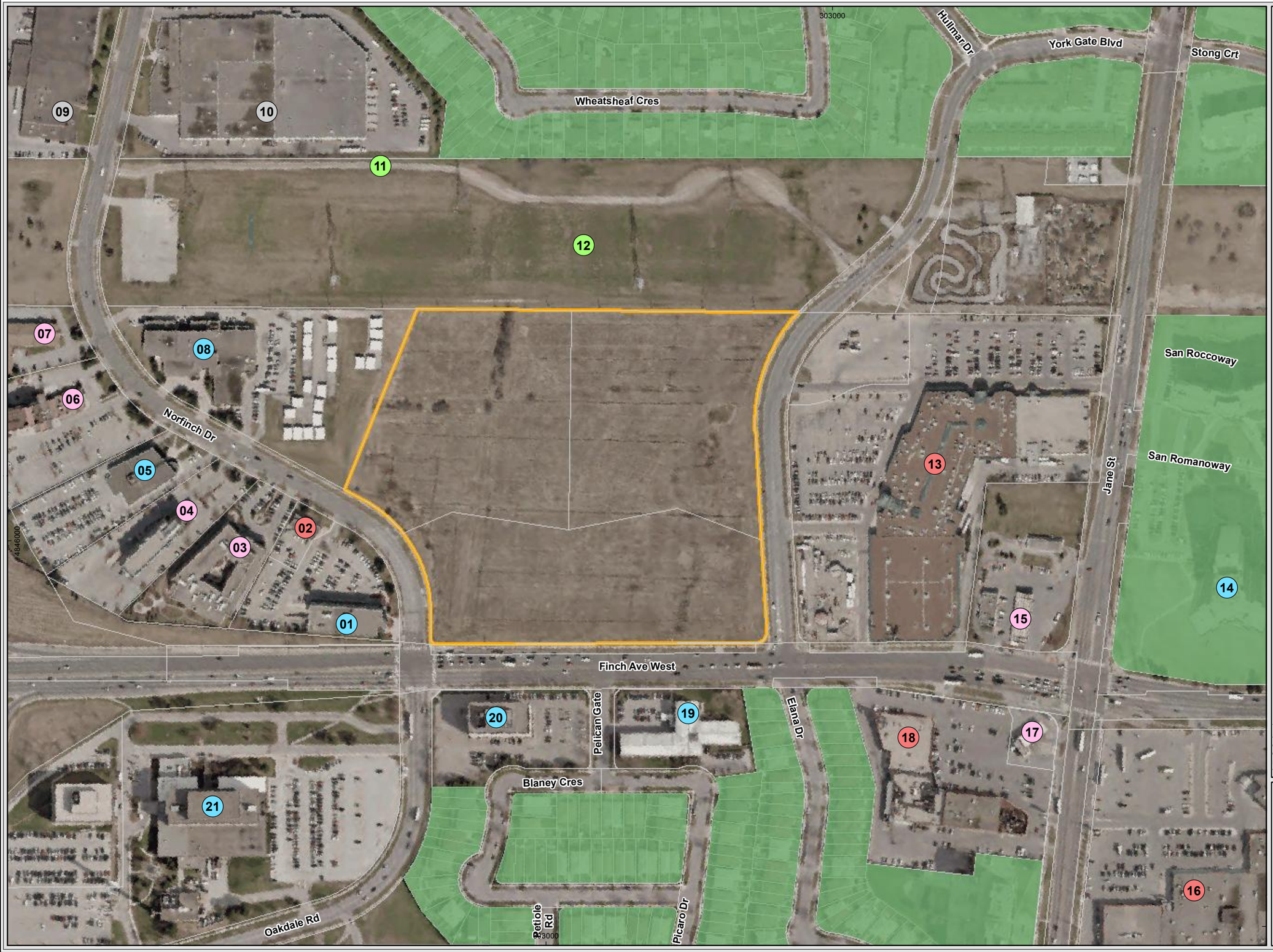
The Remberto Navia Sports field spans the entire width of the area between Norfinch Drive and York Gate Boulevard and borders the MSF site to the north. This contains recreation facilities such as soccer pitches and the Finch Hydro corridor recreational trail located on the north side of the sports field.

Retailers are almost entirely found along Finch Avenue West and are located within the Jane and Finch Mall (an outdoor plaza); and the Yorkgate Mall (an indoor shopping mall).



Yorkgate Mall

Finch Hydro Corridor Recreation Trail

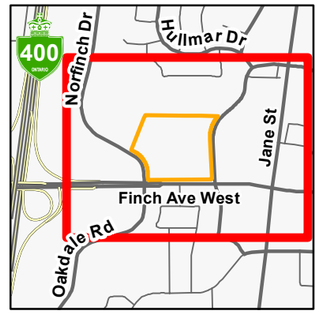


Legend

- Property Limits for the MSF Site
- Parcels
- Residential Areas

Socio Economic Feature Type

- Commercial
- Industrial
- Institutional
- Recreational
- Retail



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Finch West Light Rail
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Existing Socio-Economic Features

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Figure 3-8

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Utilities and Municipal Services

A review of existing information revealed that any utilities or municipal services were located in proximity to, or adjacent to, the site boundary. The following describes the location of municipal services and utilities in the proximity of the MSF site:

Municipal Services: Watermain

- A 1,500 mm diameter transmission main runs north/south along Oakdale Road turning east and running along the south side of Finch Avenue West.
- A 300 mm diameter Cast Iron (CI) watermain runs north/south along the east side of Oakdale Road and Norfinch Drive.
- A 300 mm diameter Polyvinyl Chloride (PVC) watermain tees off the 300 mm diameter CI watermain running east/west along the south side Finch Ave terminating between Oakdale Road and Pelican Gate.
- A 450 mm diameter watermain runs east/west along the North side of Finch Avenue West.
- A 300 mm diameter Ductile Iron (DI) watermain runs north/south along the east side of Pelican Gate.
- A 300 mm diameter CI watermain runs north/south along the east side York Gate Boulevard and Elana Drive.

Municipal Services: Storm Sewers

- A 675 mm diameter concrete Storm Sewer runs north/south along the centerline of Oakdale Road terminating on the north side of Finch Avenue West.
- A 675 mm diameter concrete Storm Sewer runs east/west along the north side of Finch Avenue West from Pelican Drive to York Gate Boulevard.
- A 375 mm diameter concrete Storm Sewer runs north/south along the centerline of Elana Drive terminating on the south side of Finch Avenue West.
- A 1650 mm diameter concrete Storm Sewer runs north/south along the east side York Gate Boulevard turning east and running along the north side of Finch Avenue West.

Municipal Services: Sanitary Sewers

- A 300 mm diameter Asbestos Concrete (AC) sanitary (Sani) Sewer runs north/south along the centreline of Oakdale Road and Norfinch Drive.
- A 250 mm diameter concrete Sani Sewer runs east/west along the north side of Finch Avenue West from Pelican Gate to Yorkgate Boulevard.
- A 300 mm diameter AC Sani Sewer runs north/south along the centreline of Yorkgate Boulevard and Elana Drive.

Communications Services

- Buried Bell and Rogers ducts going north on east side of Norfinch Drive.
- Buried Bell ducts going north on west side of Norfinch Drive.
- Existing buried Bell ducts on north side of Finch Avenue West crossing to south side of Finch Avenue West at Pelican Gate (from Norfinch Drive to Pelican Gate).
- Existing Bell and Rogers ducts on the north side of Finch Avenue West (from Norfinch Drive to York Gate Boulevard).
- Aerial Cogeco and Rogers Cable on Hydro Poles on north side of Finch Ave. W. (from Norfinch Drive to York Gate Boulevard).

Energy Services

- Buried 760 mm Enbridge Gas Pipeline north of the site within the Hydro Corridor right-of-way
- Buried ~250 mm Sarnia Pipeline north of the site within the Hydro Corridor right-of-way
- Buried 6 inch Polyethylene (PE) Intermediate Pressure (IP) Gas main duct going north on east side of Norfinch Drive and crossing to the west side and connects to existing 6 inch Steel IP Gas main duct going north/south on west side of Norfinch Drive.
- Buried 6 inch PE IP Gas Main duct on north side of Finch Ave. W. (from Norfinch Drive to Pelican Gate). At Pelican Gate it connects to a 4 inch Steel IP Gas Main duct going to York Gate Boulevard.
- Buried 6 inch Steel IP Gas main duct going north on west side of York Gate Blvd. and connecting to existing 4" Steel Gas main at Finch Avenue West.
- Buried Streetlight ducts going north on west side of Norfinch Drive.
- Hydro aerial plant on Hydro Poles on north side of Finch Ave. West (from Norfinch Drive to York Gate Boulevard).
- Buried Hydro/Street light plant going north on west side of York Gate Boulevard.

3.2.3 Noise and Vibration

The areas surrounding the MSF site were reviewed for noise sensitive areas. Aerial photography and zoning maps were used as part of this review. MOECC Environmental Noise Guideline for Stationary and Transportation Sources, publication NPC-300, and MOEE/TTC Draft Protocol for Noise and Vibration Assessment for the Proposed Scarborough Rapid Transit Extension (May 11, 1993, referred to as MOECC/TTC Protocol) were consulted as secondary sources of information, and as guidance for determining noise sensitive areas. There is some vacant land to the north of the proposed Facility. These lands are zoned for utility (hydro corridor) and open space – recreational type, and will not be redeveloped into noise sensitive land uses.

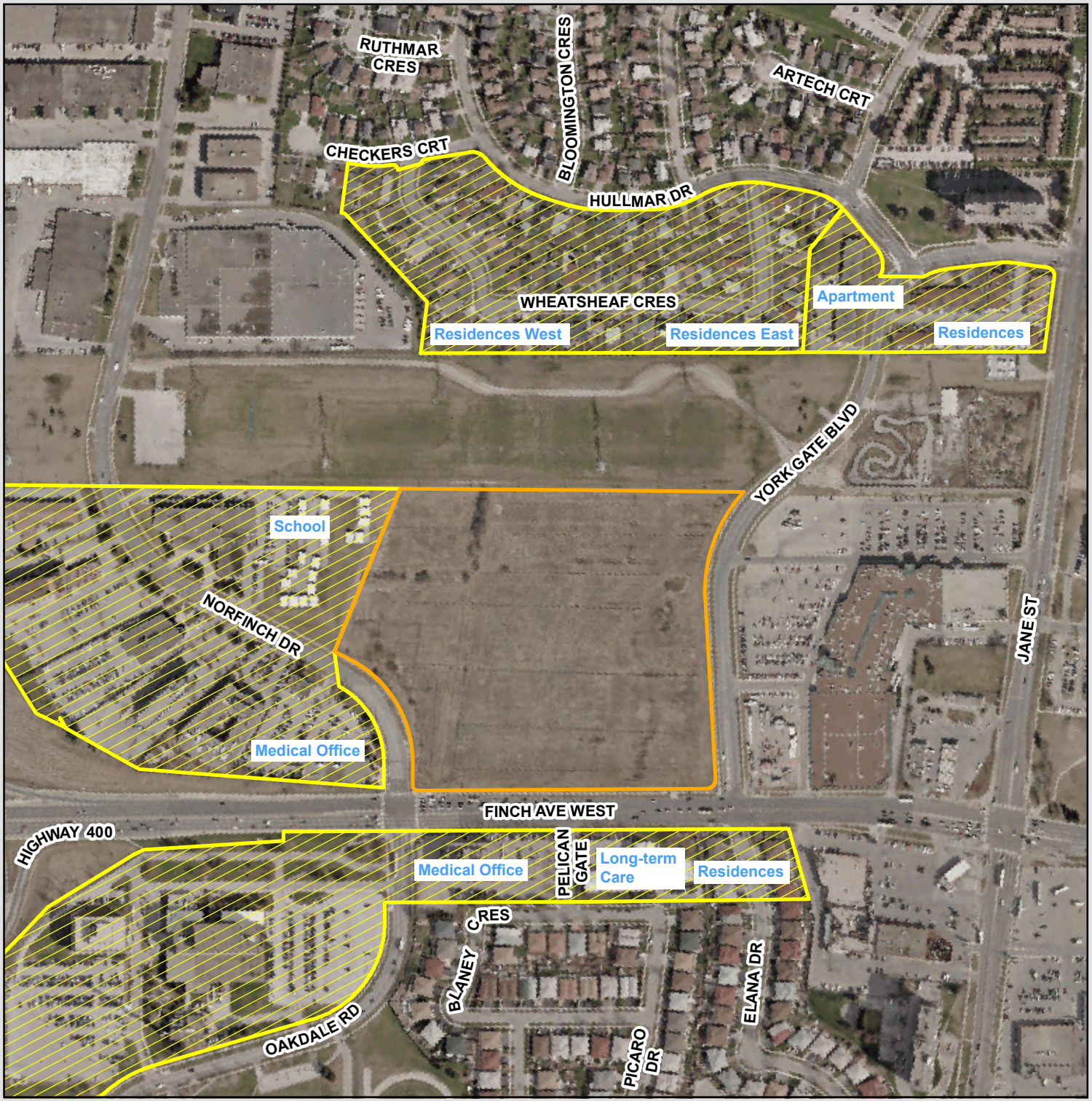
Selection of noise sensitive areas was based on the guidance provided in the MOECC/TTC Protocol, which references a MOECC noise guideline that has been superseded by MOECC publication NPC-300. The proximity of a noise sensitive area to the facility is a large factor in the noise impact level. Areas further removed from the facility than the nearest noise sensitive areas will receive lower noise impacts. NPC-300 defines noise sensitive areas as:

- Residential dwellings
- Commercial noise sensitive buildings (hotels, motels)
- Institutional noise sensitive buildings (nursing homes, schools, hospitals, daycares, etc.).

There are no nearby spaces identified as being affected only by vibration. Therefore, vibration sensitive areas for this assessment are identical to noise sensitive areas.

3.2.3.1 Study Area

The noise and vibration study area (see **Figure 3-9**) was developed based upon the proximity of noise and vibration sensitive receptors to the subject project site. As noise and vibration levels decrease with increasing distance and shielding provided by obstacles, noise and vibration sensitive areas closest to the project site will receive the highest project related noise and vibration levels and therefore will be the worst case locations for assessment. Noise and vibration sensitive areas further removed from the project site will receive lower noise and vibration levels.



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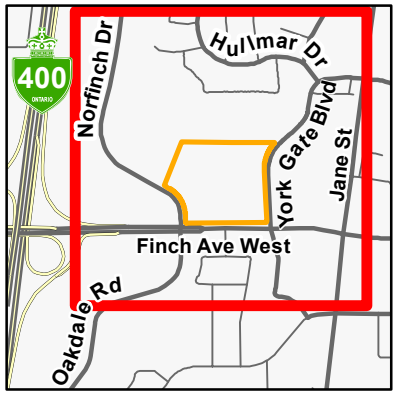
- Noise and Vibration Sensitive Areas
- Property Limits for the MSF Site



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Environmental Assessment

Noise and Vibration Study Area: Noise and Vibration Sensitive Areas

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Figure 3-9

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Areas qualifying as noise and vibration sensitive are defined in MOECC noise guideline NPC-300 and the MOEE/GO Transit Noise Protocol. The area surrounding the project site was reviewed for noise and vibration sensitive areas using aerial photography, public street level photography, and zoning maps. The closest noise and vibration sensitive areas which constitute the extent of the study area are as follows:

- Along Finch Avenue West (South)
- Along Norfinch Drive (West)
- Along Jane Street and York Gate Boulevard (East)
- Along Wheatsheaf Crescent (North)

3.2.3.2 Methodology

Field Investigations

Ambient noise monitoring was conducted between May 16, 2014 and May 21, 2014 at locations representative of noise sensitive areas (see **Figure 3-10**). Monitoring of the identified noise sensitive areas was conducted using Quest SoundPro DL-1 sound level meters. Noise monitors were mounted to an existing structure (telephone/lamp poles) approximately 3 m above ground level.

Vibration monitoring was conducted between May 16, 2014 and May 27, 2014. Monitoring was conducted using Instantel Blastmate II and Minimate Plus vibration monitors. Monitors were installed in ground, in close proximity to noise level monitors (refer to **Figure 3-10**).

Table 3-5 presents the correlation between noise sensitive areas and monitoring locations below. To avoid short term, high impact noise from the police station on Norfinch Drive as per NPC-300 guidelines, Location 1 and 2 monitors were used to represent the noise sensitive area along Norfinch Drive.

Table 3-5: Noise and Vibration Sensitive Areas

Sensitive Area	Location Description	Representative Monitoring Location
Norfinch Drive	Nursing home, hotels, school	Loc1, Loc2
Finch Avenue West	Nursing home, medical buildings, and residences	Loc1
Wheatsheaf Crescent	Residences	Loc2, Loc3
Jane Street and York Gate Blvd.	Residences	Loc4

3.2.3.3 Description of Existing Conditions

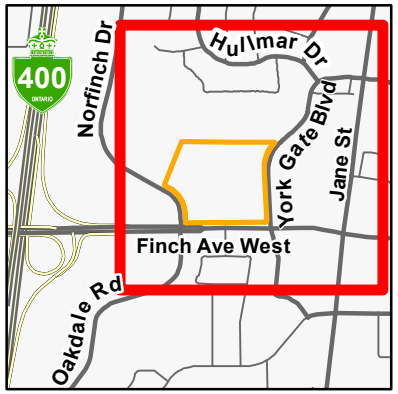
Table 3-6 displays minimum, maximum, and average 1 hour L_{EQ}[3] data for each monitoring location. Data collected during periods of inclement weather (wind speeds above 20 km/h, any precipitation) were excluded from analysis. Detailed noise measurement data can be found in **Appendix C**. Refer to **Figure 3-10** for monitoring locations**.**

The assessment of transportation corridors (vehicles within the right of way) is assessed based upon the daytime equivalent (L_{EQ16hr}) and night time equivalent (L_{EQ8hr}) noise levels, this is further discussed in **Section 4**. As such, the existing daytime and night time equivalent sound levels, calculated from the background measurements, are presented in **Table 3-7**.

3. Sound Pressure Level in dB, equivalent to the total Sound Energy over a given period of time.

Legend

- Monitoring Location
- Property Limits for the MSF Site



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Finch West Light Rail
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Environmental Assessment

Noise and Vibration Monitoring Locations

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Figure 3-10

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Table 3-6: Baseline Noise Monitoring Results

Monitoring Location	Time Period[4]	Minimum (1 hour L_{EQ} dBA)	Maximum (1 hour L_{EQ} dBA)	Average (1 hour L_{EQ} dBA)
Loc1:Between Pelican Gate and Elana Drive on Finch Avenue West	Daytime	67	73	69
	Evening	68	71	69
	Night time	63	70	66
Loc2:West side of Wheatsheaf Crescent	Daytime	48	72	57
	Evening	51	65	59
	Night time	42	61	54
Loc3:East side of Wheatsheaf Crescent	Daytime	50	66	56
	Evening	50	60	56
	Night time	42	61	54
Loc4:On York Gate Boulevard., between Hullmar Drive and Jane Street	Daytime	57	67	62
	Evening	61	75	66
	Night time	53	66	58

Table 3-7: Baseline Day and Night Equivalent Sound Levels

Monitoring Location	Day Time L_{EQ16hr} [dBA]	Night Time L_{EQ8hr} [dBA]
Loc1 – Between Pelican Gate and Elana Drive on Finch Avenue West	69.4	66.6
Loc2 – West Side of Wheatsheaf Crescent	60.7	55.6
Loc3 – East Side of Wheatsheaf Crescent	57.4	55.6
Loc4 – On York Gate Blvd., between Hullmar Drive and Jane Street	64.7	58.9

Contributions to ambient noise at the assessed noise sensitive locations included traffic noise from Finch Avenue West, Highway 400, Jane Street and Norfinch Drive.

As shown in **Table 3-6**, evenings had the highest average 1 hour L_{EQ} levels, while night time had the lowest average levels for each receptor location. The measured ambient noise levels are typical of an area where road traffic noise is the main contributor to background noise.

Sources of vibration for the area included traffic along Finch Avenue West, Norfinch Drive, Wheatsheaf Crescent and York Gate Boulevard. **Table 3-8** displays minimum, maximum, and average Vertical Peak Particle Velocity (PPV) data for each receptor location. Vertical PPV generally refers to the maximum velocity experienced by the particles of an object when set into vibratory motion. It is a widely accepted measure used to assess building damage. Data collected during periods of inclement weather (wind speeds above 50 km/h, severe precipitation) were excluded from analysis. Detailed vibration measurement data can be found in **Appendix C**.

Table 3-8: Baseline Vibration Results (Vertical PPV)

Monitoring Location	Time Period[5]	Minimum PPV (mm/s)	Maximum PPV (mm/s)	Average PPV (mm/s)	Standard Deviation	Number of Samples[6]
Loc1: Between Pelican Gate and Elana Drive on Finch Avenue West	Daytime	0.1270	0.7300	0.2889	0.0670	469
	Evening	0.1270	0.4130	0.2651	0.0543	174
	Night time	0.1110	0.5560	0.2464	0.0662	346
Loc2: West side of Wheatsheaf Crescent	Daytime	0.0476	0.3970	0.0743	0.0109	15994
	Evening	0.0476	0.2380	0.0759	0.0089	5760
	Night time	0.0794	0.2060	0.0797	0.0040	11520

4. *Daytime is defined as the hours between 07:00 to 19:00 hours, evening is defined as the hours between 19:00 to 23:00 hours, night time is defined as the hours between 23:00 to 07:00 hours.*
5. *Daytime is defined as the hours between 07:00 to 19:00 hours, evening is defined as the hours between 19:00 to 23:00 hours, night time is defined as the hours between 23:00 to 07:00 hours.*
6. *Indicates the number of samples used for statistics. Data collected during inclement weather was not included in statistical analysis.*

Monitoring Location	Time Period[5]	Minimum PPV (mm/s)	Maximum PPV (mm/s)	Average PPV (mm/s)	Standard Deviation	Number of Samples[6]
Loc3: East side of Wheatsheaf Crescent	Daytime	0.1270	0.5080	0.1822	0.0649	1456
	Evening	0.1270	0.3810	0.2024	0.0629	522
	Night time	0.1270	0.2540	0.2452	0.0322	1042
Loc4: On York Gate Blvd., between Hullmar Drive and Jane Street	Daytime	0.0794	0.9840	0.1487	0.1179	174
	Evening	0.0794	0.5400	0.1558	0.0991	64
	Night time	0.0794	0.9370	0.1158	0.0965	128

As shown in **Table 3-8**, average ambient PPV levels were between 0.1 and 0.3 mm/s. Isolated events (non-regular, only 2 to 3 over several days) that had vibration levels much greater than and not characteristic to the entire dataset were removed. These events were likely caused by a person bumping into the unit (e.g., lawn mowing), and are not representative of ambient background vibration levels.

3.2.4 Air Quality

The objectives of the air quality existing conditions assessment are as follows:

- Establish the existing regional air quality conditions for contaminants of interest through the use of ambient air data collected from local and regional ambient air monitoring stations within the vicinity of the Finch West MSF site
- Complete an inventory of air emitters within the vicinity of the Finch West MSF site.

Baseline ambient air quality was assessed based on publicly available background measurements data collected by monitoring stations operated by the MOECC and Environment Canada. Contaminants of interest were selected based on the following criteria: constituents of smog, potential effects on human health, potential emissions from the Finch West MSF site, and the availability of background concentration data. The contaminants of interest for this study are criteria air contaminants and select volatile organic compounds (VOC), and metals. These contaminants have adverse effect on the environment, human health and contribute to poor regional air quality. The majority of the contaminants have air quality standards based on effects to human health. The contaminants of interest for the assessment are provided in **Table 3-9**.

Table 3-9: Contaminants of Interest

Type	Contaminant
Criteria Air Contaminants (CAC's)	Nitrogen Oxides
	Carbon Monoxide
	Total Particulate Matter (TPM)
	Particulate Matter <2.5 microns (PM2.5)
Volatile Organic Compounds (VOC's)	1,3-Butadiene
	2-ethyl Acetate
	2,4-pentanedione
	Acetaldehyde
	Acrolein
	Benzene
	Butyl Acetate
	Formaldehyde
	Ketone
	n-Pentyl propionate
Metals	Chromium (VI) (PM-10 Fraction)

3.2.4.1 Study Area

The study area to assess the local air quality conditions extends one kilometre from the MSF property (see **Figure 3-11**). This distance is based on the MOECC "Procedure for Preparing an ESDM Report, Version 3.0" dated March 2009 guidance document, which notes that the modelled ground level maxima from shorter stacks (10 to 20 m) is expected to occur within one kilometre of the site's property boundary.

3.2.4.2 Methodology

An inventory of facilities with air emissions within the study area was conducted to consider their potential impact to the existing local and regional air quality from secondary sources. Air quality monitoring data was obtained from federal and provincial government sources.

3.2.4.3 Description of Existing Conditions

The assessment's main findings of the existing air quality conditions within the study area are outlined below:

- There are two facilities within the study area that met the reporting requirements to the National Pollutant Release Inventory. Emissions from these facilities may potentially contribute pollutants to the local and regional air quality. The air emission data was collected for these two facilities for a five year period (2008-2012), revealing that the facilities exceeded the reporting thresholds for the following air contaminants:
  - PM2.5
  - 2-Butoxyethanol
  - n-Butyl Alcohol
  - VOCs.
- There are four facilities with an existing Environmental Compliance Approval (formerly Certificate of Approval) within the study area. Emission sources and activities at these facilities consist of natural gas and diesel fired combustion equipment used for comfort and space heating and emergency power. These sources are expected to have minimal impact on the local and regional air quality.
- From the data collected at the six Air Quality (AQ) monitoring stations, the background concentration for benzene (0.70 $\mu g/m^3$ annual mean) exceeded the provincial Annual Air Quality Criteria (0.45 $\mu g/m^3$ annual mean) over the five year (2008-2012) period studied. No other exceedances of the provincial Ambient Air Quality Criteria (AAQC) or federal guidelines for the other criteria air contaminants were observed.
- From the data collected at the six AQ monitoring stations, there were no exceedances of provincial AAQC for volatile organic compounds over the five year (2008-2012) period studied.

Further details are provided in the Air Quality Assessment Report, **Appendix D.**

Legend

- Property Limits for the MSF Site
- 1000m Air Quality Study

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Finch West Light Rail
Maintenance and Storage Facility (MSF)
Environmental Assessment

Air Quality Study Area

July 2015

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Figure 3-11

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3.3 Archaeology and Cultural Heritage

3.3.1 Archaeology

The following report was reviewed to assess the existing archaeological conditions of the Finch West MSF site:

- Stage 1 and 2 Archaeological Assessment of Part of Lot 21, Concession 5 W.Y.S Geographic Township of York, County of York (formerly City of North York), Now in the City of Toronto (Archaeological Services Inc., May 2008)

The Stage 1 and 2 Archaeological Assessments were completed on behalf of the former site property owner. All activities carried out during the Stage 1 and 2 Assessments were completed in accordance with the terms of the *Ontario Heritage Act* and the Ministry of Tourism, Culture, and Sport's (MTCS) *Standards and Guidelines for Consultant Archaeologists* (Ontario, 2011).

3.3.1.1 Study Area

The archaeological study area comprises the MSF site property limits as this is the area where construction may have disturbed previously undisturbed land.

3.3.1.2 Description of Existing Conditions

A Stage 1 Archaeological Assessment recommended further Stage 2 Archaeological assessment, including a systematic pedestrian and test pit survey. A pre-contact findspot (P1) consisting of a thermally altered piece of shatter and a secondary knapping flake, both of Onondaga chart, were recovered. Given the isolated nature of P1, this find did not represent a significant archaeological resource and was considered free of any further archaeological concern. The remainder of the study area was also considered free of any archaeological concern.

A Ministry of Tourism and Culture (now MTCS) letter dated January 9, 2009 concurs with the findings of the Stage 1 and 2 Archaeological Assessments and that no further documentation of the site is necessary. See **Appendix E** for the letter.

The following reports were also reviewed to confirm the above recommendations:

- Due Diligence Assessment of Archaeological Risk, Finch Avenue West Property, Lot 21, Concession 5W, City of Toronto Ontario (Archaeological Services Inc., 2011)
- Aboriginal Interest in the Finch Avenue West Property (Archaeological Services Inc., 2011).

The above reports confirmed the Stage 1 and 2 Archaeological Assessment conclusion that the entire site is considered to be free of any further archaeological concern. However, it was noted that the following Aboriginal communities should be engaged during project consultation regarding any potential for the undertaking to affect their interests (ASI, 2011):

- Metis
- Huron-Wendat First Nation
- The Six Nations of Grand River
- Mississaugas of the New Credit First Nation
- Williams Treaty First Nations
- Kawartha Nishnawbe First Nations

Refer to **Section 5.3** for a description of Aboriginal engagement during the study.

3.3.2 Cultural Heritage

In accordance with the terms of the Ontario *Heritage Act*, a cultural heritage review was undertaken to ensure all cultural heritage resources (cultural heritage landscapes and built heritage resources) in the area were considered in the planning process for the MSF. The MTCS *Screening for Impacts to Built Heritage and Cultural Heritage Landscapes Check Sheet for Environmental Assessments* (**Appendix F**) was used to determine whether the development of the Finch West MSF may affect known or potential cultural heritage resources. Secondary sources used to complete the *MTCS EA Check Sheet* are outlined in **Table 3-10**:

Table 3-10: MTCS EA Check Sheet - Secondary Sources for Cultural Heritage Existing Conditions

Secondary Source	Information Obtained
City of Toronto	Listing and description of Heritage Properties in Toronto
City of Toronto	Listing and description of Heritage Conservation Districts in Toronto
Ontario Heritage Trust	List of Easement Properties in Ontario
Ontario Heritage Trust	List of plaques
Canada's Historic Places	The Canadian Registry of Historic Places
MTCS	List of Ontario's heritage buildings, sites and cemeteries
Canadian Heritage Rivers System	List of Heritage rivers in Canada
Archaeological Services Inc.	Cultural Heritage Assessment Report for the Etobicoke-Finch West LRT Transit Project Assessment Study, March 2010

3.3.2.1 Study Area and Methodology

The *Check Sheet for Environmental Assessments: Screening for Impacts to Built Heritage and Cultural Heritage Landscapes* requires the consideration of any potential cultural heritage resources within, or "adjacent" to a proposed project site. According to the Check Sheet: *'for the purposes of evaluating potential impacts of development and site alteration "adjacent" means: contiguous properties as well as properties that are separated from a heritage property by narrow strip of land used as a public or private road, highway, street, lane, trail, right-of way, walkway, green space, park, and/or easement or as otherwise defined in the municipal official plan'*.

