New Track and Facilities Transit Project Assessment Process

Final Environmental Project Report – Chapter 7

05-Mar-2021

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Authorization

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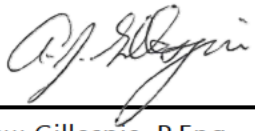
X 

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REVISION HISTORY

Revision	Date	Purpose of Submittal	Comments
00	29-Dec-2020	Final submission to Metrolinx.	N/A
01	21-Jan-2021	Final submission to Metrolinx for Minister's Review.	N/A
02	05-Mar-2021	Final submission to Metrolinx for Statement of Completion.	N/A

This submission was completed and reviewed in accordance with the Quality Assurance Process for this project.

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7 Construction Phase Impacts

The following chapter summarizes the anticipated construction phase impacts and proposed mitigation measures associated with the Project. Construction activities (and associated impacts) are generally temporary, short-term and localized in nature. It should be noted that the assessment of potential construction impacts was based on reasonable assumptions made at the conceptual design phase regarding the types of typical construction activities and equipment that may be utilized; however, construction techniques and methods will be confirmed at the detailed design stage. With this in mind, Metrolinx or its Contractor will review the mitigation and monitoring measures outlined in this EPR to confirm they fully address the range of construction activities anticipated and revise/augment these as appropriate prior to commencing construction.

7.1 Construction Management Plans

Construction Management Plans will be developed and implemented during the detailed design phase and implemented as part of construction, taking into consideration applicable legislation as appropriate. Construction Management Plan(s) will be made available to local municipalities and conservation authorities prior to implementation.

7.2 Construction Staging Areas

The locations of construction staging areas will be identified during detailed design. As these areas were unknown at the time of preparing this EPR, any potential environmental impacts and mitigation associated with construction staging areas have not been assessed. Therefore, any additional mitigation or monitoring measures that will be necessary to avoid or offset potential impacts related to the physical footprint and/or construction activities to be carried out at construction staging areas will need to be reviewed at the detailed design stage and subsequently implemented. Any associated EPR Addendum requirements will also be identified.

Construction staging areas will be assessed within the Construction Management Plan(s) and will be made available to local municipalities and conservation authorities prior to implementation.

7.3 Traffic Control and Management Plans

Metrolinx (or their Contractor) will coordinate with Municipalities and road authorities during detailed design to develop traffic, parking, transit, cycling and pedestrian management strategies prior to commencement of construction to avoid or minimize traffic interference to the extent possible during construction. The following will guide the development of Traffic Management Plans:

- Traffic Control and Management Plan will take into account any trees or vegetation that require proactive pruning/injury/removal/clearing due to the high volume of large vehicles that might require more clearance.
- Traffic Control and Management Plan(s) will be developed prior to construction to maintain reasonable access through work zones, to the extent possible.
- Access to nearby land uses will be maintained to the extent possible. Potentially affected residents, tenants and business owners will be notified of initial construction schedules, as well as modifications to these schedules as they occur.

- Potential effects to pedestrian and cyclist activities during construction will be mitigated through the installation of appropriate wayfinding, regulatory, and warning signs.

Furthermore, the following monitoring activities will be carried out during the construction phase:

- Traffic impacts to be monitored in accordance with the Traffic Control and Management Plan and adjusted as necessary during the construction period.
- Cycling network impacts to be monitored in accordance with the Construction Traffic Control and Management Plan and adjusted as necessary during the construction period.

7.4 Installation of Track Infrastructure and New Switches

New tracks and switches require excavation, backfilling and compaction prior to installation. Excavation is required to accommodate service utilities and to ensure that appropriate bearing material and drainage provisions are installed to minimize settlement and facilitate proper drainage runoff. Following excavation, appropriate backfill material such as graded Granular A and Granular B material will be compacted in specific lift sizes and at specific depths to form the sub-ballast and sub-grade layers before ballast stone is placed. The ballast stone rests beneath the track switches and rails.

Tracks and switches are comprised of concrete or timber ties and rails, fastened by rail anchors. The rail anchors prevent the track from crawling (moving) and are supported by a steel rail brace.

Track installation will proceed in accordance with GO Transit Track Standards RC-0506- 02TRK and its associated Standard Plans. The purpose of the GO Transit Track Standards is to ensure that Metrolinx and GO Transit owned and operated track is constructed and maintained utilising safe, cost effective and efficient methods to meet project delivery timelines, and meet on-time operational performance goals. Furthermore, a consistent approach in the application of GO Transit owned track standards reduces disputes during the design and construction phases of a project, enhances the long-term safety/reliability, and extends the useful service life of the track infrastructure.

It is anticipated that the following equipment will be required for installation of track infrastructure and new switches:

- Backhoe, front end loader;
- Hi-rail excavator (345CAT or equivalent);
- Hi-rail crane (10T or equivalent);
- Ballast cars (on track);
- Flatbed;
- Hi-rail boom truck;
- Speed swing loader;
- Production/switch tamper (Mark IV or equivalent);
- Dynamic ballast stabilizer;
- Ballast regulator; and
- Hi-rail pickup trucks.

7.4.1 Natural Environment

A Natural Environment Assessment Report was undertaken for the New Track & Facilities TPAP. Mitigation measures and/or monitoring to address construction phase impacts for both terrestrial and

aquatic features/habitat are summarized included in Table 5-101. Refer to **Appendix B2** for further detail.

7.4.1.1 Potential Effects & Mitigation Measures - General

Minimal potential impacts to the natural environment are anticipated during construction as the majority of new tracks and switches are proposed within the existing rail corridor ROW. Notwithstanding this, the mitigation and monitoring measures as outlined below will be implemented and adhered to.

- On-site inspection will be undertaken to confirm the implementation of the mitigation measures and identify corrective actions, if required. Corrective actions may include additional site maintenance and alteration of activities to minimize impacts. Additional monitoring measures will be developed with the MECP, if required.

7.4.1.2 Integrated Vegetation Management (IVM)

Prior to commencement of construction, an Integrated Vegetation Management (IVM) Plan will be developed that adheres to the Metrolinx Vegetation Guideline (2020) and will be approved by Metrolinx. The Guideline's selection criteria will be used to assess whether the vegetation present is compatible or incompatible, and manage it in a way which meets safety needs in a timely manner, is sensitive to environmental conditions, and maximizes cost-effectiveness.

The presence, density, and location of compatible and incompatible species will be monitored as per the frequency and methodology established in the Bi-Annual Monitoring Program within the Metrolinx Vegetation Guideline (2020). The Bi-Annual Monitoring Program will be made up of pre-treatment and post-treatment monitoring events that will be carried out via field, aerial, and high-rail vehicle or train surveys conducted by qualified specialists.

7.4.1.3 Vegetation Removals & Compensation Plan

The following measures will be implemented and adhered to during construction activities associated with track and switch infrastructure that involve vegetation removals:

- If a tree requires removal or injury, compensation and permitting/approvals (as required) will be undertaken in accordance with the Metrolinx's Vegetation Guideline (2020);
- Pruning of branches will be conducted through the implementation of proper arboricultural techniques (i.e., under the supervision of a Certified Arborist);
- Tree Protection Zone (TPZ) fencing will be established to protect and prevent tree injuries in accordance with local by-law requirements and guidelines;
- Prior to the undertaking of tree removals, a Tree Removal Strategy, building upon the considerations and elements set out in the Metrolinx Vegetation Guideline (2020), will be developed and implemented in adherence with best practices, standards and regulations on safety, environmental and wildlife protections;
- Compensation for tree/vegetation removals will be undertaken in accordance with the Integrated Vegetation Management (IVM) Program as documented in the Metrolinx Vegetation Guideline (2020);
- Vegetation removals will consider and mitigate potential impacts to sensitive species (e.g., migratory birds and Species at Risk [SAR]), and features (e.g., Designated Natural Areas and Significant Wildlife Habitat);

- On-site inspection will be undertaken to confirm the implementation of mitigation measures and identify corrective actions if required. Corrective actions may include additional site maintenance and alteration of activities to minimize impacts;
- The success of vegetation compensation activities will be monitored in accordance with the Metrolinx's Vegetation Guideline (2020). The approach to compensation monitoring will be determined by property ownership, applicable governing bylaws/regulations and location with respect to ecological functioning;
- Monitoring requirements will be undertaken in accordance with the conditions of permits and approvals;
- Monitoring and management of trees/vegetation within the rail corridor ROW will be undertaken in accordance with the IVM Program (see Section 7.4.1.2 above);
- Ensure precautions are being taken to minimize the spread of invasive species by cleaning equipment prior to moving sites in accordance with the Clean Equipment Protocol for Industry; and
- Site specific Edge Management mitigation measures will be identified and implemented at Detailed Design, as required.

7.4.1.4 Tree Removals

The following measures will be implemented and adhered to during construction activities associated with track and switch infrastructure that involve tree removals:

- Implement all measures identified in Section 7.4.1.3 above, as applicable;
- Removal of ash trees, or portions of ash trees, will be carried out in compliance with the Canada Food and Inspection Agency Directive *D-03-08: Phytosanitary Requirements to Prevent the Introduction into and Spread within Canada of the Emerald Ash Borer, Agrilus planipennis (Fairmaire)* (2014), as amended from time to time. To comply with this Directive, all Ash trees requiring removal, including any wood, bark or chips, will be restricted from being transported outside of the emerald ash borer regulated areas of Canada;
- On-site inspection will be undertaken to confirm the implementation of the mitigation measures and identify corrective actions if required. Corrective actions may include additional site maintenance and alteration of activities to minimize impacts; and
- Ensure precautions are being taken to minimize the spread of invasive species by cleaning equipment prior to moving sites in accordance with the Clean Equipment Protocol for Industry.

7.4.1.5 Wildlife

The following protocols and mitigation measures will be adhered to as part of the construction phase in order to avoid or mitigate potential adverse effects on wildlife and/or wildlife habitat.

- Prior to construction, investigation of the project area for wildlife and wildlife habitat that may have established following the completion of previous surveys will be undertaken, as appropriate;
- If wildlife is encountered, measures will be implemented to avoid destruction, injury, or interference with the species, and/or its habitat. For example, construction activities will cease or be reduced, and wildlife will be encouraged to move offsite and away from the construction area on its own. A qualified Biologist will be contacted and engaged to define the appropriate buffer required from wildlife;
- All construction equipment and vehicles will yield the right-of-way to wildlife, if it is safe to do so;

- Advise workers to perform visual survey of machinery and work area prior to commencing work since wildlife may be found basking or hiding on or under equipment, rocks, debris piles, etc.;
- Do not allow construction debris to accumulate on-site and on the soils surface, but regularly clean up the site to reduce the possibility of wildlife using debris piles for shelter;
- Clean up all litter daily and provide waste disposal containers so wildlife does not ingest indigestible materials or become entangled in debris;
- Any wildlife incidentally encountered during construction will be protected and will not be knowingly harmed; and
- Advise workers to perform a visual survey of machinery and work area prior to commencing work since wildlife may be found hiding in or under equipment, rocks, debris piles, etc. and any individuals found shall be left to move on their own or moved properly out of harm's way in the direction they were heading.

7.4.1.6 Species at Risk

Species at risk (SAR) studies/inventories will be undertaken during detailed design to confirm the presence of SAR and/or SAR habitat within the project area/construction site(s). Species-specific monitoring activities will be developed and implemented in accordance with any registration and/or permitting requirements under the *Endangered Species Act* (ESA).

The following protocols and mitigation measures will be adhered to as part of the construction phase in order to avoid or mitigate potential adverse effects on SAR and/or SAR habitat:

- All requirements of the *Endangered Species Act* (ESA) and *Species at Risk Act* (SARA) will be met. Species-specific mitigation measures will be implemented based on any recommended surveys undertaken prior to construction, and consultation with MECP/MNRF;
- If SAR is present and conservation strategies have been developed by MNRF/MECP, the Constructor will follow the commitments in the recovery strategy;
- On-site construction personnel will be provided with information (e.g., factsheets) that address the existence of potential SAR on site, the identification of the SAR species and the procedure(s) to follow if an individual is encountered or injured;
- Prior to commencing work, each work site shall be inspected for individual SAR and any individuals found shall be left to move on their own or moved properly out of harm's way in the direction they were heading; and
- Report and document all Species at Risk sightings.

7.4.2 Hydrogeological

A Hydrogeological Impact Assessment Report was undertaken for the New Track & Facilities TPAP. Mitigation measures and/or monitoring activities recommended to address construction phase impacts are summarized included Table 5-102**.** Additional details can be found in **Appendix C2.**

7.4.2.1 Potential Effects & Mitigation Measures

Proposed infrastructure for new track and switches will require shallow intrusive work that is anticipated to be less than 1 m in depth. Due to the limited depth, there are no expected adverse hydrogeological impacts associated with these excavations, and no groundwater mitigation measures are required (such as dewatering or water management) to complete the work.

Notwithstanding this, based on the detailed design developed and associated construction techniques employed, the following mitigation measures will be adhered to during construction activities:

- Develop a Groundwater Management and Dewatering Plan to guide the handling, management, and disposal of groundwater encountered during the works. The Groundwater Management and Dewatering Plan will be overseen by a QP and will comply with *Ontario Regulations 406/19* (On-Site and Excess Soil Management – to be enacted into law on July 1, 2020), 64/16 and 387/04, as amended under the *Ontario Water Resources Act*;
- The Groundwater Management and Dewatering Plan will describe the handling, transfer, testing, monitoring, disposal of groundwater generated as part of the works and in accordance with applicable regulatory requirements and the Project Agreement. The Groundwater Management and Dewatering Plan will outline general groundwater monitoring considerations during the works and provide guidance for groundwater monitoring following the works where considered applicable;
- The Groundwater Management and Dewatering Plan will describe the anticipated groundwater quantity and dewatering Zone of Influence that will be encountered during the works, and if approvals are needed for the water taking, such as a Permit to Take Water (PTTW) or an Environmental Activity Sector Registry (EASR) from the MECP;
- The Groundwater Management and Dewatering Plan will describe the storage, transfer, and disposal and or treatment of the groundwater collected during the works, and approvals for the water disposal, and/or treatment if applicable, based on the quantity and quality;
- The Groundwater Management and Dewatering Plan will be reviewed and approved by Metrolinx prior to construction. The Plan should also be reviewed by the appropriate regulatory agencies prior to finalization;
- If imported materials are used to restore onsite excavations or for site grading purposes, analytical testing of the imported material should be considered to ensure that any material brought to the site is suitable for use and meets the applicable regulations and standards. Attention should be paid to the hydraulic conductivity of the imported material to ensure it does not create undo drainage or causes reduced groundwater flow and, hence, ponding;
- During any site grading work, suitable sedimentation controls should be in place to help control and reduce the turbidity of run-off water which may flow towards any local surface water features; and
- The potential exists for groundwater contamination through accidental leaks or spills from construction equipment. However, the low permeability surficial soils found at most of the sites will limit migration of any potential contaminates into the underlying aquifers. Regardless, a Best Management Practice (BMP) and spill contingency plan, including a spill action response plan, should be in place for fuel handling, storage and onsite equipment maintenance activities. This and proper training will minimize the risk of contaminant releases as a result of the proposed construction activities. In addition, contractors working at the Site should ensure that construction equipment is in good working order.

7.4.3 Land Use & Socio-Economic

A Land Use & Socio-Economic Impact Assessment Report was undertaken for the New Track & Facilities TPAP. Mitigation measures and/or monitoring activities recommended to address construction phase impacts are summarized included Table 5-103**.** Additional details can be found in **Appendix D2.**

7.4.3.1 Potential Effects & Mitigation Measures

Potential socio-economic effects associated with construction are anticipated to be short term in duration, relating largely to noise, air quality, temporary traffic effects, construction staging areas and visual disturbances. Metrolinx will ensure that local businesses and property owners are aware of construction

scheduling and staging options will be developed to minimize potential effects on local access and travel patterns as much as possible. These effects are anticipated to cease once construction has finished.