Aboriginal communities have been engaged during project consultation (see **Section 5.4**) for the potential for site development to affect their interests. Therefore, as a cursory step, the Cultural Heritage study area was expanded to a two kilometre radius of the Finch West MSF site to identify any cultural heritage resources that may be of interest to Aboriginal Communities.

3.3.2.2 Description of Existing Conditions

No potential heritage resources are located within or "adjacent" to the Finch West MSF site. As indicated above, all cultural heritage resources within two kilometres of the site were also identified, and are shown in **Table 3-11**. Of these identified features, the closest feature was revealed to be approximately one kilometre away at 4509 Jane Street. (see **Appendix F** for location of features).

Table 3-11: Cultural Heritage Resources Within 2 km of the MSF Site

Resource Address	Feature Type	Distance from MSF Site (km)
4509 Jane Street	Heritage Property	1.00
Finch Avenue West, east of Jane Street	Waterscape	1.19
4929 Jane Street	Heritage Property	1.89

For additional information regarding the cultural and built heritage review refer to **Appendix F**.

3.4 Traffic and Transportation

The following secondary sources were reviewed to characterize the Traffic and Transportation existing conditions:

- Finch West LRT Transit Project Assessment Study Environmental Project Report (TTC, 2010)
- City of Toronto Traffic turning movement counts
- City of Toronto Traffic signal timing plans
- Finch MSF Project Hand-Over Report (TTC, 2012).
- City of Toronto Guidelines for the Preparation of Transportation Impact Studies 2013

Field investigations and traffic observations were conducted to confirm findings.

The traffic study is conducted in accordance with the *Guidelines for Using Synchro 7* (City of Toronto, 2010), and the *General Guidelines for the Preparation of Traffic Impact Studies* (MTO, 2009), where applicable. Also, where applicable, the study followed the *Transportation Association of Canada (TAC) Design Guide*, *Highway Capacity Manual 2000* (Transportation Research Board, 2000) and O*ntario Traffic Manual* (Ontario, 2005).

3.4.1 Study Area

The study area for the traffic assessment is represented by nine key intersections within the vicinity of the Finch West MSF site as shown in **Figure 3-12**. The nine key intersections are as follows:

1. Finch Avenue West / Highway 400 SB Off Ramp (Signalized)
2. Finch Avenue West / Highway 400 NB Off Ramp (Signalized)
3. Finch Avenue West / Oakdale Road / Norfinch Drive (Signalized)
4. Finch Avenue West / Pelican Gate (Unsignalized)
5. Finch Avenue West / Elana Drive / York Gate Boulevard (Signalized)
6. Finch Avenue West / Jane Street (Signalized)
7. York Gate Boulevard / South Plaza Access (Unsignalized)
8. York Gate Boulevard / North Plaza Access (Unsignalized)
9. Norfinch Drive / Medical Centre Access (Unsignalized).

The study area intersections were determined based on the area of influence of traffic into and out of the MSF property. Based on the study documents the area of influence was determined to best be represented by the area between the Highway 400 ramps and Jane Street on Finch Avenue. The additional intersections on York Gate Boulevard and Medical Centre Access were included to determine the impact of traffic at the proposed driveways at the MSF on the adjacent roads.

3.4.1.1 Methodology

Site layout information from the *Finch West MSF Project Hand-Over Report (Revision 0)* (TTC, 2012) was reviewed in conjunction with the adjacent road network and the EPR to determine work completed to date and next steps. *Guidelines for Using Synchro 7* (City of Toronto, 2010) was followed in preparation of the Synchro / SimTraffic model set up. In addition, the *General Guidelines for the Preparation of Traffic Impact Studies* (MTO, 2009) was reviewed to address the traffic operation conditions or issues at the two ramp terminals within the study area.

Field investigations and traffic observations were conducted on Tuesday May 13, 2014, concurrent with a traffic count data collection conducted at key study intersections by the sub-consultant to AECOM. There were no accidents or traffic disruptions observed during the traffic count periods. Existing lane configurations, turning movement restrictions, speed limits, and other features at the key intersections were confirmed in field observations.

3.4.2 Description of Existing Conditions

3.4.2.1 Roads

The roads corresponding to key intersections in the vicinity of the MSF site are described below. Detailed lane configurations at each key intersection within the study area are shown in **Figure 3-13**.

- Finch Avenue West is an east/west major arterial roadway with three lanes of travel in each direction and a centre left-turn lane. The road has an urban cross-section and a posted speed limit of 60 km/h.
- Jane Street is a north/south major arterial roadway with two lanes of travel in each direction and a centre left-turn lane. The road has an urban cross-section and a posted speed limit of 60 km/h.
- York Gate Boulevard is a north/south collector roadway (north of Finch Avenue West) with two lanes of travel in each direction.
- Elana Drive, south of Finch Avenue West, is a north/ south local roadway with a two-lane section, which has an urban cross-section and a posted limit of 40 km/hr. Automobiles are prohibited to continue northbound through from Elana Drive to York Gate Boulevard or vice versa. During the morning peak (7:00 to 9:00 AM) and afternoon peak (4:00 to 6:00 PM) periods, eastbound traffic movement along Finch Avenue West is prohibited from turning right onto Elana Drive.
- Pelican Gate is a north/ south local roadway with two-lane section. The road has an urban cross-section and terminates at Finch Avenue West with a T-intersection.
- Norfinch Drive/ Oakdale Road is a north/south collector roadway with a two-lane section south of Finch Avenue West (as Oakdale Road) and a four-lane cross-section north of Finch Avenue West (as Norfinch Drive). The road has an urban cross-section and provides an alternative north/south route between Sheppard Avenue and Steeles Avenue west of Jane Street. The northbound right turn traffic at the intersection of Norfinch Drive/ Oakdale Road/ Finch Avenue West is prohibited on red except with green arrow.
- Highway 400 NB Off-Ramp and SB Off-Ramp provide Highway access to Finch Avenue West and terminate as T-intersections.

Traffic Volumes

Existing traffic volumes were adjusted and balanced on the road sections where there is no commercial access or highway on-ramps present in between the two intersections. Refer to **Figure 3-14** and **3-15** for the intersection adjusted counts, including traffic by vehicle type. The Turning Movement Count (TMC) numbers reported in this study represent the peak hour volume with respect to each intersection; and therefore, the worst case scenario during AM and PM peak periods are captured in this analysis. Current signal timing plan information was obtained from the City of Toronto. Recent TMC data and signal timing plans are also provided for reference in **Appendix G**.

A review of previous data was completed for comparison in the corridor. The TMC data obtained in year 2004 and 2006 (TTC, 2010) indicated a similar travel pattern and magnitude to the recent TMC data, which represents a typical weekday AM and PM peak period traffic volumes in vicinity of the MSF site.

The traffic volume patterns observed from ATR volume counts at selected locations during a day indicates a typical weekday traffic pattern with highest traffic volume occurring between 8:00 AM and 9:00 AM in the morning period and 5:00 PM and 6:00 PM in the afternoon period. Traffic volumes along Finch Avenue West, as well as other roadways show minimal number of vehicles prior to 6:00 AM. The corridors remain busy during the midday hours (9:00 AM to 3:00 AM) with a consistent volume of traffic. Refer to **Appendix G** for further detail on existing traffic volume profiles within the study area.

3.4.2.2 Traffic

Traffic Operations

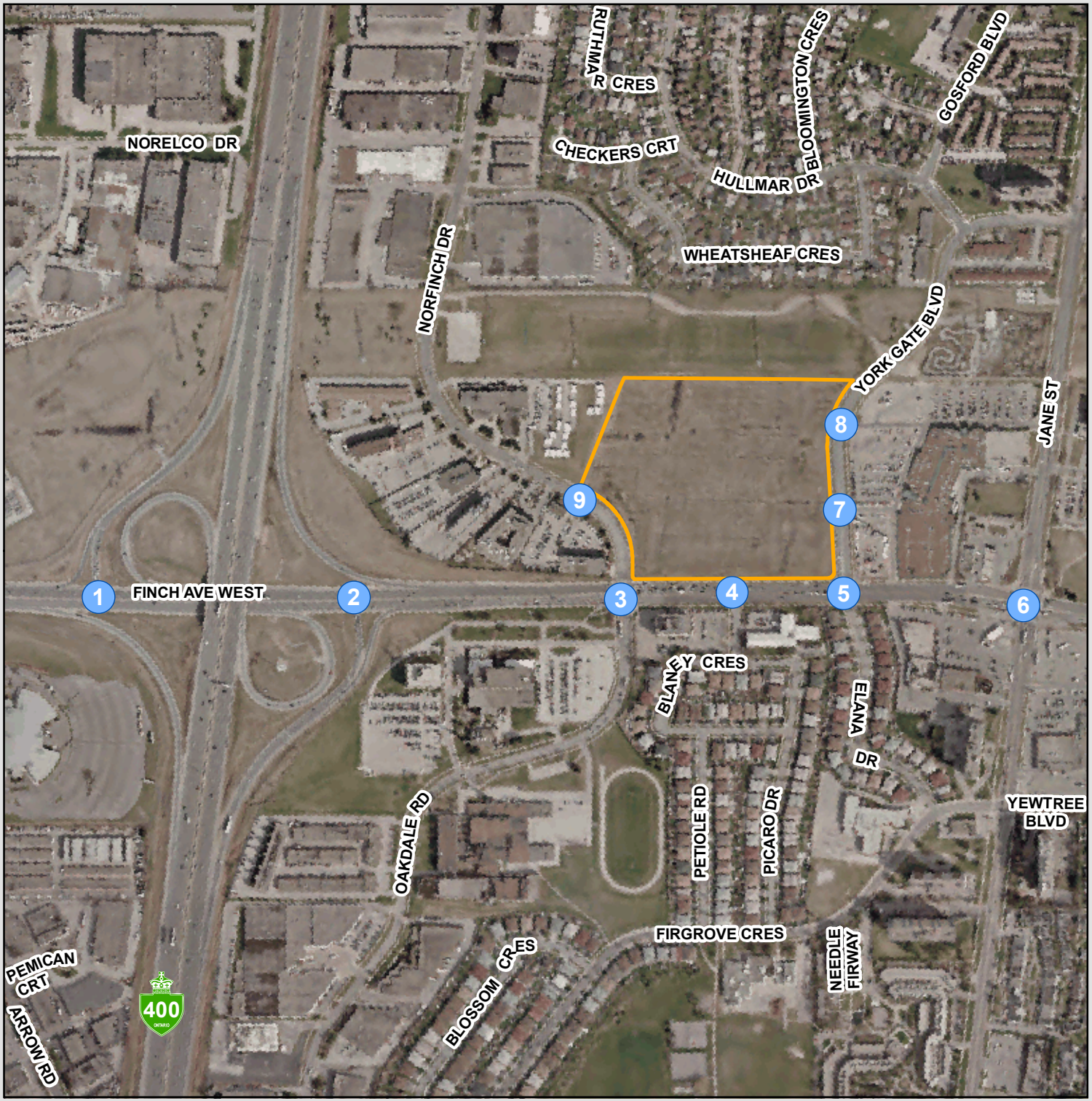
The quality of intersection traffic operations is typically measured in terms of level of service (LOS). The LOS is assigned on the basis of average delay per vehicle and includes deceleration delay, queue move-up time, stopped delay, and final acceleration delay. For signalized intersections, LOS ranges from 'A' for 10 seconds or less average delay to LOS 'F' for delays greater than 80 seconds. Similar to LOS, the Volume-to-Capacity (v/c) ratio is calculated for the intersection as a whole, and for individual movements at an intersection. The v/c ratio provides a measure of traffic volume demand to the available capacity, with a capacity condition represented by a v/c ratio of 1.0 (i.e., volume demand equals capacity). Critical individual movements are included in the LOS tables where the overall v/c ratio equals or exceeds 0.85.

To assess existing traffic conditions during peak periods, a level of service analysis was undertaken for the key intersections using Synchro 7.0 Software, which implements the methods of the *2000 Highway Capacity Manual* (Transportation Research Board, 2000). Synchro 7 is the standard version accepted by the City of Toronto in accordance with their *Guidelines for Using Synchro 7.0* (April, 2010).

The key parameters and assumptions used in the analysis of existing conditions included:

- Existing signal timing plans
- Existing lane configurations
- A peak hour factor (PHF) of each movement based on the recent traffic count data
- Heavy truck vehicle percentage and pedestrian volume based on the recent traffic count data
- Lost Time Adjust, -1.0 is applied during peak period analysis, according to *City of Toronto's Guidelines for Using Synchro 7.0* (April 2010)
- Synchro defaults for all other input factors.

The results of the analysis of the existing AM and PM peak hour conditions are shown in **Table 3-12**. The analysis of existing conditions was performed for the peak hours as they represent the one hour periods with the highest traffic demands with respect to each intersection, and it can be assumed that better operations will occur during the remaining hours. The 95th percentile queue length was analyzed using SimTraffic modelling techniques averaging over five simulation runs with 15 minutes seeding period and 60 minutes simulation time for each run.



Legend

- Key Traffic Survey Intersection
- Property Limits for the Proposed MSF Site

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MTM 3Degree, NAD 27

Finch West Light Rail
Maintenance and Storage Facility (MSF)
Environmental Assessment

Traffic Study Area

July 2015

AECOM

Figure 3-12

Map Document: (P:\60318592\400-Technical\401 Environment\GIS\MXD\60318592_Traffic_Study_Area)
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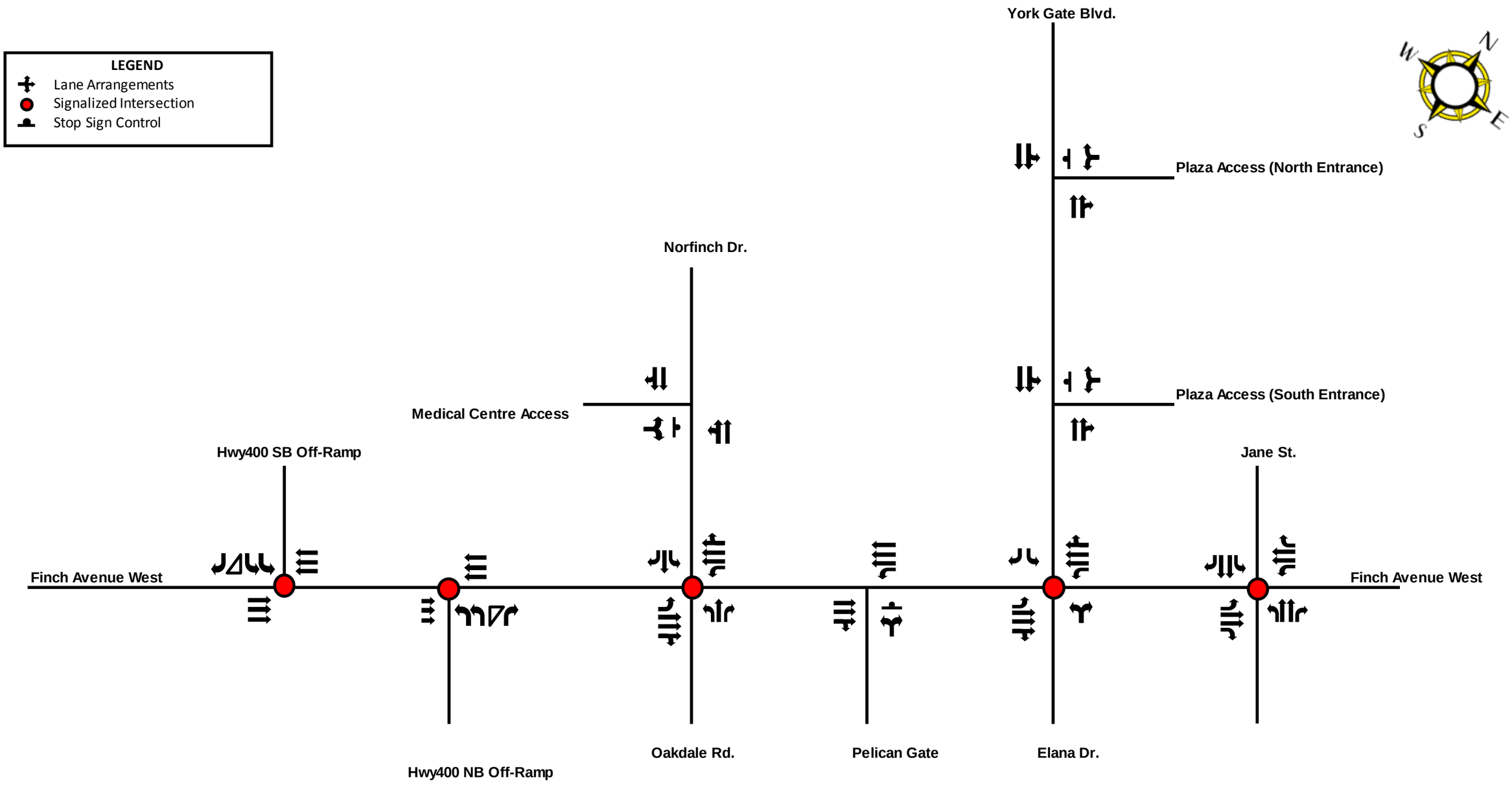


Figure 3-13: Key Intersections within the Study Area

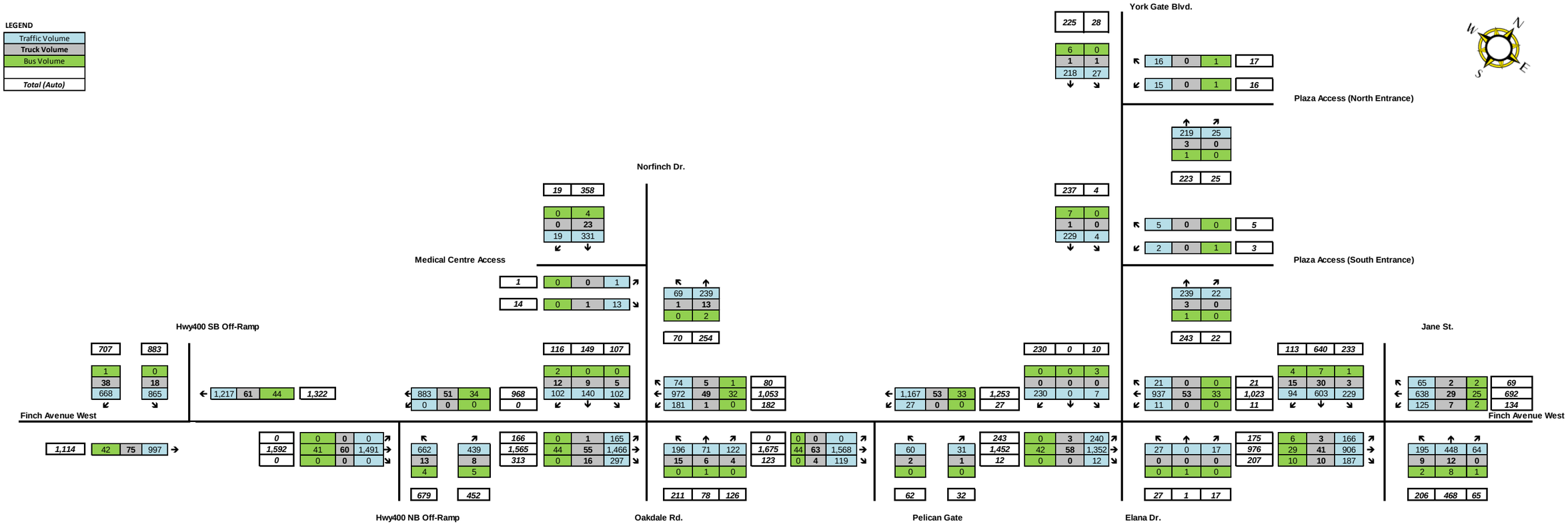


Figure 3-14: Existing (Adjusted) AM Peak Hour Traffic Volume

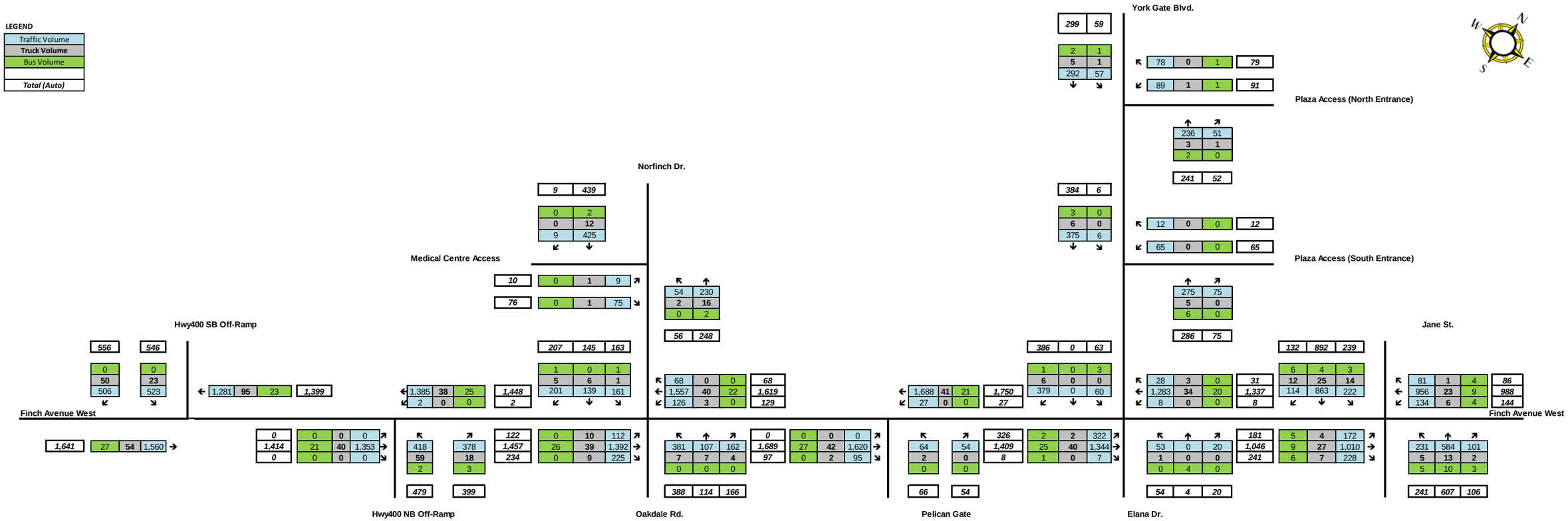


Figure 3-15: Existing (Adjusted) PM Peak Hour Traffic Volume

Table 3-12: Existing Peak Hour Level of Service

At signalized intersections:

Intersection	Weekday AM Peak Hour							Weekday PM Peak Hour						
	Average Delay (s)	*Overall LOS*	*Critical Movement (V/C ≥0.85)*	*V/C*	*Delay (s)*	*LOS*	*95th Queue Length (m)*	*Average Delay (s)*	*Overall LOS*	*Critical Movement (V/C ≥0.85)*	*V/C*	*Delay (s)*	*LOS*	*95th Queue Length (m)*
Finch Ave. W./ Highway 400 SB Off Ramp	16.6	B	-	-	-	-	-	12.9	B	-	-	-	-	-
Finch Ave. W./ Highway 400 NB Off Ramp	17.0	B	-	-	-	-	-	11.4	B	-	-	-	-	-
Finch Ave. W./ Oakdale Rd./ Norfinch Dr.	65.0	E	EBTR NBL	1.13 0.90	103.5 65.0	F E	499 59	45.2	D	EBTR WBTR NBL	0.88 0.92 1.03	38.6 42.7 113.9	D D F	214 127 44
Finch Ave. W./ Elana Dr./ York Gate Blvd.	10.4	B	-	-	-	-	-	16.5	B	-	-	-	-	-
Finch Ave. W./ Jane St.	32.3	C	NBL	0.85	45.8	D	63	44.7	D	EBL EBT WBL NBL SBL SBT	1.00 0.89 0.85 1.21 0.90 0.86	104.3 37.0 52.0 159.4 54.2 39.9	F D D F D D	79 191 71 57 64 202

At unsignalized intersections:

Intersection	Weekday AM Peak Hour							Weekday PM Peak Hour						
	Average Delay (s)	*ICU LOS*	*Conflicting Movements*	*V/C*	*Delay (s)*	*LOS*	*95th Queue Length (m)*	*Average Delay (s)*	*ICU LOS*	*Conflicting Movements*	*V/C*	*Delay (s)*	*LOS*	*95th Queue Length (m)*
Finch Ave. W./ Pelican Gate	1.0	A	NBL WBT	0.39 0.26	21.0 0.0	C A	42 14	0.6	A	NBL WBT	0.27 0.37	13.9 0.0	B A	67 3
York Gate Blvd./ South Plaza Access	0.4	A	WBL SBT	0.03 0.01	10.5 0.2	B A	8 3	2.2	A	WBL SBT	0.29 0.18	16.3 0.2	C A	18 5
York Gate Blvd. / North Plaza Access	1.5	A	WBL SBT	0.08 0.05	11.9 1.5	B A	12 8	4.4	A	WBL SBT	0.41 0.13	17.1 1.2	C A	26 11
Norfinch Dr. / Medical Centre Access	1.7	A	WBL NBT	0.11 0.06	1.0 11.1	A B	14 12	2.3	A	WBL NBT	0.08 0.22	2.2 13.9	A B	14 17

The analysis of existing conditions indicates that an acceptable overall level of service 'D' or better is provided at all key intersections within study area. The eastbound through and right-turn movement at the intersection of Finch Avenue West/ Oakdale Road/ Norfinch Drive during the AM peak hour is shown to operate with acceptable delays (half of the cycle length) and slightly beyond capacity. The 95th percentile queue length for the eastbound through traffic may queue back to the upstream intersection, however, this occurrence will not be frequent and the queue length is expected to clear in the following cycles. The northbound left-turn movement at the intersections of Finch Avenue West/ Jane Street and Finch Avenue West/ Oakdale Road/ Norfinch Drive, are shown to operate above capacity with long delays. The 95th percentile queue length for the northbound left-turn at both intersections indicates that in some occurrences, there may be queues longer than the storage length available and therefore, the queues might block the northbound through traffic movement. This observation was confirmed during the site visit on the same day as the survey date at both intersections.

At both intersections of Finch Avenue West/ Jane Street and Finch Avenue West/ Oakdale Road/ Norfinch Drive, it is understood that the signal timing phasing for the northbound protective left-turn movement is currently operating under a 24-hour callable mode with maximum green time of 8 and 15 seconds, respectively. Permitting this protected northbound left-turn green phase to extend beyond the current maximum green time would be helpful in alleviating northbound left-turn traffic congestions.

All unsignalized intersections are currently operating at good overall LOS 'A' with minimal delays and 95th percentile queue lengths. The detailed Synchro software analysis summaries and SimTraffic queuing report for existing conditions are provided for reference in **Appendix G**.

3.4.2.3 Transit

The vicinity of the Finch West MSF site is currently served by TTC bus routes 35 (along Jane Street), 36 (along Finch Avenue West), 84 (along Norfinch Drive/ Oakdale Road) and 99 (circular route covers both Finch Avenue West and Jane Street). These routes provide bus service along Jane Street, Finch Avenue West and Oakdale Road/ Norfinch Drive. Each of the routes is described in further detail and illustrated in **Figure 3-16** below:

Route 35

- 35A (Jane Station – Steeles via Hullmar) operates during peak periods from Monday to Friday with a bus stop at the intersection of Finch Avenue West/ Jane Street.
- 35B (Jane Station – Pioneer Village and Steeles) operates between approximately 9:00 AM until 9:30 PM. from Monday to Friday (this bus route also operates during weekends and holidays) with a bus stop at the intersection of Finch Avenue West/ Jane Street.
- 35C (Jane Station – Steeles) is the main branch, operating seven days a week with a bus stop at the intersection of Finch Avenue West/ Jane Street.
- 35D (Jane Station – Langstaff Road) operates during peak periods from Monday to Friday with a bus stop at the intersection of Finch Avenue West/ Jane Street.

The headway among Route 35 buses is approximately at five minutes during both AM and PM peak hours.

Route 36

- 36 (Finch Station – Humberwood) is the main branch, operating seven days a week with bus stops at the intersections of Finch Avenue West/ Norfinch Drive and Finch Avenue West / Jane Street.
- 36D (Finch Station – Weston Road and Milvan) operates during the morning and afternoon peak periods from Monday to Friday with bus stops at the intersections of Finch Avenue West/ Norfinch Drive and Finch Avenue West/ Jane Street.
- 36F (Finch Station - Weston Road and Milvan via Fenmar) also operates during the morning and afternoon peak periods from Monday to Friday with bus stops at the intersections of Finch Avenue West/ Norfinch Drive and Finch Avenue West/ Jane Street.

The headway among 36 route buses is approximately at two to four minutes in the AM peak and two to five minutes in the PM peak.

Route 84

- Only 84D (Sheppard and Yonge Station – Steeles via Oakdale) operates during the peak periods from Monday to Friday with bus stops at the intersection of Finch Avenue West / Oakdale Road/ Norfinch Drive.

The headway among 84D route buses is approximately at 20-25 minutes in both the AM and PM peak periods.

Route 99

- This route operates on a circular route between the area of Jane Street and Sheppard Avenue West, and the area of Arrow Road and Finch Avenue West, in one clockwise direction. The route operates during the midday and all evening from Monday to Friday as well as weekends and holidays, with bus stop at intersection of Finch Avenue/ Jane Street.

The headway among 99 route buses is approximately 20 minutes in both the AM and PM peak periods.