To address nuisance effects (temporary effects that are inherent to construction and difficult to mitigate, such as noise, etc.), the following mitigation measures and protocols will be implemented as appropriate during construction activities:

- Proper fencing should be erected around all work areas prior to commencement of any earth moving, clearing or construction activities in order to prevent encroachment on adjacent properties. Fencing should remain for the duration of the work and be periodically inspected to ensure it is in good repair;
- An Erosion and Sediment Control Plan will be developed in accordance with the Erosion and Sediment Control Guide for Urban Construction (2019), as amended from time to time, that addresses sediment release to adjacent properties and roadways;
- Erosion and sediment control monitoring to be conducted per the Project Agreement;
- Develop and implement a Communications Protocol in accordance with the Project Agreement, which will indicate how and when surrounding property owners and tenants will be informed of anticipated upcoming construction works, including work at night, if any; and
- Develop and implement a Complaints Protocol in accordance with the Project Agreement.

There is also potential for temporary construction phase impacts resulting from short-term access restrictions in the vicinity of construction sites. Therefore, the following mitigation measures will be adhered to by Metrolinx and their Contractors:

- Provide well connected, clearly delineated, and appropriately signed walkways and cycling route options, with clearly marked detours where required;
- Provide temporary lighting, wayfinding signs and cues for navigation around the construction site;
- Develop and implement a plan to reduce the effects of light pollution in accordance with the Project Agreement;
- Access to businesses during working hours will be maintained, where feasible. Where regular access cannot be maintained, alternative access and signage will be provided;
- Temporary access paths, walkways, cycling routes and fencing will be monitored; and
- Document the number of complaints received, and resolution of complaints received.

7.4.4 Property

7.4.4.1 Potential Effects & Mitigation Measures

Specific property requirements associated with the installation of track infrastructure and new switches will need to be confirmed future project phases. Where access to property is required, ongoing consultation with affected landowners will help identify appropriate site-specific mitigation measures. The following measures related to property impacts will be implemented prior to construction:

- Select staging/laydown areas in accordance with Metrolinx procedures; and
- Staging/laydown areas should be located in areas that minimize adverse effects to sensitive receptors.

7.4.5 Visual/Aesthetics

A Visual/Aesthetics Impact Assessment Report was undertaken for the New Track & Facilities TPAP. Mitigation measures and/or monitoring activities recommended to address construction phase impacts are summarized included in Table 5-104. Additional details can be found in **Appendix E2.**

7.4.5.1 Potential Effects & Mitigation Measures

The use of heavy construction equipment may be visually disruptive, especially to residences situated close to the rail corridor ROW. If construction is to take place at night, construction lighting will be required. This lighting could impact adjacent homes and recreational areas. The following mitigation will be implemented:

- Construction schedule delays will be avoided to the extent possible in order to minimize the duration of construction and corresponding visual impacts;
- A screened enclosure for the development site will be provided, with particular attention to the waste disposal and material storage areas;
- Consideration will be given to providing temporary landscaping along the borders of the construction site between site fencing/enclosure and walkways, where space allows, and where necessary;
- Municipal by-laws and Ministry of Transportation (MTO) practices for lighting in areas near or adjacent to highways and roadways will incorporate industry best practices provided in ANSI/IES RP-8-18, to the extent feasible;
- The Constructor will perform the Works in such a way that any adverse effects of construction lighting are controlled or mitigated in such a way as to avoid unnecessary and obtrusive light with respect to adjoining residents, communities and/or businesses; and
- Construction activities will be monitored by a qualified Environmental Inspector to confirm that all activities are conducted in accordance with mitigation plans and within specified work zones.

7.4.6 Cultural Heritage

Cultural Heritage studies were undertaken as part of the New Track & Facilities TPAP. Mitigation measures and/or monitoring activities recommended to address construction phase impacts are summarized included in Table 5-105**.** Additional details can be found in **Appendix F2.**

7.4.6.1 Potential Effects & Mitigation Measures – General

The following general measures and processes will be adhered to prior to commencing construction:

- If there is a change in project design post TPAP that causes any additional heritage properties to be impacted above and beyond those described in this EPR, additional impact assessment work and heritage studies will be undertaken in accordance with applicable federal/provincial legislation prior to commencement of construction activities;
- Selection of construction staging and laydown areas will follow Metrolinx's selection procedures which include avoiding heritage attributes wherever possible or effectively mitigating impacts where not possible;
- For any anticipated indirect impacts to the heritage attribute(s) of a property of known or potential Cultural Heritage Interest or Value (CHVI) due to installation of new/modified infrastructure, refer to Chapter 9 for studies to be completed prior to construction;
- For any anticipated direct impacts to the heritage attribute(s) of a Provincial Heritage Property (PHP) or Provincial Heritage Properties of Provincial Significance (PHPPS) due to installation of

new/modified infrastructure, refer to Chapter 9 for studies to be completed prior to construction; and

- To ensure Built Heritage Resources (BHRs) and Cultural Heritage Landscapes (CHLs) are not adversely impacted during construction, baseline vibration monitoring should be undertaken in advance of construction. Should this advance monitoring assessment conclude possible vibration impacts:
  - Preferred Option: Plan construction activities to avoid adverse vibration impacts to BHRs and CHLs; and
  - Alternative Option: Should it not be feasible to avoid adverse vibration impacts, a qualified engineer should undertake a condition assessment of the structures within the vibration Zone of Influence. Further, Metrolinx must make a commitment to repair any damages caused by vibrations.

The following general measures and processes will be adhered to during construction:

- All work shall be performed in accordance with Applicable Law, including but not limited to the *Ontario Heritage Act* and the MHSTCI, formerly Ministry of Tourism Culture and Sport (MTCS) guidance on *Cultural Heritage Report: Existing Conditions and Preliminary Impact Assessment* (MHSTCI 2019);
- Follow the process and recommendations outlined in the MHSTCI 2019 guidance on Cultural Heritage Report: Existing Conditions and Preliminary Impact Assessment (MHSTCI 2019) and Environmental Project Reports (EPR) under Transit Project Assessment Process (TPAP) for Proponents and their Consultants;
- Follow the recommendations outlined in the heritage reporting contained in **Appendix F1, Appendix F2** and **Appendix F3** of this EPR;
- Implement and comply with monitoring requirements and commitments pertaining to Bult Heritage Resources/Cultural Heritage Landscapes/properties as per previously completed Metrolinx and/or GO Transit EPRs and/or ESRs and Addenda and the recommendations contained in any/all of the following associated documents: CHRs, CHERs, HIAs and SCPs; and
- The area should be monitored for vibration impacts during construction, and immediately cease work if acceptable vibration thresholds are exceeded until the above has been undertaken.

7.4.6.2 Potential Effects & Mitigation Measures – Project Specific

The installation of track infrastructure and new switches has the potential to indirectly impact twenty-four (24) BHRs on the Barrie corridor, and eight (8) BHRs and CHLs on the Richmond Hill corridor. Table 7-1 summarizes the potential impacts and mitigation measures to be implemented.

TABLE 7-1 POTENTIAL CULTURAL HERITAGE IMPACTS FROM INSTALLATION OF TRACK INFRASTRUCTURE

Reference Number (and Location)	Type and Description of Potential/ Anticipated Impact	Mitigation Measures
Barrie Corridor		
#BR-01 (121 Wellington Street East, Aurora, Aurora) *Segments BR-2 and BR-3*	Indirect impacts to the heritage attributes of this BHR are anticipated due to the construction of a new track. In particular, the construction activities associated with the new track may result in limited and temporary adverse vibration impacts to this historic train station, which sits approximately 8 m from the proposed new track.	To ensure this property is not adversely impacted during construction, baseline vibration monitoring should be undertaken in advance of construction. Should this advance monitoring assessment conclude that the structure on this property will be subject to vibration impacts: • Preferred Option: Plan construction activities to avoid adverse vibration impacts to the structure on this property. • Alternative Option: Should it not be feasible to avoid adverse vibration impacts to the structure on this property, a qualified engineer should undertake a condition assessment of the structures within the vibration zone of influence. Further, Metrolinx must make a commitment to repair any damages caused by vibrations. The area should be monitored for vibration impacts during construction, and immediately cease work if acceptable vibration thresholds are exceeded until the above has been undertaken. Where mitigation measures are required to be implemented, the Town of Aurora and the MHSTCI should review and approve the proposed strategy for reducing anticipated indirect impacts to this PHPPS.
#BR-02 (124 Wellington Street East, Aurora) *Segment BR-3*	Indirect impacts to the heritage attributes of this BHR are possible due to the construction of a new track. In particular, the construction activities associated with the new track may result in limited and temporary adverse vibration impacts to this BHR. The structure on this property is located approximately 20 m from the new track.	To ensure this property is not adversely impacted during construction, baseline vibration monitoring should be undertaken in advance of construction. Should this advance monitoring assessment conclude that the structure on this property will be subject to vibration impacts: • Preferred Option: Plan construction activities to avoid adverse vibration impacts to the structure on this property. • Alternative Option: Should it not be feasible to avoid adverse vibration impacts to the structure on this property, a qualified engineer should undertake a condition assessment of the structures within the vibration zone of influence. Further, Metrolinx must make a commitment to repair any damages caused by vibrations. The area should be monitored for vibration impacts during construction, and immediately cease work if acceptable vibration thresholds are exceeded until the above has been undertaken.
#BR-03 (136 Wellington Street East, Aurora) *Segment BR-3*	Indirect impacts to the heritage attributes of this BHR are possible due to the construction of a new track. In particular, the construction activities associated with the new track may result in limited and temporary adverse vibration impacts to the building on this property, which sits approximately 10 m from the proposed new track.	To ensure this property is not adversely impacted during construction, baseline vibration monitoring should be undertaken in advance of construction. Should this advance monitoring assessment conclude that the structure on this property will be subject to vibration impacts: • Preferred Option: Plan construction activities to avoid adverse vibration impacts to the structure on this property. • Alternative Option: Should it not be feasible to avoid adverse vibration impacts to the structure on this property, a qualified engineer should undertake a condition assessment of the structures within the vibration zone of influence. Further, Metrolinx must make a commitment to repair any damages caused by vibrations.

Reference Number (and Location)	Type and Description of Potential/ Anticipated Impact	Mitigation Measures
		The area should be monitored for vibration impacts during construction, and immediately cease work if acceptable vibration thresholds are exceeded until the above has been undertaken.
#BR-04 (136 Centre Street, Aurora) *Segment BR-3*	Indirect impacts to the heritage attributes of this BHR are possible due to the construction of a new track. In particular, the construction activities associated with the new track may result in limited and temporary adverse vibration impacts to this BHR. The structure on this property is located approximately 30 m from the new track.	To ensure this property is not adversely impacted during construction, baseline vibration monitoring should be undertaken in advance of construction. Should this advance monitoring assessment conclude that the structure on this property will be subject to vibration impacts: • Preferred Option: Plan construction activities to avoid adverse vibration impacts to the structure on this property. • Alternative Option: Should it not be feasible to avoid adverse vibration impacts to the structure on this property, a qualified engineer should undertake a condition assessment of the structures within the vibration zone of influence. Further, Metrolinx must make a commitment to repair any damages caused by vibrations. The area should be monitored for vibration impacts during construction, and immediately cease work if acceptable vibration thresholds are exceeded until the above has been undertaken.
#BR-05 (365 Cotter Street, Newmarket) *Segment BR-9*	Indirect impacts to the heritage attributes of this BHR are possible due to the construction of a new track. In particular, the construction activities associated with the new track may result in limited and temporary adverse vibration impacts to this BHR. The structure on this property is located approximately 18 m from the Metrolinx right-of-way.	To ensure this property is not adversely impacted during construction, baseline vibration monitoring should be undertaken in advance of construction. Should this advance monitoring assessment conclude that the structure on this property will be subject to vibration impacts: • Preferred Option: Plan construction activities to avoid adverse vibration impacts to the structure on this property. • Alternative Option: Should it not be feasible to avoid adverse vibration impacts to the structure on this property, a qualified engineer should undertake a condition assessment of the structures within the vibration zone of influence. Further, Metrolinx must make a commitment to repair any damages caused by vibrations. The area should be monitored for vibration impacts during construction, and immediately cease work if acceptable vibration thresholds are exceeded until the above has been undertaken.
#BR-06 (359 Cotter Street, Newmarket) *Segment BR-9*	Indirect impacts to the heritage attributes of this BHR are possible due to the construction of a new track. In particular, the construction activities associated with the new track may result in limited and temporary adverse vibration impacts to this BHR. The structure on this property is located approximately 18 m from the Metrolinx right-of-way.	To ensure this property is not adversely impacted during construction, baseline vibration monitoring should be undertaken in advance of construction. Should this advance monitoring assessment conclude that the structure on this property will be subject to vibration impacts: • Preferred Option: Plan construction activities to avoid adverse vibration impacts to the structure on this property. • Alternative Option: Should it not be feasible to avoid adverse vibration impacts to the structure on this property, a qualified engineer should undertake a condition assessment of the structures within the vibration zone of influence. Further, Metrolinx must make a commitment to repair any damages caused by vibrations. The area should be monitored for vibration impacts during construction, and immediately cease work if acceptable vibration thresholds are exceeded until the above has been undertaken.

Reference Number (and Location)	Type and Description of Potential/ Anticipated Impact	Mitigation Measures
#BR-07 (353 Cotter Street, Newmarket) *Segment BR-9*	Indirect impacts to the heritage attributes of this BHR are possible due to the construction of a new track. In particular, the construction activities associated with the new track may result in limited and temporary adverse vibration impacts to this BHR. The structure on this property is located approximately 20 m from the Metrolinx right-of-way.	To ensure this property is not adversely impacted during construction, baseline vibration monitoring should be undertaken in advance of construction. Should this advance monitoring assessment conclude that the structure on this property will be subject to vibration impacts: • Preferred Option: Plan construction activities to avoid adverse vibration impacts to the structure on this property. • Alternative Option: Should it not be feasible to avoid adverse vibration impacts to the structure on this property, a qualified engineer should undertake a condition assessment of the structures within the vibration zone of influence. Further, Metrolinx must make a commitment to repair any damages caused by vibrations. The area should be monitored for vibration impacts during construction, and immediately cease work if acceptable vibration thresholds are exceeded until the above has been undertaken.
#BR-08 (349 Cotter Street, Newmarket) *Segment BR-9*	Indirect impacts to the heritage attributes of this BHR are possible due to the construction of a new track. In particular, the construction activities associated with the new track may result in limited and temporary adverse vibration impacts to this BHR. The structure on this property is located approximately 20 m from the Metrolinx right-of-way.	To ensure this property is not adversely impacted during construction, baseline vibration monitoring should be undertaken in advance of construction. Should this advance monitoring assessment conclude that the structure on this property will be subject to vibration impacts: • Preferred Option: Plan construction activities to avoid adverse vibration impacts to the structure on this property. • Alternative Option: Should it not be feasible to avoid adverse vibration impacts to the structure on this property, a qualified engineer should undertake a condition assessment of the structures within the vibration zone of influence. Further, Metrolinx must make a commitment to repair any damages caused by vibrations. The area should be monitored for vibration impacts during construction, and immediately cease work if acceptable vibration thresholds are exceeded until the above has been undertaken.
#BR-09 (341 Cotter Street, Newmarket) *Segment BR-9*	Indirect impacts to the heritage attributes of this BHR are possible due to the construction of a new track. In particular, the construction activities associated with the new track may result in limited and temporary adverse vibration impacts to this BHR. The structure on this property is located approximately 17 m from the Metrolinx right-of-way.	To ensure this property is not adversely impacted during construction, baseline vibration monitoring should be undertaken in advance of construction. Should this advance monitoring assessment conclude that the structure on this property will be subject to vibration impacts: • Preferred Option: Plan construction activities to avoid adverse vibration impacts to the structure on this property. • Alternative Option: Should it not be feasible to avoid adverse vibration impacts to the structure on this property, a qualified engineer should undertake a condition assessment of the structures within the vibration zone of influence. Further, Metrolinx must make a commitment to repair any damages caused by vibrations. The area should be monitored for vibration impacts during construction, and immediately cease work if acceptable vibration thresholds are exceeded until the above has been undertaken.

Reference Number (and Location)	Type and Description of Potential/ Anticipated Impact	Mitigation Measures
#BR-10 (291 Cotter Street, Newmarket) *Segment BR-9 and BR-10*	Indirect impacts to the heritage attributes of this BHR are possible due to the construction of a new track. In particular, the construction activities associated with the new track may result in limited and temporary adverse vibration impacts to this BHR. The structure on this property is located approximately 16 m from the Metrolinx right-of-way.	To ensure this property is not adversely impacted during construction, baseline vibration monitoring should be undertaken in advance of construction. Should this advance monitoring assessment conclude that the structure on this property will be subject to vibration impacts: • Preferred Option: Plan construction activities to avoid adverse vibration impacts to the structure on this property. • Alternative Option: Should it not be feasible to avoid adverse vibration impacts to the structure on this property, a qualified engineer should undertake a condition assessment of the structures within the vibration zone of influence. Further, Metrolinx must make a commitment to repair any damages caused by vibrations. The area should be monitored for vibration impacts during construction, and immediately cease work if acceptable vibration thresholds are exceeded until the above has been undertaken.
#BR-11 (271 Cotter Street, Newmarket) *Segment BR-9 and BR-10*	Indirect impacts to the heritage attributes of this BHR are possible due to the construction of a new track. In particular, the construction activities associated with the new track may result in limited and temporary adverse vibration impacts to this BHR. The structure on this property is located approximately 13 m from the Metrolinx right-of-way.	To ensure this property is not adversely impacted during construction, baseline vibration monitoring should be undertaken in advance of construction. Should this advance monitoring assessment conclude that the structure on this property will be subject to vibration impacts: • Preferred Option: Plan construction activities to avoid adverse vibration impacts to the structure on this property. • Alternative Option: Should it not be feasible to avoid adverse vibration impacts to the structure on this property, a qualified engineer should undertake a condition assessment of the structures within the vibration zone of influence. Further, Metrolinx must make a commitment to repair any damages caused by vibrations. The area should be monitored for vibration impacts during construction, and immediately cease work if acceptable vibration thresholds are exceeded until the above has been undertaken.
#BR-12 (115-117 Main Street South, Newmarket) *Segment BR-10*	No direct or indirect impacts to the heritage attributes associated with this known BHR are anticipated. The historic residential structure identified in the heritage designation by-law is situated approximately 90 m from the Metrolinx right-of-way. The historic structure is part of a larger townhouse complex and is visually set apart from the Metrolinx right-of-way by a row of modern townhouses and associated parking lots.	No impacts are expected. No further work is recommended.
#BR-13 (450-474 Davis Drive East, Newmarket) *Segment BR-11*	Indirect impacts to the heritage attributes of a known BHR are possible due to the construction of a new track. In particular, the construction activities associated with the new track may result in limited and temporary adverse vibration impacts to the former	To ensure this property is not adversely impacted during construction, baseline vibration monitoring should be undertaken in advance of construction. Should this advance monitoring assessment conclude that the structure on this property will be subject to vibration impacts: • Preferred Option: Plan construction activities to avoid adverse vibration impacts to the structure on this property.

Reference Number (and Location)	Type and Description of Potential/ Anticipated Impact	Mitigation Measures
	Canadian National Railway Station, which sits approximately 3 m from the proposed new track.	• Alternative Option: Should it not be feasible to avoid adverse vibration impacts to the structure on this property, a qualified engineer should undertake a condition assessment of the structures within the vibration zone of influence. Further, Metrolinx must make a commitment to repair any damages caused by vibrations. The area should be monitored for vibration impacts during construction, and immediately cease work if acceptable vibration thresholds are exceeded until the above has been undertaken.
#BR-14 (465 Davis Drive, Newmarket) *Segment BR-11*	Indirect impacts to the heritage attributes of a known BHR are possible due to the construction of a new track. In particular, the construction activities associated with the new track may result in limited and temporary adverse vibration impacts to the former tannery building (since repurposed into a mall and GO Station), which sits approximately 4 m from the proposed new track.	To ensure this property is not adversely impacted during construction, baseline vibration monitoring should be undertaken in advance of construction. Should this advance monitoring assessment conclude that the structure on this property will be subject to vibration impacts: • Preferred Option: Plan construction activities to avoid adverse vibration impacts to the structure on this property. • Alternative Option: Should it not be feasible to avoid adverse vibration impacts to the structure on this property, a qualified engineer should undertake a condition assessment of the structures within the vibration zone of influence. Further, Metrolinx must make a commitment to repair any damages caused by vibrations. The area should be monitored for vibration impacts during construction, and immediately cease work if acceptable vibration thresholds are exceeded until the above has been undertaken.
#BR-15 (91 Franklin Street, Newmarket) *Segment BR-11*	Indirect impacts to the heritage attributes of this BHR are possible due to the construction of a new track. In particular, the construction activities associated with the new track may result in limited and temporary adverse vibration impacts to this BHR. The residence on this residential property is located approximately 30 m from the Metrolinx right-of-way.	To ensure this property is not adversely impacted during construction, baseline vibration monitoring should be undertaken in advance of construction. Should this advance monitoring assessment conclude that the structure on this property will be subject to vibration impacts: • Preferred Option: Plan construction activities to avoid adverse vibration impacts to the structure on this property. • Alternative Option: Should it not be feasible to avoid adverse vibration impacts to the structure on this property, a qualified engineer should undertake a condition assessment of the structures within the vibration zone of influence. Further, Metrolinx must make a commitment to repair any damages caused by vibrations. The area should be monitored for vibration impacts during construction, and immediately cease work if acceptable vibration thresholds are exceeded until the above has been undertaken.
#BR-16 (95 Franklin Street, Newmarket) *Segment BR-11*	Indirect impacts to the heritage attributes of this BHR are possible due to the construction of a new track. In particular, the construction activities associated with the new track may result in limited and temporary adverse vibration impacts to this BHR. The residence on this residential property is located approximately 30 m from the Metrolinx right-of-way.	To ensure this property is not adversely impacted during construction, baseline vibration monitoring should be undertaken in advance of construction. Should this advance monitoring assessment conclude that the structure on this property will be subject to vibration impacts: • Preferred Option: Plan construction activities to avoid adverse vibration impacts to the structure on this property. • Alternative Option: Should it not be feasible to avoid adverse vibration impacts to the structure on this property, a qualified engineer should undertake a condition assessment of the structures within the vibration zone of influence. Further,

Reference Number (and Location)	Type and Description of Potential/ Anticipated Impact	Mitigation Measures
		Metrolinx must make a commitment to repair any damages caused by vibrations. The area should be monitored for vibration impacts during construction, and immediately cease work if acceptable vibration thresholds are exceeded until the above has been undertaken.
#BR-17 (285 Bradford Street, Barrie) *Segment BR-16*	No direct or indirect impacts to the heritage attributes associated with this BHR are anticipated due to construction activities. The historic Allandale Train Station on this property is located approximately 50 m from the Metrolinx right-of-way.	No impacts are expected. No further work is recommended.
#BR-18 (33 Essa Road, Barrie) *Segment BR-16*	Indirect impacts to the heritage attributes of a potential BHR are possible due to the construction of a new track. In particular, the construction activities associated with the new track may result in limited and temporary adverse vibration impacts to the building which sits approximately 7 m from the proposed new track.	To ensure this property is not adversely impacted during construction, baseline vibration monitoring should be undertaken in advance of construction. Should this advance monitoring assessment conclude that the structure on this property will be subject to vibration impacts: • Preferred Option: Plan construction activities to avoid adverse vibration impacts to the structure on this property. • Alternative Option: Should it not be feasible to avoid adverse vibration impacts to the structure on this property, a qualified engineer should undertake a condition assessment of the structures within the vibration zone of influence. Further, Metrolinx must make a commitment to repair any damages caused by vibrations. The area should be monitored for vibration impacts during construction, and immediately cease work if acceptable vibration thresholds are exceeded until the above has been undertaken.
#BR-19 (35 Essa Road, Barrie) *Segment BR-16*	Indirect impacts to the heritage attributes of a potential BHR are possible due to the construction of a new track. In particular, the construction activities associated with the new track may result in limited and temporary adverse vibration impacts to the building which sits approximately 6 m from the proposed new track.	To ensure this property is not adversely impacted during construction, baseline vibration monitoring should be undertaken in advance of construction. Should this advance monitoring assessment conclude that the structure on this property will be subject to vibration impacts: • Preferred Option: Plan construction activities to avoid adverse vibration impacts to the structure on this property. • Alternative Option: Should it not be feasible to avoid adverse vibration impacts to the structure on this property, a qualified engineer should undertake a condition assessment of the structures within the vibration zone of influence. Further, Metrolinx must make a commitment to repair any damages caused by vibrations. The area should be monitored for vibration impacts during construction, and immediately cease work if acceptable vibration thresholds are exceeded until the above has been undertaken.
#BR-20 (47 Tiffin Street, Barrie) *Segment BR-16*	Indirect impacts to the heritage attributes of this BHR are possible due to the construction of a new track. In particular, the construction activities associated with the new track may result in limited and temporary adverse vibration impacts to this BHR.	To ensure this property is not adversely impacted during construction, baseline vibration monitoring should be undertaken in advance of construction. Should this advance monitoring assessment conclude that the structure on this property will be subject to vibration impacts: • Preferred Option: Plan construction activities to avoid adverse vibration impacts to the structure on this property.

Reference Number (and Location)	Type and Description of Potential/ Anticipated Impact	Mitigation Measures
	The residence on this residential property is located approximately 15 m from the Metrolinx right-of-way.	• Alternative Option: Should it not be feasible to avoid adverse vibration impacts to the structure on this property, a qualified engineer should undertake a condition assessment of the structures within the vibration zone of influence. Further, Metrolinx must make a commitment to repair any damages caused by vibrations. The area should be monitored for vibration impacts during construction, and immediately cease work if acceptable vibration thresholds are exceeded until the above has been undertaken.
#BR-21 (51 Tiffin Street, Barrie) *Segment BR-16*	No direct or indirect impacts to the heritage attributes associated with this BHR are anticipated due to construction activities. The residence on this residential property is located approximately 35 m from the Metrolinx right-of-way.	No impacts are expected. No further work is recommended.
#BR-22 (53 Tiffin Street, Barrie) *Segment BR-16*	No direct or indirect impacts to the heritage attributes associated with this BHR are anticipated due to construction activities. The residence on this residential property is located approximately 35 m from the Metrolinx right-of-way.	No impacts are expected. No further work is recommended.
#BR-23 (65 Tiffin Street, Barrie) *Segment BR-16*	No direct or indirect impacts to the heritage attributes associated with this BHR are anticipated due to construction activities. The residence on this residential property is located approximately 35 m from the Metrolinx right-of-way.	No impacts are expected. No further work is recommended.
#BR-24 (69 Tiffin Street, Barrie) *Segment BR-16*	No direct or indirect impacts to the heritage attributes associated with this BHR are anticipated due to construction activities. The residence on this residential property is located approximately 35 m from the Metrolinx right-of-way.	No impacts are expected. No further work is recommended.
Richmond Hill Corridor		
#RH-01 (Queen Street East Bridge, Toronto, Mile 1.98) *Segment RH-01*	Track upgrades have the potential for indirect impacts to the heritage attributes of this BHR through potential vibration damage to the bridge substructure due to construction activity adjacent to the structure.	To ensure this bridge is not adversely impacted during construction, baseline vibration monitoring should be undertaken in advance of construction. Should this advance monitoring assessment conclude that the structure will be subject to vibration impacts: • Preferred Option: Plan construction activities to avoid adverse vibration impacts to the structure on this property. • Alternative Option: Should it not be feasible to avoid adverse vibration impacts to the structure on this property, a qualified engineer should undertake a condition assessment of the structures within the vibration zone of influence. Further,

Reference Number (and Location)	Type and Description of Potential/ Anticipated Impact	Mitigation Measures
		Metrolinx must make a commitment to repair any damages caused by vibrations. The area should be monitored for vibration impacts during construction, and immediately cease work if acceptable vibration thresholds are exceeded until the above has been undertaken.
#RH-02 (Dundas Street East Bridge, Toronto, Mile 2.26) *Segment RH-02*	Track upgrades have the potential for indirect impacts to the heritage attributes of this BHR through potential vibration damage to the bridge substructure due to construction activity adjacent to the structure.	To ensure this bridge is not adversely impacted during construction, baseline vibration monitoring should be undertaken in advance of construction. Should this advance monitoring assessment conclude that the structure will be subject to vibration impacts: • Preferred Option: Plan construction activities to avoid adverse vibration impacts to the structure on this property. • Alternative Option: Should it not be feasible to avoid adverse vibration impacts to the structure on this property, a qualified engineer should undertake a condition assessment of the structures within the vibration zone of influence. Further, Metrolinx must make a commitment to repair any damages caused by vibrations. The area should be monitored for vibration impacts during construction, and immediately cease work if acceptable vibration thresholds are exceeded until the above has been undertaken.
#RH-03 (Gerrard Street East Bridge, Toronto, Mile 2.45) *Segment RH-02*	Track upgrades have the potential for indirect impacts to the heritage attributes of this BHR through potential vibration damage to the bridge substructure due to construction activity adjacent to the structure.	To ensure this bridge is not adversely impacted during construction, baseline vibration monitoring should be undertaken in advance of construction. Should this advance monitoring assessment conclude that the structure will be subject to vibration impacts: • Preferred Option: Plan construction activities to avoid adverse vibration impacts to the structure on this property. • Alternative Option: Should it not be feasible to avoid adverse vibration impacts to the structure on this property, a qualified engineer should undertake a condition assessment of the structures within the vibration zone of influence. Further, Metrolinx must make a commitment to repair any damages caused by vibrations. The area should be monitored for vibration impacts during construction, and immediately cease work if acceptable vibration thresholds are exceeded until the above has been undertaken.
#RH-04 (Cabbagetown South HCD, Toronto) *Segments RH-02 and RH-03*	No direct or indirect impacts are expected to this HCD. The study area buffer encroaches onto the eastern limits of the HCD and is not anticipated to result in any impacts to the heritage attributes associated with this CHL.	No impacts are expected. No further work is recommended.
#RH-05 (Cabbagetown North HCD, Toronto) *Segment RH-03*	No direct or indirect impacts are expected to this HCD. The study area buffer encroaches onto the eastern limits of the HCD and is not anticipated to result in any	No impacts are expected. No further work is recommended.

Reference Number (and Location)	Type and Description of Potential/ Anticipated Impact	Mitigation Measures
	impacts to the heritage attributes associated with this CHL.	
#RH-06 (Prince Edward Viaduct, Bloor Street Bridge, Toronto, Mile 3.31) *Segment RH-04; Don Valley Layover*	No track infrastructure or track upgrades are expected adjacent to this bridge.	No impacts are expected. No further work is recommended.
#RH-07 (550 Bayview Avenue, Toronto) *Segment RH-05*	No direct or indirect impacts are expected to this known CHL. The study area buffer encroaches onto the southern limits of this property, and is not anticipated to result in any impacts to the heritage attributes associated with this CHL. The closest building to the rail corridor is more than 30 m from the ROW, and as such vibration impacts are not a concern.	No impacts are expected. No further work is recommended.
#RH-08 (CP Belleville Sub Bridge, Toronto, Mile 4.03) *Segment RH-05*	No track infrastructure or track upgrades are expected adjacent to this bridge.	No impacts are expected. No further work is recommended.

7.4.7 Archaeology

A Stage 1 Archaeological Assessment was undertaken for the New Track & Facilities TPAP. Mitigation measures and/or monitoring activities recommended to address construction phase impacts are summarized included in Table 5-106. Additional details can be found in **Appendix G2**.