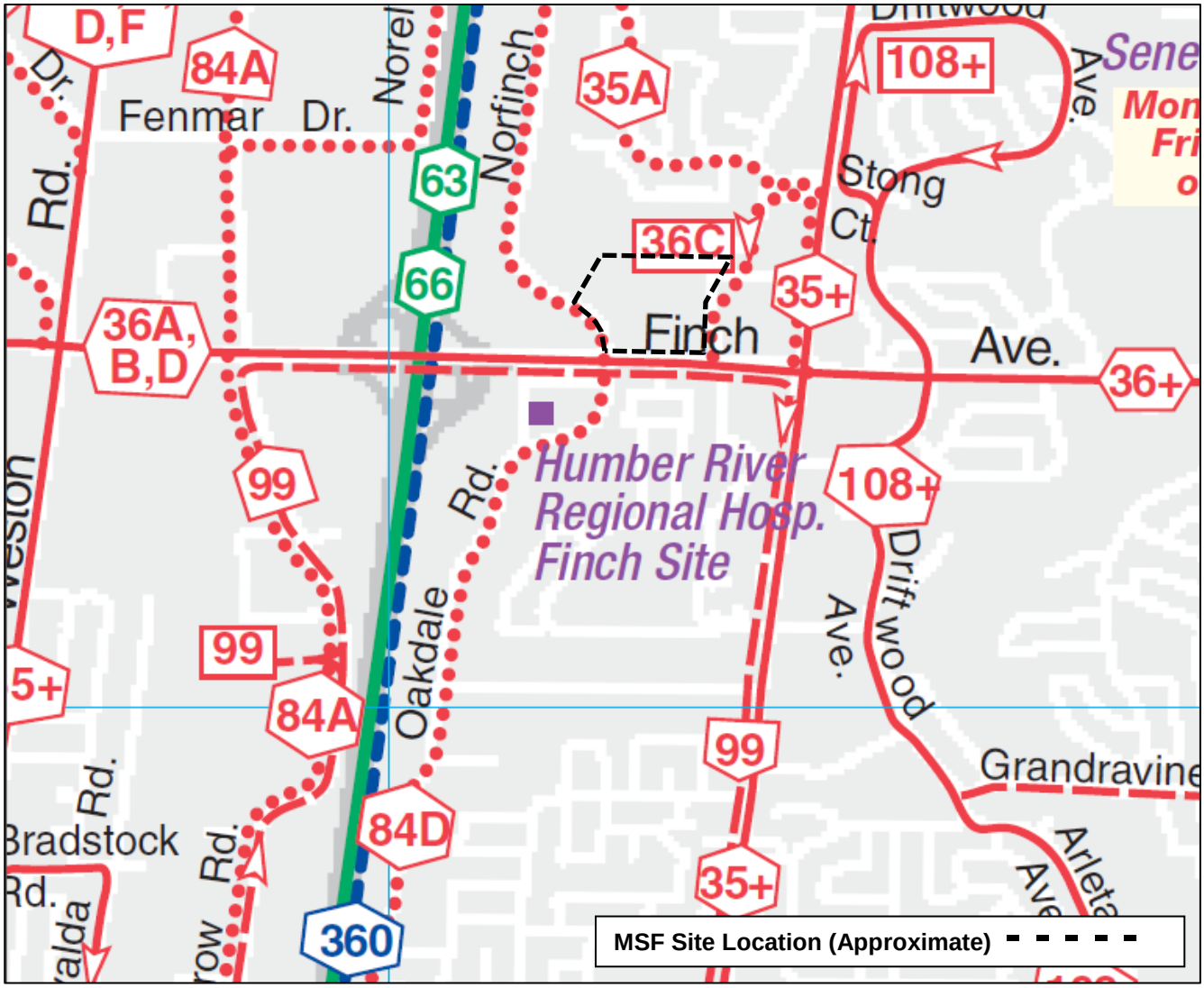


Figure 3-16: Existing TTC Bus Routes in Vicinity of the MSF Site[7]

3.4.2.4 Active Transportation

There are sidewalks on both sides of Finch Avenue West, Norfinch Drive, Oakdale Road, Pelican Gate, York Gate Boulevard and Jane Street in vicinity of the Finch West MSF site. There are no existing bicycle lanes marked on the study area roadway facilities, however, an active bicycle/multi-use path, including bicycle traffic signals at York Gate Boulevard, exists north of the site on the Hydro Corridor (see **Section 3.2.2**).

Future bicycle lanes are planned in both directions along Finch Avenue West adjacent to the MSF site upon implementation of the Finch West LRT (TTC, 2010).

7. *Source: TTC Online Route Maps*

4. Impact Assessment of the Preferred Design

The following sections provide a detailed description of the potential environmental effects associated with the two development phases (construction and operation) of the Preferred Design for the MSF, the identified mitigation and/or compensation measures to minimize the potential effects, and the resultant net effects following the implementation of identified mitigation and/or compensation measures. Effects monitoring (i.e., monitoring to ensure implemented mitigation measures are functioning as intended) associated with environmental factors is also included, where required.

The potential effects on the environment were identified for the Preferred Design through understanding of the existing environmental conditions for each of the discipline specific study areas, based on existing information sources and field investigations documented in **Section 3**, and through consultation with stakeholders (Public, Regulatory Agencies, Aboriginal communities) as documented in **Section 5**. Consultation with stakeholders occurred prior to and during key decision points in the TPAP and feedback from consultation was considered throughout the impact assessment of the Preferred Design.

Next, avoidance/mitigation/compensation measures were developed and applied to prevent/minimize/off-set potential adverse environmental effects of the Preferred Design. More specifically, the intent of these measures is as follows:

Avoidance:.....The first priority is to prevent the occurrence of adverse effects associated with the Preferred Design.

Mitigation:.....Where adverse environmental effects cannot be avoided, it will be necessary to develop the appropriate measures to remove or alleviate to some degree the adverse effects associated with implementing the Preferred Design.

Compensation:.....In situations where appropriate mitigation measures are not available, or significant net adverse effects will remain following the application of mitigation, compensation measures may be required to counterbalance the adverse effect through replacement (in kind), or provision of a substitute.

Given the above noted intentions, the avoidance/mitigation/compensation measures were developed based on professional expertise reflecting on current procedures and legislation, historical performance, and existing environmental conditions. These measures were developed and documented in the 'Mitigation Measures' subsections below.

Once the appropriate avoidance/mitigation/compensation measures were developed and applied to the potential environmental effects of the Preferred Design, the remaining net effect(s) was determined and documented in the 'Net Effects' subsections below.

Compliance with applicable laws and best management practices is an assumption carried throughout the assessment of potential effects. Supplemental data on the impact assessment of the Preferred Design for each discipline can be found in corresponding Appendices as noted below.

4.1 Natural Environment

4.1.1 Terrestrial Natural Heritage

4.1.1.1 Potential Effects

The site will be fully disturbed during construction and operation of the MSF. Consequently, the documented Eastern Meadowlark habitat, migratory bird species habitat, and all trees and other vegetation (including two locally rare and one locally uncommon plant) on the property will be disturbed / removed.

4.1.1.2 Mitigation Measures

In light of migratory bird species identified nesting in or in association with the tree cover on the subject property and pursuant to the federal *Migratory Birds Convention Act,* tree removal will not occur during the typical nesting period of migratory birds, May 1 to July 31 in any year. This limitation of tree removal would prevent the destruction or disruption of courtship, breeding, nesting, fledging and associated feeding requirements of migratory bird species at this site. Where destruction or disruption of these habitats is unavoidable, construction activities (including site preparation) may proceed following a recent (typically within 7 days) assessment by a qualified biologist documenting the absence of nests. This due diligence approach to protecting reproduction of migratory birds requires appropriate timing and frequency of nest surveys prior to habitat disruption and within the typical nesting period. The *Migratory Birds Convention Act* allowances do not override the requirements of the *Endangered Species Act, 2007* with respect to Eastern Meadowlark.

With respect to Eastern Meadowlark, the species and their general habitat are protected under the *Endangered Species Act, 2007*. Where the habitat cannot be retained or protected, Ontario Regulation 242/08 outlines the approach to documenting the extent of habitat impacted and the measures and requirements for compensation of the habitat damaged or lost to the proposed development (i.e., the MSF).

Since the area of habitat that will be damaged or destroyed is less than 30 ha in size, a permit under Section 17c of the *Endangered Species Act, 2007* is not required; rather, the construction activity will need to be registered with the MNRF as a Notice of Activity in accordance with Ontario Regulation 242/08. Upon registration via Notice of Activity with the MNRF, a Habitat Management Plan will be designed for an alternative site(s) of an area no less than the disturbed habitat area where appropriate habitat can be created or significantly enhanced. The compensation or enhancement habitat may be situated anywhere in southern Ontario south or east of the Pre Cambrian Shield (Ecozones 6E and 7E). Within 12 months after the construction activity commences, the creation or enhancement of Eastern Meadowlark habitat must be completed in a manner that ensures the habitat meets the requirements outlined in O. Reg. 242/08 with respect to the types of vegetation it provides. The compensation or enhancement habitat will then be monitored for 5 years after habitat is created or enhanced and managed for 20 years with specified site management, monitoring and maintenance requirements as outlined in the Habitat Management Plan. The Habitat Management Plan will be maintained on file for at least five years after the activity is complete, and will be provided to MNRF within 14 days of receiving a request for it.

As per *Ontario Regulation 242/08*, mitigation measures for Eastern Meadowlark focus on avoiding the disturbance of nesting and associated feeding habitat during the period May 1 to July 31 of any year. Therefore, following registration with MNRF via Notice of Activity, clearing of the site during the period May 1 to July 31 of any year may

only proceed following completion of an avian survey documenting the absence of nests as per the requirements of the *Migratory Birds Convention Act*[8].

City of Toronto tree protection policies[9] outline the required mitigation measures with respect to tree removal. Specifically, the policy outlines that an inventory of all trees 30 cm diameter at breast height (dbh) or greater, and an assessment of tree health by a certified arborist is required. Tree protection measures for retainable trees (if any) will be documented on survey plans. A compensation landscape plan will be required as part of the permit requirements of this policy. The compensation landscape plan will include planting at a minimum of a 2:1 compensation ratio.

No mitigation measures are required with respect to the two locally rare plants and one locally uncommon plant observed on-site.

4.1.1.3 Net Effects

The permanent displacement of Eastern Meadowlark habitat from the MSF site will be mitigated by implementing a Habitat Management Plan in accordance with O.Reg. 242/08. The compensation or enhancement habitat will be managed for a period of 20 years. Situating the compensation or enhancement habitat in a rural area or, at least more natural area than the current site will result in the long term protection of this species' habitat. Long term, the development of the MSF will result in a net positive impact on Eastern Meadowlark species in southern Ontario.

The removal of identified migratory birds nesting or associated vegetation cover on-site will be minimized through the avoidance of tree removals during the typical nesting period, and/or proceeding in accordance with an assessment by a qualified biologist documenting the absence of nests.

The loss of trees greater than 30 cm dbh from the MSF site and associated urban wildlife habitat will be offset by adhering to the requirements of the Tree Protection policies of the City of Toronto, ensuring the suitable landscape plan include the replacement of, or compensation for, the removal of trees.

4.1.1.4 Monitoring

The off-site Eastern Meadowlark compensation or enhancement habitat will be consistent with Ontario Regulation 242/08 requirements, which include the following monitoring elements:

- For five years after habitat is created or enhanced, the proponent must:
  - Manage the habitat by carrying out the following measures:
    - The area shall not be harvested, mowed or cut between May 1 and July 31 of any year.
    - If the habitat is used for pasture, grazing farm animals must be excluded from at least 50 percent of the habitat from May 1 until July 31 of each year.
    - In each of the five years following the creation or enhancement of the habitat, take such actions as are necessary to maintain the grass species, forbs and legumes in the area in the proportions described in the Bobolink, Eastern Meadowlark section of *O. Reg. 242/08* (i.e., Section 23.6) and remove woody vegetation and invasive species.

8. *While the Migratory Birds Convention Act provides conditions for undertaking work in the breeding habitat of regulated species, the more restrictive Endangered Species Act, 2007 overrides those conditions with respect to regulated Species at Risk.*
9. *Toronto Municipal Code, Chapter 813 Trees - ARTICLE III Private Tree Protection [Adopted 2004-09-30 by By-law No. 780-200412; amended 2008-01-30 by By-law No. 118-200813; 2013-02-21 by By-law No. 248-201314]*

- Monitor the area in which the habitat was created or enhanced by conducting at least three surveys every year at a time when bobolink or eastern meadowlark are likely to be present, to determine if the species are in fact present and, if so, to assess fledging success.
- Prepare and maintain a record in respect of the activity and the habitat created or enhanced and ensure that the record meets the requirements outlined in Section 23.6 of *O. Reg. 242/08*.
- Provide a copy of the record to MNRF within 14 days of receiving a request for it.

With respect to new landscape plantings on-site, they will be monitored until successful establishment is confirmed, in accordance with City of Toronto tree protection policies.

4.1.2 Aquatic and Surface Water

4.1.2.1 Potential Effects

The MSF development will result in an increase in the imperviousness of the site, which will cause an increase in the quantity of storm runoff (peak flow rates and volumes) that will be directed off-site to the municipal stormwater sewer system and ultimately to surface watercourses.

There is a potential for sediments to enter the municipal sewer system that will ultimately make their way to the Black Creek and Humber River watershed during construction of the MSF. Accidental spills from construction equipment including petroleum/oil/hydraulic fuels could possibly enter the municipal sewer system and potentially, the Black Creek and Humber River watershed.

During operation of the MSF, drainage from floor drains and other effluent sources such as roof leaders, will similarly enter the municipal sewer system and potentially, the Black Creek and Humber River watershed.

4.1.2.2 Mitigation Measures

Mitigation measures will be implemented in the form of a Stormwater Management (SWM) Plan to reduce/avoid the impact of the MSF development on the stormwater quality and quantity. Metrolinx will comply with the regulation requirements established by the Toronto and Region Conservation Authority (TRCA) and the City of Toronto. Metrolinx is also required to comply with the requirements of the *SWM Planning and Design Manual* (MOECC, 2003) and *Ontario Water Resources Act (OWRA)* with respect to the quality and quantity of water discharging into the sewer system. The City of Toronto criteria for stormwater management are outlined in the Toronto Green Standard and the Wet Weather Flow Management (WWFM) guidelines. Metrolinx will assess the capacity of the existing receiving storm sewer system during detailed design and a SWM Plan for the site will be prepared as part of this detailed design process in consultation with the City of Toronto and the TRCA. The SWM Plan will consist of but not be limited to; water balance requirements, quality, quantity and erosion control measures.

An Erosion and Sediment Control Plan will be developed for the site to be implemented during construction to meet applicable guidelines and criteria. The plan will consist of a multi-barrier approach to meet the requirements.

An Application for Environmental Compliance Approval (Sewage Works) (ECA) will be prepared for the MSF during detailed design.

Spill Prevention and Contingency Plans will be developed for both the construction and operational phases of the MSF. Personnel will be trained in how to implement the mitigation plans. Spills will be immediately contained and

cleaned up in accordance with provincial regulatory requirements and the project-specific contingency plans. A hydrocarbon spills response kit will be on site at all times during construction. Spills, if any, will be reported to the Ontario Spills Action Centre.

4.1.2.3 Net Effects

The implementation of the SWM Plan and Sediment and Erosion Control Plan will ensure mitigation measures to address potential impacts to aquatic/surface water resources meet or exceed regulatory standards, guidelines and expectations.

The potential effects to aquatic and surface water quality will be avoided through the proposed mitigation measures.

No adverse effects to aquatic and surface water quality and quantity are anticipated with the implementation of the required mitigation measures.

4.1.2.4 Monitoring

No monitoring is required.

4.1.3 Geology and Groundwater

4.1.3.1 Potential Effects

Disturbance of the ground surface and interaction with the subsurface that will occur during construction (i.e., short term effects) and operations (i.e., longer term effects) of the Finch West MSF has the potential to adversely affect groundwater, both in terms of quantity and quality.

Construction activities may have an effect on geology and groundwater, but due to their short duration and temporary nature, their overall significance is generally low. During operation of the Finch West MSF, potential effects may initially be minor, but over time, can become adverse.

The following potential effects were identified:

- Groundwater Recharge / Discharge
- Groundwater Levels
- Groundwater Flow
- Groundwater Quality
- Aquifers and Wells
- Contaminated Soils and Groundwater.

Groundwater Recharge / Discharge

During the Phase II Environmental Site Assessment (ESA) (SNC-Lavalin, 2011), a series of ten boreholes were drilled across the site to depths ranging from 4.6 to 6.1 metres(m) below ground surface (mBGS) (refer to **Figure 3-3** for borehole locations). Soils encountered during this drilling program included a surficial layer of clayey silt fill (potentially re-worked native soil), underlain by sandy silt to clayey silt native (till) soils consistent with the Halton Till. The thickness of the surficial fill layer, and depth at which the till was encountered, was reported to be relatively consistent within the boreholes at approximately 0.75 m, with exception of BH-108 located in the east-central area of

the site where it was found to be about 3.1 m thick. A sand horizon was reported to occur within the till at BH-101 and BH-105, located in the northwest and central areas of the site, respectively. At BH-101, the sand unit was encountered at a depth of approximately 5.3 mBGS and extended to below the bottom of the borehole (5.9 mBGS), whereas at BH-105 it was found to reside at a depth of approximately 4.6 mBGS and be only about 0.3 m thick. The soils encountered were reported as ranging from moist to wet. The Halton Till is considered to be a regional aquitard given its low hydraulic conductivity (less than 10^{-9} m/sec, Alston Associates, 2011). These till deposits restrict groundwater flow and infiltration (i.e., groundwater recharge), and confine deeper aquifer units. The presence of thick deposits of low permeability till soils identified at the site will limit the amount of infiltration that will occur and promote runoff of surface water even during moderate rainfall events. The various components of the water balance are quantified at a high level below. Also discussed are the potential implications of adding impervious surfaces to the site.

A potential reduction in the groundwater recharge that does occur through the fine grained soils may result from increasing the area on the site covered by impervious surfaces. This is a longer term effect (i.e., operational effect) and the magnitude of the potential effect can be evaluated in general terms by evaluating the water balance for the site. This is done by first calculating a water surplus for the site, by subtracting the evapotranspiration that occurs from the precipitation received. The resulting amount of water is available to either infiltrate the ground surface (i.e., groundwater recharge), or runoff the site. Considering a total property area of approximately 8 ha, an annual pre-development infiltration volume of 8,000 m^3 has been estimated for the site.

During operation of the Finch West MSF, the property area occupied by buildings and other solid surfaces (i.e., track and yard areas, parking lots, driveways, etc.) will become impervious to precipitation. The area covered by storage / track amenities also will be impervious, although there will likely be a certain amount of infiltration through these features. Considering no re-infiltration of precipitation captured within impervious areas, a net infiltration reduction of approximately 15.3%, or 1,224 m^3/yr. is estimated to occur due to operation of the Finch West MSF. Although the site is not considered a significant groundwater recharge area, the current rate of recharge should be generally maintained post-development.

No areas of groundwater discharge (seepage) are evident either upon or in the general vicinity of the site. Similarly, no watercourses or other surface water features were observed to occur within a radius of approximately one kilometre from the site. The nearest surface feature to the site is Black Creek, located at a distance of about 1.2 km to the east. Based on its distance away and occurrence of fine-grained till soils within the shallow subsurface, it is interpreted that Black Creek likely does not receive a significant contribution of flow, if any, from groundwater recharge at the site.

Overall, the site is not considered to be a groundwater discharge area.

Groundwater Levels

As noted in **Section 3.1.3.2**, the shallow groundwater table is interpreted to reside locally at depths ranging between approximately 0.5 m and 1.5 mBGS. Construction activities requiring excavation may extend below the groundwater table. Depending on the nature and magnitude of construction, dewatering may be required to provide dry working conditions. However, no significant sub-surface construction below the water table is anticipated.

When construction dewatering occurs, it lowers groundwater levels at the point of dewatering and generally in a radial pattern outward to some distance away from the point of dewatering. This area is termed the radius of influence. If a receptor, such as a water well or stream as common examples, exists within the radius of influence and that the receptor relies on groundwater levels remaining generally stable, an adverse effect can potentially occur.

Lowering of groundwater levels below and around the site is not anticipated to represent a potential adverse effect. Further, the site is located within an existing urban setting where surrounding properties are municipally serviced and groundwater supply wells do not occur locally.

It is not anticipated that construction or operation of the Finch West MSF will result in a lowering of groundwater levels on either a short term or longer term basis to an extent requiring mitigation.

Groundwater Flow

With the exception of excavation(s) for connection to buried municipal services extending onto the site (i.e., water, sanitary and storm infrastructure), no significant sub-surface construction below the water table is anticipated. No significant aquifer has been identified at the depth of investigation for the site.

Construction and operation of the Finch West MSF is not anticipated to adversely affect groundwater flow.

Groundwater Quality

Potential effects to groundwater quality are related to spills of deleterious substances on the ground surface that infiltrate into the subsurface. The potential for this to occur exists during construction and operation of the Finch West MSF.

Effects on surface water quality can also occur through the discharge of water collected during dewatering activities. Groundwater quality samples would be collected prior to construction and this information used to develop an appropriate water discharge plan. Further, if required, the water discharge plan would provide a discharge methodology that protects surface water quality.

Overall, the potential for adverse effects to surface water quality as a result of groundwater discharge is considered to be low.

Aquifers and Wells

No significant aquifer units were identified at surface or within the shallow subsurface at the site. No active groundwater supply wells or groundwater users were identified in the local area.

Construction and operation of the Finch West MSF is not anticipated to affect groundwater aquifers or wells.

Contaminated Soils and Groundwater

Subsurface excavation and ground levelling will occur on the Finch West MSF site during construction and will require the handling of soil and/or groundwater. Potential contaminants of concern identified during a Phase I ESA (SNC-Lavalin, 2011) included petroleum hydrocarbons (PHC F1 to F4), volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs) and metals. Investigative work completed during the subsequent Phase II ESA (SNC-Lavalin, 2011) included the drilling of ten boreholes at various locations across the site (see **Figure 2-3**), and the collection of soil and groundwater samples at selected locations. Based on the Phase II ESA results, the concentrations of all analyzed parameters in soil and groundwater were below the MOECC Table 3 standards for residential/parkland property use (more stringent criteria than industrial/commercial/ community land use). Soil and groundwater quality will be further evaluated as part of detailed hydrogeological and geotechnical investigations that are to be completed at the site.

Based on the ESA investigations (SNC-Lavalin, 2011), it is not anticipated that contaminated soils or groundwater will be encountered at the MSF site.

4.1.3.2 Mitigation Measures

Groundwater Recharge/Discharge/Groundwater Levels/Groundwater Flow

The following mitigation measures will be implemented through the design of the facility to assist in preserving the natural groundwater recharge (infiltration) function of the site:

- Where feasible, select parking and/or driveway areas will be paved with permeable pavement to facilitate infiltration and reduce runoff
- Maintain a portion of the site as landscaped areas to facilitate infiltration
- Adhere to the Toronto Green Standard.

Groundwater Quality/Aquifers and Wells

The following mitigation measures will be implemented to assist in preserving groundwater quality and minimizing potential effects on aquifers and wells:

A certain degree of temporary construction dewatering may be required where any buried infrastructure coincides with saturated, permeable sediments. A construction dewatering assessment will be conducted, prior to construction, to determine the need for a MOECC Permit To Take Water (PTTW) based on the results of forthcoming detailed subsurface hydrogeological and geotechnical investigations and review of engineering design details for the site development.

Groundwater quality samples will be collected as part of a forthcoming hydrogeological investigation prior to construction and will be evaluated in the construction dewatering assessment. If dewatering is required, pumped groundwater will be discharged into local municipal sanitary or storm infrastructure along Finch Avenue West, York Gate Boulevard and/or Norfinch Drive and be subject to prior quality review and approval by the City of Toronto.

Potential accidental spills that could occur on site and adversely affect the groundwater system will be mitigated through the following measures:

- Prior to construction the contractor will develop and institute an Environmental Spills Prevention and Response Plan to use during construction
- Prior to operation, an Environmental Spills Prevention and Response Plan will be developed and implemented to use during operation.

Contaminated Soils and Groundwater

A Soil and Groundwater Management Strategy will be developed prior to construction to minimize potential adverse effects resultant from potentially encountering contaminated soil and groundwater on-site.

4.1.3.3 Net Effects

The potential for reduction in groundwater recharge functions at the site will be minimized through the implementation of the identified mitigation measures. Groundwater recharge function on-site will be maintained at near pre-development rates.

Potential effects to aquifers/wells and groundwater quality will be minimized, if required[10], through the implementation of mitigation measures identified following additional detailed hydrogeological investigations, and by developing Spill Prevention and Contingency Plans.

Potential effects from encountering contaminated soils and groundwater during construction would be mitigated through adherence to a Soil and Groundwater Management Strategy during construction.

4.1.3.4 Monitoring

A PTTW (if required) would include recommendations for monitoring during active construction dewatering for any potential adverse effects identified in the dewatering assessment during detailed design. Potential monitoring activities identified in the PTTW would include: pumping rate/volume monitoring, groundwater level monitoring and groundwater discharge monitoring (flow and quality).

4.2 Socio-Economic Environment

4.2.1 Land Use Designations

The assessment of visual effects to land uses surrounding the site as a result of the Project is included in **Section 4.2.2**. An impact assessment in relation to land use designations governing the site is presented below.

4.2.1.1 Potential Effects

City of Toronto Official Plan

As described in **Section 3.2.1**, the MSF development context conforms to the broad, general policies of the City of Toronto Official Plan to provide for enhanced transit services. The on-site configuration of buildings has regard to the 'Avenues' policy of the Official Plan.

As such, no potential effects to Official Plan designations governing the MSF site are anticipated.

Zoning By-law

As described in **Section 3.2.1,** the MSF is an essential public service that is permitted by the City of Toronto zoning By-law. The City of Toronto has issued a Notice of Zoning Compliance, which confirms that a transit-related Maintenance and Storage Facility complies with the Zoning By-law.

As such, no potential effect to zoning governing the site is anticipated.

4.2.1.2 Mitigation Measures

10. No significant aquifer units were identified at surface or within the shallow subsurface at the site. According to previous studies, no active groundwater supply wells or groundwater users are present within the local area.

No mitigation measures are required as there are no potential effects to land use designations. The development of the MSF site will conform with Metrolinx Design Excellence principles and applicable City of Toronto planning and design principles.

4.2.1.3 Net Effects

No effects to existing land use designations are anticipated as a result of the MSF.

4.2.2 Visual Character

4.2.2.1 Potential Effects

During construction of the MSF, temporary construction related equipment, machinery and vehicles will be visible from visually sensitive receptors (i.e., institutions, residences, businesses, and pedestrians) in the vicinity of the site.

During operation of the MSF, institutions, residences, businesses, and pedestrians in the vicinity of the site will experience a permanent change to their existing views; the existing unobstructed view of a natural (albeit disturbed) grassy field will be replaced with a view of an urbanized, industrial-type facility.

The nature and degree of visual impacts are related to the visibility of MSF components from sensitive visual receptor locations. Visually sensitive receptors are generally present from the east, north, and west viewpoints surrounding the site (as identified on **Figure 3-6**), however the most sensitive viewpoint from a visual perspective is from the southerly direction. This is due to the Finch Avenue West corridor that currently exhibits a high volume of pedestrian and traffic usage, and that in the future will also include the Finch West LRT and any associated urban renewal and streetscaping elements. Additionally, a retirement residence and two existing homes with side frontage on Finch Avenue West will have a relatively unobstructed view of the MSF. Therefore, the future viewshed from Finch Avenue West will be a strong focus for visual mitigation features.

The potential visual impacts are generally due to the size, height and inherent aesthetic nature of the features being introduced on site. With this in mind, the following outlines the MSF elements and their potential for visual impact on sensitive visual receptors (refer to **Section 2.2** for a detailed description of the following features):

- Main Repair Shop Building (due to height, size, inherent aesthetic nature)
- Operations Company Building (due to height)
- Maintenance of Way Building (due to height)
- LRV vehicles in storage yard and travelling through access/egress points (due to inherent aesthetic nature);
- Electrical substation (due to height and inherent aesthetic nature)
- Traction Power Distribution System - Overhead Contact System (OCS) wiring support structures due to height and inherent aesthetic nature)
- Parking lots (inherent aesthetic nature)

Security lighting required at the MSF will represent a new light source that may have minor effects on the surrounding area, including sensitive residential and institutional uses.

In order to allow for ease of movement for LRVs on-site during operation, the site will be reduced to a relatively flat grade, roughly at the same elevation as Finch Avenue West. This will result in a cut at the northern perimeter of the property whereby the site ground elevation will be lower than the adjacent hydro corridor/recreational field elevation

to the north. As a result, MSF features will be potentially less visible from the northern viewpoints beyond the hydro corridor. MSF features will be potentially most visible from the eastern, southern, and western viewpoints.

A series of site renderings were developed to represent MSF visibility from off-site viewpoints (**Figures 4-1** through **4-4**)**.**

Figure 4-1 Preferred Design - Viewpoint #1

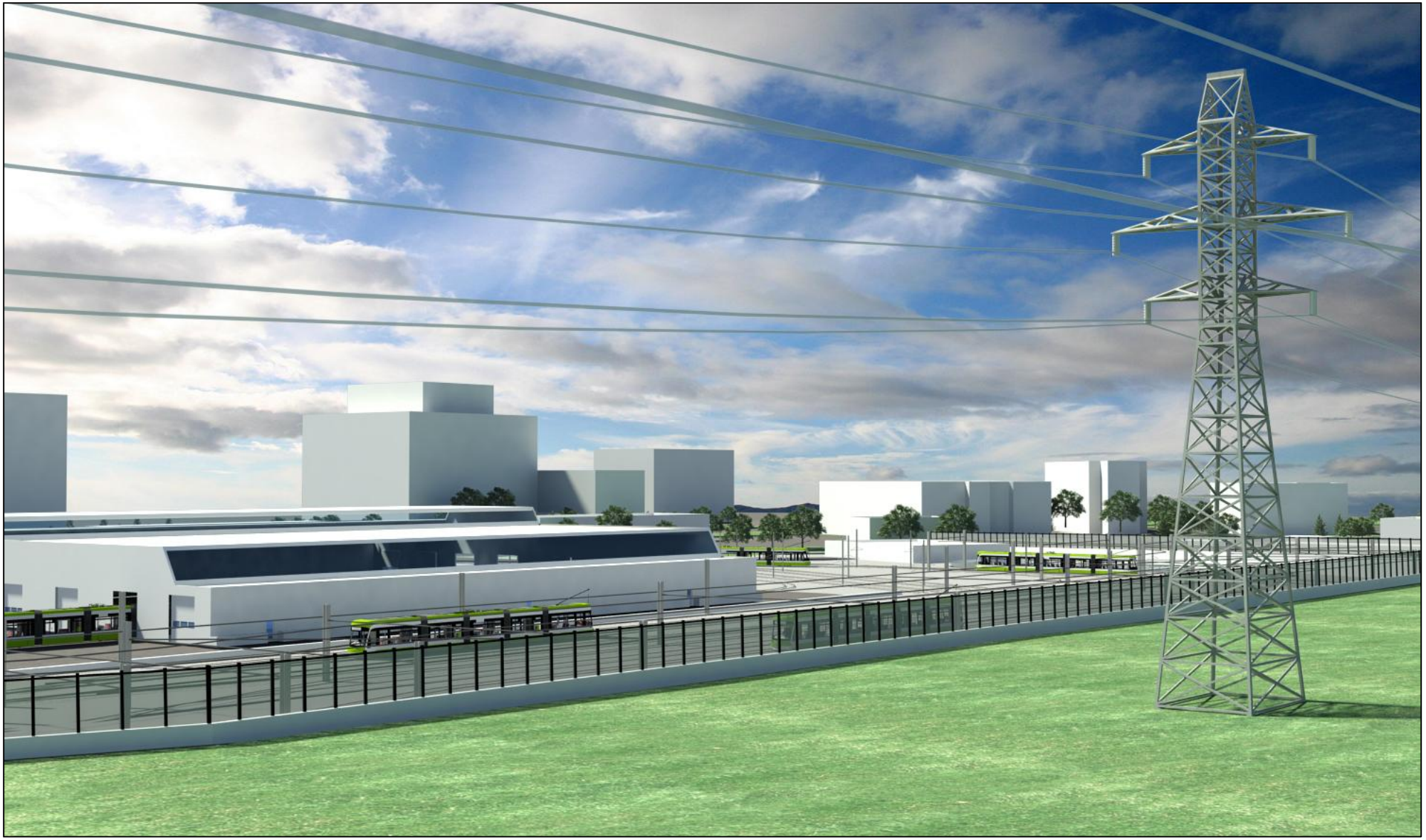


Figure 4-2 Preferred Design - Viewpoint #2

Figure 4-3 Preferred Design - Viewpoint #3

Figure 4-4 Preferred Design - Viewpoint #4

The renderings capture the daytime (i.e., 8 am to 6 pm) activities on-site, when most of the LRV are in service, and therefore, off-site. The following outlines the directional viewpoints[11] and their associated potential impacts based on the MSF Preferred Design:

- **Viewpoint #1: *Looking Southeast***
  From the northwest, representing the potential views of the MSF from an elevated viewpoint at Norfinch Drive and the hydro corridor, overlooking surrounding institutional uses.
  Figure 4-1 shows the Main Repair Shop, Operations Company Building, Maintenance of Way Building, parking, LRV access/egress, LRV Storage Yard and associated OCS.
- **Viewpoint #2**: ***Looking South / Southeast***
  From the north, representing the potential views of the MSF from a slightly elevated viewpoint at the recreational facilities beneath the hydro corridor.