7.4.7.1 Potential Effects & Mitigation Measures

The following general mitigation measures will be adhered to during construction activities:

- Due to the previously documented evidence of disturbed human remains on the historic Allandale Station site, archaeological monitoring of any proposed impacts to the historic station property as well as to any crawl spaces or soils beneath existing structures without basements is recommended within the area between Essa Road and Milburn Street;
- The Constructor will develop and implement an Archaeological Risk Management Plan that addresses any recommendations resulting from Archaeological Assessments and documents all protocols for the discovery of human remains and undocumented archaeological resources. The Archaeological Risk Management Plan shall be amended to incorporate any additional actions required resulting from subsequent Archaeological Assessment Reports;

- All work shall be performed in accordance with Applicable Law, including but not limited to the *Ontario Heritage Act*, the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI), formerly the Ministry of Tourism, Culture and Sport (MTCS) *Standards and Guidelines for Consultant Archaeologists* (2011), and the MHSTCI document, *Engaging Aboriginal Communities in Archaeology: A Draft Bulletin for Consultant Archaeologists in Ontario* (2011);
- In the event that archaeological materials are encountered or suspected of being encountered during construction, all work will cease. The location of the findspot should be protected from impact by employing a buffer in accordance with requirements of the MHSTCI. A professionally licensed archaeologist will be consulted to complete the assessment. If materials are confirmed to possess cultural heritage value/interest then they will be reported to the MHSTCI, and further Archaeological Assessment of the materials may be required. If it is determined that there is a potential for Indigenous artifacts, the Contracting Authority should be contacted, and Applicable Law will be followed;
- If final limits of the Project footprint are altered and fall outside of the assessed study area, additional Archaeological Assessments will be conducted by a professionally licensed archaeologist prior to disturbance and prior to construction activities. This will include completing all required Archaeological Assessments resulting from the Stage 1 Archaeological Assessment (Stage 2, Stage 3 and Stage 4, as required) as early as possible, prior to the completion of design, and in advance of any ground disturbance;
- For areas determined to have archaeological potential or contain archaeological resources that will be impacted by project activities, additional Archaeological Assessment will be conducted by a professionally licensed archaeologist prior to disturbance;
- If human remains are encountered or suspected of being encountered during project work, all activities must cease immediately and the local police/coroner as well as the Bereavement Authority of Ontario on behalf of the Ministry of Government and Consumer Services must be contacted. Archaeological investigations of human remains will not proceed until police have confirmed the remains are not subject to forensic investigation. Once human remains have been cleared of police concern, the MHSTCI will also be notified to ensure that the site is not subject to unlicensed alterations which would be a contravention of the *Ontario Heritage Act*. If the human remains are determined to be of Indigenous origin, the Contracting Authority should be contacted, and all Applicable Law must be adhered to;
- All Archaeological Assessment findings will be shared with Indigenous communities, as per Metrolinx's procedures; and
- Work in proximity to known cemeteries requires completion of an Archaeological Assessment prior to any proposed ground disturbance in accordance with the MHSTCI's *Standards and Guidelines for Consultant Archaeologists* (2011) and the *Funeral, Burial, and Cremation Services Act* and regulations under that Act.

7.4.8 Stormwater Management/Site Drainage

A Preliminary Stormwater Management Assessment was undertaken for each of the three (3) New Track & Facilities TPAP layover/storage yard facilities. Mitigation measures and/or monitoring activities recommended to address construction phase impacts are summarized included in Table 5-107 to Table 5-109. Additional details can be found in **Appendix H**.

7.4.8.1 Potential Effects & Mitigation Measures

The following mitigation measures for stormwater and site drainage will be implemented and adhered to:

- The Constructor will prepare and implement a Drainage and Stormwater Report, an Erosion and Sediment Control Plan, detailed drainage design and erosion and sediment control drawings in accordance with the Ministry of the Environment, Conservation and Parks (MECP) Stormwater Management Planning and Design Manual (2003), the Erosion and Sediment Control Guide for Urban Construction (2019), as amended from time to time, and the guidelines and regulatory requirements of the Conservation Authority having jurisdiction;
- The overall stormwater quality and quantity control strategy will be developed in accordance with all relevant municipal, provincial and federal requirements, as amended, as well as the requirements of Conservation Authorities having jurisdiction;
- A detailed assessment of proposed ditches along the rail corridor is required to ensure adequate drainage conveyance in accordance with municipal requirements and American Railway Engineering and Maintenance-of-Way Association (AREMA) Manual for Railway Engineering (2019); and
- The Constructor will develop and implement a Spill Prevention and Response Plan in accordance with the Project Agreement.

The following monitoring measures will also be implemented as applicable:

- Turbidity levels within discharges from sites to be monitored visually. Turbidity levels will be monitored upstream and downstream of sites at watercourse crossings or adjacent to watercourses. Turbidity levels within discharges from sites and within receiving storm sewers will also be monitored visually to determine potential impacts from construction;
- Any proposed bridge expansions and culvert replacements will be sized to maintain or improve local flood levels and supported by hydrologic/hydraulic calculations and/or models. Creek bed and banks design will include geomorphological input for scour and erosion prevention, and creation of appropriate fish habitat (i.e., at Shoreacres Creek);
- A hydraulic assessment of each crossing and any proposed bridge expansions (replacements) is required to determine proposed flood levels and associated creek bed and bank treatments to prevent scour and erosion and facilitate fish passage. Where applicable, the regulatory model(s) will be obtained from the local Conservation Authority to assess the hydraulic impacts along regulated watercourses;
- Collect samples for existing watercourses and/or wetlands, when runoff from the site discharges to a watercourse and/or wetland will be conducted for pre-construction, during construction, and post construction conditions until the site is considered stabilized. Obtain samples from watercourses and wetlands for non-precipitation event and for precipitation events to obtain a reasonable understanding of turbidity levels. Post-construction monitoring of wetland areas may be required depending on input from Conservation Authorities;
- Monitoring will be conducted for potential oil spills and containment of spills to be conducted as per provincial requirements; and
- Functionality of stormwater quantity controls including peak flows and water levels for storm events within the design range will be monitored. This will require local rainfall data.

7.4.9 Traffic

7.4.8 A Traffic Impact Study was undertaken for each of the three (3) New Track & Facilities TPAP layover/storage yard facilities. Additional details can be found in **Appendix I**.

7.4.9.1 Potential Effects & Mitigation Measures – General

Metrolinx (or their Contractor) will coordinate with Municipalities and road authorities, as appropriate during detailed design, to develop traffic, parking, transit, cycling and pedestrian management strategies prior to commencement of construction to avoid or minimize interferences to traffic to the extent possible during construction/installation of track infrastructure at level road crossings.

7.4.10 Utilities

A Third-Party Utilities Impact Assessment Report was prepared for the New Track & Facilities TPAP. Mitigation measures and/or monitoring activities recommended to address construction phase impacts are summarized included in Table 5-110**.** Additional details can be found in **Appendix J.**

7.4.10.1 Potential Effects & Mitigation Measures

Potential impacts on utilities during construction include disruption or damage of those utilities not relocated in a timely fashion.

Prior to commencement of construction, the following work will be completed:

- Implementation/amendment of Corridor Crossing Agreements to define future access and maintenance scopes. Update Corridor Crossing Agreements as required;
- Where new utility crossings are proposed, application for a new utility crossing agreement will be required. Where modifications to an existing utility crossing takes place, updates to an existing utility crossing will be needed;
- Where feasible, all work shall follow applicable standards/policies provided by the public and private utility providers;
- During detailed design, develop and implement a detailed Utility Infrastructure Relocation Plan that identifies all utilities anticipated to be impacted by the construction works, all relevant utility agencies and authorities, and outlines the approach to the utility relocation process. The Utility Infrastructure Relocation Plan will be developed in accordance with the Project Agreement;
- During detailed design, CCTV investigations and surveys will be performed to field locate and verify existing utilities within the project area and document their condition;
- Undertake pre-submission consultation with the relevant regulatory authorities to develop an early approach to securing permits and approvals for utility infrastructure works to ensure they proceed in a timely manner to support the design and construction schedule; and
- In the event unexpected utility conflicts are encountered during construction, these will be documented and communicated immediately to Metrolinx and all relevant stakeholders. A field conflict resolution process will be implemented to mitigate the conflict and will include input from all relevant stakeholders. Metrolinx will be notified at the first indication of a delay to their relocation schedule due to the unknown conflict. Metrolinx will review the impact of the delay on the overall utility relocation plan.

During construction, the following mitigation and monitoring measures will be implemented and adhered to:

- Implement and follow the provisions contained in the Utility Infrastructure Relocation Plan;

- Perform all work identified in the Utility Infrastructure Relocation Plan to protect, support, safeguard, remove, and relocate all Utility Infrastructure;
- Ensure minimal impact to the Train Service Plans, continuity of service, and disruption to property owners and customers of the Utility Companies to the satisfaction of the Utility Companies and Metrolinx;
- Maintain regular communication and coordination through issuance of regular progress reports and updates to applicable utility agencies;
- Record all installation tolerances and how they are to be monitored;
- Perform inspection and testing to ensure successful utility relocation and safe and efficient installation;
- In the event of potential impacts to critical utilities, instrumentation and monitoring shall be carried out to protect the critical utilities and structures and reduce risks of damage due to construction activities;
- During construction, ensure minimizing impact to the Train Service Plans and to continuity of service and disruption to property owners and customers of the Utility Companies to the satisfaction of the Utility Companies and Metrolinx;
- In the event of damage resulting in service interruptions during construction, the damage will be reported immediately to Metrolinx and Utility Owner representatives, and all work adjacent to the damaged utility will stop to prevent further damage;
- After construction, obtain as-built plans of the relocated infrastructure from utility agencies per as-built preparation standards CSA S250-11; and
- Post- construction inspections of the new utility infrastructure shall be undertaken for applicable works upon completion of the construction works to document condition.

7.4.11 Noise

A Noise & Vibration Facilities Construction Impact Assessment Report was prepared for the New Track & Facilities TPAP. Refer to **Appendix K** for further detail**.**

7.4.11.1 Potential Effects & Mitigation Measures

Environmental noise may cause annoyance, disturb sleep and other activities, and affect human health.

The severity of the noise effects resulting from construction projects varies, depending on:

- Scale, location and complexity of the project;
- Construction methods, processes and equipment deployed;
- Total duration of construction near sensitive noise receptors;
- Construction activity periods (days, hours, time period); and
- Number and proximity of noise-sensitive sites to construction area(s).

Prior to commencement of construction, develop and submit a detailed Construction Noise Management Plan[1].

[1] Regulations, standards and guidance documents referenced herein are current as of the time of writing and may be amended from time to time. If clarification is required regarding regulatory requirements, consult with the appropriate regulatory agencies.

- The Construction Noise Management Plan shall:
    - Document and commit to all measures to be taken for meeting the noise exposure limits documented in the Metrolinx *Guide for Noise and Vibration Assessment* (2020) at every directly exposed sensitive receptor and throughout the entire project;
    - Determine the Zone of Influence for construction related noise based on the noise exposure limits outlined in the Metrolinx *Guide for Noise and Vibration Assessment* (2020) and taking into consideration the construction site, staging and laydown sites and hauling routes, each stage of the construction (including demolition), the overall construction schedule along with the schedule of each major component and associated major construction processes and equipment usage; and
    - Identify all sensitive receptors that fall within the Zone of Influence for construction related noise. Mitigation measures will be proposed for these sensitive receptors, and the effects of the proposed mitigation measures will then be evaluated using noise modelling. If results of the modelling indicate that any sensitive receptors still remain within the Zone of Influence for construction related noise, then the following shall apply:
        - Additional mitigation is proposed and subsequently modelled until the sensitive receptor does not fall within the Zone of Influence; or
        - If mitigation strategies are not viable, receptor-based mitigation will be proposed.
        - Scale, location and complexity of the project;
- The Construction Noise Management Plan will include the temporary/permanent noise barriers indicated in the applicable noise and vibration construction impact assessment report (2020). Where additional work sites are identified which were not assessed as part of the applicable noise and vibration construction impact assessment report (2020), or where construction activities at any given site differ from those considered in this report, conduct modelling to evaluate the need for additional noise barriers as part of the Construction Noise Management Plan.

The Construction Noise Management Plan will incorporate the following requirements related to monitoring of noise and noise related complaints and these measures will be implemented during construction:

- Monitor noise where the Construction Noise Management Plan indicates that noise exposure limits may be exceeded. At these locations, monitor noise continuously at each geographically distinct, active construction site with one monitor located strategically to capture the highest exposure level based on planned construction activities and the number, geographic distribution and proximity of noise sensitive receptors. Develop weekly reports describing the monitoring conducted and summarizing the data collected for the reporting period. The reports will include but not be limited to the number and duration of any incident during which any of the noise exposure limits documented in the Metrolinx *Guide for Noise and Vibration Assessment* (2020) were exceeded, the probable cause of each exceedance, the incident-specific measure(s) implemented, the resulting mitigated noise levels and the complaints investigation procedure; and
- Establish a Communications Protocol and a Complaints Protocol to respond to issues that develop during construction.

7.4.12 Vibration

A Noise & Vibration Facilities Construction Impact Assessment Report was prepared for the New Track & Facilities TPAP. Refer to **Appendix K** for further detail.

7.4.12.1 Potential Effects & Mitigation Measures

Exposure to vibration may result in public annoyance and complaints. Vibration may also cause damage to buildings and other structures.

The following measures[2] will be implemented and adhered to during construction:

- Adhere to the following vibration exposure limits:
    - Vibration, as a human irritant, is assessed in terms of its average level. Vibration velocity should not exceed 0.14 mm/s or current conditions (whichever is higher) by more than 25%;
    - As a threat to buildings, vibration is assessed in terms of its peak value. The Zone of Influence for vibration shall be the area where structures are expected to experience vibration peak particle velocities that exceed 5 mm/s. Vibration velocity should be limited to 8-22 mm/s, depending on vibration frequency. These limits are prescribed by the most current versions of the Municipal Code Chapter 591, Noise (2020) and Chapter 363, Vibration (2019) for typical structures (not building with special needs);
- Adhere to the ground-born (vibration induced) noise exposure criteria in the US FTA Report No. 0123, *Transit Noise and Vibration Impact Assessment Manual* (2018); and
- Develop and implement a detailed Construction Vibration Management Plan for Metrolinx review and approval with minimum requirements outlined below:
    - Complete a detailed construction related vibration assessment prior to the commencement of construction that includes assessment of the vibration Zone of Influence. The Zone of Influence for vibration shall be established by using the methodology and input data provided in Section 7.2 of the US FTA Report No. 0123 (2018), *Transit Noise and Vibration Impact Assessment Manual* (2018);
    - Complete pre-construction condition surveys for properties within the vibration Zone of Influence of the planned work to establish their condition and establish a baseline prior to any work beginning;
    - Identify any heritage structures and other sensitive structures, buildings or infrastructure vulnerable to vibration damage, assess requirements and, if necessary, develop mitigation measures;
    - Identify buildings, where vibration sensitive activities such a sound recording or medical image processing take place, assess requirements and, if necessary, develop mitigation measures;
    - Establish a 15-metre setback distance between the construction vibration source and nearby buildings, where possible, to minimize impacts. If this is not possible, then monitor the vibration levels associated with the activity;
    - Select construction/maintenance methods and equipment with the least vibration impacts; and
    - In the presence of persistent complaints and subject to the results of a field investigation, identify alternative vibration control measures, where reasonably available.

[2] Regulations, standards and guidance documents referenced herein are current as of the time of writing and may be amended from time to time. If clarification is required regarding regulatory requirements, consult with the appropriate regulatory agencies.