  Figure 4-2 shows the Main Repair Shop as the potentially most visible/prominent viewshed feature, however, only the upper portion and roof of the building will be visible due to the elevation change and future sound barriers at the northern property limit. The LRV Track Storage Yard would be completely obstructed due to the elevation change and sound barriers at the northern property limit. The view of the Operations Company Building and Maintenance of Way Building will be mostly obstructed and distant from this viewpoint.
- **Viewpoint #3: *Looking West***
  From the east, representing the potential views of the MSF from York Gate Boulevard.
  Figure 4-3 shows the Main Repair Shop, LRV Track Storage Yard and associated OCS as prominently visible features.
- **Viewpoint #4**: ***Looking Northwest***
  From the southeast, representing potential views of the MSF from intersection of Elana Drive/York Gate Boulevard and Finch Avenue West and the existing residences on Elana Drive.
  Figure 4-4 shows the Operations Company Building as the most visible on-site feature due to its proximity to Finch Avenue West. The LRV Site access/egress and some parking are also visible from this viewpoint. The Main Repair Shop and LRV Track Storage Yard are also visible from this location.

4.2.2.2 Mitigation Measures

During construction of the MSF, security fencing along the southern property line will be used to limit the potential for driver distraction along the busy Finch Avenue West corridor. Similar fencing will be considered along the eastern, western, and northern property boundaries to limit potential adverse visual effects or distraction to adjacent residences/businesses/institutions and pedestrians from those viewpoints. In addition temporary security lighting will be implemented on-site.

With respect to mitigation during operation of the MSF, Metrolinx has instituted a Design Excellence Group with a Board-directed mandate and program for the improvement of design for all Metrolinx facilities. The Design Excellence Group will ensure that design guidelines for architecture, aesthetics and corporate identity considerations are implemented in detailed design contract documents for compliance. Specifically, design excellence for the site will include, and may not be limited to the following mitigation measures:

- Provide screening and buffers from the street edge and adjacent properties using a combination of landscaping, fences and grading changes.

11. The existing conditions key viewpoints were modified in response to community input received during Preliminary Project Planning.

- Noise mitigation (i.e., barriers) incorporated into site design (as required) will include aesthetically pleasing design elements as a component of visual mitigation. These design elements may include transparent or semi-transparent barriers, artistic features or landscaping included in barrier design and implementation.
- Provide landscaped buffers at the site property lines, where feasible.
- Security lighting for the MSF will be sensitively designed with respect to adjacent land use surroundings, including residential.
- Provide appropriate facility identification and street related signage.
- Facility adherence to the Toronto Green Standard.
- Refine parking requirements, with the goal to further reduce.

As described in **Section 4.1.1,** to compensate for the loss of existing trees on-site, any trees found to be greater than 30 dbh will be inventoried. Landscape plans will include planting at a minimum of a 2:1 compensation ratio. Compensation plantings will improve the visual aesthetics of the site and its surroundings.

4.2.2.3 Net Effects

The visually sensitive receptors will have a partially obstructed and/or unobstructed view of the MSF following the implementation of the required mitigation measures. However, the implementation of the required mitigation measures will act to minimize potential visual adverse effects by screening potential lower and mid-level views of buildings, portions of the Overhead Contact System (OCS), internal roads, parking, tracks and storage of the MSF while maximizing the potential for facility integration into the existing community fabric and the Finch Avenue West urban streetscape.

4.2.2.4 Monitoring

No monitoring is required.

4.2.3 Community Features

4.2.3.1 Potential Effects

Changes to Living Conditions in the Community

Project works may result in changes to living conditions in the community (e.g., nuisance effects such as noise, vibration, dust, and traffic).

Use and Enjoyment of Property and Outdoor Spaces

Increased nuisance effects such as noise, vibration, dust and traffic, during construction of the MSF, may affect the extent to which people use and enjoy private property or outdoor spaces. Additionally, higher levels of noise can be expected from site activity and LRT movement during MSF operation.

There is not expected to be any building damage, however vibration during construction may result in annoyances for local residents. No perceptible vibration is anticipated during MSF operation following implementation of the required mitigation measures and recommended best management practices.

It is anticipated that no recreational land will be lost as a result of the site construction; however, the outdoor recreation facilities to the north of the MSF site (Remberto Navia Sports Field and Finch Corridor Recreation Trail) may experience nuisance effects during construction and operation of the MSF in the absence of mitigation.

Businesses

Businesses in the study area (refer to **Figure 3-8** for business locations) may be impacted by construction and operation of the MSF by resulting changes in traffic flow or changes to access or egress routes affecting customers or deliveries. Traffic flow during construction will be restricted for short periods and it is anticipated that there may be some diversion of traffic away from the study area.

Positive effects on businesses (i.e., increased patronage) may be experienced due to additional work force in the area during both construction and operation of the MSF. Specifically, this may result in increased patronage to service providers such as food outlets. Well-designed and appropriately-scaled buildings with an attractive streetscape could provide a catalyst for the revitalization of this segment of Finch Avenue West, increasing retail establishments, retail sales, and the general economic health of the area.

Institutions

There will be increased levels of dust, noise and vibration during construction of the MSF. Institutions potentially affected include Monsignor Fraser College, Hawthorne Place Care Centre, Leisureworld Caregiving Centre, Norfinch Medical Centre, and Oakdale Professional Medical Centre (refer to **Figure 3-8** for institutional locations). Equally, higher levels of noise can be expected from site activity and LRT movement during MSF operation. Increased noise and vibration effects to temporary classrooms (portables) at the Monsignor Fraser College (currently located to the northwest of the site) are anticipated.

Community Character or Cohesion

The MSF will facilitate an increased community presence via an increased work force.

Utility and Municipal Services

There may be a need for temporary relocation of utilities and municipal services within the adjacent municipal right-of way(s) to provide for connection(s) to the MSF site. To enable MSF operations, direct connections to existing utility and municipal services within the existing adjacent municipal roadway rights-of-way are expected.

4.2.3.2 Mitigation Measures

Mitigation measures from the relevant disciplines as documented in this EPR will be implemented to minimize potential effects on community features, including, but not limited to the following:

- A Dust Management Plan that will consist of mitigation measures to ensure that any dust emissions are reduced to the fullest extent possible;
- Construction noise and vibration mitigation measures as documented in **Section 4.2.4;**
- Noise and vibration mitigation to ensure facility operation is within acceptable noise and vibration limits;
- Facility aesthetic design in accordance with Metrolinx Design Excellence Guidelines;
- Placement of fences and noise walls will consider aesthetics while allowing security to the greatest extent possible;

- Measures to minimize potential conflicts with pedestrians and cyclists at affected intersections including signage, signal control, flashing lights, and audible warnings;
- Ensuring active transportation facilities (i.e., sidewalks, bike paths) are preserved through construction and operation;
- Signage alerting potential customers that businesses are still operating during construction;
- Compensation to business owners for unanticipated temporary loss of access during construction, if required; and,
- Temporary security fencing along the site perimeter and night-time security lighting that is sensitive to adjacent residential and institutional land uses.

In addition, to facilitate greater recreational enjoyment, a dedicated right-of-way along the western boundary of the MSF site fronting the property line with Monsignor Fraser School between Norfinch Drive and the Hydro Corridor will be provided to accommodate a future multi use path connection.

Metrolinx will continue to consult with the community regarding potential future intensification opportunities in the areas near the Finch West MSF Site throughout the design and construction phases of the project.

The exact locations and depths of utilities will be determined during detailed design and a staging and relocations approach will be established in consultation with affected utility companies.

4.2.3.3 Net Effects

Minimal adverse effects on community features are anticipated following the implementation of applicable mitigation measures.

Living Conditions in the Community

The potential for changes to living conditions in the community as a result of the Project will be minimized through the implementation of the mitigation measures for air quality, noise and vibration, visual and traffic.

Use and Enjoyment of Property and Outdoor Spaces

The potential for effects on the use and enjoyment of property and outdoor spaces will be minimized through the implementation of the mitigation measures for air quality, noise and vibration, visual and traffic. Any effects on users of the Remberto Navia Sports Field and Finch Corridor Recreational Trail are expected to be negligible, ensuring the continued enjoyment of these public recreational facilities.

Long term, the provision of a multi-use pathway connection through the western portion of the MSF property fronting the property line with Monsignor Fraser School, will facilitate greater recreational enjoyment.

Businesses

Business access will be maintained during construction of the MSF. Disruption to business access during construction would be compensated for as appropriate by providing signage that identifies that businesses continue to operate during construction. Any loss of drive-by business due to traffic restrictions or diversions during construction may be offset by additional patronage from an increased local population during construction (i.e., on site construction personnel) and future operations personnel. Additionally, well-designed and appropriately-scaled buildings with an attractive streetscape will provide a catalyst for the revitalization of this segment of Finch Avenue West, increasing retail establishments, retail sales, and the general economic health of the area.

Institutions

Potential nuisance effects to institutions will be minimized through the implementation of the mitigation measures for air quality, noise and vibration, visual and traffic.

Potential noise and vibration nuisance effects to Monsignor Fraser College will be minimized to the extent possible during detailed design of the facility, including MSF on-site mitigation and/or the potential movement of portable classrooms.

Community Character or Cohesion

Although the current property is a vacant lot/greenspace, it is a private property that is unused by the community and significantly degraded. In combination with the Finch LRT, the MSF will bring positive effects to the community through increased employment and a potential increase in spending in the community and a well-designed, attractive streetscape. Increased employment opportunities and urban aesthetics may encourage local economic regeneration. The construction and operation of the MSF will not result in any loss of sidewalks, ensuring that the existing pedestrian facilities/community connectivity is not affected.

4.2.3.4 Monitoring

No monitoring is required.

4.2.4 Noise and Vibration

This section documents the potential impact on the noise and vibration sensitive receptors surrounding the MSF. The identification of the noise and vibration sensitive receptors was based upon the definition provided in MOECC publication NPC-300 (2013) and MOEE/TTC Draft Protocol for Noise and Vibration Assessment (1993) which includes land uses such as:

- Residential dwellings
- Commercial noise sensitive spaces (hotels, motels)
- Institutional noise sensitive buildings (nursing homes, schools, hospitals).

Receptors were grouped into areas where similar noise and vibration levels can be expected, as identified in the existing conditions assessment (refer to **Figure 3-9** for the location of sensitive receptors in the study area).Areas further removed from the facility (i.e., outside of the study area) will receive lower noise and vibration impacts.

4.2.4.1 Potential Effects of Noise

Noise Assessment Criteria

The primary metric for measuring potential noise impact (effect) is the change in noise level above existing sound levels. Refer to **Section 3.2.3.3** for existing background noise levels. **Table 4-1** below represents the perceived impact of changes in sound level, measured in decibels (dB), and the significance of the noise impact by noise level difference.

Table 4-1: Perceived Impact of Increased Sound Levels[12]

Increased Sound Level Above Ambient (dB)	Perception	Perceived Impact
0 to 3	Potentially Perceptible	Minor
3 to 5	Perceptible	Low
5 to 10	Up to twice as loud	Medium
Greater than 10	Twice as loud or greater	High

Noise sources were input into an environmental noise prediction algorithm (ISO 9613-2 implemented in Cadna/A software package) to predict the noise levels at the worst case receiver locations within each noise sensitive area for both the construction and operations phases of the MSF.

As the Facility is within the Province of Ontario, and within the City of Toronto, the operational noise of the MSF is subject to compliance with MOECC publication NPC-300. Mobile equipment, while operating within the confines of a facility, is also included in the assessment of stationary noise. Once mobile equipment exits a facility, it is considered part of the traffic in the public right of way and included in the assessment of the associated transportation corridor. The noise level limits for on-site noise sources, as noted in NPC-300, and assessed based upon the worst case hour of operation (L_{EQ1hr}) are the higher of:

- The minimum background noise level that occurs or is likely to occur during the operation of the noise sources under assessment; or
- The minimum exclusionary limits as set out in Tables B-1 and B-2 of NPC-300 (see **Appendix C**)

Comparison between the background noise level limits (see **Table 3-6**), and the minimum exclusionary limits (see **Appendix C**), indicates that in most cases the minimum background noise level would be set as the noise level limit for assessment under NPC-300. **Table 4-2** shows the preliminary on-site operational noise level limits.

Table 4-2: Preliminary On-Site Operational Noise Level Limits

Monitoring Location	Time Period[13]	Minimum (1 hour L_{EQ} dBA)	Resulting Limit (1 hour L_{EQ} dBA)
Loc1: Between Pelican Gate and Elana Drive on Finch Ave. West	Daytime	67	67
	Evening	68	68
	Night time	63	63
Loc2: West side of Wheatsheaf Crescent	Daytime	48	50
	Evening	51	51
	Night time	42	45
Loc3: East side of Wheatsheaf Crescent	Daytime	50	50
	Evening	50	50
	Night time	42	45
Loc4: On York Gate Blvd., between Hullmar Drive and Jane St.	Daytime	54	54
	Evening	58	58
	Night time	50	50

As mentioned above, once mobile equipment exits the MSF, they are considered as part of the traffic in the public right of way and included in the assessment of the associated transportation corridor. In accordance with the approved Finch West LRT Environmental Project Report (March, 2010), LRVs located off the MSF were assessed using the MOEE/TTC Draft Protocol for Noise and Vibration Assessment. Noise levels for the transit operations

*12. Adapted from "*Engineering Noise Control, Theory and Practice*" 4th edition, David A. Bies and Colin H. Hansen, 2009*

13. Daytime is defined as the hours between 07:00 to 19:00 hours, evening is defined as the hours between 19:00 to 23:00 hours, night time is defined as the hours between 23:00 to 07:00 hours.

within the public right of way are assessed using the sixteen hour daytime and eight hour night time equivalent sound levels. Noise level criteria are set as the higher of the existing day/night time ambient noise levels or the minimum noise levels set out in **Table 4-3** below. Noise mitigation measures are only warranted if the noise level criteria are exceeded by more than 5 dB.

Table 4-3: Minimum Noise Level Criteria for Transportation Corridors

Time Period	Limit (dBA)
16 hour day	55
8 hour night	50

In conjunction with the background noise levels presented in **Table 3-6** and considering the LRVs enter the public right of way immediately north of Finch Avenue West on York Gate Boulevard (only receptors on Finch Avenue West are affected), the resulting noise level criteria for the assessment of the off-site vehicles are presented in **Table 4-4** below.

Table 4-4: Resultant Noise Level Criteria – Transportation (TTC) Corridors – Finch Avenue West Receptors

Time Period	Limit (dBA)
16 hour day	69.4
8 hour night	66.6

Assessment of Construction Noise

Construction noise was reviewed based upon the expected equipment, construction phases, and expected construction operational areas (refer to **Appendix C**). The majority of the construction activities will occur within the property line of the MSF; however, there will be some construction outside of the property for the rail connection to the main Finch West LRT Line.

To predict the maximum construction impact at each noise sensitive area during each phase of construction, several scenarios were modeled for each phase of construction. Each scenario considered the worst possible active construction area for a particular noise sensitive area. The active construction areas were assumed to be approximately 50 m x 100 m for onsite construction and 30 m x 15 m for off-site construction. For the purposes of this assessment, the noise impact is defined as the difference between the Project (construction) noise levels, and the existing background noise levels.

The potential effects of construction noise are as follows:

- Noise impacts will be highest during the night time hours, and during impact or sonic piling in all time periods
- Noise impacts will be high (see **Table 4-1**) at noise sensitive locations along Finch Avenue West (see **Figure 3-9**) during construction of the track work outside of the property limits
- Human annoyance due to construction noise is expected in the absence of noise control measures during construction.

The sound quality from the construction of the MSF will be typical of construction activities at other civil engineering projects.

Refer to **Appendix C** for further details on the construction noise assessment, including noise impacts on specific sensitive receivers during phases of construction.

Assessment of Operational Noise

The predicted noise levels were compared to the background noise levels to determine the perceived noise impacts due to the operations of the MSF. Noise levels from the MSF and off-site sources, respectively, were also compared with operational noise level limits as discussed in **Tables 4-2** and **4-4** above. As in the construction noise assessment, the noise impact was defined as the difference between the Project noise levels and the existing background noise levels. Refer to **Table 4-1** for the significance of the noise impact by noise level difference. For this assessment, the Monsignor Fraser School is not considered to be noise sensitive during the night time hours (23:00 to 07:00). Further, it is assumed that the LRV will traverse the west side of the site.

The noise from the operation of the MSF can be grouped into three main components:

1. Noise associated with the MSF buildings and their operations
   - Interior operations including wheel truing and vehicle washing
   - Exterior ventilation, exhaust fans, HVAC, compressors, emergency diesel generators
2. Noise from the LRVs traversing over rail junctions
3. Noise from general LRV movements

Specific noise source information was sourced from similar facilities and adjusted for project specific conditions. For example, the building ventilation was increased in proportion to the size of the buildings. Noise sources were input into an environmental noise prediction algorithm (ISO 9613-2 implemented in Cadna/A software package).

Table 4-5 shows the maximum perceived noise impacts resultant from MSF operations (in decibels (dB)) at the noise receiver locations (see **Figure 3-9**) within each noise sensitive area.

Table 4-5: Perceived Noise Impact at Sensitive Receptor Locations

Assessment Locations	Maximum Noise Impact [dB]			Perceived Noise Impact		
	Day	*Evening*	*Night*	*Day*	*Evening*	*Night*
Wheatsheaf – Residence 1 (east)	9	9	11	Medium	Medium	High
Wheatsheaf – Residence 2 (west)	4	2	8	Low	Minor	Medium
York Gate at Hullmar – Apartment	3	-	8	Low	-	Medium
York Gate at Hullmar – Residence	3	-	7	Low	-	Medium
Elana Drive at Finch – Residence	-	-	2	-	-	Minor
Pelican at Finch – Long term Care Facility	-	-	3	-	-	Low
Pelican at Finch – Medical Office	-	-	2	-	-	Minor
Norfinch at Finch – Medical Office	3	3	7	Low	Low	Medium
Norfinch at Hydro Corridor– School	19	17	-	High	High	-

Table 4-6 shows the potential maximum noise levels from the MSF compared with the established operational noise level limits.

Table 4-6: Operational Noise Level Limit Assessment

Assessment Locations	Predicted Noise Level [dBA]			Criteria			Meet Criteria		
	Day	*Evening*	*Night*	*Day*	*Evening*	*Night*	*Day*	*Evening*	*Night*
Wheatsheaf – Residence 1 (east)	65	65	65	50	50	45	No	No	No
Wheatsheaf – Residence 2 (west)	61	61	62	50	51	45	No	No	No
York Gate at Hullmar – Apartment	62	62	63	54	58	50	No	No	No
York Gate at Hullmar – Residence	62	62	62	54	58	50	No	No	No
Elana Drive at Finch – Residence	67	67	68	67	68	63	Yes	Yes	No
Pelican at Finch – Long term Care Facility	69	69	69	67	68	63	No	No	No
Pelican at Finch – Medical Office	68	68	68	67	68	63	No	Yes	No
Norfinch at Finch – Medical Office	72	72	73	67	68	63	No	No	No
Norfinch at Hydro Corridor– School	76	76	-	50	51	-	No	No	-

Note that the perceived noise impact is based upon the difference between project noise levels and the average background noise. The assessment against the operational noise level limit is based on the maximum predicted project related noise levels and the applicable noise level limits.

The assessment indicates that in the majority of cases, there will be a minor to a medium perceived noise impact on sensitive receptor locations with a few cases having a high noise impact. The results also indicate that the MSF will not meet MOECC noise level limits in most cases without the implementation of noise control.

The following on-site noise sources are predicted to require noise control:

- Track Crossovers
- Generators
- Wheel Truing
- Transformer
- Some large bay doors
- Brake testing
- Some vehicle movements
- Some rooftop equipment
- Compressors

The dominant noise sources associated with the access to the Finch West MSF (along York Gate Boulevard and Finch Avenue West) include new track junctions and wheel squeal from the turns. The predicted noise levels from the track junctions and wheel squeal were added (energy addition) to the predicted noise levels from the Finch West LRT Line and compared against the applicable criteria. The results of this assessment are presented in **Table 4-7**. Further details of this assessment can be found in **Appendix C.**

Table 4-7: Assessment Results – Finch West MSF Access

Time Period	Noise Level – Facility Access Only [dBA]	Resultant Noise Level – Access and Line [dBA]	Criteria [dBA]	Exceedance [dB]	Mitigation Required?
16 hour day	70.7	73.0	69.4	3.6	No
8 hour night	69.2	70.8	66.6	4.2	No

Preliminary noise mitigation for the operation of the facility (to be refined during detailed design), is discussed in the following section and further detailed in **Appendix C**.

4.2.4.2 Noise Mitigation Measures

Noise Mitigation During Construction

A Construction Noise Management Plan will be prepared to address the construction noise from this project. The Construction Noise Management Plan will include the following details:

- A construction noise complaint process and action plan to address construction noise complaints;
- How construction equipment will meet guideline limits documented in NPC-115 and NPC-118;
- What measures are being taken to be compliant with City of Toronto noise by-laws;
- What noise control measures are being implemented;
- What actions are being taken to minimize the potential for noise complaints and noise impact on surround noise sensitive receivers; and,
- Development of a monitoring/verification plan to demonstrate that the mitigation measures above are appropriate, functioning correctly, and that acceptable noise levels at noise sensitive receivers are maintained for the duration of construction.

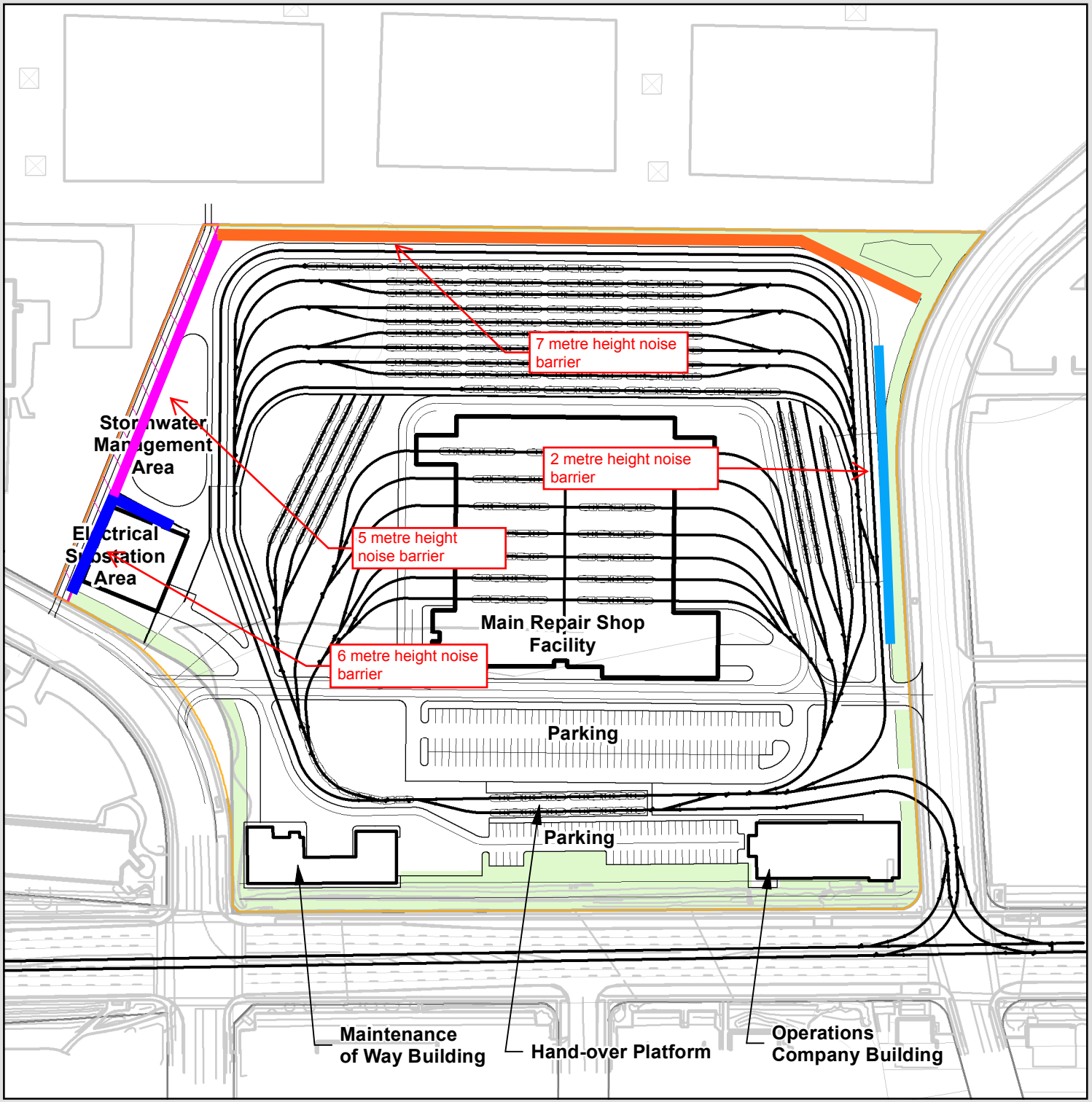
Additional guidance to aid in the development of the Construction Noise Management Plan is provided in **Appendix C**.

Noise Mitigation During Operations

An Environmental Compliance Approval (Noise) (ECA) application will be prepared and submitted to the MOECC to demonstrate that the built facility meets the requirements of MOECC document NPC-300. No noise mitigation is required to address the off-site LRV access to the Finch West LRT.

Noise mitigation measures that will be implemented for the Preferred Design are summarized below and will be refined during detailed design, as required:

- Main Maintenance shop / Main Repair Shop:
  - Close bay doors while wheel truing
  - Specify shop compressors to have a maximum environmental sound power level of 90 dBA
  - West facing doors
    - Close bay doors during night time hours unless being used for the transiting vehicles, possible use of an automated quick close system.
    - Open to a maximum of ¼ of the way during all other hours unless being used for the transiting vehicles, possible use of an automated quick close system
  - East facing doors
    - Open at most 1/2 way during the night time hours unless being used for the transiting vehicles, possible use of an automated quick close system
- Maintenance of Way Building:
  - Specify compressor to have a maximum environmental sound power level of 90 dBA
  - Bay doors during loud operations such as using impact wrenches or hammering sheet metal
    - Close during night time hours
    - Close half way and operate no more than 30 minutes out of any given hour during the daytime
- Specify operations building 2 main AC units to maximum sound power level of 102 dBA
- Include noise specifications for roof top equipment based upon final number, location, and capacities
- Generators tested during daytime only, specified maximum sound power level of about 98 dBA
- Attempt to keep turning radiuses greater than 1,000 ft. (~300 m):
  - Make provisions for rail greasers for curves less than 300 m/radius less than 100 times the truck wheel base
- Change maximum hourly deployment from 20/hr day, 20/hr evening, 50/hr night, to:
  - 20/hr day (remains unchanged)
  - 20/hr evening (remains unchanged)
  - 30/hr night – this is for the morning deployment (currently forecasted at 50 in a single hour) to 50 over the course of an hour and forty minutes (1 every 2 minutes)
- LRT vehicle speed on site limited to 10 km/hr
- Distribute shunting of LRT vehicles as evenly as possible across site
- Noise barriers as presented on **Figure 4-5**



Legend

- Property Limits for the MSF Site
- Light Rail Vehicle (LRV)
- LRV Track
- Multi-use Pathway
- Landscape Buffer

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Finch West Light Rail
Maintenance and Storage Facility (MSF)
Environmental Assessment

Preferred Design Noise Barrier Locations

July 2015

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Figure 4-5

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An Operational Noise Management Plan will be prepared to address noise control for the operation of the Finch West LRT MSF. The Operational Noise Management Plan will include the following details:

- Demonstration that the facility meets MOECC noise guideline NPC-300;
- Demonstration that the facility meets municipal (Toronto) noise by-law requirements;
- A plan to submit an Environmental Compliance Approval (ECA) application to the MOECC;
- Noise control measures being implemented at the facility;
- Measurement/verification plan to confirm performance of the noise mitigation measures

4.2.4.3 Noise Net Effects

Effects of noise during construction will be minimized through the implementation of a Construction Noise Management Plan.

The implementation of the operational noise management plan for the MSF will ensure the noise impacts are in compliance with the NPC-300 guideline and the MOEE/TTC Protocol.

4.2.4.4 Potential Effects of Vibration

Vibration Assessment Criteria

There are two main concerns during the assessment of vibration effects: building damage and human comfort. Building damage may occur when there are excessive vibration impacts on a structure. Depending on the type of structure, there are different thresholds of damage. The assessment for potential building damage is based upon the methodology as presented in the United States Federal Transit Administration's Transit Noise and Vibration Impact Assessment (FTA) document, which defines and provides threshold vibration damage limits for four different building types, as summarized in **Table 4-8** below.