The Construction Vibration Management Plan will incorporate the following requirements related to monitoring of vibration and vibration related complaints and the provisions of this Plan will be implemented and adhered to during construction:

- Monitor vibration continuously at structures where the Construction Vibration Management Plan indicates that structures are deemed to be within the Zone of Influence for construction related vibration or at additional structures as requested by Metrolinx; and
- The type of Vibration Monitoring Program that is established is based on the vibration Zone of Influence, the project location, duration, presence of night-time activity, and receptor proximity. The monitoring types include:
    - Type 1: Monitoring continuously throughout the project (for receptors within the Zone of Influence).
    - Type 2: Monitoring during most impactful phases of the project only (for receptors outside of the Zone of Influence but within 50 m of the boundary of the construction site).
    - Type 3: Monitoring in response to complaints only (for receptors outside of the Zone of Influence and beyond 50 m of the boundary of the construction site).
- Establish a Communications Protocol and a Complaints Protocol to respond to issues that develop during construction.

7.4.13 Air Quality

An Air Quality Facilities Construction Impact Assessment Report was prepared for the New Track & Facilities TPAP. Refer to **Appendix L** for further detail**.**

7.4.13.1 Potential Effects & Mitigation Measures

Construction related air pollution may pose risks to human health and wellbeing. Prior to commencement of construction, develop and implement a detailed Construction Air Quality Management Plan (AQMP) to Metrolinx. The AQMP will:

- Demonstrate compliance with the specific air quality criteria and limits in the Metrolinx Environmental Guide for Air Quality and Greenhouse Gas Emissions Assessment (2019);
- Define the Project's air quality impact zone and identify all sensitive receptors within this area;
- Assess the baseline air quality by continuous measurement of local ambient concentrations of PM2.5 and PM10 over a minimum period of one week, where large local sources of pollution, such as highways, directly affect the Zone of Influence of the Project;
- Estimate and document the predictable worst-case air quality impacts of the Project on sensitive receptors within the air quality impact zone, develop appropriate mitigation measures, demonstrate their effectiveness, and commit to their timely implementation;
- Monitor continuously any contaminant, in addition to PM2.5 and PM10, which is predicted to exceed its relevant air quality exposure criterion during any phase of the Project and at any receptor; and
- Include explicit commitment to the implementation of all applicable best practices identified in the Environment Canada document, Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities (2005).

In addition, a Communications Protocol and a Complaints Protocol will be developed to respond to issues that develop during construction..

Weekly Air Quality Monitoring Plans will also be developed and implemented during construction. These plans will document how air quality monitoring has been conducted and compliance assessed to effectively prevent unacceptable rates of air emissions in accordance with the following guidelines:

- The construction related air contaminants of primary concern are in the form of particulate matter, with the principal construction related fractions of $PM_{2.5}$ and PM_{10} - particulate matter of less than 2.5 and 10 micron in diameter, respectively. Other contaminants of concern include crystalline silica and oxides of nitrogen. The list of contaminants will be expanded with any and all air pollutants that may be produced as a result of the work;
- The criteria for $PM_{2.5}$, PM_{10} and crystalline silica are provided in Metrolinx's *Environmental Guide for Air Quality and Greenhouse Gas Emissions Assessment* (2019). The applicable criteria for all other air contaminants of concern are to be found in the various schedules of *Ontario Regulation 419/05*; and
- Siting of the monitors should generally follow the guidelines provided in the Ministry of the Environment, Conservation and Parks (MECP) *Operations Manual for Air Quality Monitoring in Ontario* (2018).

7.4.14 Contaminated Soils & Excavated Materials

A Phase I Environmental Site Assessment was undertaken for each of the three (3) New Track & Facilities TPAP layover/storage yard facilities. Mitigation measures and/or monitoring activities recommended to address construction phase impacts are summarized included in Table 5-112. Additional details can be found in **Appendix O**.

7.4.14.1 Potential Effects & Mitigation Measures – General

The following general mitigation/monitoring measures and plans will be implemented during construction to address construction activities/operations that could expose contaminated materials and/or result in the spreading of contaminated materials:

- Develop and implement a Soil and Excavated Materials Management Plan for the handling, management and disposal of all excavated material (i.e. soil, rock and waste) that is generated or encountered during the work. The plan will be overseen by a Qualified Person pursuant to Ontario Regulation 153/04 under the *Environmental Protection Act* (QP) and will comply with Ontario Regulation 406/19 (On-Site and Excess Soil Management – to be enacted into law on July 1, 2020), the Ministry of the Environment, Conservation and Parks (MECP), formerly the Ministry of the Environment and Climate Change (MOECC)'s Management of Excess Soils: A Guide for Best Management Practices (April 2019, as amended) and all Applicable Law. The plan will describe how to address the management of the excavated materials, imported materials, contaminated materials, and impacted railway ties, including handling, transportation, testing, documentation and reuse and disposal of excavated materials generated as part of the works and in accordance with applicable regulatory requirements and the Project Agreement, as applicable;
- Non-soil materials, including railway bedding, railway ties, or ballast materials encountered during the earthworks will also require waste classification as documented by testing where applicable to determine management and disposal requirements as per *Ontario Regulation 347* (as amended) and all Applicable Law;
- The Soil and Excavated Materials Management Plan will be reviewed and approved by Metrolinx prior to construction;

- A Soil and Excavated Material Monthly Dashboard Report will be developed by the Constructor for Metrolinx review that includes monitoring and performance data related to the management of excavated materials for the preceding month; and
- Upon completion of the work, the Constructor will submit a Soil and Excavated Material Management Implementation Report to Metrolinx.

7.5 Construction of New Layover/Storage Facilities

The following section summarizes potential effects and mitigation/monitoring measures related to the construction of new layover/storage facilities.

Initial activities typically carried out as part of the construction of layover facilities are site clearing and ground improvements. There may be instances where installation of culverts and retaining walls is required, and grading must occur.

Each layover/storage yard facility will require significant electrical work to install either a sub-station or new transformer to provide power to the site, which includes significant grounding work. Electrical power will feed low voltage systems, separate from electrification power requirements, including lighting and all communication devices such as cameras and public address systems. For layovers that are not electrified, wayside power will be installed, which are high-voltage systems.

The layover/storage yard facilities will require construction of access roads using hot mix asphalt and emulsified bitumen, complete with concrete curb and sidewalks. Drainage work will also be required in addition to track construction, as previously described. Road construction includes a subgrade, subbase and base course, all of which require extensive use of aggregate and compaction effort. A nuclear gauge is typically used to measure compaction levels.

Office and maintenance buildings typically consist of structural steel buildings. These require construction of concrete foundations and will be serviced by power, fire suppression water, domestic water, telecommunications and gas. Buildings will also be equipped with HVAC units. Some facilities will require a septic tank and an electrical substation. Pole bases will also be installed for the OCS system to accommodate electrification.

Other elements that may need to be installed as part of a typical layover/storage facility include, which will be confirmed based on detailed design:

- Fencing and gates;
- Exterior lighting;
- Roadways and walkways;
- Parking areas;
- Waste management areas;
- Stormwater management facilities;
- Sanitary field;
- Transformer and power distribution systems;
- Back-up power/uninterrupted power supply (UPS);
- Telecommunications and security/CCTV;
- Restroom facilities; and

- Mobile standing storage.

The following equipment may be required for layover/storage facility construction:

- Excavator;
- Backhoe;
- Grader;
- Tower cranes;
- Loaders;
- Paver;
- Compactor;
- Dump trucks;
- Bulldozer;
- Pumps;
- Generators;
- Lighting equipment; and
- Boom trucks.

7.5.1 Natural Environment

A Natural Environment Assessment Report was undertaken for the New Track & Facilities TPAP. Mitigation measures and/or monitoring activities recommended to address construction phase impacts are summarized included in Table 5-101. Additional details can be found in **Appendix B2.**

7.5.1.1 Potential Effects & Mitigation Measures- General

The mitigation measures outlined in Section 7.4.1.1 will be implemented during layover/storage facility construction.

7.5.1.2 Integrated Vegetation Management (IVM)

The mitigation measures outlined in Section 7.4.1.2 will be implemented during layover/storage facility construction.

7.5.1.3 Vegetation Removals & Compensation Plan

The mitigation measures outlined in Section 7.4.1.3 will be implemented during layover/storage facility construction.

7.5.1.4 Tree Removals

The mitigation measures outlined in Section 7.4.1.4 will be implemented during layover/storage facility construction.

7.5.1.5 Wildlife

The processes and mitigation measures outlined in Section 7.4.1.5 will be adhered to.

7.5.1.6 Species at Risk

The processes and mitigation measures outlined in Section 7.4.1.6 will be adhered to.

7.5.1.7 Potential Effects & Mitigation Measures – Walkers Line Layover Facility

Sediment and erosion control will be required to ensure that construction activities do not impact water quality within Shoreacres Creek or its associated riparian wetland communities.

7.5.1.8 Potential Effects & Mitigation Measures – Unionville Storage Yard

Sediment and erosion control will be required to ensure that construction activities do not impact water quality within the Rouge River or its associated riparian wetland communities.

7.5.1.9 Potential Effects & Mitigation Measures – Don Valley Layover Facility

Sediment and erosion control will be required to ensure that construction activities do not impact water quality within the Don River or its associated riparian wetland communities.

7.5.2 Hydrogeological

A Hydrogeological Impact Assessment Report was undertaken for the New Track & Facilities TPAP. Mitigation measures and/or monitoring activities recommended to address construction phase impacts are summarized included in Table 5-102**.** Additional details can be found in **Appendix C2.**

7.5.2.1 Potential Effects & Mitigation Measures – General

The mitigation measures outlined in Section 7.4.2.1 will be implemented during layover/storage facility construction.

7.5.2.2 Potential Effects & Mitigation Measures – Walkers Line Layover Facility

The MECP Well Record Database includes 94 records for wells within 500 m of the proposed Walkers Line Layover facility. Three of the records indicate use for domestic water supply. The remaining records are for wells used for observation/monitoring/test holes (77 wells), abandoned (3 wells) or of unknown use (11 wells). Well records 2800260 and 2800261 are for wells drilled in 1952 and 1954, respectively, and are located approximately 200 m south of the Study Area Segment along the Walkers Line Layover. The records indicate well depths of 11 m and 10 m, extending through clay overburden and into shale bedrock. The area is currently highly developed with municipal services, and therefore it is not likely that these wells are still in use for water supply, however this should be confirmed prior to site construction and any dewatering activities.

The majority of the construction excavations are expected to be shallow (less than 2 m in depth), however dewatering of deeper construction excavations associated with foundations and utilities may be required. Based on the limited excavation depth, there are no anticipated impacts to adjacent water users due to the dewatering activities. However, a more detailed investigation is needed during detailed design to determine if a PTTW or EASR is required, and to provide water management plans during pumping. Consideration should also be given to whether construction dewatering will have an impact on nearby surface water intake as part of the IPZ. The site is within the Iroquois Plain Physiographic Region, which Includes shoreline and fine-grained lacustrine deposits associated with the flooding of Lake Iroquois during the last glacial retreat. Sediment deposits within the Iroquois plain are comprised of sand, clay, gravel bars, till and shale, and are coarse grained (sand and gravel) near the historic shorelines and fine grained (silt then clay) in an offshore direction, which is typical of this Site. However, the surficial geology is mapped with Paleozoic bedrock (Blue Mountain Dolostone or Shale) near surface and initial review of MECP well records for the area indicate little to no overburden soils in the vicinity of the site. Any imported materials used to backfill excavations or for site grading purposes should be evaluated for ensure that the material is suitable for use and meets the applicable regulations and standards for quality. The Walkers Line Layover is located within two sub-watersheds; Shoreacres Creek and Tuck Creek. Suitable sedimentation controls should be in place to help control and reduce the turbidity of run-off water which may flow towards these surface water features.

The main branch of Shoreacres Creek traverses through the eastern potion of the proposed layover and passes under the existing tracks through a triple chamber concrete structure. Preliminary designs include the extension of the culvert by approximately 32 m. A more detailed investigation, including flow estimates and groundwater contributions is needed during detailed design to determine if a PTTW or EASR is required for installation and construction of the culvert extension, and to provide water management plans during dewatering.

The potential exists for groundwater contamination through accidental leaks or spills from construction equipment. A BMP and spill contingency plan, including a spill action response plan, should be in place for fuel handling, storage and onsite equipment maintenance activities. This and proper training of site personnel will minimize the risk of contaminant releases as a result of the proposed construction activities. In addition, contractors working at the Site should ensure that construction equipment is in good working order.

It is noted that municipal services (water and septic) are present at the Site of the proposed layover facility. Therefore, it is anticipated that the use of a private well for water supply and/or private septic system will not be required, and no hydrogeological impacts related to these features would be realized.

7.5.2.3 Potential Effects & Mitigation Measures - Unionville Storage Yard

Excavations for the Unionville Storage Yard are expected to be shallow (less than 1 m in depth) for construction, and therefore no hydrogeological impacts associated with dewatering or local water users is anticipated.

Any imported materials used to backfill excavations or for site grading purposes should be evaluated for ensure that the material is suitable for use and meets the applicable regulations and standards for quality.

The Rouge River and an associated wetland is located adjacent to the proposed Storage Yard. Suitable sedimentation controls should be in place to help control and reduce the turbidity of run-off water which may flow towards the River.

The potential exists for groundwater contamination through accidental leaks or spills from construction equipment. A spill contingency plan, including a spill action response plan, should be in place for fuel handling, storage and onsite equipment maintenance activities. This should include proper training of site personnel to minimize the risk of contaminant releases as a result of the proposed construction activities.

In addition, contractors working at the Site should ensure that construction equipment is in good working order.

The proposed Storage Yard is located within an urbanized area that is serviced with municipal water and sewage. Therefore, it is anticipated that the use of a private well for water supply and/or private septic system will not be required, and no hydrogeological impacts related to these features would be expected.

7.5.2.4 Potential Effects & Mitigation Measures - Don Valley Layover

Although the Don Valley Layover is located within the highly urbanized area of Toronto, the immediate surroundings of the proposed infrastructure are generally greenspace. Within 500 m of the Don Valley Layover, a total of 281 well records have been identified in the MECP Well Record Database, with all records except three indicating either monitoring/observation wells (162 records), unknown (22 records) or decommissioned/abandoned (209 records). There are three wells noted to be and used for dewatering purposes (Well ID 7050598, 7140186 and 7140191). The wells extend to a depth between 5 to 7 m through silty sand to sandy silt. No water supply wells were identified in the area. The area is highly developed with municipal services, and therefore the existence of currently used private water wells for water supply in this area (not listed in the MECP database) is likely negligible.

It is assumed that dewatering and water management may be required as part of construction works as there is potential for significant groundwater inflow to excavations fed by the nearby Don River. However, additional details on the site-specific water table and direction of groundwater flow is required in order to understand the amount of dewatering that may be required, and the potential for impacts as a result of discharge of this water to the natural environment.

During construction, short-term impacts to the near surface and shallow groundwater quantity may be realized as a result of construction dewatering, however the extent of drawdown would be limited. The length of time where this impact would occur would be limited to the time when active pumping of the groundwater is being carried out. Once construction activities are complete, the shallow groundwater levels would be expected to stabilize.

The proposed infrastructure is adjacent to the Don River, and contamination can result is significant impact to the water quality and ecological health. Therefore, a BMP, spill contingency plan and spill action response plan should be in place for fuel handling, storage and onsite equipment maintenance activities. This and formal personnel training will minimize the risk of contaminant releases as a result of the proposed construction activities.

The proposed layover facility is generally located within an urbanized area that is serviced with municipal water and sewage. Therefore, it is anticipated that the use of a private well for water supply and/or private septic system will not be required, and no hydrogeological impacts related to these features would be realized. However, if a septic system and sanitary field are to be incorporated at the facility, shallow groundwater quality may be impacted. A more detailed evaluation based on requirements outlined in the *Ontario Water Resources Act* (flow >10,000 L/d) and/or *Ontario Building Code Act* (flow <10,000 L/d) would be required.