Table 4-8: Building Type Definitions

Building Type	Description	Vibration Damage Criteria Peak Particle Velocity (mm/s)
Type I	Reinforced-concrete, steel or timber (no plaster)	12.70
Type II	Engineered concrete and masonry (no plaster)	7.62
Type III	Non-engineered timber and masonry buildings	5.08
Type IV	Buildings extremely susceptible to vibration damage	3.05

Construction vibration is also subject to City of Toronto By-law 514, which requires that a vibration control form and study be submitted as part of a building permit application should certain types of construction operations be used, such as deep foundations. This assessment identifies the requirement for additional vibration study to be submitted as part of a building permit application, and the potential requirement for construction vibration monitoring and building condition surveys. The requirement for further assessment is triggered when a "zone of influence" (an area where construction vibration is predicted to be equal to or greater than 5 mm/s) extends beyond the legal boundaries of the construction site and encompasses any buildings on adjacent properties.

Human comfort is assessed based upon differing levels of response to vibration levels. The latest MOECC/TTC vibration criteria is documented in the 1993 Draft Protocol for Noise and Vibration Assessment for the Proposed Scarborough Rapid Transit Extension, in which the vibration from the transit vehicles is limited to 0.1 mm/s root mean square velocity (Vrms) at a point of reception. This equates to a vibration velocity level of 72 VdB, which is in line with the criteria as presented in the FTA document, but does not include limits for other conditions and types of vibration

sensitive spaces. Therefore the FTA document criteria were used in this assessment. **Table 4-9** presents the threshold levels for varying human responses to vibration, as well as the criteria for high resolution equipment. The assessment of human annoyance to vibration was also based upon methodology as presented in the FTA document.

Table 4-9: Human and Sensitive Equipment Vibration Criteria

Receptor Type	Limit [VdB][14]	Description
Offices and non-sensitive spaces	85.0	Annoyance in Sensitive Spaces
Institutional – Daytime Primary	75.0	Noticeable Vibration – Likely Annoying
Residential Night and Operating Rooms	72.0	Generally not Noticeable Vibration
Threshold of Perception	65.0	Barely Perceptible Vibration
MRI and High Resolution equipment	54.0	Equipment with 1 micron detail size

Ground borne noise has the potential to cause situations where there are excessive interior noise levels. Ground borne noise is caused when vibration is transmitted into a building structure and reradiated as sound by the interior room surfaces. Ontario currently does not have an established limit for ground borne noise. However, the FTA guide has a recommended limit within sleeping quarters of 35 dBA. Generally ground borne noise is not considered an issue when the exterior vibration levels are met. This is confirmed when taking the exterior vibration limit of 72 VdB and calculating the interior noise levels using methodology as presented in the FTA guide, which results in an interior noise level of approximately 35 dBA.

Assessment of Construction Vibration

Vibration was predicted at the smallest separation distance between a vibration sensitive receptor and the closest anticipated point of equipment operation. Nearby residential areas surrounding the facility were assumed to be Type III buildings while commercial locations (hotels, nursing homes) were assumed to be Type II. The construction vibration assessment revealed the following (refer to **Appendix C** for further detail):

- No building damage is expected to occur during construction of the MSF.
- A vibration “zone of influence” during construction (as per City of Toronto By-law 514) will not encompass buildings not associated with this project.

Similar to the assessment of vibration building damage, the assessment of human annoyance was based on the smallest separation distance between the vibration sensitive receivers and area of construction equipment operation. There is the potential for vibration impact on high sensitivity machines (up to 1 micron detail size, for example some MRI machines) in the two medical buildings near the southwest corner of the MSF site. As the criteria for high sensitivity equipment is different from the residential locations, the assessment of vibration impact on high sensitivity machines was conducted in addition to the assessment of human annoyance.

The assessment determined the following (refer to **Appendix C** for further detail):

- There is potential for human annoyance due to vibration during piling operations with the use of impact or vibratory methods at the closest point of operation to sensitive receivers;
- Potential annoyance to humans will likely occur with the use of a vibratory roller or compaction machine at the closest point of operation to sensitive receivers;
- Most of the expected construction equipment operating at the closest potential point of operation will negatively affect highly sensitive medical equipment.

Refer to **Figure 3-9** for the affected vibration sensitive receivers, including the medical buildings with potentially sensitive equipment.

14. Vibration velocity level referenced to 1 micro-inch/second

Assessment of Operational Vibration

Effects of vibration due to the operation of the MSF will be from LRV movements. There are two main origins of vibration: the LRV traversing on continuous rail, and the LRV traveling over a junction (crossover or frog) between different sets of rails. As the velocity of a LRV is a contributing factor in the vibration emissions, the following three operational vibration scenarios/sources were reviewed:

1. General vehicle movements
   - On continuous rail onsite and traveling to the mainline on Finch Avenue West
2. Vehicles traveling over onsite rail junctions
   - General movements over the rail junctions on site at 20 km/h speed limit
3. Vehicles travelling over the rail junction to Finch Avenue West (Rail Connection to Finch)
   - Through-traffic LRT vehicles traversing over the rail junction from the site to the mainline at 60 km/h currently expected near the York Gate and Finch Avenue West intersection.

The assessment of the in-service LRVs travelling along Finch Avenue West was completed as part of the Etobicoke-Finch West Light Rail Transit Environmental Project Report (March, 2010) and as such it is not considered in this assessment of potential effects.

Vibration predictions and requirements for vibration control investigation with respect to the three MSF operational vibration scenarios/sources (refer to **Appendix C**) are presented in **Tables 4-10** through **4-12**. The results indicate that some vibration mitigation is required (see **Section 4.2.4.5** below).

Table 4-10: Vibration Review – General LRV Movements

Receptor	Receptor Type	Background Level [VdB]	Predicted Level [VdB]	Limit [VdB]	Vibration Control Investigation Requirement
Pelican at Finch – Medical Office	MRI/High Res	68.5	53.2	54.0	No
Norfinch at Finch – Medical Office	MRI/High Res	68.5	56.6	54.0	Yes

Table 4-11: Vibration Review – Onsite Track Connections (crossovers)

Receptor	Receptor Type	Background Level [VdB]	Predicted Level [VdB]	Limit [VdB]	Vibration Control Investigation Requirement
Pelican at Finch – Medical Office	MRI/High Res	68.5	63.2	54.0	Yes
Norfinch at Finch – Medical Office	MRI/High Res	68.5	65.8	54.0	Yes
Norfinch at Hydro Corridor– School – Closest Portable Grouping	Institutional	66.2	72.5	75.0	No
Norfinch at Hydro Corridor– School – Other Portable Grouping	Institutional	66.2	67.1	75.0	No

Table 4-12: Vibration Review – Rail Connection to Finch (crossovers and track)

Receptor	Receptor Type	Background Level [VdB]	Predicted Level [VdB]	Limit [VdB]	Vibration Control Investigation Requirement
York Gate Mall	Institutional	62.7	84.6	75.0	Yes
Norfinch Shopping Centre	Institutional	62.7	78.1	75.0	Yes
Elana Drive at Finch – Residence	Residential	68.5	87.0	72.0	Yes
Pelican at Finch – Long term Care Facility	Residential	68.5	81.6	72.0	Yes

4.2.4.5 Vibration Mitigation Measures

Vibration Mitigation During Construction

The zone of influence (City of Toronto By-law 514) is required to be reviewed as part of the building permit application and should be revised if necessary during detailed design. Refer to **Appendix C** for zone of influence radii for construction equipment.

A Construction Vibration Management Plan will be prepared to address the construction vibration from this project. The Construction Vibration Management Plan will include the following details:

- How City of Toronto vibration By-law 514 requirements are being met;
- What actions are being taken to minimize the perceptible vibration impacts on surrounding sensitive receivers;
- Vibration mitigation measures being implemented;
- A construction vibration complaint process and action plan to address perceptible vibration complaints;
- A monitoring/verification plan to demonstrate that the mitigation measures above are appropriate, functioning correctly, and that acceptable vibration levels at sensitive receivers are maintained for the duration of construction; and,
- How vibration levels at buildings potentially housing vibration sensitive machinery (e.g., Norfinch Medical Centre, Oakdale Professional Medical Centre, and Humber River Regional Hospital) will be managed to acceptable levels, and how the levels will be monitored/verified for the duration of construction.

Additional guidance on vibration control methods and mitigation measures for inclusion in the Construction Vibration Management Plan is provided in **Appendix C**.

Vibration Mitigation During Operation

There are various options in terms of vibration control for the movements of the LRVs at the MSF. Some typical vibration control types, with their associated approximate achievable vibration reductions, are presented in **Table 4- 3.**

Table 4-13: Approximate Vibration Reduction by Vibration Control Type

Vibration Control Type	Approximate Vibration Reduction Provided [VdB]
Floating Slab Track Bed	15
Ballast Mats	10
High Resilience Fasteners	5
Resiliently Supported Ties	10

The reductions (based on the Preferred Design) for the closest track-sensitive receptor distances are provided in **Table 4-14** to **Table 4-16.** These tables also provide the distances from each receptor where track vibration control is required, referred to as the 'Vibration Control Radius'. All track within each 'Vibration Control Radius' will require vibration mitigation.

Table 4-14: Vibration Control Requirements – General LRV Movements

Receptor	Receptor Type	Predicted Level [VdB]	Limit [VdB]	Vibration Control	
				Reduction Required	*Vibration Control Radius [m]*
Medical Offices – Norfinch Drive	MRI/High Res	56.6	54.0	2.6	89

Table 4-15: Vibration Control Requirements – Onsite Track Connections (crossovers)

Receptor	Receptor Type	Predicted Level [VdB]	Limit [VdB]	Vibration Control	
				Reduction Required	*Vibration Control Radius [m]*
Medical Offices – Pelican Gate	MRI/High Res	63.2	54.0	9.2	113
Medical Offices – Norfinch Drive	MRI/High Res	65.8	54.0	11.8	113

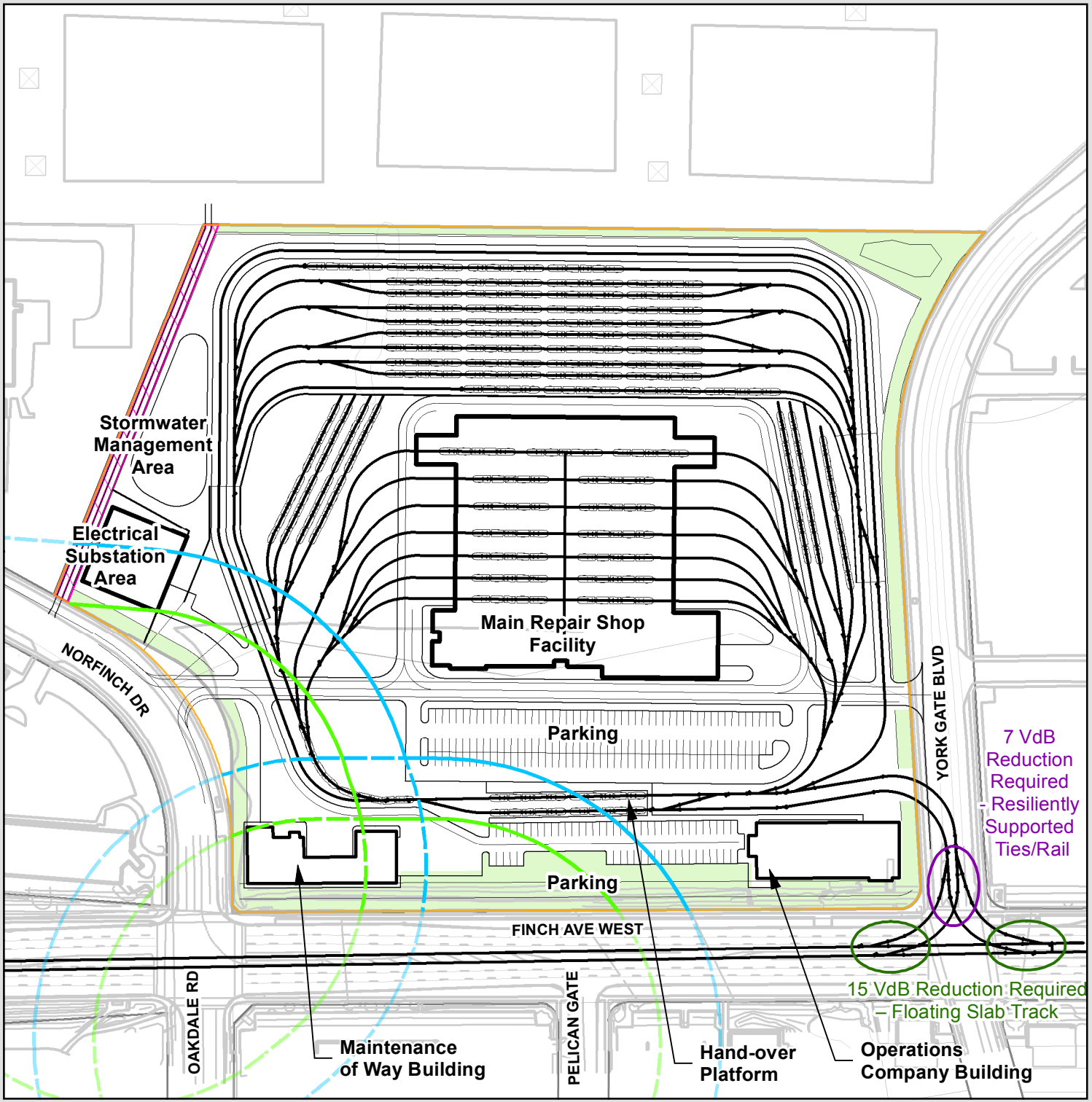
Table 4-16: Vibration Control Requirements – Rail Connection to Finch (crossovers and track)

Receptor	Receptor Type	Predicted Level [VdB]	Limit [VdB]	Vibration Control	
				Reduction Required	*Vibration Control Radius [m]*
York Gate Mall	Institutional	84.6	75.0	9.6	78
Norfinch Shopping Centre	Institutional	78.1	75.0	3.1	78
Residences – Elana Drive	Residential	87	72.0	15	97
Long Term Care Facility – Pelican Gate	Residential	81.6	72.0	9.6	97

Vibration mitigation measures that will be implemented for the Preferred Design are summarized below and will be refined during detailed design, as required: (refer to **Figure 4-6** for vibration control locations and **Table 4-13** for potential methods of vibration control):

- Up to 15 VdB of attenuation would be required for track connections to the Finch West LRT Line at York Gate Boulevard and Finch Avenue West;
- For onsite track connections (crossovers) within 113 m of the medical buildings on Finch Avenue West at Norfinch Drive and Pelican Gate, up to 12 VdB of attenuation at the closest track connection (crossover) would be required. The further the track connection (crossover), the lower performance required up to 113 m distance. Approximately 11 crossovers have been identified at this time.
- Up to 3 VdB of attenuation (at the closest on-site track) is required for track within 89 m of the medical building at Norfinch Drive and Finch Avenue West. Approximately 200 m of track on-site would require vibration control.

The above vibration mitigation is based upon the typical performance of typical vibration control types for rail. Alternatives providing the minimum required reductions may also be acceptable. Vibration control requirements, including transition zones, and performance will be reviewed during detailed design.



Legend

- Property Limits for the MSF Site
- Light Rail Vehicle (LRV)
- LRV Track
- Vibration Control Radius for On-Site Track Crossovers
- Vibration Control Radius for On-Site Track
- Multi-use Pathway
- Landscape Buffer

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Finch West Light Rail
Maintenance and Storage Facility (MSF)
Environmental Assessment

Vibration Control for the Preferred Design

July 2015

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Figure 4-6

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Further, the following measures may decrease vibration requirements and should be reviewed during detailed design:

- Lower speed limit for LRT vehicles traveling over track junctions along Finch Avenue West (currently modeled as posted speed limit of 60 km/hr);
- Conduct force mobility measurements to determine the ability of the ground to transmit vibration;
- Some areas may have localized lower transmission characteristics and may decrease the vibration reduction requirements

An Operational Vibration Management Plan will be prepared to address the vibration impacts due to the operation of the Finch West LRT MSF. The vibration management will include the following details:

- A plan to incorporate vibration assessment into ECA application
- Demonstration that design will meet FTA vibration criteria
- Vibration mitigation measures being implemented
- How performance and level limits at sensitive receptors will be verified/measured

Additional information on the contents of the Operational Vibration Management Plan is included in **Appendix C**.

4.2.4.6 Vibration Net Effects

Building damage due to construction vibration is not expected. The potential effects of vibration during construction and operation will be minimized through the implementation of Construction and Operational Vibration Management Plans.

4.2.4.7 Noise and Vibration Monitoring

Noise and vibration monitoring is required to confirm that both construction and operational noise and vibration levels meet acceptable level limits. A Noise and Vibration Monitoring Plan will be developed during detailed design, and will include the following elements:

- During operations, vibration monitoring is required to determine if the implemented vibration mitigation measures are performing sufficiently and that operational vibration levels are met at the vibration sensitive receptors.
  - Prior to construction, conduct force-mobility measurements to refine the vibration transmission characteristic of the ground between the site and vibration-sensitive locations. This may reduce the required vibration control.
- Conduct pre-construction noise monitoring survey, representative of the noise sensitive receptors surrounding the site at the time, to refine the noise level limits used for the assessment of the MSF.
- Perform commissioning measurements to confirm that noise sources on site meet required specifications.

4.2.5 Air Quality

4.2.5.1 Potential Effects

The potential effects during the construction stage were identified based on anticipated construction site activities, equipment and site vehicles. During construction of the facility, nuisance dust will be generated at the construction

sites. Sources of dust will include material handling and construction site activities by on-site equipment and vehicles (refer to **Section 2.2.2** for expected on-site equipment). Material handling will include activities such as excavation, stockpiling and transfer to truck beds for hauling. Vehicles may also "track out" dirt onto public roads and generate dust. Releases of combustion emissions are expected from the diesel and gasoline-fired equipment and vehicles on-site.

The potential effects to air quality during operations are based on the elements of the MSF (see **Section 2.2.1**). The activities of the MSF having potential effects on air quality include maintenance of the LRVs, (including washing & cleaning, maintaining sandbox levels, and minor body repairs). Potential Project emission sources were determined to be: compressed air cleaning and sand system ventilation/dust collector systems; painting operations; maintenance welding (exiting the building via general exhaust as fugitive emissions), comfort heating, emergency generators; and parking lot vehicle emissions. Potential effects from the releases to atmosphere of the various compounds of concern are evaluated by a comparison of maximum predicted contaminant concentrations combined with existing background concentrations to applicable ambient air quality criteria (AAQC). The AAQCs have been developed based on individual health based effects of the various compounds of concern. Potential effects were assessed by predicting the maximum impact of contaminant concentrations at the MSF property line, grid receptors and at each of the identified sensitive receptor locations. The results from the maximum emissions scenario for the Preferred Design show that the maximum impacts are below all existing and proposed MOECC Standards and/or Guidelines (with the exception of benzene on an annual basis). It should be noted that the measured background concentration of benzene is 155.6 % of the annual limit, of which the MSF's contribution is only approximately 0.4%. Further details are provided in the Air Quality Assessment Report, **Appendix D**.

4.2.5.2 Mitigation Measures

A Dust Management Plan to complying with applicable regulations and standards will be prepared and implemented during construction.

The following mitigation measures will be implemented to limit any emission impacts from diesel/gas powered construction equipment during construction:

- Use electric-powered equipment where possible, or diesel powered construction equipment with stringent emissions standards;
- Minimize idling time for all diesel/gas powered construction equipment; and,
- Use well-maintained construction equipment.

During the operation of the facility, particulate matter generated from the compressed air cleaning and sand dispensing system will be controlled with a ventilation/dust collection system. Painting will be conducted inside the paint spray booth equipped with an exhaust system and overspray filters which will control particulate matter emissions. Maintenance welding will be performed with mobile fume extraction units equipped with high efficiency filtration and exhaust inside the building.

The following mitigation measures will be incorporated into the design and operation of the facility in order to reduce resultant air emissions:

- All on-site roadways and parking lots will be paved to minimize the generation of road dust;
- Emergency generators with more stringent air emission levels will be selected for procurement (i.e., generators conforming with EPA Tier IV emission standards or higher) which are required for compliance at the off-site receptors;

- During operation, the emergency generators will be tested only one at a time;
- Stack location for the paint booth exhaust will be at least 100 m from the nearest property line;
- Paint Arrestor Pads will be installed in the paint booth and have a minimum of 95% particulate removal efficiency;
- Stack locations for other process exhausts will be situated as far away from the property line as feasible;
- Stack parameters (height, location, configuration, etc.) will be designed to ensure good dispersion (no rain caps), avoid re-entrainment of contaminant air into building and compliance with MOECC limits
- Selection of welding material that is chromium-free or the material will contain the least amount of chromium compounds as possible for welding to ensure minimal hexavalent chromium emissions are generated during welding process;
- Maintenance welding must be carried out with mobile fume extraction units equipped with high efficiency filtration with a minimal removal efficiency of 99% for particulate matter and metal fumes before exhausting inside the building; and,
- Maintenance welding will only be performed for a maximum of 12 hours per day.

An application for Environmental Compliance Approval (Air) (ECA) will be prepared for the MSF during detailed design.

The significance of source of emissions will be further evaluated as part of the ECA. Further detail is provided in the Air Quality Assessment Report, **Appendix D**.

4.2.5.3 Net Effects

During construction, the effects on air quality will be localized within the construction area. The potential off-site effects to air quality will be minimized through the implementation of a Dust Management Plan and measures to limit emissions from diesel/gas powered construction equipment.

The operational AERMOD modelling results of the Preferred Design incorporating the mitigation measures are presented in the Air Quality Assessment Report, **Appendix D**. The expected MSF emissions during operation are within the acceptable levels of the applicable air quality criteria in accordance with MOECC Standards and/or Guidelines.

Potential effects to local air quality during operations will be mitigated through the implementation of the mitigation measures described in **Section 4.2.5.2**. As such, the expected MSF emissions during operation are within the applicable air quality criteria in accordance with MOECC Standards and/or Guidelines.

4.2.5.4 Monitoring

During construction, fence line air concentrations of dust (particulate) and other compounds identified as being released during construction will be monitored in accordance with the Dust Management Plan. Further details are provided in the Air Quality Assessment Report, **Appendix D**.

4.2.6 Archaeology

4.2.6.1 Potential Effects

A Stage 1 and 2 Archaeological Assessment (Archaeological Services Inc., May 2008) was completed for the site in accordance with the *Ontario Heritage Act, 2005* and the Draft Standards and Guidelines for Consultant Archaeologists (Ontario Ministry of Culture, 2009).

The results of the Stage 1 and 2 Archaeological Assessment indicated that the site does not require any additional archaeological assessment and is considered clear of further archaeological concern. The Ministry of Tourism, Culture and Sport (MTCS) concurred with this recommendation in a letter dated January 6, 2009 (see **Appendix E**).

4.2.6.2 Mitigation

As there are no potential effects (i.e., areas of further archeological concern) from this project on archaeological resources, no mitigation measures are required.

4.2.6.3 Net Effects

No potential effects to archaeological resources are identified.

4.2.6.4 Monitoring

As there are no potential effects from this project on archaeological resources, no monitoring is required.

4.2.7 Cultural Heritage

4.2.7.1 Potential Effects

No heritage resources are located within or adjacent to the MSF site (see **Section 3.3.2**).The nearest cultural heritage resource is located approximately one kilometre from the MSF site.

Based on the results of the cultural heritage resource investigation, the study area does not retain above ground cultural heritage resources that warrant further investigation (**Appendix F**).

4.2.7.2 Mitigation

The study area does not retain above ground cultural heritage resources that warrant further investigation; therefore, no mitigation measures are required.

4.2.7.3 Net Effects

No potential effects to above ground cultural heritage resources are identified.

4.2.7.4 Monitoring

As there are no potential effects from this project on above ground cultural heritage resources, no monitoring is required.

4.3 Traffic and Transportation

4.3.1 Potential Effects

In order to assess the future traffic conditions, a level of service (LOS) analysis was undertaken for the key intersections (refer to **Figure 3-12**) in the vicinity of the MSF relative to its operations using Synchro / SimTraffic software package, which implements the methods of the 2000 Highway Capacity Manual. The three future scenarios analyzed include traffic during construction, future background traffic conditions (i.e., without the MSF in-place), and future total traffic conditions (i.e., with the MSF in-place). The year 2020 was used as the horizon year for the analysis of traffic conditions during construction and the year 2031 was used as the horizon year for the analysis of operational traffic conditions.

The traffic evaluation and lane configurations during construction are based on the anticipated through lanes that can be maintained during construction.

The future background lane configurations and traffic volumes include a method to evaluate the future roadway conditions on Finch Avenue and the study intersections.

The future total conditions includes the MSF and its associated geometry and traffic volume impacts as noted in **Section 2.2.1** (see **Appendix H** for detail on traffic assumptions). The results of the traffic analyses are presented in sections below.

4.3.1.1 Traffic Evaluation during Construction

An analysis of traffic operations during the construction phase was undertaken to review the potential impacts of lane closures and changes in lane geometry on the traffic operations in the peak hours. Construction staging assumptions have been further developed to better define the impacts on traffic operations during construction. This includes determining a number of through lanes in the area of the MSF and where it may not be practical to include turn lanes during construction. Traffic volumes during construction are initially assumed to match existing conditions to create a high-impact scenario. Potential reductions to traffic volumes are described below as a methodology for evaluating the potential rerouting of traffic. The following assumptions were made in the analysis of traffic during construction:

- Two lanes of traffic in each direction are maintained on Finch Avenue from Hwy 400 to Jane Street;
- Exclusive left turn lanes are maintained at signalized intersections on Finch Avenue
- There will be no right turn lanes during construction (they become shared through/right)
- The unsignalized intersection at Finch Avenue West and Pelican Gate is right in/right out only.

The quality of intersection traffic operations is typically measured in terms of level of service (LOS) and volume-to-capacity (v/c) ratio. LOS is a qualitative measure of roadway congestion ranging from ‘A’ to ‘F’ while the v/c ratio is a measure of traffic demand to its traffic-carrying capacity (see **Section 3.4.2.2** for a detailed definition of LOS and v/c).

Assuming all existing traffic volumes will continue to be present within the study area during construction, the intersection of Finch Avenue West / Oakdale Road / Norfinch Drive will operate at LOS ‘F’ with delays resulting in long queues and poor operating conditions during both AM and PM peak hours.

Some traffic diversion to parallel arterial and collector roads is likely to occur, based on previous observation of similar magnitude construction projects within the City of Toronto. To provide a range of traffic volumes for evaluation, the first evaluation point was based on existing traffic volumes during the peak hours to provide a higher

end level of congestion in the area. The second was based on potentially 25% of traffic diverting to other routes to provide for changes in travel patterns. The 25% was based on the combination of previous observations; that drivers often reroute to parallel arterials/collectors; adjust their schedule to make the trip at other times; choose transit, or may choose to not make the trip. Travel demand model data will be used during detailed design to confirm construction impacts on the entire LRT corridor, inclusive of the MSF study area.

Table 4-17 compares the level of service during construction for the peak hour volumes and the alternative with a 25% reduction in traffic volumes. The results indicate that with the 25% traffic diversion from Finch Avenue West to other road network(s), the operating conditions at all study intersections will likely be acceptable with overall LOS 'D' or better with v/c below 0.85 during both am and pm peak periods.

Table 4-17: Comparison of Overall LOS at Peak Hours during Construction Traffic Conditions

Intersection	Time Period	Construction			Construction with 25% Discount		
		Delay	*LOS*	*v/c*	*Delay*	*LOS*	*v/c*
Finch Ave. W./ Highway 400 SB Off Ramp	AM Peak	20.2	C	0.78	15.7	B	0.59
	PM Peak	16.7	B	0.76	12.3	B	0.57
Finch Ave. W./ Highway 400 NB Off Ramp	AM Peak	17.0	B	0.78	11.5	B	0.60
	PM Peak	13.2	B	0.70	9.3	A	0.54
Finch Ave. W./ Oakdale Rd./ Norfinch Dr.	AM Peak	146.5	F	1.19	66.6	E	0.89
	PM Peak	125.9	F	1.06	58.2	E	0.81
Finch Ave. W./ Elana Dr./ York Gate Blvd.	AM Peak	39.6	D	0.75	28.6	C	0.57
	PM Peak	58.1	E	0.88	32.0	C	0.66
Finch Ave. W./ Jane St.	AM Peak	58.1	E	0.93	36.0	D	0.69
	PM Peak	71.8	E	1.02	37.6	D	0.77

The results tables, traffic volumes, and detailed Synchro analysis output for construction conditions are provided for reference in **Appendix G**.

4.3.1.2 Future Background Traffic Conditions - without MSF

The Future Background scenario is based on the LRT operating on Finch Avenue without the MSF in place. This provides a base level of future operations to compare with the potential traffic impacts including the MSF.

The following assumptions were used for the future background scenario:

- Future lane configurations will correspond to those assumed in the *Etobicoke – Finch West LRT Transit Project Assessment Study (TTC, 2010)*, i.e. three lanes of through traffic maintained in each direction along Finch Avenue West.
- 50 left-turn trips leaving the retail / commercial accesses immediate west of Jane Street are assumed to be diverted to use the Finch Avenue West / Elana Drive intersection to go westbound.

The traffic conditions assessment conducted under this section is applicable to any future year horizons, i.e. for both year 2020 and 2031 study horizons, consistent with the assumptions of the *Etobicoke – Finch West LRT Transit Project Assessment Study (TTC, 2010)*). The future background traffic assumptions are the baseline for the future corridor traffic development and will be the comparison for the addition of the MSF. Additional background growth and development data was not added to the base future conditions because it was found that there are no major traffic generators.

The results of the analysis of the future background AM and PM peak hour conditions are shown in **Table 4-18**. The analysis of future background conditions indicates that only the Finch Avenue West / Norfinch Drive intersection

operates at LOS 'E' in the AM peak hour. All other intersections operate at LOS 'D' or better in the peak hours. The additional U-turn traffic and removal of the permissive left-turn phases at signalized intersections will result in longer left-turn delays and queues. Some individual approaches in the tables do experience higher delays from the rerouting of traffic. For example, the assumed 50 left-turn trips leaving the retail / commercial accesses immediate west of Jane Street are rerouted and added to the Finch Avenue West/ Elana Drive intersection as the northbound left-turn traffic.

This analysis included large trucks that were counted in the AM and PM peak hours. The Finch Avenue West corridor in the vicinity of Highway 400 does serve industrial sites and truck movements are anticipated to continue on the arterial roadways. Truck percentages in the between the Highway 400 northbound ramp and Jane Street in this alternative are 3.5 to 5 percent in the AM peak and 2.5 to 4 percent in the PM peak. Truck percentages between the ramps are 5 to 7 percent in the peak hours.

The results tables, traffic volumes, and detailed Synchro analysis output for future background analysis are provided for reference in **Appendix G**.

Table 4-18: Overall LOS at Peak Hours during Future Background Traffic Conditions

Intersection	Time Period	Future Background		
		Delay	*LOS*	*v/c*
Finch Ave. W./ Highway 400 SB Off Ramp	AM Peak	24.5	C	0.66
	PM Peak	19.8	B	0.63
Finch Ave. W./ Highway 400 NB Off Ramp	AM Peak	15.6	B	0.64
	PM Peak	13.8	B	0.56
Finch Ave. W./ Oakdale Rd./ Norfinch Dr.	AM Peak	73.7	E	0.96
	PM Peak	59.0	E	0.88
Finch Ave. W./ Elana Dr./ York Gate Blvd.	AM Peak	30.3	C	0.63
	PM Peak	36.5	D	0.81
Finch Ave. W./ Jane St.	AM Peak	45.2	D	0.81
	PM Peak	58.2	E	0.95

Furthermore, according to the *Etobicoke – Finch West LRT Transit Project Assessment Study (pages 2-17)* (TTC, 2010), the existing channelized right-turns at the Highway 400 ramp terminals will be eliminated and replaced with dual right turn lanes to eliminate the merge from the ramps. The analysis result indicates that the overall intersection delays will be expected to be increased slightly and both Highway 400 ramp terminals are expected to continue operate at good LOS during both AM and PM.

One of the bases for designing a signal timing plan is to accommodate pedestrian movements in the future widened road section. Crossing distances were assessed in the *Etobicoke – Finch West LRT Transit Project Assessment Study* (TTC, 2010) in order to estimate pedestrian walking requirements. The assessment of crossing distances was based on functional plans at intersections, which include two bike lanes, six through lanes, one left-turn lane and two centre LRT lanes with station platform in this study corridor. The direct measurement is approximately 36.5 m crossing width for pedestrians intended to cross Finch Avenue West. City of Toronto guidelines related to "walk" and "do not walk" flashing durations were followed in determining pedestrian walk times and pedestrian clearance times for the future widened Finch Avenue West. These guidelines were incorporated into the above future background assessment.

4.3.1.3 Future Total Traffic Conditions- with MSF Operational

Under the future total traffic conditions, the future LRV and employee traffic entering and leaving the Finch West MSF is added to the future background traffic volumes with the same set of assumptions as listed in **Section 4.3.1.2**. The site

traffic generated by the MSF will be mainly comprised of employee traffic. This analysis includes only the impacts of the facility and does not assume any redevelopment of properties or new development adjacent to the MSF property. The lane configurations and associated traffic volumes are based on the MSF being operational in the future scenarios and evaluate traffic under the 'high impact' scenario by having two options for access (Norfinch Drive or York Gate Boulevard). Any new or redeveloped areas will be subject to future City of Toronto review and approvals. The assumed future lane configurations in the study area with the MSF operational are shown in **Figure 4-7**.

Employee Traffic Volumes

The MSF will ultimately have a total of approximately 350 employees who will be assigned to shifts. One vehicle trip per employee per arrival or departure is assumed. Refer to **Appendix H** for the detailed staff estimations, and their assumed arrival and departure times.

Table 4-19 illustrates the related entrance and exit by employee traffic in proximity or within the analysis hours. For employee trip distribution and assignment, the latest Transportation Tomorrow Survey (TTS) data (2011) was used to review the distribution of employees who work in the vicinity area of the subject site. The resultant distribution to/from each direction is shown in **Table 4-20**.

Table 4-19: Operating Staffing Trips for the Finch West MSF

	Time Period	Vehicles
Driver Staff *(additional AM shift)*	Early AM during 5:00 to 5:30 a.m.	36
Maintenance Staff	Prior to AM Peak during 7:00 to 8:00 a.m.	50
Driver Staff *(additional PM shift)*	After PM Peak during 6:00 to 7:00 p.m.	36

Table 4-20: Employee Trip Distribution To/From the Site Area

To/ From	Percentage of Trips
South via Highway 400	25%
North via Highway 400	6%
West	33%
North	15%
East	16%
South	5%
Total	**100%**

The information shown in **Table 4-20** is used as a basis for determining the logical routings to/from the MSF site. Trips coming to / from west / east of the site will likely take Finch Avenue West and north / south along Jane Street. In developing the routings, two scenarios (options) were considered during both the AM and PM peak hours: one assuming all employee trips arrive and depart the site via Norfinch Drive and the other assuming all employee trips arrive and depart the site via York Gate Boulevard. The analysis is based on the employee arrivals and departures during the AM and PM peak hours. All vehicle traffic is applied to one driveway on Norfinch Drive to test the impacts of the MSF traffic in one scenario (Option 1). All vehicle traffic is then applied to the driveway on York Gate Boulevard to test the impacts in the second scenario (Option 2).

As noted previously, the highest impact scenario is considered to be an event where all MSF vehicle traffic will enter and exit from a single driveway. These driveway options were selected with consideration of geometric and operational feasibility for the Preferred Design. Refer to **Figure 2-1** for their locations.

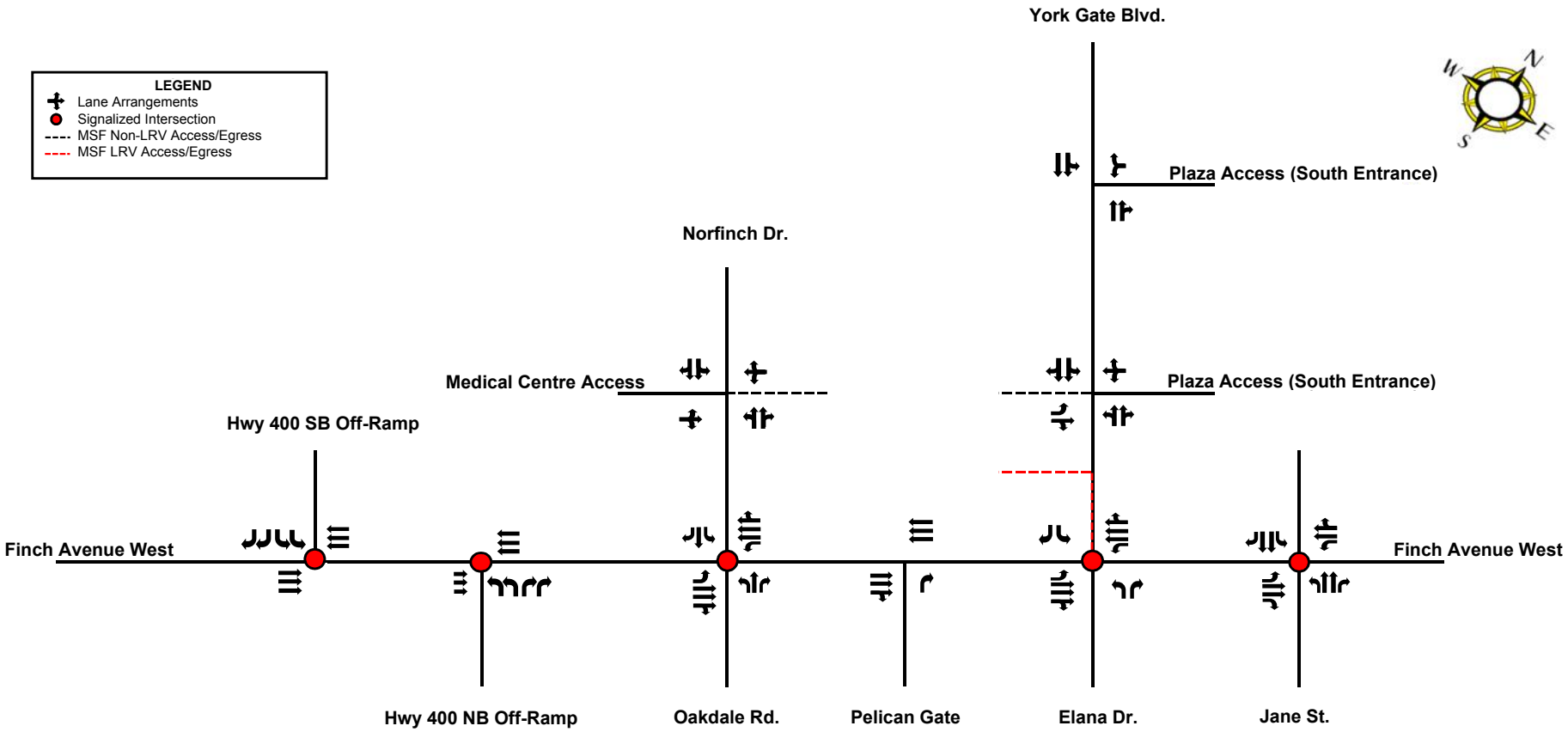

Figure 4-7 Future Lane Configurations

LRV Operation

Throughout the day, the amount of LRV traffic to/from the MSF facility will vary. The majority of the LRVs will be put into service early in the early morning (between 4:30 am – 8:00 am), a smaller number will return or depart during the day as related to peak and off peak service, and higher numbers will return in the evening and after mid-night as the service terminates.

The MSF will have a maximum capacity of 75 single consist vehicles (projected 2051+). LRV departures and returns are based on an operating scenario from the MSF mostly in non-peak hours. For a 'high impact' scenario, however, some LRVs are assumed to leave and return during peak-hours. Refer to **Appendix H** for the details of the estimated assumed LRV traffic volumes arriving and departing the MSF.

As the LRVs depart into service, the east-west LRVs on Finch Avenue West will eventually increase to a full service frequency of a vehicle approximately every five minutes or 12 vehicles during the AM or PM peak hour (as per the year 2031 service plan).

Assessment of Total MSF Traffic Volumes

Refer to **Appendix H** for the combined MSF traffic volumes summing up the non-transit (employee vehicles) and transit (LRV traffic) volumes during the early morning period, as well as AM and PM peak periods. A conservative estimate was made during both AM and PM peak hours for the employee traffic.

As part of the assessment of potential effects, employee vehicles and truck traffic generated by the MSF are anticipated to enter/exit via a driveway on Norfinch Drive and/or York Gate Boulevard (Refer to **Figure 2-1** for the non-LRV entrance/egress driveway locations). Therefore, two driveway options were investigated for the non-transit traffic:

- Driveway Option 1 – Access via Norfinch Drive
- Driveway Option 2 – Access via York Gate Boulevard.

Transit vehicles (LRVs), will use an MSF entry/exit point north of the intersection of Finch Avenue West and York Gate Boulevard (refer to **Figure 2-1**).

The LRV traffic is assumed to exit from the York Gate Boulevard intersection and travel both west and east to both ends of the Finch LRT line. A noted previously, the east-west trains on Finch Avenue West will only travel on their own track in the middle of the roadway, therefore these LRV volumes are not included in the total traffic volumes which serve as the input into the Synchro model.

Table 4-21 shows the future total (with MSF Site Traffic Added) traffic conditions for Driveway Options 1 and 2. Refer to **Appendix G** for the further detailed Synchro analysis output for Driveway Options 1 and 2 for the future conditions with the MSF operational.

The results indicate that in both cases (driveway options) all study intersections will continue to operate at same LOS as the future background conditions with optimized signal timing plans under the future total traffic conditions. In addition, it is expected that the operation conditions at these study intersections outside of peak hour periods will be acceptable with lower traffic volumes as demonstrated in early morning period as well as in the 24-hour volume profile in the existing traffic analysis.

Table 4-21: Overall LOS at Analysis Periods during Future Total (with MSF Site Traffic Added) Traffic Conditions

Intersection	Time Period	Driveway Option 1 Future Total			Driveway Option 2 Future Total		
		Delay	*LOS*	*v/c*	*Delay*	*LOS*	*v/c*
Finch Ave. W./ Highway 400 SB Off Ramp	Early AM	15.8	B	0.20	15.8	B	0.20
	AM Peak	25.1	C	0.67	25.1	C	0.67
	PM Peak	19.8	B	0.63	19.8	B	0.63
Finch Ave. W./ Highway 400 NB Off Ramp	Early AM	12.2	B	0.25	13.6	B	0.25
	AM Peak	16.2	B	0.65	16.2	B	0.65
	PM Peak	13.8	B	0.56	13.8	B	0.56
Finch Ave. W./ Oakdale Rd./ Norfinch Dr.	Early AM	24.3	C	0.22	22.7	C	0.21
	AM Peak	79.1	E	0.95	69.3	E	0.95
	PM Peak	60.8	E	0.87	64.3	E	0.87
Finch Ave. W./ Elana Dr./ York Gate Blvd.	Early AM	13.5	B	0.16	14.5	B	0.18
	AM Peak	36.0	D	0.64	36.2	D	0.63
	PM Peak	39.1	D	0.74	39.0	D	0.74
Finch Ave. W./ Jane St.	Early AM	26.2	C	0.23	26.2	C	0.23
	AM Peak	45.2	D	0.81	45.5	D	0.82
	PM Peak	62.7	E	1.00	62.9	E	1.00

4.3.1.4 Summary of Potential Effects

During construction, a 25% traffic diversion from Finch Avenue West to other road network(s) is expected, that will result in the operating conditions at all study intersections being acceptable with overall LOS 'D' or better with v/c below 0.90 during both AM and PM peak periods.

With respect to operation of the MSF:

- As indicated in the existing conditions traffic analysis (see **Section 3.4**), study intersections are currently operating at an overall acceptable LOS 'D' or better, though a few individual movements are operating with long delays.
- Future background traffic conditions will be similar to that as the existing conditions.
- The non-transit (employee) and transit (LRV) traffic generated by the MSF will be minimal.

Table 4-22 below compares the existing traffic conditions, future background traffic conditions and future total traffic conditions (with MSF). The results show the Finch Avenue intersections with Norfinch Drive and Jane Street with higher volume to capacity levels (all over 0.75) for the future background and future total. This indicates increasing levels of traffic congestion that are present under the general background growth conditions. These intersections currently experience congestion during the peak hours. In general, these intersections also experience queue impacts for through traffic due to demand.

Most of the study intersections will continue to operate at an acceptable overall LOS 'D' or better under the future total conditions. At the intersection of Finch Avenue West and Norfinch Drive, delays might occur during both AM and PM peak periods, however, the traffic conditions during off-peak periods will be acceptable as lower traffic volumes are expected on the street network.

The projected future background traffic (including main line LRT) increases the intersection operation to capacity and the addition of the MSF (future total) will have a small incremental impact.

Table 4-22: Comparison of Existing Overall LOS, Future Background and Future Total Overall LOS at Peak Hours

Intersection	Time Period	Existing			Future Background			Driveway Option 1 Future Total			Driveway Option 2 Future Total		
		Delay	*LOS*	*v/c*	*Delay*	*LOS*	*v/c*	*Delay*	*LOS*	*v/c*	*Delay*	*LOS*	*v/c*
Finch Ave. W./ Highway 400 SB Off Ramp	AM Peak	16.6	B	0.68	24.5	C	0.66	25.1	C	0.67	25.1	C	0.67
	PM Peak	12.9	B	0.60	19.8	B	0.63	19.8	B	0.63	19.8	B	0.63
Finch Ave. W./ Highway 400 NB Off Ramp	AM Peak	17.0	B	0.62	15.6	B	0.64	16.2	B	0.65	16.2	B	0.65
	PM Peak	11.4	B	0.54	13.8	B	0.56	13.8	B	0.56	13.8	B	0.56
Finch Ave. W./ Oakdale Rd./ Norfinch Dr.	AM Peak	65.0	E	0.93	73.7	E	0.96	79.1	E	0.95	69.3	E	0.95
	PM Peak	45.0	D	0.85	59.0	E	0.88	60.8	E	0.87	64.3	E	0.87
Finch Ave. W./ Elana Dr./ York Gate Blvd.	AM Peak	10.4	B	0.44	30.3	C	0.63	36.0	D	0.64	36.2	D	0.63
	PM Peak	16.5	B	0.62	36.5	D	0.81	39.1	D	0.74	39.0	D	0.74
Finch Ave. W./ Jane St.	AM Peak	32.3	C	0.74	45.2	D	0.81	45.2	D	0.81	45.5	D	0.82
	PM Peak	44.7	D	0.90	58.2	D	0.95	62.7	E	1.00	62.8	E	1.00

In addition, MSF LRV access/egress will result in potential delay and/or safety concerns for future active transportation (bike lanes/sidewalks) along Finch Avenue West and York Gate Boulevard.

Ridership on TTC bus routes will be affected upon implementation of the LRT service.

4.3.2 Mitigation Measures

The following mitigation measures will optimize the traffic conditions in vicinity of the MSF during construction:

- A 25% traffic diversion to parallel arterial and collector roads will relieve traffic congestion on Finch Avenue West and minimize any impact to travel times in the vicinity of the MSF. Travel demand modelling will be used during detailed design to refine diversion rates and methods.

The following mitigation measures will optimize the traffic conditions in vicinity of the MSF during operation:

- Prepare a Traffic Management Plan during detailed design that considers the impacts of LRV operation in the corridor during the peak hours. The primary operation of LRVs in and out of the MSF will occur at off-peak hours and have a minimal impact on vehicle traffic.
- Refine the signal timing and LRV operating plan to minimize the impacts of both modes of transportation on the street networks.

Signing, striping, and active devices (if appropriate) will be incorporated as additional safety measures for cyclists and pedestrians in the vicinity of the MSF LRV access/egress locations.

Metrolinx and the TTC will re-assess bus service and routing requirements in the vicinity of the MSF site, including replacing the Finch 36+ route with the LRT service.

4.3.3 Net Effects

Effects to travel times along Finch Avenue West during construction will be minimized through a potential 25% traffic diversion to parallel collector and arterial roads.

During operations, most of the study area intersections will continue to operate at an acceptable overall LOS ‘D’ or better. Potential effects to intersection operations at Finch Avenue West and Norfinch Drive will be minimized by implementing a Traffic Management Plan and refining the signal timing and LRV operating plan during detailed design of the facility.

The potential effects to active transportation (safety) will be mitigated by incorporating signing, striping, and active devices (if appropriate) in the vicinity of MSF LRV access/egress locations.

Effects to TTC bus routes will be confirmed through future TTC/Metrolinx system planning and co-ordination.

4.3.4 Monitoring

LRV and traffic volumes will be monitored following the opening of the facility. Mitigation measures for pedestrians/cyclists will be evaluated for their effectiveness and modified if appropriate.

4.4 Summary of Potential Effects, Mitigation Measures, Net Effects, and Monitoring Requirements of the Preferred Design

A summary of potential effects, mitigation measures, net effects and monitoring requirements is provided in **Table 4-23**.

Table 4-23: Potential Effects, Mitigation Measures, Net Effects and Monitoring Requirements of the Preferred Design

Potential Effect	Mitigation Measures	Net Effect	Monitoring Requirements
Terrestrial Natural Heritage			
Permanent displacement of Eastern Meadowlark (Species at Risk) habitat	• As per the requirements of the *Endangered Species Act 2007*: - Register construction activities with the MNRF as a Notice of Activity in accordance with Ontario Regulation 242/08. - Upon registration via Notice of Activity with the MNRF, design a Habitat Management Plan for an alternative site(s) of an area no less than the disturbed habitat area where appropriate habitat can be created or significantly enhanced of equal area. ▪ The compensation or enhancement habitat may be situated anywhere in southern Ontario south or east of the Pre Cambrian Shield (Ecozones 6E and 7E). ▪ Within 12 months of the day construction activity has commenced, the work of creating or enhancing Eastern Meadowlark habitat must be completed in a manner that ensures the habitat meets the requirements outlined in O. Reg. 242/08 with respect to the types of vegetation it provides. - Following registration with MNRF via Notice of Activity, clearing of the site during the period May 1 to July 31 of any year may only proceed following completion of an avian survey documenting the absence of nests as per the requirements of the *Migratory Birds Convention Act*[15]. - The compensation or enhancement habitat must be managed for 20 years with specific site management, monitoring and maintenance requirements as outlined in the Habitat Management Plan. - The Habitat Management Plan will be maintained on file for a minimum of five years of annual monitoring, and will be provided to MNRF upon request.	• The permanent displacement of Eastern Meadowlark habitat from the subject site will be mitigated by implementing a Habitat Management Plan in accordance with O.Reg. 242/08. The compensation or enhancement habitat will be managed for a period of 20 years. Situating the compensation or enhancement habitat in a rural area or, at least more natural area than the current site will result in the long term protection of this species' habitat. Long term, the development of the MSF will result in a net positive impact on Eastern Meadowlark species in southern Ontario.	• The off-site Eastern Meadowlark compensation or enhancement habitat will be consistent with Ontario Regulation 242/08 requirements, which include the monitoring elements for five years after the habitat is created or enhanced, described in **Section 4.1.1.4** of this EPR.
Removal of all trees and other vegetation on the property	• Abide to City of Toronto policies on tree protection, that will include, and may not be limited to the following: - A Certified Arborist shall conduct an assessment of tree health, including a tree inventory to identify all trees 30 cm diameter at breast height (dbh) or greater. - Document tree protection measures for trees that can be retained on site survey plans. - Develop a compensation landscape plan for the removal of trees. - The compensation landscape plan will include planting at a minimum a 2:1 compensation ratio.	• Ultimately, a small number of trees ≥30 cm dbh and associated urban wildlife habitat will be lost. • The loss of trees ≥30 cm dbh from the MSF site and associated urban wildlife habitat will be offset by adhering to the requirements of the Tree Protection policies of the City of Toronto, ensuring the suitable landscape plan include the replacement of, or compensation for, the removal of trees.	• Landscape plantings on-site will be monitored until successful establishment is confirmed, in accordance with City of Toronto tree protection policies.
Removal of identified migratory birds nesting or associated vegetation cover on-site	• Pursuant to the *Migratory Birds Convention Act*, avoid vegetation removals during the typical nesting period of migratory birds, May 1 to July 31 in any year. • Where destruction or disruption of these habitats during nesting periods is unavoidable between May 1 and July 31, proceed following a recent (typically within 7 days) assessment by a qualified biologist documenting the absence of nests. • The *Migratory Birds Convention Act allowances* do not override the requirements of the *Endangered Species Act, 2007* with respect to the Eastern Meadowlark.	• The removal of identified migratory birds nesting or associated vegetation cover on-site will be minimized through the avoidance of vegetation removals during the typical nesting period, and/or proceeding in accordance with an assessment by a qualified biologist documenting the absence of nests.	• N/A
Aquatic and Surface Water			
Potential increase in quantity of storm runoff due to increase in the imperviousness of the site	• Comply with the *Water Resources Act* and MOECC (MOE) SWM Planning and Design Manual with respect to the quantity of water discharging into the sewer system. • Assess the capacity of the existing receiving storm sewer system and prepare a Stormwater Management (SWM) Plan for the site as part of the detailed design process in consultation with the City of Toronto and the TRCA.	• No adverse effects to aquatic and surface water quantity are anticipated with the implementation of the required mitigation measures.	• N/A
Potential for sediments (during construction) and other effluents, including accidental spills (during construction and operations) to enter the municipal sewer system	• Comply with the *Water Resources Act* and MOECC (MOE) SWM Planning and Design Manual with respect to the quality of water discharging into the sewer system. • Prepare a Stormwater Management Plan (SWM) for the site as part of the detailed design process in consultation with the City of Toronto and the TRCA. • In addition: - Develop an Erosion and Sediment Control Plan for the site during construction to meet applicable guidelines and criteria. The plan will consist of a multi-barrier approach to meet the requirements. - Develop Spill Prevention and Contingency Plans for both construction and operation: ▪ Personnel will be trained in how to implement the mitigation plans; ▪ Spills will be immediately contained and cleaned up in accordance with provincial regulatory requirements and contingency plans; ▪ A hydrocarbon spills response kit will be on site at all times during construction; and, ▪ Spills will be reported to the Ontario Spills Action Centre at 1-800-268-6060.	• No adverse effects to aquatic and surface water quality are anticipated with the implementation of the required mitigation measures.	• N/A
Geology and Groundwater			
Potential for reduction in groundwater recharge functions of the site	• Implement the following mitigation measures during detailed design/construction: - Where feasible, pave select parking and/or driveway areas with permeable pavement to facilitate infiltration and reduce runoff; - Maintain a portion of the site as landscaped areas to facilitate infiltration.	• The potential for reduction in groundwater recharge functions of the site will be minimized through the implementation of the identified mitigation measures. • Groundwater recharge function on-site will be maintained at near pre-development rates.	• N/A

15. While the Migratory Birds Convention Act provides conditions for undertaking work in the breeding habitat of regulated species, the more restrictive Endangered Species Act, 2007 *overrides those conditions with respect to regulated Species at Risk.*

Table 4-23: Potential Effects, Mitigation Measures, Net Effects and Monitoring Requirements of the Preferred Design

Potential Effect	Mitigation Measures	Net Effect	Monitoring Requirements
Potential effects to aquifers/ wells and groundwater quality	• A certain degree of temporary construction dewatering may be required where any buried infrastructure coincides with saturated, permeable sediments. A construction dewatering assessment will be conducted, prior to construction, to determine the need for a MOECC Permit To Take Water (PTTW) based on the results of forthcoming detailed subsurface hydrogeological and geotechnical investigations and review of engineering design details for the site development. • Groundwater quality samples will be collected prior to construction and will be evaluated in the construction dewatering assessment. If dewatering is required, pumped groundwater will be discharged into local municipal sanitary or storm infrastructure along Finch Avenue West, York Gate Boulevard and/or Norfinch Drive and be subject to prior quality review and approval by the City of Toronto. • Potential accidental spills that could occur on site and adversely affect the groundwater system will be mitigated as follows: - Prior to construction, contractors will develop and institute a Spills Prevention and Contingency Plan to use during construction; and, - Prior to operation, develop and implement a Spills Prevention and Contingency Plan to use during operation.	• Potential effects to aquifers/wells and groundwater quality will be minimized, if required, through the implementation of additional mitigation measures identified following detailed hydrogeological investigations, and by developing spill prevention and contingency plans. • No significant aquifer units were identified at surface or within the shallow subsurface at the site. According to previous studies, no active groundwater supply wells or groundwater users are present within the local area.	• A PTTW (if required) would include recommendations for monitoring during active construction dewatering for any potential adverse effects identified in the dewatering assessment during detailed design. Potential monitoring activities identified in the PTTW would include: pumping rate/volume monitoring, groundwater level monitoring and groundwater discharge monitoring (flow and quality).
Potential to encounter existing contaminated soils or groundwater during construction	• Develop a Soil and Groundwater Management Strategy prior to construction that would minimize adverse effects resultant from potentially encountering contaminated soil and groundwater on-site.	• Potential effects from encountering contaminated soils and groundwater during construction would be minimized through adherence to a Soil and Groundwater Management Strategy during construction.	• N/A
Socio-Economic Environment			
Potential effects to land use designations	• The development of the MSF site will conform with Metrolinx Design Excellence principles and applicable City of Toronto planning and design principles.	• No effects to existing land use designations are anticipated as a result of the MSF.	• N/A
Potential visual impact of facility construction	• Implement temporary security fencing along the site perimeter and night-time security lighting that is sensitive to adjacent residential and institutional land uses.	• The potential visual impact of facility construction will be minimized through the implementation of temporary security fencing and night time security lighting that is sensitive to adjacent residential and institutional uses.	• N/A
Potential visual impact of facility operation	• The Metrolinx Design Excellence Group will ensure that design guidelines for architecture, aesthetics and corporate identity considerations are implemented. • Specifically, design excellence for the site will include, and may not be limited to the following mitigation measures: - Provide screening and buffers from the street edge and adjacent properties using a combination of landscaping, fences and grading changes; ▪ Noise mitigation (i.e., barriers) incorporated into site design (as required) will include aesthetically pleasing design elements as a component of visual mitigation. These design elements may include transparent or semi-transparent barriers, artistic features or landscaping included in barrier design and implementation; - Provide a landscaped buffer at the site property lines, where feasible; - Security lighting for the MSF will be sensitively designed with respect to adjacent land use surroundings, including residential; - Provide appropriate facility identification and street related signage; - Facility adherence to the Toronto Green Standard; and, - Refine parking requirements, with the goal to further reduce. • To compensate for the loss of existing trees on-site, any trees found to be >30 dBh will be inventoried. Landscape plans will include planting at a minimum 2:1 compensation ratio.	• The visually sensitive receptors will have a partially obstructed and/or unobstructed view of the MSF following the implementation of the required mitigation measures. However, the implementation of the mitigation measures will act to minimize potential visual adverse effects by screening potential lower and mid-level views of buildings, portions of the Overhead Contact System (OCS), internal roads, parking, tracks and storage of the MSF while maximizing the potential for facility integration into the existing community fabric and the Finch Avenue West urban streetscape.	• N/A •
Potential for Changes to Living Conditions in the Community due to Project Implementation	• Implement recommended noise, vibration, air quality, visual, and traffic mitigation to avoid potential nuisance effects that may lead to resident dissatisfaction.	• The potential for effects to living conditions in the community as a result of the Project will be minimized through the implementation of the mitigation measures for air quality, noise and vibration, visual and traffic.	• N/A
Potential effects to use and enjoyment of property and outdoor spaces (e.g., Remberto Navia Sports Field and Finch Corridor Recreational Trail)	• Implement recommended noise, vibration, air quality, visual, and traffic mitigation to avoid potential nuisance effects that may lead to discomfort. No recreational land will be lost. • In addition, to facilitate greater recreational enjoyment, a dedicated right-of-way along the western boundary of the MSF site fronting the property line with Monsignor Fraser School between Norfinch Drive and the Hydro Corridor will be provided to accommodate a future multi use path connection.	• The potential for effects to the use and enjoyment of property and outdoor spaces will be minimized through the implementation of the required mitigation measures for air quality, noise and vibration, visual and traffic. Any effects on users of the Remberto Navia Sports Field and Finch Corridor Recreational Trail are expected to be negligible, ensuring the continued enjoyment of these public recreational facilities. • Long term, the provision of a multi-use pathway connection along the western boundary of the MSF site fronting the property line with Monsignor Fraser School will facilitate greater recreational enjoyment.	• N/A
Potential effects to Businesses	• Implement recommended noise, vibration, air quality, visual, and traffic mitigation to avoid potential nuisance effects that may lead to business patron discomfort. In addition: - Post signage alerting potential customers that businesses are still operating during construction works; - Compensate business owners for unanticipated temporary loss of access during construction, if required; and, - Metrolinx will continue to consult with the community regarding potential future intensification opportunities in the areas near the Finch West MSF Site throughout the design and construction phases of the project.	• Business access will be maintained during construction of the MSF. Unanticipated disruption to business access during construction would be compensated for as appropriate. Any loss of drive-by business due to traffic restrictions or diversions during construction may be offset by additional patronage from an increased local population during construction (i.e., on site construction personnel) and future operations personnel. Well-designed and appropriately-scaled buildings with an attractive	• N/A