7.5.3 Land Use & Socio-Economic

A Land Use and Socio-Economic Impact Assessment Report was undertaken for the New Track & Facilities TPAP. Mitigation measures and commitments were characterized and grouped as outlined in Table 5-103. Additional details can be found in **Appendix D2.**

7.5.3.1 Potential Effects & Mitigation Measures

Potential socio-economic effects associated with construction are anticipated to be short term in duration, relating largely to noise, air quality, temporary traffic effects, construction staging areas and visual disturbances. Metrolinx will ensure that local businesses and property owners are aware of construction scheduling and staging options will be developed to minimize potential effects on local access and travel patterns as much as possible. These effects are anticipated to cease once construction has finished.

The mitigation measures outlined in Section 7.4.3.1 will be implemented during layover/storage facility construction.

7.5.4 Property

7.5.4.1 Potential Effects & Mitigation Measures

Specific property requirements associate with the installation of the proposed infrastructure will need to be confirmed during design. Where access to property is required, ongoing consultation with affected landowners will help identify appropriate site-specific mitigation measures. The following measures related to property impacts will be implemented during construction:

- Select staging/laydown areas in accordance with Metrolinx procedures; and
- Staging/laydown areas should be located in areas that minimize adverse effects to sensitive receptors.

7.5.5 Visual/Aesthetics

A Visual/Aesthetics Impact Assessment Report was undertaken for the New Track & Facilities TPAP. Mitigation measures and/or monitoring activities recommended to address construction phase impacts are summarized included in Table 5-104**.** Additional details can be found in **Appendix E2.**

7.5.5.1 Potential Effects & Mitigation Measures

The use of heavy construction equipment may be visually disruptive, especially to residences situated close to the rail corridor ROW. If construction is to take place at night, construction lighting will be required. This lighting could impact adjacent homes and recreational areas.

The mitigation measures outlined in Section 7.4.5.1 will be implemented during layover/storage facility construction.

7.5.6 Cultural Heritage

Cultural Heritage studies were undertaken as part of the New Track & Facilities TPAP. Mitigation measures and/or monitoring activities recommended to address construction phase impacts are summarized included in Table 5-105. Additional details can be found in **Appendix F2.**

7.5.6.1 Potential Effects & Mitigation Measures- General

The mitigation measures outlined in Section 7.4.6.1 will be implemented during layover/storage facility construction.

7.5.6.2 Potential Effects & Mitigation Measures – Project Specific

Table 7-2 summarizes the proposed impacts, potential effect, and mitigation measures. The Don Valley Layover Location has the potential for construction impacts to one identified BHR (RH-06).

TABLE 7-2 POTENTIAL CULTURAL HERITAGE IMPACTS - PROPOSED LAYOVER & STORAGE FACILITIES

Reference Number (and Location)	Type and Description of Potential/ Anticipated Impact	Mitigation Measures
#RH-06 (Prince Edward Viaduct, Bloor Street Bridge, Toronto, Mile 3.31) *Segment RH-04; Don Valley Layover*	No direct impacts to this BHR resulting from construction activities are anticipated. Construction of the layover facility has the potential for indirect impacts to the heritage attributes of this known BHR through potential vibration damage to the bridge piers due to construction activity adjacent to the structure.	To ensure this bridge is not adversely impacted during construction, baseline vibration monitoring should be undertaken in advance of construction. • Preferred Option: Plan construction activities to avoid adverse vibration impacts to the structure on this property. • Alternative Option: Should it not be feasible to avoid adverse vibration impacts to the bridge a qualified engineer should undertake a condition assessment of the structures within the vibration zone of influence. Further, Metrolinx must make a commitment to repair any damages caused by vibrations. The area should be monitored for vibration impacts during construction, and immediately cease work if acceptable vibration thresholds are exceeded until the above has been undertaken.

7.5.7 Archaeology

A Stage 1 Archaeological Assessment was undertaken for the New Track & Facilities TPAP. Mitigation measures and/or monitoring activities recommended to address construction phase impacts are summarized included in Table 5-106**.** Additional details can be found in **Appendix G2**.

The mitigation measures outlined in Section 7.4.7.1 will be implemented during layover/storage facility construction.

7.5.7.1 Potential Effects & Mitigation Measures – Project Specific

There is potential for the disturbance of unassessed or documented archaeological resources within the Don Valley Layover site. For areas determined to have archaeological potential or contain archaeological resources that will be impacted by project activities, a Stage 2 Archaeological Assessment conducted by test pit survey at five metre intervals will be conducted by a professionally licensed archaeologist prior to construction/disturbance.

According to the *Ministry of Tourism and Culture 2011 Standards and Guidelines for Consultant Archaeologists Section 2.1.2,* test pit survey is required on terrain where ploughing is not viable, such as wooded areas, properties where existing landscaping or infrastructure would be damaged, overgrown farmland with heavy brush or rocky pasture, and narrow linear corridors up to 10 metres wide.

7.5.8 Stormwater Management

Preliminary Stormwater Management Impact Assessment Reports were undertaken for the layover/storage yard sites contained within the New Track & Facilities TPAP. Mitigation measures and commitments for the Walkers Line Layover Facility are outlined in Table 5-107, Unionville Storage Yard are outlined in Table 5-108, and Don Valley Layover Facility are outlined in Table 5-109**.** Additional details can be found in **Appendix H.**

7.5.8.1 Potential Effects & Mitigation Measures

The mitigation measures outlined in Section 7.4.8.1 will be implemented during layover/storage facility construction.

In addition, positive drainage must be maintained throughout all stages of construction and all area grading and resulting drainage patterns shall not adversely affect adjacent lands.

7.5.9 Traffic

Traffic Impact Studies were prepared for the New Track & Facilities TPAP. Mitigation for this speciality included recommended improvements to the local road network to accommodate the introduction of layover traffic (to make the entrances operate more safely); however, it should be noted that expected trip generation is minimal. Refer to **Appendix I** for additional details.

7.5.9.1 Potential Effects & Mitigation Measures – General

The mitigation/monitoring measures and plans outlined in Section 7.3 and Section 7.4.9.1 will be implemented during layover/storage facility construction.

7.5.10 Utilities

A Third-Party Utilities Impact Assessment Report was prepared for the New Track & Facilities TPAP. Mitigation measures and commitments are outlined in Table 5-110. Refer to **Appendix J** for additional details**.**

7.5.10.1 Potential Impacts and Mitigation Measures

The mitigation measures outlined in Section 7.4.10.1 will be implemented during layover/storage facility construction.

7.5.11 Noise

A Construction Noise and Vibration Assessment was prepared for all layover/storage yard facilities proposed under the New Track and Facilities TPAP (see **Appendix K**). The mitigation measures and commitments are outlined in Sections 7.4.11 are also applicable to the construction of layover and storage facilities.

7.5.11.1 Applicable Criteria

Construction sound levels are assessed against their own set of criteria based on the nature of the receptor, time of day, and the duration of the assessment period. Table 7-3 summarizes the noise exposure limits that are provided and used for this assessment.

TABLE 7-3 WEEKDAY CONSTRUCTION NOISE CRITERIA

Land Use	L_{EQ} (15h, 9h) (dBA)		L_{EQ} (15-min) (dBA)		Lmax (dBA)	
	Day (7:00 – 22:00)	Night (22:00 – 7:00)	Day (7:00 – 22:00)	Night (22:00 – 7:00)	Day (7:00 – 22:00)	Night (22:00 – 7:00)
Residential - Weekday	Louder of: 75 or Baseline+5	Louder of: 65 or Baseline+5	85	75	90	80
Residential – Weekend & Holiday	Louder of: 70 or Baseline+5	Louder of: 60 or Baseline+5	75	65	90	80
Institutional	Louder of: 70 or Baseline+5	Louder of: 60 or Baseline+5	75	65	90	80
Commercial	Louder of: 80 or Baseline+5	None	None	None	None	None
Industrial	Louder of: 85 or Baseline+5	None	None	None	None	None

MECP stipulates limits on noise emissions from individual items of equipment contained in the MECP Publication NPC-115 – “Construction Equipment” (MECP, 1977).

Although provincial agencies, such as Metrolinx, are not subject to municipal by-laws, Metrolinx (and its Contractor) will endeavour to adhere to this local by-law as a best practice, where practical. As part of the electrification construction activities, nighttime work may be required. Although Metrolinx is exempt from municipal noise control by-laws that place limits on the timing of construction activity, Metrolinx (and their Contractor) will strive to adhere to this by-law by limiting nighttime noisy activities wherever practical.

7.5.11.2 Key Inputs and Assumptions

Various aspects of the project construction will generate noise; however, construction noise impacts are temporary in nature. Key inputs and assumptions utilized to evaluate the potential off-site noise impacts due to construction of the layover/storage yard facilities is detailed below:

- The construction of layover/storage yard facilities is considered a long-term construction project, as it will involve several phases, such as demolition, excavation, track and building construction and landscaping. The phases will involve the use of a wide array of construction equipment ranging from small generators to excavators with crushing jaws;
- The track and building/structure construction of the layover/storage yard facility sites is expected to involve the greatest number of noise sources; thus, it is expected to have the greatest effect on the sound levels in the area and affect the highest number of land uses and receptors in the area.

Therefore, the focus of the assessment has been the effects of the track and building/structure construction;

- Overall construction duration will depend on a number of factors associated with obtaining various approvals, stakeholder inputs, soil conditions, issues encountered during each of the phases, etc., which are not yet known. Current plans limit construction activities to daytime hours between 0700h and 1900h only, therefore the construction was only assessed against the applicable day time criteria in Table 7-3;
- Construction activities are generally focused within specific areas which tend to move throughout the site as work progresses. To be conservative, and protect the interests of the public, multiple worst-case construction locations were evaluated for the track and building construction phase;
- Construction equipment is rarely used continuously throughout the day or work shift. An equipment duty cycle is used to account for times the equipment is not operational. The FTA protocol provides a generally acceptable duty cycle that was used as a starting point to estimate an L_{EQ} (15-hr) value. This value was altered to fit the proposed work schedule;
- Equipment was assessed based on worst-case height from where sound may originate (i.e. diesel engine/power module is located or exhausts from). An average worst-case height was estimated for equipment that was modelled collectively as a group using an area source;
- Sound level propagation of stationary sources was modelled based on the algorithms in ISO 9613 (ISO 1994, ISO 1996) as implemented by the Cadna/A software. Each construction stage was modelled using a combination of point sources, area sources and line sources; and
- Receptor types considered for the construction assessment were residential, institutional, commercial and industrial. In general, receptors were identified using publicly available land parcel databases Open Data GIS shapefiles. Empty lands designated for one of the noted land uses were also included and assessment was completed following Publication NPC-300 guidance.

7.5.11.3 Potential Effects

Sound levels were propagated to the criteria for each time period as noted in Table 7-3. The construction sound levels were modelled for the areas surrounding each of the layover/storage yard facilities in all directions regardless of the land uses.

Table 7-4 to Table 7-6 summarize the number of receptors that are expected to be exposed to sound levels above the criteria noted Table 7-3 during the track and building/structure construction phase for each the layover/storage yard facility sites.

Walkers Line Layover

TABLE 7-4 RECEPTORS EXPOSED TO SOUND LEVELS ABOVE CRITERIA (WALKERS LINE LAYOVER)

Time Period	Land Use			
	Residential	Commercial	Institutional	Industrial
L_{EQ} (15-hr)	0	0	1	0
L_{EQ} (15-min)	0	-	1	-
L_{max}	0	-	0	-

The construction sound levels are generally expected to be primarily contained within the layover construction area and are expected to affect only the immediately adjacent land uses, which are primarily mixed-use for Walkers Line. Based on the current uses of each of the buildings within the Zones of Influence, only the Burlington Humane Society located south of Walkers Line layover, could be affected.

Although only one receptor is expected to be above the Table 7-3 criteria, the Zone of Influence figures indicate that a number of immediate buildings could be affected by construction activities (see **Appendix K** for these figures). As noise perception is subjective there is some potential risk for complaints during construction and that some administrative or physical controls will be required. It is recommended that the results of this assessment be reviewed and confirmed once more information regarding construction becomes available.

Unionville Storage Yard

TABLE 7-5 RECEPTORS EXPOSED TO SOUND LEVELS ABOVE CRITERIA (UNIONVILLE STORAGE YARD)

Time Period	Land Use			
	Residential	Commercial	Institutional	Industrial
L_{EQ} (15-hr)	0	0	2	0
L_{EQ} (15-min)	0	-	2	-
L_{max}	0	-	0	-

The receptors that have the most potential to be affected are near the middle and northern portions of the storage yard where institutional and commercial lands are located in close proximity. The institutional receptor to the east is Bill Crothers Secondary School and a significant portion of its main building and athletic facilities are within the Zone of Influence. Although there are a number of commercial land uses that are located in close proximity to the storage yard, the majority of the lands are only zoned for commercial use but are not currently developed or used in that manner. The commercial plaza to the north, Shoppes on Unionville, is located outside of the commercial Zone of Influence, but according to current business listings, the southeastern portion is occupied by the York Region Community and Health Services clinic. For the purposes of this assessment, the clinic was classified as an institutional receptor and it is located within the institutional Zone of Influence. Its highest expected sound levels are 74 dBA (LEQ (15-hour)) and 78 dBA (LEQ (15-min)).

There are residential land uses to the north/northeast of the storage yard but only the southwest corner of the nearest residential parcel is within the Zone of Influence. See **Appendix K** for detailed figures showing all land uses surrounding the storage yard. Based on the current aerial imagery, the residence is well beyond the residential Zone of Influence, and was thus not included as a receptor.

Don Valley Layover

TABLE 7-6 RECEPTORS EXPOSED TO SOUND LEVELS ABOVE CRITERIA (DON VALLEY LAYOVER)

Time Period	Land Use			
	Residential	Commercial	Institutional	Industrial
L_{EQ} (15-hr)	2	0	0	0
L_{EQ} (15-min)	0	-	0	-
L_{max}	0	-	0	-

The land uses that have the most potential to be affected within the study area are all residential. As construction is expected to the take place in the valley, the height difference provides good shielding and only a few residential land uses are located within the Zones of Influence. Results were compared against the latest aerial imagery and was noted that many of the residential land uses are only marginally within the residential Zones of Influence meaning that the actual structures and majority of their outdoor living spaces are well outside of the Zone of Influence. Only two receptors, Westdale Properties and a townhouse complex on Doncrest Road, have larger portions of their outdoor living spaces within the residential Zone of Influence, which may affect the resident's ability to enjoy their properties. This is illustrated in figures provided in **Appendix K**.

Parklands were not included in this assessment as there is no set criteria. Residents using the public trails and spaces will be only temporarily exposed to noise and have the ability to relocate to another area, unlike fixed buildings/spaces which are the focus of this assessment. Based on the figures provided in **Appendix K**, the sound levels at the adjacent public lands will be less than 80 dBA (L_{EQ}(15-hr)).

7.5.11.4 Mitigation Measures

Mitigation measures presented in Section 7.4.11.1 should be implemented to noise impacts due to layover/storage yard facility construction,

7.5.12 Vibration

Noise & Vibration Facilities Construction Impact Assessment Report was prepared for all layover and storage yard facilities proposed under the New Track and Facilities TPAP (see **Appendix K**). The mitigation measures and commitments are outlined in Sections 7.4.12 are also applicable to the construction of layover and storage facilities.

7.5.12.1 Applicable Criteria

Vibration is assessed against public annoyance and building damage criteria outlined in Table 7-7.

TABLE 7-7 VIBRATION EXPORURE LIMITS REGARDING PUBLIC ANNOYANCE AND BUILDING DAMAGE

Target of Guidance/Criteria	Source of Guidance/Criteria	Description of Criteria
Public Annoyance[1]	1995 MOEE/GO Transit Protocol	Vibration Velocity not to exceed 0.14 mm/s or current conditions (whichever is higher) by more than 25%
Building Damage[2]	City of Toronto By-Law 514-2008	Vibration Velocity to be limited to 8 – 22 mm/s depending on vibration frequency.