Table 4-23: Potential Effects, Mitigation Measures, Net Effects and Monitoring Requirements of the Preferred Design

Potential Effect	Mitigation Measures	Net Effect	Monitoring Requirements
		streetscape will provide a catalyst for the revitalization of this segment of Finch Avenue West, increasing retail establishments, retail sales, and the general long-term economic health of the area.	
Potential effects to Institutions (e.g., Monsignor Fraser College, Hawthorne Place Care Centre, Oakdale Professional Medical Centre, Norfinch Medical Centre)	• Implement recommended noise, vibration, air quality, visual, and traffic mitigation to minimize potential disruption to nearby institutions including hotels, schools, and hospitals.	• The potential effects to institutions will be minimized through the implementation of the required mitigation measures for air quality, noise & vibration, visual and traffic. • Potential noise and vibration nuisance effects to Monsignor Fraser College will be minimized to the extent possible during detailed design of the facility, including MSF on-site mitigation and/or the potential movement of portable classrooms.	• N/A
Potential effects to community character or cohesion	• Implement recommended noise, vibration, air quality, visual, and traffic mitigation to minimize potential effects to community character or cohesion. In addition: - Ensure active transportation facilities (i.e., sidewalks, bike paths) are preserved through construction and operation; and, - Metrolinx will continue to consult with the community regarding potential future intensification opportunities in the areas near the Finch West MSF Site throughout the design and construction phases of the project.	• Potential effects to community character or cohesion will be minimized through the implementation of the required mitigation measures for air quality, noise & vibration, visual and traffic. • Although the current property is a vacant lot/greenspace, it is a private property that is unused by the community and significantly degraded. In combination with the Finch LRT, the MSF will bring positive effects to the community through increased employment and a potential increase in spending in the community, and a well-designed, attractive streetscape. Increased employment opportunities and urban aesthetics may encourage local economic regeneration. The construction and operation of the MSF will not result in any loss of sidewalks, ensuring that the existing pedestrian facilities/community connectivity is not affected.	• N/A
Potential effects to archaeological resources	• There are no areas of further archeological concern or archaeological resources, therefore, no mitigation measures are required.	• No effects to archaeological resources are identified.	• N/A
Potential effects to above ground Cultural Heritage Resources	• The study area does not retain above ground cultural heritage resources that warrant further investigation; therefore, no mitigation measures are required.	• No effects to above ground cultural heritage resources are identified.	• N/A
Noise and Vibration			
Noise effects on sensitive receptors during construction	• Develop a Construction Noise Management Plan to address the construction noise from this project. The Construction Noise Management Plan will include: - Detail a construction noise complaint process and action plan to address potential construction noise complaints; - Detail how construction equipment will meet guideline limits documented in NPC-115 and NPC-118; - Detail what measures are being taken to be compliant with City of Toronto noise By-laws; - Detail what noise control measures are being implemented; - Detail what actions are being taken to minimize the potential for noise complaints and noise impact on surround noise sensitive receivers; and, - Develop a monitoring/verification plan to demonstrate that the mitigation measures above are appropriate, functioning correctly, and that acceptable noise levels at noise sensitive receivers are maintained for the duration of construction. • Additional guidance to aid in the development of a Construction Noise Management Plan is provided in **Appendix C – Noise and Vibration Report**.	• Effects of noise during construction will be minimized through the implementation of a Construction Noise Management Plan.	• Noise and vibration monitoring is required to confirm that both construction and operational noise and vibration levels meet acceptable level limits. A noise and vibration monitoring plan will be developed during detailed design. See **Section 4.2.4.7** for detail.
Noise effects on sensitive receptors during operations	• An Environmental Compliance Approval (Noise) (ECA) application for the MSF will be prepared and submitted to the MOECC showing that the built facility meets MOECC NPC-300 requirements. Noise mitigation measures that will be implemented for the Preferred Design are summarized below and will be refined during detailed design, as required: - Main Maintenance shop / Main Repair Shop ▪ Close bay doors while wheel truing ▪ Specify shop compressors to have a maximum environmental sound power level of 90 dBA ▪ West facing doors ▪ Close bay doors during night time hours unless being used for the transiting vehicles, possible use of an automated quick close system. ▪ Open to a maximum of ¼ of the way during all other hours unless being used for the transiting vehicles, possible use of an automated quick close system ▪ East facing doors ▪ open at most 1/2 way during the night time hours unless being used for the transiting vehicles, possible use of an automated quick close system - Maintenance of way building ▪ Specify compressor to have a maximum environmental sound power level of 90 dBA ▪ Bay doors during loud operations such as using impact wrenches or hammering sheet metal	• Effects of noise during operation will be minimized through the implementation of an Operational Noise Management Plan. The MSF and associated elements of the Preferred Design for the facility will be in compliance with the NPC-300 guideline and MOEE/TTC Protocol.	• Noise and vibration monitoring is required to confirm that both construction and operational noise and vibration levels meet acceptable level limits. A Noise and Vibration Monitoring Plan will be developed during detailed design. See **Section 4.2.4.7** for detail.

Table 4-23: Potential Effects, Mitigation Measures, Net Effects and Monitoring Requirements of the Preferred Design

Potential Effect	Mitigation Measures	Net Effect	Monitoring Requirements
	▪ Close during night time hours ▪ Close half way and operate no more than 30 minutes out of any given hour during the daytime - Specify operations building 2 main AC units to maximum sound power level of 102 dBA - Include noise specifications for roof top equipment based upon final number, location, and capacities - Generators tested during daytime only, specified maximum sound power level of about 98 dBA - Attempt to keep turning radiuses greater than 1,000 ft. (~300 m) ▪ Make provisions for rail greasers for curves less than 300 m radius/radius less than 100 times the truck wheel base - Change maximum hourly deployment from 20/hr day, 20/hr evening, 50/hr night, to: ▪ 20/hr day ▪ 20/hr evening ▪ 30/hr night – this is for the morning deployment (currently forecasted at 50 in a single hour) to 50 over the course of an hour and forty minutes (1 every 2 minutes) - LRT vehicle speed on site limited to 10 km/hr - Distribute shunting of LRT vehicles as evenly as possible across site - Noise barriers as presented on **Figure 4-5** • An Operational Noise Management Plan will be prepared to address noise control for the operation of the Finch West LRT MSF. The Operational Noise Management Plan will: - Demonstrate that the facility meets MOECC noise guideline NPC-300; - Demonstrate that the facility meets municipal (Toronto) noise by-law requirements; - Detail a plan to submit an Environmental Compliance Approval (ECA) application to the MOECC; - Detail noise control measures being implemented at the facility; - Detail measurement/verification plan to confirm performance of the noise mitigation measures.		
Vibration effects on sensitive receptors during construction	• Review the zone of influence for construction equipment (City of Toronto By-law 514) as part of the building permit application and revise, if necessary, during detailed design. Refer to **Appendix C – Noise and Vibration Report** for zone of influence radii for construction equipment. • Prepare a Construction Vibration Management Plan to address the construction vibration from this project. The construction vibration management plan will: - Detail how City of Toronto vibration By-law 514 requirements are being met; - Detail what actions are being taken to minimize the perceptible vibration impacts on surrounding sensitive receivers; - Detail vibration mitigation measures being implemented; - Detail construction vibration complaint process and action plan to address perceptible vibration complaints; - Develop a monitoring/verification plan to demonstrate that the mitigation measures above are appropriate, functioning correctly, and that acceptable vibration levels at sensitive receivers are maintained for the duration of construction; and, - Detail how vibration levels at buildings potentially housing vibration sensitive machinery (e.g., Norfinch Medical Centre, Oakdale Professional Medical Centre, and Humber River Regional Hospital) will be managed to acceptable levels, and how the levels will be monitored/verified for the duration of construction. • Additional guidance on vibration control methods and mitigation measures for inclusion in the Construction Vibration Management Plan is provided in **Appendix C – Noise and Vibration Report**.	• Building damage due to construction vibrations is not expected. The potential effects of vibration on sensitive receptors during construction will be minimized through the implementation of a Construction Vibration Management Plan.	• Noise and vibration monitoring is required to confirm that both construction and operational noise and vibration levels meet acceptable level limits. A Noise and Vibration Monitoring Plan will be developed during detailed design. See **Section 4.2.4.7** for detail.
Vibration effects on sensitive receptors during operations	• Vibration mitigation measures that will be implemented for the Preferred Design are summarized below and will be refined during detailed design, as required (refer to **Figure 4-6** for vibration control locations and **Table 4-13** for potential methods of vibration control): - Up to 15 vdB of attenuation would be required for track connections to the Finch West LRT Line at York Gate Boulevard and Finch Avenue West; - For onsite track connections (crossovers) within 113 m of the medical buildings on Finch Avenue West at Norfinch Drive and Pelican Gate, up to 12 VdB of attenuation at the closest track connection (crossover) would be required. The further the track connection (crossover), the lower performance required up to 113 m distance. Approximately 11 crossovers have been identified at this time. - Up to 3 VdB of attenuation (at the closest on-site track) is required for track within 89 m of the medical building at Norfinch Drive and Finch Avenue West. Approximately 200 m of track on-site would require vibration control. • The above vibration mitigation is based upon the typical performance of typical vibration control types for rail. Alternatives providing the minimum required reductions may also be acceptable. Vibration control requirements, including transition zones, and performance will be reviewed during detailed design. • Further, the following may decrease vibration requirements and should be reviewed during detailed design: - Lower speed limit for LRT vehicles traveling over track junctions along Finch Avenue West (currently modeled as posted speed limit of 60 km/hr); - Conduct force mobility measurements to determine the ability of the ground to transmit vibration; ▪ Some areas may have localized lower transmission characteristics and may decrease the vibration reduction requirements • An Operational Vibration Management Plan will be prepared to address the vibration impacts due to the operation of the MSF. The Operational Vibration Management Plan will: - Detail plan to incorporate vibration assessment into ECA application - Demonstrate that design will meet FTA vibration criteria - Detail vibration mitigation measures being implemented - Detail how performance and level limits at sensitive receptors will be verified/measured • Additional information on the contents of the Operational Vibration Management Plan is included in **Appendix C.**	• The potential effects of vibration on sensitive receptors during operation will be minimized through the implementation of an Operational Vibration Management Plan.	• Noise and vibration monitoring is required to confirm that both construction and operational noise and vibration levels meet acceptable level limits. A Noise and Vibration Monitoring Plan will be developed during detailed design. See **Section 4.2.4.7** for detail.

Table 4-23: Potential Effects, Mitigation Measures, Net Effects and Monitoring Requirements of the Preferred Design

Potential Effect	Mitigation Measures	Net Effect	Monitoring Requirements
Air Quality			
Potential for nuisance dust and emissions during construction	• Implement a Dust Management Plan to comply with applicable regulations and standards during construction. • The following mitigation measures will be implemented to limit any emission impacts from diesel/gas powered construction equipment during construction: - Use electric-powered equipment where possible, or diesel powered construction equipment with stringent emissions standards; - Minimize idling time for all diesel/gas powered construction equipment; and, - Use well-maintained construction equipment.	• During construction, any net effect on air quality will be localized to the construction area for the duration of the construction activities. The potential off-site effects to air quality (nuisance dust and emissions) will be minimized through the implementation of a Dust Management Plan and measures to limit emissions from diesel/gas powered construction equipment.	• A Dust Management Plan (DMP) will be implemented to minimize dust concentrations at the fence line during construction.
Potential effects to local air quality during facility operations	• Particulate matter generated from the compressed air cleaning and sand dispensing system will be controlled with a ventilation/dust collection system. Painting will be conducted inside the paint spray booth equipped with an exhaust system and overspray filters which will control particulate matter emissions. Maintenance welding will be performed with mobile fume extraction units equipped with high efficiency filtration and exhaust inside the building. • An Application for Environmental Compliance Approval (Air) (ECA) will be prepared for the MSF during detailed design. • The following mitigation measures will be incorporated into the design and operation of the facility in order to reduce resultant air emissions: - All on-site roadways and parking lots should be paved to minimize the generation of road dust; - Emergency generators with more stringent air emission levels will be selected for procurement (i.e., generators conforming with EPA Tier IV emission standards or higher) which are required for compliance at the off-site receptors; - During operation, the emergency generators will be tested only one at a time; - Stack location for the paint booth exhaust will be at least 100 m from the nearest property line; - Paint Arrestor Pads will be installed in the paint booth and have a minimum of 95% particulate removal efficiency; - Stack locations for other process exhausts will be situated as far away from the property line as feasible; - Stack parameters (height, location, configuration, etc.) will be designed to ensure good dispersion (no rain caps), avoid re-entrainment of contaminant air into building and compliance with MOECC limits - Selection of welding material that is chromium-free or the material will contain the least amount of chromium compounds as possible for welding to ensure minimal hexavalent chromium emissions are generated during welding process; - Maintenance welding must be carried out with mobile fume extraction units equipped with high efficiency filtration with a minimal removal efficiency of 99% for particulate matter and metal fumes before exhausting inside the building; and, - Maintenance welding will only be performed for a maximum of 12 hours per day.	• Potential effects to local air quality during operations will be mitigated through the implementation of the measures described in the Air Quality Assessment Report, **Appendix D**, resulting in expected MSF emissions during operation being within applicable air quality criteria and within MOECC Standards and/or Guidelines.	• N/A
Traffic and Transportation			
Potentially lower road capacity available/increased travel times during construction	• A 25% traffic diversion to parallel arterial and collector roads will relieve traffic congestion on Finch Avenue West during construction and minimize any impact to travel times in the vicinity of the MSF. Travel demand modeling will be used during detailed design to refine diversion rates and methods.	• A potentially lower road capacity available during construction and resultant increased travel times will be mitigated by a 25% traffic diversion to parallel arterial and collector roads. Regular traffic patterns will resume when construction activities end.	• N/A
Potential effects to study area intersection operations, including at Finch Avenue West and Norfinch Drive during AM and PM peak periods during operation	• Prepare a Traffic Management Plan during detailed design that considers the impacts of LRV operation in the corridor during the peak hours. The primary operation of LRVs in and out of the MSF will occur at off-peak hours and have a minimal impact to vehicle traffic. • Refine the signal timing and LRV operating plan to minimize the impacts of both modes of transportation on the street networks.	• During operations, most of the study intersections will continue to operate at an acceptable overall LOS 'D' or better. Potential effects to intersection operations at Finch Avenue West and Norfinch Drive will be minimized by implementing a Traffic Management Plan and refining the signal timing and LRV operating plan during detailed design of the facility.	• LRV and traffic volumes will be monitored following the opening of the facility in consultation with the City of Toronto.
Potential safety concerns for future active transportation (bike lanes/sidewalks) along Finch Avenue West and York Gate Boulevard due to MSF LRV access/egress	• Incorporate signing, striping, and active devices (if appropriate) into the design as additional safety measures for cyclists in the vicinity of the MSF LRV access/egress locations.	• Potential effects to active transportation (safety) will be mitigated by incorporating signing, striping, and active devices (if appropriate) in the vicinity of MSF LRV access/egress locations.	• LRV and traffic volumes will be monitored following the opening of the facility. Mitigation measures for pedestrians/cyclists will be evaluated for their effectiveness and modified if appropriate.
Potential effects to existing TTC Bus Services	• Metrolinx and the TTC will re-assess bus service and routing requirements in the vicinity of the MSF site, including replacing the Finch 36+ route with the LRT service.	• Effects to TTC bus routes will be confirmed through future TTC/Metrolinx system planning and co-ordination.	• LRV and traffic volumes will be monitored following the opening of the facility in consultation with the City of Toronto.

5. Consultation Process

In accordance with Section 8 of *Ontario Regulation 231/08*, this chapter summarizes the consultation activities carried out with the public, property owners, review agencies, Aboriginal communities and other stakeholders during the course of the Finch West MSF Project, including a summary of feedback and comments received and how they were considered. A Project Mailing list was continually updated in response to project feedback and was utilized to inform stakeholders of key consultation milestones. The Project Mailing list is included in **Appendix A**.

5.1 Consultation Activities

Metrolinx offered a wide range of communication methods to the general public, review agencies, property owners, Aboriginal communities and other interested groups and carried out the following activities to solicit comments and feedback on the Project:

- Project Website
- Community Meetings
- Public Open Houses
- Notifications/Newspaper Advertisements.

5.1.1 Project Website

The Project Website (www.metrolinx.com/finchwest) was dedicated to keep the public up-to-date on the latest developments of the Finch West MSF, provide notice of upcoming Public Open Houses, serve as a virtual library for materials presented at Public Open Houses and other project documentation, and provide a means for the public to comment on the Project.

5.1.2 Community Meetings

Community meetings were held throughout the course of the Project.

A meeting was held with the Community Action Planning Group – York West (CAPG) on Tuesday August 12, 2014 during the Preliminary Planning stage to provide the group project information and gather their input. During the TPAP, CAPG provided correspondence (see **Appendix A**) including a set of seven principles generated by their members specifically for the MSF. They are as follows:

1. **Community Engagement and Inclusion**
   Prior to the selection of the successful proponent, Metrolinx should develop and implement an engagement plan that covers all stages of the design and development of the Finch MSF.

2. **Community Benefits**
   Metrolinx should work closely with the proponents, Infrastructure Ontario, and local partners to ensure that benefits are provided through the design, development, and operation of the MSF.

3. **Environmental Impact and Sustainability**
   The MSF should be designed and developed to a high environmental standard, in order to minimize its overall impact on the surrounding neighbourhood.

4. **Opportunities for Additional Uses**
   Proponents should propose a design and development approach that minimizes the footprint of the MSF, while considering a range of uses on the lands, particularly along Finch Avenue West and Yorkgate Boulevard.

5. **Street Frontage**
   Proponents should apply creative approaches to the design and development of the Finch Avenue West and Yorkgate Boulevard frontages with respect to at-grade uses, architectural treatment, as well as streetscape and other public realm improvements.

6. **Physical Connections**
   Proponents should take an integrated approach to the design and development of the MSF lands with respect to the surrounding urban context.

7. **Design Excellence**
   Proponents should adopt design excellence as part of their responses to all aspects of the development of the MSF.

A commitment was made to meeting with the CAPG after the TPAP to discuss how these principles may be incorporated in the subsequent Request for Proposals (RFP) for the detailed design and construction of the MSF.

In addition, various community stakeholder meetings were also held for the wider Finch West LRT Project. During these meetings, the MSF was discussed in relation to its function within the overall LRT Project.

5.1.3 Public Open House (POH) #1

The first Public Open House was held as part of the Preliminary Planning Step in advance of commencing the TPAP on July 9, 2014 at the Julius Banquet Centre at 2201 Finch Avenue West from 7:00 PM to 9:00 PM.

Notification for POH #1 was accomplished through the following:

- Posting on the Project Website on June 27, 2014;
- Publication in the following local newspapers:
  - *Metro News Toronto* on June 27, 2014 and July 4, 2014
  - *24 Hours Toronto* on July 2, 2014 and July 7, 2014
  - *North York Mirror* on July 3, 2014.
- Addressed mail to the following groups on June 30, 2014:
  - Properties within approximately 30 m of the site
  - All federal, provincial, and municipal agencies, Aboriginal communities, and other interested stakeholders on the project contact list;
- Unaddressed mail to residents and businesses within approximately 500 m of the site on June 30, 2014.

Copies of the above notice are included in **Appendix A**.

In total, 25 comments (23 comment sheets and 2 online comments) were received regarding the proposed MSF. The Online Consultation #1, which was promoted as an alternative to attending POH #1, ran from July 9 until July 23, 2014. Comments sent to the project email address were included in the POH # 1 Summary Report (**Appendix A**). The following information was presented at POH #1:

- Introduction to the components of the MSF
- Description of the MSF Site Selection Process
- Description of the MSF Site
- How the planning process will proceed under the Transit Project Assessment Process
- Existing conditions in the study area

- How the potential effects associated with the facility will be assessed
- The Infrastructure Ontario AFP Process
- Study schedule and next steps.

Participants of POH # 1 and Online Consultation #1 indicated community engagement, integration of community uses on-site, and community impacts as important considerations for the Project. There was also concern with safety and accessibility during construction activities. Some of the comments received were focused on the wider Finch West LRT project rather than the MSF itself.

The sections below summarize the common themes of the public comments received. **Appendix A** includes the original comments received at the Public Open House #1.

Community Engagement

Participants felt that involving members of the community in the Project should be a priority. Some participants requested to expand future notification beyond 500 m catchment to include more public input from the Jane and Finch community. Many participants also requested a working group be developed to provide design input throughout the Project, similar to the function of the CAPG in York West.

Multi-Purpose Use

Rather than having the MSF operate as a single-function facility, participants indicated that they would prefer the facility to incorporate a separate function that will service the community (i.e., a bike repair shop). Daniels Spectrum in Regent Park was mentioned as an example of utilizing space for community benefit.

Visual Impact

The visual impact that the MSF will have on the neighbourhood was a common concern. Residents expressed concern that the facility will be visually intrusive, especially for those who live within viewing distance of the site. Suggestions for a visual separation wall were also received.

5.1.4 Notice of Commencement

The Notice of Commencement was issued to the public on May 15, 2015 and was published in the Downsview Advocate on May 15, 2015, and the Metro News Toronto, 24 Hours Toronto, North York Mirror on May 21, 2015. The Notice of Commencement was also posted to the Project website (www.metrolinx.com/finchwest) on May 15, 2015.

The MOECC Special Project Officer and Environmental Approvals Branch Director were sent the Notice of Commencement by email and addressed mail on May 12, 2015.

The Notice of Commencement was emailed to stakeholders (government review agencies, Aboriginal communities, property owners within 30 m) and POH #1 attendees, where email was available, on May 14, 2015. All other stakeholders were sent addressed mail on May 14, 2014. Refer to **Appendix A** for the project mailing list.

5.1.5 Public Open House (POH) #2

The second Public Open House was held following the commencement of the TPAP on June 24, 2015 at St. Wilfrid Catholic School (1685 Finch Avenue West) from 7:00 PM to 9:00 PM.

Notification for the POH #2 (**Appendix A**) was accomplished through the following:

- Posting on the Project Website on June 11, 2015;
- Publication in the following local newspapers:
  - *North York Mirror* on June 11, 2015 and June 18, 2015
  - *Downsview Advocate* on June 15, 2015
  - *Metro News Toronto* on June 17, 2015 and June 22, 2015
  - *24 Hours Toronto* on June 17, 2015 and June 22, 2015
- Addressed mail to the following groups on June 5, 2015:
  - Properties within approximately 30 m of the site
  - All federal, provincial, and municipal agencies, Aboriginal communities, and other interested stakeholders on the project contact list;
- Unaddressed mail to residents and businesses within approximately 500 m of the site on June 11, 2015.

In total, 16 comments (10 comment sheets and 6 online comments) were received at POH #2. The Online Consultation #2, which was promoted as an alternative to attending POH #2, ran from June 24 until July 8, 2015. Comments received to the project email from the Notice of the Public Open House (June 11, 2015) were included in the POH # 2 Summary Report (**Appendix A**). The following information was presented at the POH #2:

- Recap of POH #1
- Purpose of the MSF
- How the planning process will proceed under the Transit Project Assessment Process
- Preferred Design for the MSF (site layout and renderings)
- Description of the environmental effects assessment process
- Potential effects and mitigation
- Other mitigation measures during construction and operations/maintenance
- Commitments to future work
- Study schedule and next steps.

Participants of the POH #2 and Online Consultation #2 indicated interest in mixed-use opportunities and community integration at the MSF. Participant feedback also indicated potential traffic delays as a common concern. Some of the comments received were focused on the wider Finch West LRT project, rather than the proposed MSF.

The sections below summarize the common themes of the public comments received. **Appendix A** includes the original comments received at the POH #2.

Community Integration

Participants felt that involving members of the community in the Project should be a priority. Participants indicated concern that the MSF will not enhance the Jane-Finch community and suggested that the proposed MSF integrate community facilities that will provide benefit to community residents.

Mixed-Use Opportunity

Participants suggested exploring opportunities to provide a mix of uses at the MSF, rather than operating as a single-function facility. Affordable housing and local commercial development were common suggestions to consider for mixed-use opportunities.

Traffic Concerns

Participants expressed concern with traffic delays during MSF construction and operations, specifically regarding impacts to delivery trucks and traffic coming from Highway 400. Participants also suggested advanced left-turn signals to improve access to and from residential streets.

5.1.6 Notice of Completion

The Notice of Completion was issued to the public on July 31, 2015 and was published in Metro News Toronto and 24 Hours Toronto on July 31, 2015. The Notice of Completion will be published in the North York Mirror on August 6, 2015; and in the Downsview Advocate on August 17, 2015. The Notice of Completion was also posted to the project website (www.metrolinx.com/finchwest) on July 31, 2015.

The MOECC Director and Regional Director were sent the Notice of Completion by email and addressed mail prior to July 31, 2015.

The Notice of Completion was emailed to stakeholders (government review agencies, Aboriginal communities, property owners within 30 m) and POH #1 and #2 attendees, where email was available, the week of July 29, 2015. All other stakeholders were sent addressed mail the week of July 29, 2015.

5.2 Public Consultation

Multiple public comments unrelated to the MSF concerning the Finch West LRT were not included in the Summary of Public Comments Received.

Members of the public requesting general project information were directed to the project website and notified of upcoming Public Open Houses.

Multiple comments received from the public requested to be added to the project mailing list and kept informed. In response to these requests, Metrolinx added the requested contacts to the project mailing list accordingly.

Table 5-1: Summary of Public Comments

Correspondence Type	Comments Received	Response Provided
Project Website	Noted that the MSF site is a good use of vacant land. Requested a study of the impacts to the adjacent hydro corridor to ensure health of employees is not compromised.	Comment noted.
Telephone	Questions regarding the Project status and level of approval from City and City Councillors.	Recent announcements from the Province and the master agreement between the City, Metrolinx and TTC confirm Project approval.
Telephone	Questions regarding site selection and potential traffic impacts surrounding the MSF.	Alternate sites were identified during the initial selection. The final site was selected based on size and proximity to the Finch LRT. Traffic impacts have been assessed through traffic modelling based on existing and predicted traffic volumes in the area. Traffic impacts are negligible due to majority of LRV movements outside of peak hours.
Email	Questions regarding overall construction timeline and work being done on Finch Avenue West.	Current work is pre-design activity related to land surveying. The MSF EA is underway and construction of the Finch West LRT is expected to begin in 2016.
Email	Questions regarding Project status.	The MSF EA is underway and construction of the Finch West LRT is expected to begin in 2016.
Email	Expressed support for the Finch West LRT. Does not support site selection for MSF due potential impacts to neighbourhood character. Noted that transit facilities are not supported in the Toronto Official Plan designation for this site.	Alternate sites were identified during the initial selection. The final site was selected based on size and proximity to the Finch LRT.
Email	Community Action Planning Group (CAPG) York West provided 7 Community Principles related to: • Community engagement and inclusion • Community benefits • Environmental Impact and Sustainability • Additional uses • Street frontage • Physical connections • Design excellence	A commitment was made to meeting with the CAPG after the TPAP to discuss how these principles may be incorporated in the subsequent Request for Proposals (RFP) for the design and construction of the MSF.
Email	Questions regarding site purchase process and zoning requirements. Does not support MSF at this location.	Metrolinx acquired the land in 2011 from the Province of Ontario. Metrolinx has been reviewing the zoning by-law with the City to address any potential issues with a transit facility. Other sites along the Finch corridor were reviewed but deemed incapable of supporting the Finch LRT.
Email	Suggested to consider the hydro corridor (north of the MSF site) as an alternate site for the MSF.	Comment noted.
Email	Expressed noise concern for residents of Norfinch Care Community.	The facility will be designed to meet Ministry requirements for noise and vibration. Impact to sensitive receptors will be mitigated through both construction and operation of the MSF.
Email	Inquired if a steel pre-engineered building (PEB) design was considered for the MSF.	Successful Proponent could elect to use PEBs in their design, provided that it meets the design criteria. A list of qualified bidders for the Finch West LRT may be released on the Infrastructure Ontario website and could potentially confirm if PEBs are proposed.

5.3 Agency Consultation

5.3.1 Technical Advisory Committee (TAC) Meetings

A Technical Advisory Committee (TAC) comprised of City of Toronto Transportation Planning, City of Toronto Transportation Services, AECOM, and Metrolinx was arranged to solicit input from key stakeholders. The Committee met four times over the course of the Project.

TAC Meeting #1: ..... The first TAC meeting was held on July 3, 2014 at 5160 Yonge Street from 9:30 AM to 10:45 AM. The meeting discussed the EA schedule, existing conditions of the MSF site, and introduced the effects assessment approach.

TAC Meeting #2: ..... The second TAC meeting was held on September 26, 2014 at 5160 Yonge Street from 9:30 AM to 12:00 PM. The meeting discussed the public consultation/input received to date, Preferred Design and the associated effects assessment, and the timeline for future consultation.

TAC Meeting #3: ..... The third TAC meeting was held on November 21, 2014 at 5160 Yonge Street from 9:30 AM to 12:00 PM.
The meeting discussed revisions to the Preferred Design, and future consultation.
Also discussed at this meeting were TAC comments on the Draft EPR and how these comments were addressed accordingly in the EPR.

TAC Meeting #4: ..... The fourth TAC meeting was held on May 26, 2015 at 5160 Yonge Street from 1:30 PM to 3:30 PM. The meeting discussed presentation materials for Public Open House #2 and the overall TPAP schedule.

5.3.2 Regulatory Agencies Consultation

Consultation with regulatory agencies was carried out throughout the course of the Project through meetings and written correspondence. In addition, all regulatory agencies were circulated invitations to Public Open Houses, the Notice of Commencement, and Notice of Completion.

Table 5-2 provides a summary of comments received from agencies. The list of agencies consulted with and copies of original correspondence is included in **Appendix A**.