1. Vibration is assessed as root-mean-square velocity.
2. Vibration is assessed as peak-particle velocity.

7.5.12.2 Key Inputs and Assumptions

In addition to the key inputs and criteria outlined in Section 7.5.11.2, layover/storage yard facility construction vibration assessment was based on the decay of the proxy levels obtained from the FTA protocol. Minimum setback distances were estimated for the largest pieces of equipment for both annoyance and building damage. Minimum setback distances were applied to the same equipment locations as used in the noise study, additionally the paths expected to be traveled by the haul trucks had separate minimum set back distances applied to determine the number of affected receptors and types of land uses.

Propagation was based on the following equation:

$$PPV_{equip} = PPV_{ref}\left(\frac{7.62}{D}\right)^{1.5}$$

where:

PPV_{equip} = the peak particle velocity of the equipment adjusted for distance (mm/s);
PPV_{ref} = the source reference vibration at 7.62 m (mm/s); and
D = distance from the equipment to the receptor (m).

Adjustments were made using a crest factor to estimate both peak particle velocity (PPV) and root mean square (RMS) values for comparison against criteria noted in Table 7-7.

Receptor types were assigned based on the permitted land uses per the relevant by-law and using data available through parcel databases and Open Data GIS shapefiles. Where land was zoned for mixed uses the receptor is counted once in each applicable category to provide a more conservative estimate on the impact of the construction work. A receptor was considered to be impacted if any portion of it was within the worst-case Zone of Influence.

Only receptors located within the estimated Zones of Influence on either side of the construction site locations, were included in the assessment. The Zones of Influence are the areas where sound and vibration levels will be above the criteria defined in the Metrolinx Work Plan for each land use and each time period. This ensured that worst-case noise and vibration levels were predicted.

Lastly, reference equipment vibration levels for the construction equipment were obtained from the US Federal Transit Administration's Transit Noise and Vibration Impact Assessment Guide (FTA Protocol).

7.5.12.3 Potential Effects

Vibration level setbacks were based on the most impactful equipment expected to be used for the track and building construction phase. As such, only the worst-case setbacks were used for this assessment. The setbacks were assessed for both criteria noted in Table 7-7 and were calculated to be 8.1 m and 59.1 m, respectively.

The receptors that could be potentially affected by the track and building construction phase at each of the layover/storage yard facility sites are presented below in Table 7-8 to Table 7-10.

Walkers Line Layover

TABLE 7-8 NUMBER OF RECEPTORS ABOVE APPLICABLE VIBRATION CRITERIA (WALKERS LINE)

Criteria	Number of Receptors
Building Damage[1]	0
Annoyance[2]	5

Five (5) buildings are expected to be within the Walkers Line Layover Annoyance Zone of Influence. Their locations are identified in **Appendix K**. Aerial imagery and business listings indicate that the majority of these buildings are used for commercial and storage purposes. The buildings used for storage are not expected to be especially prone to complaints given their limited use. Buildings used for other purposes may be more prone to complaints given that they are likely occupied by office workers throughout the day and may also serve customers directly. The most notable building that falls within the

Zone of Influence is one to the south that is currently used by the Burlington Humane Society where animals live and could be exposed to continuous construction activities. The results of this assessment for this layover should be reviewed and confirmed as more information becomes available. Attention should be paid to the Humane Society as annoyance due to vibration could have a different effect on animals.

Unionville Storage Yard

TABLE 7-9 NUMBER OF RECEPTORS ABOVE APPLICABLE VIBRATION CRITERIA (UNIONVILLE STORAGE YARD)

Criteria	Number of Receptors
Building Damage[1]	0
Annoyance[2]	3

There are no buildings located within the building damage Zone of Influence, but there are several receptors located within the annoyance Zone of Influence. These receptors include the Bill Crothers Secondary School to the east, the Shoppes on Unionville plaza to the northwest, and the outdoor yard of the residence to the northeast on East Drive. Although the Shoppes on Unionville was considered a single receptor, its current business listings indicate that there are several businesses occupying the southeastern corner of the plaza, including the York Region Community and Health Services clinic. Attention should be paid to these receptors when plans for work in close proximity, and management plans, are developed.

Don Valley Layover

TABLE 7-10 NUMBER OF RECEPTORS ABOVE APPLICABLE VIBRATION CRITERIA (DON VALLEY LAYOVER)

Criteria	Number of Receptors
Building Damage[1]	0
Annoyance[2]	1

For this vibration assessment, only land uses defined in Section 7.5.12.2 were investigated for potential effects. Potential vibration impacts on the Prince Edward Viaduct should not be significant if setbacks can be maintained. If construction is to proceed within these setback distances, vibration monitoring should be considered to evaluate impacts and indicate where further mitigation may be required.

Like with the noise assessment, vibration effects will be contained within the valley and only the outdoor living area of the Westdale Properties lies within the annoyance Zone of Influence. A management plan will be implemented with this receptor in mind. Other residential properties are just outside of the annoyance Zone of Influence but could benefit from inclusion in any management plans developed for this layover.

7.5.12.4 Mitigation Measures

Efforts should be made to maximize the distance between receptors and construction activities with high vibration potential. Annoyance may result when these activities occur within the Zone of Influence. Maximizing the distance will considerably reduce receptor annoyance but may not completely eliminate it. If receptors must be located within the Zone of Influence, residences that are within the area should be notified of construction activities. In addition to notifying the community, nighttime construction

activities involving equipment with high vibration potential should be avoided when sensitive receptors are located within the Zone of Influence.

Additionally, the mitigation measures outlined in Section 7.4.12.1 and the Noise & Vibration Facilities Construction Impact Assessment Report (**Appendix K**) will be implemented during layover/storage facility construction.

7.5.13 Air Quality

Air Quality Facilities Construction Impact Assessment Report was prepared for all layover facilities proposed under the New Track and Facilities TPAP (see **Appendix L**). The mitigation measures and commitments are outlined in Section 7.4.13 are also applicable to the construction of layover and storage facilities.

At the time of this assessment, no specific or detailed construction plans were available for the new layovers. As a result, the proposed methodology for assessing potential air quality impacts from construction activities was a screening-level analysis based on conceptual construction scenarios. This assessment is therefore considered to be preliminary.

Of the layovers/storage yards that were assessed, only one was modelled quantitatively: the Beach Layover[3] on the Lakeshore West Corridor. This facility was selected as the worst-case, based on the size of the layover construction, expected intensity of construction activities, and the proximity of receptors.

The quantitative assessment of the Beach Layover was completed through an emission estimation and computer dispersion modeling analysis. This analysis produced a series of contour plots that indicate zones of influence for the project, based on comparison between the predicted impacts and the relevant guideline limits. The most limiting air quality contaminant was used to generate the contour plot provided, that is, the assessment was based on Total Suspended Particulate (TSP) as this was expected to generate the largest and most conservative Zone of Influence.

Given the approximate nature of the analysis, the assessment of other layovers was done in a qualitative manner by a comparison with the analysis completed for the Beach Layover, essentially noting whether the air quality impacts would be expected to be similar to or less than those predicted for Beach Layover.

7.5.13.1 Air Contaminants and Air Quality Objectives

Emissions were estimated for contaminants listed in Table 7-11, with the addition of Total Suspended Particles (TSP), which is linked to nuisance effects during construction. Emissions due to activities such as material handling, heavy equipment movement, vehicle travel, and earth moving were estimated using standard emission factors from the U.S. EPA AP-42 emission factor database. These emission calculations are provided in **Appendix L**. Tailpipe emissions from heavy equipment operating on-site and trucks entering, moving through and then leaving the site were assessed using the U.S. EPA MOVES database. These emission calculations are included in **Appendix L**. Emissions from stationary sources such as generators were assessed using emission factors from the U.S. EPA NON-ROAD database. These emission calculations are also provided in **Appendix L**. Normal operating practices were assumed for all operations. As an example, no specific fugitive dust controls were applied.

[3] Please note that Metrolinx is not seeking approval for the Beach Layover under *Ontario Regulation 231/08*, *Transit Projects and Metrolinx Undertakings*.

TABLE 7-11 AIR QUALITY OBJECTIVES

Contaminant	Averaging Period	Objective (µg/m^3)
AAQC		
CO	1 hour	36,200
	8 hours	15,700
NO_2	1 hour	400
	24 hours	200
PM_{10}	24 hours	50
Benzene	24 hours	2.3
	Annual	0.45
Benzo(a)pyrene	24 hours	5.0E-05
	Annual	1.0E-05
1,3-Butadiene	24 hours	10
	Annual	2
Formaldehyde	24 hours	65
Acetaldehyde	24 hours	500
Acrolein	1 hour	4.5
	24 hours	0.4
	Annual [4]	8.8

7.5.13.2 Background Air Quality Data & Modeling

The dispersion modelling assessment (for Beach Layover) was conducted using the U.S. EPA AERMOD model (version code 19191). Meteorological and terrain data were obtained from the Ontario Ministry of the Environment Conservation and Parks (MECP), which are pre-processed for use with the AERMOD model. The meteorological data set selected considers suburban land-use patterns, which is generally consistent with all of the layover/storage yard facilities.

The site was modelled as a single large area source, using the property boundary of the Beach Layover site to define the dimensions of the source. The release height was set at 1 m, reflecting a combination of ground-level fugitive sources and tailpipe exhausts. The use of a single area source allows the predicted concentrations to be scaled based on the emission rate of any given contaminant. A ground-level receptor grid was established to provide a set of concentration contours for each contaminant around the site, establishing the maximum “Zone of Influence”.

The dispersion modelling showed that Total Suspended Particulate (TSP) generates the largest Zone of Influence relative to other contaminants of interest. Therefore, only results for TSP are shown here, as a surrogate for all construction-related air contaminants. The AAQC for TSP is 120 µg/m^3 on a 24-hour basis (there is also an annual average value, however this is not relevant in the case of short-term construction impacts).

Overall construction duration will depend on a number of factors including obtaining various approvals, stakeholder inputs, soil conditions, and other issues encountered during each of the phases, that are not yet known. Current plans limit construction activities to daytime hours between 0700h and 1900h, therefore the layover construction emissions were modelled as occurring for 12 hours per day.

In general, concentrations of TSP were predicted to meet the relevant AAQC at distances beyond 290 m from the site boundary, based on the worst-case construction scenario and without the application of any mitigation measures such as watering to reduce dust emissions. Since TSP is a worst-case surrogate, the same is true for all construction-related air contaminants of concern. With the application of strict dust control measures, the distance from the site boundary drops to 40 m (also shown in **Appendix L**) resulting in a reduction in the number of receptor locations potentially impacted by the construction.

The assessment of potential impacts includes both the potential emissions from activities at the site and existing background concentrations in the area. The ambient background data was taken from the nearby MECP Burlington Monitoring Station, located at North Shore Boulevard East at Lakeshore Road, approximately 2 km from the project site, and is presented in Table 7-12, below.

TABLE 7-12 BACKGROUND AIR QUALITY DATA (MECP STATION 44008, BURLINGTON)

Year	TSP 90th Percentile 24-hour (µg/m³)	PM_{10} 90th Percentile 24-hour (µg/m³)	$PM_{2.5}$ 90th Percentile 24-hour (µg/m³)	NO^2 90th Percentile 1-hour		O_3 90th Percentile 1-hour	
				(ppb)	(µg/m³)	(ppb)	(µg/m³)
2013	57	31	17	22	44	45	93
2014	60	33	18	22	44	41	85
2015	67	37	20	22	44	43	89
2016	50	28	15	22	44	44	91
2017	47	26	14	21	42	43	89
Average	56	31	17	22	44	43	89

7.5.13.3 Potential Effects

Walkers Line Layover

The potential air quality impacts from construction activities was assessed qualitatively, referencing and comparing with the quantitative assessment done for Beach Layover, as noted in the overview section above.

The proposed Walkers Line Layover is significantly smaller than the Beach Layover, consisting of 4 double-ended sidings (each capable of holding two full trains) and associated structures for staff, disposal, etc. In comparison, the Beach Layover consists of stub-end sidings capable of holding 16 trains, progressive maintenance and wash facilities and other associated structures noted above (staff, disposal, etc.).

Due to the smaller size of the Walkers Line Layover, potential emissions from construction activities are expected to be lower, both with respect to intensity and duration. Applying the approximate Zones of Influence associated with the Beach Layover are therefore expected to be conservative (see Figure 7-1). This provides a conservative worst-case Zone of Influence, which under controlled conditions includes no residential receptor locations. The uncontrolled scenario does show potential impacts at some residential receptors. Even though the estimated Zone of Influence is expected to be conservative this does indicate that application of controls would be considered best practice. Although the true Zone of Influence is likely smaller, the recommended controls are also not beyond industry norms.

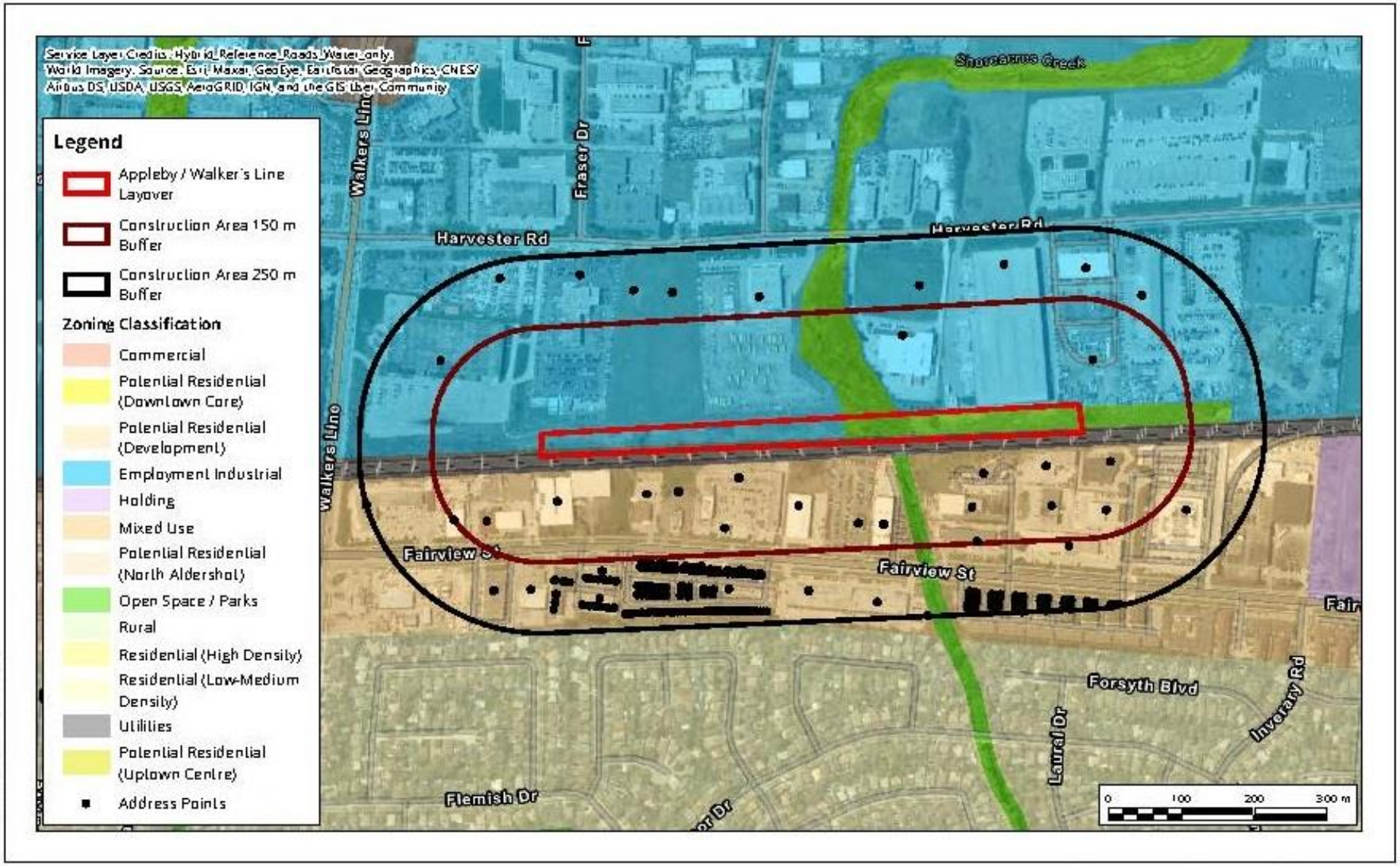

FIGURE 7-1 WALKERS LINE LAYOVER CONSTRUCTION IMPACT ZONE AND RECEPTORS

Unionville Storage Yard

The potential air quality impacts from construction activities were assessed qualitatively, referencing and comparing with the quantitative assessment done for Beach Layover.