Table 5-2: Summary of Agencies' Comments

Agency	Comments Received	How the Comment was Considered
Ministry of Natural Resources and Forestry (MNRF)	• A request was sent to the MNRF to comment on the Eastern Meadowlark that was observed during two site visits and to advise for next steps per the *Endangered Species Act, 2007.* • MNRF advised that if less than or equal to 30 ha of Eastern Meadowlark habitat is damaged or destroyed and the rules set out in the regulation can be met, then the proposed MSF may be eligible for registration. However, if the proposed MSF will damage or destroy more than 30 ha of the habitat or rules in the regulation cannot be met, a 17(2)(c) permit will be required under the *Endangered Species Act, 2007* to damage or destroy Eastern Meadowlark habitat. The first step in this process will be to fill out an Information Gathering Form and submit it to MNRF Aurora District Office.	• As per O.Reg, 242/08, Notice of Activity (via registration) will be completed for the MSF, and a Habitat Management Plan for the Eastern Meadowlark habitat compensation site will be prepared.
Hydro One Networks Inc.	• In response to Notice of Public Open House #1, Hydro One requested all plans in order to provide an official response to the	• The proposed MSF will be located on lands owned by Metrolinx.

Agency	Comments Received	How the Comment was Considered
	proposed MSF.	
Toronto and Region Conservation Authority (TRCA)	• In response to Notice of Public Open House #1, The TRCA does not have any comments or concerns with the proposed development; however, would like to be kept on the circulation list. • In response to Notice of Commencement, TRCA advised that there are no areas of interest within the identified study limits, therefore there are no concerns with the Project.	• Comments noted
Ministry of Tourism, Culture and Sport (MTCS)	• In response to Notice of Public Open House #1, MTCS noted that the *Standards and Guidelines for Conservation of Provincial Heritage Properties (S&G),* prepared pursuant to Section 25.2 of the Ontario Heritage Act (OHA), came into effect on July 1, 2010. All Ontario government ministries and public bodies that are prescribed under Ontario Regulation 157/10 must comply with the S&Gs. • It was also noted that Aboriginal communities may have knowledge that can contribute to the identification of cultural heritage resources, and suggested that any engagement with Aboriginal communities includes a discussion about known or potential cultural heritage resources that are of value to these communities. • MTCS asked the Project team to advise whether an archaeological assessment will be completed for the Project, as this site was not included in the Finch West LRT EA, and to include completed cultural heritage screening checklists and supporting documentation in the EPR. MTCS requested to be kept on the Project notice circulation list throughout the EA process.	• Advised MTCS that the project is proceeding in accordance with all applicable regulations, that appropriate Aboriginal communities have been informed and their concerns will be appropriately incorporated, and that a Stage 1 and 2 Archaeological Assessment was completed for the Site. • Further noted that the MTCS previously concurred with the findings of the Stage 1 and 2 Archaeological Assessment conducted in 2008 on the same site (agreeing with the recommendation that no further documentation of the site is necessary). • Project notices will continue to be circulated to MTCS throughout the EA process.
Hydro One Networks Inc.	• In response to Notice of Commencement, Hydro One confirmed that there are no Hydro One Transmission (above 115 kV) Facilities in the subject area after undergoing initial review.	• Comment noted.

5.4 Aboriginal Consultation

5.4.1 During Preliminary Planning (Pre-Notice of Commencement):

On November 7, 2014 a formal request was sent to the MOECC's Environmental Approvals Branch for a list of Aboriginal communities that may be interested in the Project. MOECC responded by making reference to the Ministry's website on Aboriginal consultation for developing the Aboriginal contact list. The Aboriginal contact list was developed by using the Aboriginal Affairs and Northern Development Canada (AANDC) Aboriginal and Treaty Rights Information System (ATRIS).

Aboriginal communities were contacted for an opportunity to participate and provide comments on the Project. The following Aboriginal communities were consulted during the Preliminary Planning stage, prior to Notice of Commencement:

- Alderville First Nation
- Beausoleil First Nation
- Chippewas of Georgina Island
- Chippewas of Mnjikaning (Rama)
- Curve Lake First Nation
- Hiawatha First Nation
- Huron-Wendat First Nation
- Kawartha Nishwabe First Nations
- Métis Nation of Ontario
- Mississaugas of the New Credit First Nation
- Mississaugas of Scugog Island First Nation
- Six Nations of the Grand River Territory

Comments were not received from the above-mentioned groups during Preliminary Planning step.

5.4.2 During TPAP

During the TPAP stage, the list of communities below were confirmed on the basis of being a First Nations community signatory to the Williams Treaty (1923). As a result, the following Aboriginal communities and representative organizations were consulted:

- Alderville First Nation
- Beausoleil First Nation
- Chippewas of Georgina Island
- Chippewas of Mnjikaning (Rama)
- Curve Lake First Nation
- Hiawatha First Nation
- Huron-Wendat First Nation
- Métis Nation of Ontario
- Mississaugas of Scugog Island

Each of the above-noted Aboriginal communities were contacted by email (where available) or addressed mail to notify them of the Project, invite them to Public Open Houses, and seek their input on the Project. The Aboriginal communities were also circulated the Notice of Commencement and Notice of Completion. Written invitations were included as part of the circulation of these notices, which also included an offer to hold individual meetings to discuss any concerns.

Aboriginal communities were contacted by email (where available) or addressed mail on July 3, 2015 as a follow-up due to lack of response to Notice of Public Open House #2, which was distributed on June 24, 2015. **Table 5-3** provides a summary of comments received from Aboriginal communities.

In addition, the Ontario Ministry of Aboriginal Affairs (MAA) and AANDC were included on the Project mailing list and notified at all major milestones (Notice of Commencement, Notice of Public Open Houses, and Notice of Completion).

Table 5-3: Summary of Aboriginal Comments

Community	Comments Received	How the Comment was Considered
Hiawatha First Nation	• In response to Notice of Commencement, Hiawatha First Nation confirmed that the Project has little, if any, impact on its traditional territory and/or rights. • Hiawatha requested to be notified of any archaeological findings and/or reports as a result of the Project.	• Comment noted.
Huron-Wendat First Nation	• In response to Notice of Commencement, the Huron-Wendat Nation requested to be informed of all project development aspects and asked to receive the GIS data of the project area to determine if they have archaeological sites and potential for sites in this area.	• The proposed site for the MSF has previously been investigated for archaeological potential. In May 2008, Archaeological Services Inc. (ASI) completed a Stage 1 and 2 Archaeological Assessment (AA) for a proposed development on the same site. The initial Stage 1 AA determined that there was potential for the identification of pre-contact archaeological remains within the study area, and so a Stage 2 AA was undertaken. This subsequently determined that the study area could be considered free of any further archaeological concern. This recommendation was subsequently accepted by MTCS in January 2009 in their archaeological clearance letter. • The above information will be documented as an appendix in the final EPR which will be made available for public review shortly. This EA is using the previously accepted Stage 1 and 2 AA as the basis for conducting the assessment of potential environmental effects for the proposed MSF.
Métis Nation of Ontario	• In response to Public Open House #2 follow-up correspondence, Métis Nation confirmed no interest in the Project.	• Removed from Project mailing list, as requested.

6. Future Commitments & Permits and Approvals

6.1 Canadian Environmental Assessment Act 2012 (CEAA 2012) Review

The Regulations Designating Physical Activities under the *Canadian Environmental Assessment Act (CEAA) 2012* identify the physical activities (i.e., types of projects) that constitute "designated projects" that may require a Federal EA. A review of the Regulations was carried out by Metrolinx with respect to the proposed undertaking (MSF). Based on this review, the Finch West MSF Project does not constitute a designated project under *CEAA, 2012*.

6.2 Permits and Approvals Required

In accordance with *Ontario Regulation 231/08*, a Notice to Proceed must be obtained from the Minister of the Environment and Climate Change (MOECC) before the Project can proceed to implementation. In addition to carrying out the TPAP in accordance with *O. Reg. 231/08*, there are also a number of other provincial, municipal, and other approvals/permits required for this Project prior to implementation. Accordingly, the following section summarizes the anticipated permits and approvals based on the Preferred Design and input received from stakeholders to date.

6.2.1 Federal

All migratory birds, including Eastern Meadowlark which has been documented as breeding at the site, are protected from disturbance of their breeding, nesting and rearing habitat under the federal *Migratory Birds Convention Act*. Disturbance of these habitats is not permitted during the nesting period of April 1 to August 31. If vegetation removal or other development activity must occur during that period, the work may be undertaken[16], however a qualified biologist must inspect the site and document the absence of active nesting or rearing habitat(s). If active nests or rearing habitat(s) are observed, the qualified biologist will document the location, and the habitat will be protected from disturbance until nesting or rearing activity is completed.

6.2.2 Provincial

6.2.2.1 Ministry of the Environment and Climate Change (MOECC)

Environmental Compliance Approval (Air and Noise): An ECA for Air and Noise for the facility must be obtained from the MOECC under Part II.1 of the *Environmental Protection Act (EPA)*, during detailed design.

Environmental Compliance Approval (Sewage Works): An ECA for sewage works must be obtained from the MOECC with regard to the stormwater management, during detailed design.

Permit to Take Water: Under the *Ontario Water Resources Act (O.Reg 128/03)*, a PTTW permit from the MOECC must be obtained for the taking of water over 50,000 L/day from any given source, whether temporary or permanent for any purpose including but not limited to: diversion, potable water supply, cleaning, flushing and dewatering during MSF construction, operation and maintenance. It is not anticipated that significant construction dewatering will be required. However, this will need to be revisited closer to the construction phase when specific details such as

16. Vegetation removal or other development activity cannot be undertaken on site until registration of construction activities with the MNRF as a Notice of Activity in accordance with Ontario Regulation 242/08.. Refer to ***Section 4.1.1*** *for detail.*

construction timing and methods are known. Potential impacts will be assessed and strategies for mitigation will be proposed as part of the PTTW application process, if required.

6.2.2.2 Ministry of Natural Resources and Forestry (MNRF)

Eastern Meadowlark, a Species at Risk designated "Threatened" under the *Endangered Species Act* (2007), has been documented as breeding at this site. Removal of this habitat requires registration of construction activities with the MNRF via Notice of Activity in accordance with *Ontario Regulation 242/08* under the *Act*. Upon registration via Notice of Activity with the MNRF, a Habitat Management Plan must be designed for an alternative site(s) of an area no less than the disturbed habitat area where appropriate habitat can be created or significantly enhanced of equal area. Within 12 months after the day the construction activity is commenced on the MSF site, the work of creating or enhancing an alternative Eastern Meadowlark habitat must be completed in a manner that ensure the habitat means the requirements outlined in O. Reg. 242/08 with respect to the types of vegetation it provides.

6.2.2.3 Ministry of Tourism, Culture and Sport (MTCS)

No further approval is required from MTCS based on the Stage 1 and 2 Archaeological Clearance Letter received for the site which can be found in **Appendix E**.

6.2.3 Municipal

Although Metrolinx, as a Provincial Agency, is not subject to municipal permits and approvals, Metrolinx will adhere to the intent of the relevant permits/approvals requirements to the greatest extent possible, and will submit applications for review and information.

6.2.3.1 City of Toronto

Metrolinx will continue to communicate and engage with the City of Toronto during the detailed design phase and during construction planning to ensure that any municipal concerns are addressed in the construction plans prior to commencement of construction activities, as follows:

- 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.
- When developing plans for new or expanded infrastructure, Metrolinx will co-ordinate with municipal staff to ensure infrastructure is constructed to meet municipal requirements to the greatest extent possible.
- Submissions relating to building permits and Site Plan approvals for the proposed MSF will be made in the spirit of co-operation and will provide the Municipality with an opportunity to comment.
- Submissions relating to sewer discharge approvals will be made in accordance with City of Toronto requirements, as applicable.
- Submissions relating to permits for construction within the existing road allowances will be made in accordance with City of Toronto requirements, as applicable.
- Submissions relating to City of Toronto Private Tree By-law, Street Tree By-law, and Parks By-law will be made in accordance with City of Toronto requirements, as applicable.
- The facility will adhere to the Toronto Green Standard.

6.2.3.2 Toronto and Region Conservation Authority

Wherever possible, Metrolinx will engage the TRCA and will adhere to TRCA requirements, as applicable:

- Tree protection and removal/injury in accordance with TRCA requirements
- Sewer discharge in accordance with TRCA requirements
- TRCA requirements for work within a regulated area.

6.2.3.3 Utilities

There are a number of utilities and utility owners in the vicinity of the MSF site. The final assessment of utility conflicts will be reviewed as part of detailed design. Implementation and construction obligations will be undertaken pursuant to the crossing agreements with each of the utility companies as required.

6.3 Future Commitments

EPR commitments are developed to satisfy the requirements *O. Reg 231/08*. Specifically the purpose of the commitments is to facilitate the implementation of the Finch West MSF in accordance with the mitigation measures and monitoring activities described in the EPR and in a manner that does not result in negative impact on matters of provincial interest related to the natural environment or to cultural heritage value or interest, or on constitutionally protected Aboriginal or treaty rights.

Establishing EPR commitments also satisfies the requirements of the TPAP Guide. Specifically, Section 4.3 of the Guide prescribes that the monitoring actions identified in the EPR respecting the mitigation measures must be carried out and reported.

A summary of EPR commitments is provided in **Table 6-1**. All applicable permits, licences, approvals and monitoring requirements under environmental laws will be reviewed, confirmed and obtained prior to the construction of the Project.

Table 6-1: Summary of Future Commitments and Monitoring Requirements

Discipline	Environmental Project Report Commitments	
	Mitigation Measure (or related action)	***Monitoring Activity Requirements***
Terrestrial Natural Heritage	• Register construction activities with the MNRF as a Notice of Activity in accordance with Ontario Regulation 242/08. • Upon registration via Notice of Activity with the MNRF, design a Habitat Management Plan in accordance with the requirements of Ontario Regulation 242/08. • Following registration with MNRF via Notice of Activity, clearing of the site during the period May1 to July 31 of any year may only proceed following completion of an avian survey documenting the absence of nests as per the requirements of the Migratory Birds Convention Act[17]. • The Habitat Management Plan will be maintained on file for a minimum of five years of annual monitoring, and will be provided to MNRF upon request. • Manage the compensation or enhancement habitat for 20 years based on the specified site management, monitoring and maintenance requirements as outlined in the Habitat Management Plan.	• Monitor the compensation or enhancement habitat for a minimum of 5 years after habitat is created or enhanced • Monitor the area in which the habitat was created or enhanced by conducting at least three surveys every year at a time when Bobolink or Eastern Meadowlark are likely to be present, to determine if the species are in fact present and, if so, to assess fledging success. • Provide annual reports upon request documenting the Eastern Meadowlark use of the compensation or enhancement site to the MNRF during the 5-year minimum monitoring period.
	• Conduct an assessment of tree health prior to site disturbance by a Certified Arborist, including a tree inventory to identify all trees 30 cm diameter at breast height (dbh) or greater. • Document tree protection measures for trees that can be retained on site survey plans.	• N/A
	• Develop a compensation planting plan for the removal of trees. The compensation landscape plan will include planting at a minimum a 2:1 compensation ratio.	• Landscape plantings on-site will be monitored until successful establishment is confirmed, in accordance with City of Toronto tree protection policies.
	• Avoid tree removals/site disturbance during the typical nesting period of migratory birds, May 1 to July 31 in any year. • Where destruction or disruption of these habitats during nesting periods is unavoidable, proceed in accordance with a recent (typically within 7 days) assessment by a qualified biologist documenting the absence of nests.	• N/A
Stormwater Management	• Prepare a SWM Plan for the site as part of the detailed design phase in consultation with the City of Toronto and the TRCA. • Prepare an application for ECA (Sewage Works) for the MSF during detailed design.	• N/A
	• Develop an Erosion and Sediment Control Plan for the site during construction to meet applicable guidelines and criteria.	• N/A
	• Develop Spill Prevention and Contingency Plans for both construction and operational phases.	• N/A
Geology and Groundwater	• Conduct a construction dewatering assessment, prior to construction, to determine the need for a MOECC Permit To Take Water (PTTW). • Collect and evaluate groundwater quality samples prior to construction as part of the construction dewatering assessment. • If dewatering is required, pumped groundwater will be subject to prior quality review and approval by the City of Toronto.	• A PTTW (if required) will include recommendations for monitoring during active construction dewatering for any potential adverse effects identified in the dewatering assessment during detailed design.
	• During site design/construction: ▪ Pave select parking and/or driveway areas with permeable pavement to facilitate infiltration and reduce runoff; and, ▪ Maintain a portion of the site as landscaped areas to facilitate infiltration.	• N/A
	• Develop a Soil and Groundwater Management Strategy prior to construction and mitigate potential	• N/A

17. *While the Migratory Birds Convention Act provides conditions for undertaking work in the breeding habitat of regulated species, the more restrictive* Endangered Species Act, 2007 *overrides those conditions with respect to regulated Species at Risk.*

Table 6-1: Summary of Future Commitments and Monitoring Requirements

Discipline		Environmental Project Report Commitments	
		Mitigation Measure (or related action)	***Monitoring Activity Requirements***
		adverse effects resultant from potentially encountering contaminated soil and groundwater on site.	
Socio-Economic Environment	**Land Use**	• Conform with Metrolinx Design Excellence principles and applicable City of Toronto planning and design principles.	• N/A
	Visual	• Implement temporary security fencing along the site perimeter and night-time security lighting that is sensitive to adjacent residential and institutional land uses.	• N/A
		• Ensure that Metrolinx Design Excellence guidelines for architecture, aesthetics and corporate identity considerations are implemented. • To compensate for the loss of existing trees on-site, any trees found to be >30 dBh will be inventoried. Landscape plans will include planting at a 2:1 compensation ratio.	▪ Landscape plantings on-site will be monitored until successful establishment is confirmed, in accordance with City of Toronto tree protection policies.
	Community Features	• Implement noise, vibration, air quality, visual, and traffic mitigation to minimize potential effects to community features, including businesses, residences, residents, institutions, and recreational facilities. In addition; ▪ Ensure active transportation facilities (i.e., sidewalks, bike paths) are preserved through construction and operation; ▪ Post signage alerting potential customers that businesses are still operating during construction works; ▪ Compensate business owners for (unanticipated) temporary loss of access during construction. ▪ Implement temporary security fencing along the site perimeter and night-time security lighting that is sensitive to adjacent residential and institutional land uses; and, ▪ Convey land of 5 m width to the City of Toronto along the northwestern boundary of the MSF site fronting the property line with Monsignor Fraser School between Norfinch Drive and the Hydro Corridor to accommodate a future multi use pathway connection. • Metrolinx will continue to consult with the community regarding potential future intensification opportunities in the areas near the Finch West MSF Site throughout the design and construction phases of the project.	• N/A
	Archaeological Resources	• Should previously unknown or unassessed deeply buried archaeological resources be uncovered during development, they may be a new archaeological site and therefore subject to Section 48 (1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources will cease alteration of the site immediately and engage a licensed archaeologist to carry out archaeological field work, in compliance with Sec. 48 (1) of the *Ontario Heritage Act*.	• N/A
	Noise (Construction)	• Implement a Construction Noise Management Plan to address the construction noise from this project.	• Develop a Noise and Vibration Monitoring Plan during detailed design.
	Noise (Operations)	• Submit an Environmental Compliance Approval (Noise) (ECA) application to the MOECC demonstrating that the built facility meets MOECC NPC-300 requirements. • Implement an Operational Noise Management Plan to address noise control for the operation of the facility.	• Develop a Noise and Vibration Monitoring Plan during detailed design.
	Vibration (Construction)	• Review the zone of influence for construction equipment as part of the building permit application and revise, if necessary, during detailed design. • Implement a Construction Vibration Management Plan to address the vibration impacts due to construction.	• Develop a Noise and Vibration Monitoring Plan during detailed design.
	Vibration (Operations)	• Implement an Operational Vibration Management Plan to address the vibration impacts due to operation.	• Develop a Noise and Vibration Monitoring Plan during detailed design.

Table 6-1: Summary of Future Commitments and Monitoring Requirements

Discipline		Environmental Project Report Commitments	
		Mitigation Measure (or related action)	***Monitoring Activity Requirements***
	Air Quality (Construction)	• Implement a Dust Management Plan to reduce dust from construction. • Implement mitigation measures to limit emissions from diesel/gas powered construction equipment during construction, including: ▪ Use electric-powered equipment where possible, or diesel powered construction equipment with stringent emissions standards ▪ Minimize idling time for all diesel/gas powered construction equipment ▪ Ensure construction equipment is well maintained.	• During construction, monitor fence line air concentrations of dust (particulate) and other compounds identified as being released during construction in accordance with the Dust Management Plan.
	Air Quality (Operations)	• Control particulate matter generated from the compressed air cleaning and sand dispensing system with a ventilation/dust collection system. • Conduct painting inside the paint spray booth equipped with an exhaust system and overspray filters to control particulate matter emissions. • Perform maintenance welding with mobile fume extraction units equipped with high efficiency filtration and exhaust inside the building. • Prepare an application for Environmental Compliance Approval (Air) (ECA) for the MSF during detailed design. • Implement appropriate operational mitigation measures to reduce the contaminant ambient air concentration levels below MOECC Standards and/or Guidelines.	• N/A
	Traffic and Transportation	• 25% traffic diversion to parallel arterial and collector roads will relieve traffic congestion on Finch Avenue West during construction.	• N/A
		• Prepare a Traffic Management Plan during detailed design to consider the impacts of LRV operation in the corridor during the peak hours. • Refine the signal timing and LRV operating plan to minimize the impacts of both modes of transportation on the street networks.	• Monitor LRV and traffic volumes following the opening of the facility.
		• Incorporate signing, striping, and active devices (if appropriate) as additional safety measures for cyclists and pedestrians.	
		• Metrolinx and the TTC will re-assess bus service and routing requirements in the vicinity of the site, including replacing the Finch 36+ route with the LRT service.	
Utilities		• Determine the exact locations and depths of utilities during detailed design and establish a staging and relocations approach in consultation with affected utility companies. ▪ Temporarily relocate utilities affected by construction along municipal road right of way(s). ▪ Implement mitigation measures for any potentially affected utilities, as required.	N/A
Stakeholder Engagement	**Public/Stakeholder Consultation**	• Continue to engage and communicate with stakeholders beyond EPR approval: ▪ Design and implement a response strategy to address/resolve potential construction complaints; ▪ Maintain the project website throughout the detailed design and construction phases where the public can access updated information on the project; ▪ Implement a project office during the construction phase where public can inquire information on the project; ▪ Consult with the Monsignor Fraser College to discuss the potential relocation of portables near the northwest corner of the MSF boundary, if required; ▪ Continue discussions/consultation with local stakeholders with respect to potential changes to traffic flow during the detailed design and construction phase, as appropriate; ▪ Continue to consult with the community regarding potential future intensification opportunities in the areas near the Finch West MSF Site throughout the design and construction phases of the project;	N/A

Table 6-1: Summary of Future Commitments and Monitoring Requirements

Discipline		Environmental Project Report Commitments	
		Mitigation Measure (or related action)	***Monitoring Activity Requirements***
		▪ Consult with the Community Action Planning Group (CAPG) regarding how seven Community Principles may be included in the subsequent Request for Proposals (RFP) for the design and construction of the MSF.	
	City of Toronto	• Undertake a Site Plan Application process, as required; • Review options to maximize the aesthetics of project components during detailed design in accordance with Metrolinx Design Excellence guidelines; • Develop traffic, parking, cycling and pedestrian management strategies to be included in construction contract documents in co-ordination with the City of Toronto, as appropriate, to avoid/minimize interference to the extent possible; and, • Consult with the City of Toronto during the development of the construction plans prior to commencement of construction activities.	N/A

7. References

Alston Associates Inc. (Alston Associates), 2011:
Preliminary Geotechnical Assessment: Elderbrook Development Site. Toronto, Ontario.

CCME, 2007:
Canadian Council of Ministers of the Environment. Canada-Wide Standards for Particulate Matter and Ozone. Last Accessed June 2013. http://www.ccme.ca/assets/pdf/1391_gdad_e.pdf

City of Toronto, 2003:
By-Law 111-2003 with amendments, City of Toronto Municipal Code – Noise – Chapter 591

City of Toronto, 2008:
By-Law 514-2008, City of Toronto Municipal Code Chapter 363

Coffey Geotechnics Inc. (Coffey), 2011:
Report on Preliminary Geotechnical Investigation – Road Widening, Finch Avenue West LRT. Toronto, Ontario.

Decommissioning Consulting Services Limited (DCS), 2009:
Report to Toronto Transit Commission: Geotechnical Investigation TTC Contract No. TC002 Finch Avenue West LRT. Toronto, Ontario.

Environment Canada:
"National Air Pollution Surveillance (NAPS) Network. Annual Data Summary for 2007", Last Accessed June 2014

Environment Canada:
"National Air Pollution Surveillance (NAPS) Network. Annual Data Summary for 2008", Last Accessed June 2014

Environment Canada:
"National Air Pollution Surveillance (NAPS) Network. Annual Data Summary for 2009", Last Accessed June 2014

Environment Canada:
"National Air Pollution Surveillance (NAPS) Network. Annual Data Summary for 2010", Last Accessed June 2014

Environment Canada:
"National Air Pollution Surveillance (NAPS) Network. Annual Data Summary for 2011", Last Accessed June 2014

Eyles, N., 1997:
Chapter 2. Environmental Geology of a Supercity: The Greater Toronto Area. In Eyles, N. (Ed), Environmental Geology of Urban Areas, Geological Association of Canada, Geotext #3, 7-80.

Eyles, N., 2002:
Ontario rocks: three billion years of environmental change. Fitzhenry and Whiteside, Markham, Ontario.

Karrow, P.F., 1967:
Pleistocene geology of the Scarborough area. Ontario Geological Survey, Report 46, Ontario Department of Mines.

Karrow, P.F., 1983:
Quaternary Geology of the Hamilton Area, Southern Ontario: Geological Survey Map P.2605. Geological Series – Preliminary Map, Scale 1:50,000.

Lall, R., M. Kendall, K. Ito and G. Thurston, 2004:
Estimation of historical annual $PM_{2.5}$ exposures for health effects assessment. *Atmospheric Environment 38 (*2004) 5217-5226

National Pollutant Release Inventory (NPRI):
Downloadable Datasets, Environment Canada, Last accessed: June, 2014 <http://www.ec.gc.ca/inrp-npri/default.asp?lang=En&n=0EC58C98-1>

Ontario Geological Survey (OGS), 2000:
Quaternary geology, seamless coverage of the Province of Ontario; Ontario geological Survey, Data Set 14-Revised.

Ontario Geological Survey (OGS), 2003:
Surficial Geology of Southern Ontario.

Ontario Ministry of Environment and Energy (MOEE), 1995:
Hydrogeological Technical Information Requirements for Land Development Applications

Ontario Ministry of Natural Resources (OMNR), 1983:
Map P.2605. Quaternary Geology Hamilton Area, Southern Ontario. Scale 1:50,000.

Ontario Ministry of the Environment and Energy, 1995:
"Guideline D-6 Compatibility between industrial facilities and sensitive land uses" Environmental Planning and Analysis Branch MOE Document: 3272e

Ontario Ministry of the Environment, 1977:
Environmental Noise Guideline Publication NPC-115 – Construction Equipment

Ontario Ministry of the Environment, 1977:
Environmental Noise Guideline Publication NPC-118 – Motorized Conveyances

Ontario Ministry of the Environment, 1993:
Draft Protocol for Noise and Vibration Assessment for the Proposed Scarborough Rapid Transit Extension

Ontario Ministry of the Environment, 2003:
Stormwater Management (SWM) Planning and Design Manual. MOE Document: 4329e

Ontario Ministry of the Environment, 2008:
Air Quality in Ontario, 2007 Report, Monitoring & Reporting Section, Environmental Monitoring and Reporting Branch MOE Document: 6930e

Ontario Ministry of the Environment, 2009:
Air Dispersion Modelling Guideline for Ontario, Version 2, MOE Document: 5165e02

Ontario Ministry of the Environment, 2009:
Air Quality in Ontario, 2008 Report, Monitoring & Reporting Section, Environmental Monitoring and Reporting Branch MOE Document: 7356e

Ontario Ministry of the Environment, 2010:
Air Quality in Ontario, 2009 Report, Monitoring & Reporting Section, Environmental Monitoring and Reporting Branch MOE Document: 8035e

Ontario Ministry of the Environment, 2011:
Air Quality in Ontario, 2010 Report, Monitoring & Reporting Section, Environmental Monitoring and Reporting Branch MOE Document: 8640e

Ontario Ministry of the Environment, 2012:
Air Quality in Ontario, 2011 Report, Monitoring & Reporting Section, Environmental Monitoring and Reporting Branch MOE Document: 9196e

Ontario Ministry of the Environment, 2012:
Ontario's Ambient Air Quality Criteria, Standards and Development Branch MOE Ontario Document 6570e

Ontario Ministry of the Environment, 2012:
Summary of Standards and Guidelines to Support Ontario Regulation 419: Air Pollution – Local Air Quality MOE Document: PIBS # 6569e01.

Ontario Ministry of the Environment, 2013:
Environmental Noise Guideline Publication NPC-300

Sharpe, D.R., 1980:
Quaternary Geology of Toronto and Surrounding Area; Ontario Geological Survey Preliminary Map P. 2204, Geological Series. Scale 1:100,000. Compiled 1980.

Sharpe, D.R., H.A.J. Russell and C. Logan. 2002a:
Structural Model of the Oak Ridges Moraine and Greater Toronto Areas, Southern Ontario: Newmarket Till. Geological Survey of Canada, Open File 4241, scale 1:250,000.

Sharpe, D.R., H.A.J. Russell and C. Logan. 2002b:
Structural Model of the Oak Ridges Moraine and Greater Toronto Areas, Southern Ontario : Lower Sediment. Geological Survey of Canada, Open File 4242, scale 1 :250,000.

Sharpe, D.R., L.D. Dyke, M.J. Hinton, S.E. Pullan, H.A.J. Russell, T.A. Brennand, P.J. Barnett and A. Pugin, 1996:
Groundwater prospects in the Oak Ridges Moraine area, Southern Ontario: application of regional geological models. In Current Research 1996. Geological Survey of Canada, pp. 181-190.

SNC-LAVALIN Environment (SNC), 2011:
Phase I Environmental Site Assessment: Elderbrook Development Site Finch Avenue West. Toronto, Ontario.

SNC-LAVALIN Environment (SNC), 2011:
Phase II Environmental Site Assessment: Elderbrook Development Site Finch Avenue West. Toronto, Ontario.

The Nordic Committee of Senior Officials for Environmental Affairs, 1996:
Railway traffic Noise – The Nordic Prediction Method

Toronto Transit Commission (TTC) /City of Toronto, 2010:
Etobicoke-Finch West Light Rail Transit - Transit Project Assessment Environmental Project Report.

TRCA, 2008:
Humber River Watershed: Scenario Modelling and Analysis Report.

United States Department of Transportation, 2006:
Federal Transit Administration – Transit Noise and Vibration Impact Assessment