The proposed Unionville Storage Yard is significantly smaller than the Beach Layover, consisting of a single stub-end siding, capable of holding two full trains, with no associated structures for staff, disposal, etc. In comparison, the Beach Layover consists of stub-end sidings capable of holding 16 trains, progressive maintenance and wash facilities and associated structures for staff, disposal, etc.

Due to the smaller size of the Unionville Storage Yard, potential emissions from construction activities are expected to be lower, both with respect to intensity and duration. Applying the approximate zones of influence associated with the Beach Layover is therefore expected to be conservative (see Figure 7-2). This provides a conservative worst-case Zone of Influence.

The uncontrolled scenario (250 m Zone of Influence) shows potential impacts at approximately 50 receptors, including Bill Crothers Secondary School and the Union Villa Long-Term Care. Under controlled conditions, there are no receptors within the Zone of Influence.

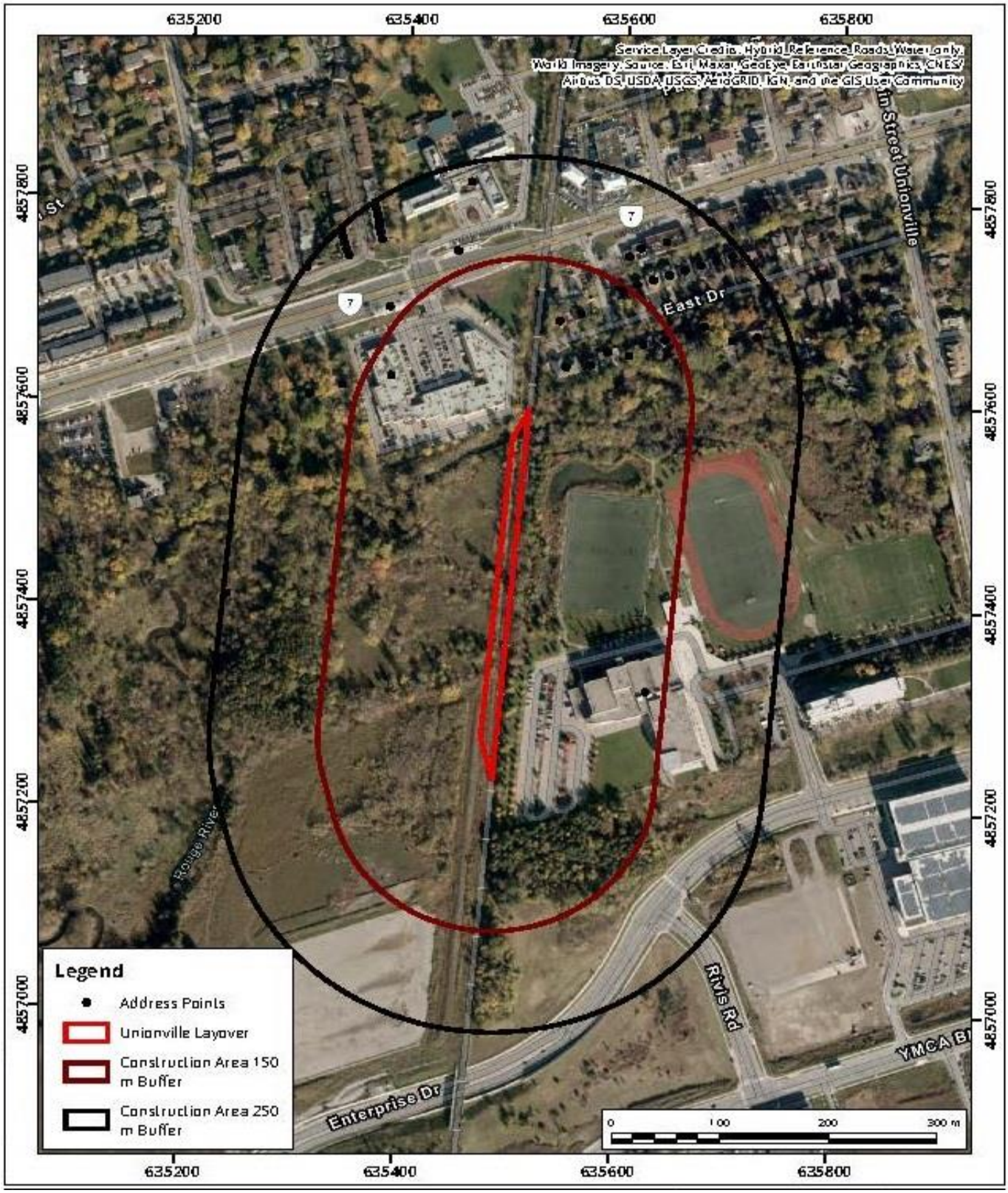

FIGURE 7-2 UNIONVILLE STORAGE YARD CONSTRUCTION IMPACT ZONE AND RECEPTORS CONTROLLED AND UNCONTROLLED SCENARIOS

Don Valley Layover

The potential air quality impacts from construction activities were assessed qualitatively, referencing and comparing with the quantitative assessment done for Beach Layover.

The proposed Don Valley Layover is significantly smaller than the Beach Layover, consisting of a single stub-end siding, capable of holding three full trains, and associated structures for staff, disposal, etc. In comparison, the Beach Layover consists of stub-end sidings capable of holding 16 trains, progressive maintenance and wash facilities and other associated structures noted above (staff, disposal, etc.).

Due to the smaller size of the Don Valley Layover, potential emissions from construction activities are expected to be lower, both with respect to intensity and duration. Applying the approximate Zones of Influence associated with the Beach Layover are therefore expected to be conservative, as seen in Figure 7-3. This provides a conservative worst-case Zone of Influence.

The uncontrolled scenario shows potential impacts at approximately 200 single-detached and townhome residential receptors, 5 multi-storey apartment/condo towers, the City Adult Learning Centre and a private school (Montcrest). This does indicate that application of controls would be considered best practice. Under controlled conditions, there are no receptors within the Zone of Influence.

The Lower Don Trail is in close proximity to the site and is within the Zone of Influence for the uncontrolled scenarios. It is recommended that the trail and Don River Valley Park be considered similar to other sensitive land uses with respect to implementation of mitigation and monitoring.

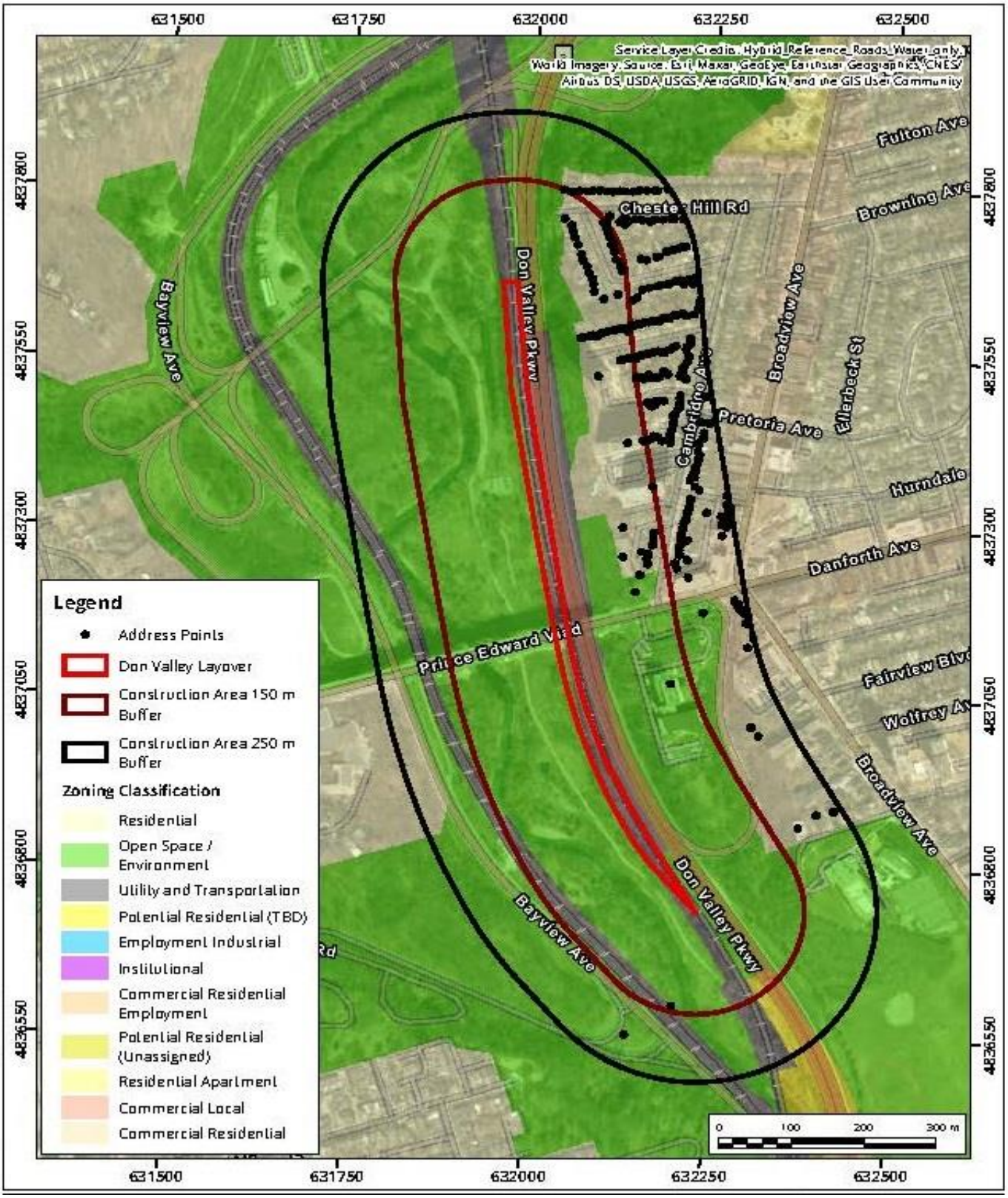

FIGURE 7-3 DON VALLEY LAYOVER CONSTRUCTION IMPACT ZONE AND RECEPTORS CONTROLLED AND UNCONTROLLED SCENARIOS

7.5.13.4 Mitigation Measures

The mitigation measures outlined in Section 7.4.13.1 will be implemented during layover/storage facility construction.

7.5.14 Contaminated Soils & Excavated Materials

A Phase I ESA Report was prepared as part of the NTF TPAP. Mitigation measures and commitments are outlined in Chapter 5, Table 5-112.

7.5.14.1 Potential Effects & Mitigation Measures – General

The following mitigation/monitoring measures and plans will be implemented during construction:

- Develop and implement a Soil and Excavated Materials Management Plan for the handling, management and disposal of all excavated material (i.e. soil, rock and waste) that is generated or encountered during the work. The plan will be overseen by a Qualified Person pursuant to Ontario Regulation 153/04 under the *Environmental Protection Act* (QP) and will comply with Ontario Regulation 406/19 (On-Site and Excess Soil Management – to be enacted into law on July 1, 2020), the Ministry of the Environment, Conservation and Parks (MECP), formerly the Ministry of the Environment and Climate Change (MOECC)'s *Management of Excess Soils: A Guide for Best Management Practices* (April 2019, as amended) and all Applicable Law. The plan will describe how to address the management of the excavated materials, imported materials, contaminated materials, and impacted railway ties, including handling, transportation, testing, documentation and reuse and disposal of excavated materials generated as part of the works and in accordance with applicable regulatory requirements and the Project Agreement, as applicable;
- Non-soil materials, including railway bedding, railway ties, or ballast materials encountered during the earthworks will also require waste classification as documented by testing where applicable to determine management and disposal requirements as per *Ontario Regulation 347* (as amended) and all Applicable Law;
- The Soil and Excavated Materials Management Plan will be reviewed and approved by Metrolinx prior to construction;
- A Soil and Excavated Material Monthly Dashboard Report will be developed by the Constructor for Metrolinx review that includes monitoring and performance data related to the management of excavated materials for the preceding month; and
- Upon completion of the work, the Constructor will submit a Soil and Excavated Material Management Implementation Report to Metrolinx.

7.5.14.2 Potential Effects & Mitigation Measures – Project Specific

With respect to contaminated soil and/or groundwater at the layover/storage yard facility sites, mitigation measures may include the remediation of the identified impacts and/or the development of a management plan as outlined in Section 7.4.14.1 above. Remediation may include the excavation and off-site disposal of impacted fill and soil, and/or the on-site treatment of impacted soil and groundwater to reduce contaminant concentrations to acceptable levels.

The Soil and Excavated Materials Management Plan will address contaminants that remain at the site and include measures to minimize human and ecological exposure to these contaminants during and following construction.

Depending on the location, extent and degree of potential impacts to be confirmed during detailed design, the following measures will be implemented:

- Modify construction procedures to minimize the generation of dust, odour and waste materials;
- Implementation of site-specific health and safety procedures during construction to minimize worker and public exposure to contaminants;
- The remedial measures and/or management plan are to be developed following completion of subsequent Environmental Site Assessments and/or subsurface investigation activities and are to be based on the specific construction and infrastructure proposed for each layover/storage yard facility site;
- Contaminated soils and groundwater will be managed in accordance with applicable environmental legislation (i.e.; *Ontario Environmental Protection Act, Ontario Regulation 347, Transportation of Dangerous Goods Act and Regulations,* and *Ontario Regulation 153/04*);
- Prior to the construction of the Beach layover facility, a Phase II ESA has been recommended to determine the potential for soil/groundwater contamination due to on-site and off-site land uses. Recommendations provided in Phase II ESA should be adhered to during detailed design and construction; and
- Construction of the Unionville and Don Valley layover/storage yard facilities will likely require soil removal and backfill materials to form suitable foundations to support the proposed facility, as the soils have been deemed geotechnically unsuitable. It is recommended that Metrolinx complete a baseline conditions sampling for soil and groundwater during detailed design (i.e., pre-construction assessment) for each site boundary and depth to determine soil quality, and ensure proper off-site disposal, if required. Pre-construction soil and groundwater conditions should then be compared to post-construction soil and groundwater conditions (i.e., post-construction assessment), to ensure appropriate.

7.6 Construction of New GO Station Platforms

Detailed engineering plans/designs for the proposed new GO station platforms were not available at the time of writing this EPR and therefore construction activities and methods will need to be confirmed during detailed design. Notwithstanding this, the following activities and elements are typically required as part of the construction of a new GO Station platform:

- Demolition and site preparation;
- Grading and drainage work;
- Platform paving and construction of concrete curbs;
- Installation of tunnels, ramps, stairs, elevator shafts and elevators;
- Construction of canopies and shelters;
- Installation of site lighting (potentially high-mast lighting), communication systems, and ancillary features such as CCTV, fare handling units, etc.;
- Installation of a standby generator or UPS;
- Construction of walkways and sidewalks;
- Potential adjustments to parking areas if affected by construction of other platform elements
- Installation of wayfinding and signage;
- Utility modifications, as required;

- HVAC systems for mini-hubs and radiant heating for shelters;
- Building modifications for mechanical pumps or heat tracing systems; and
- Fibre optic cable installation.

7.6.1 Natural Environment

7.6.1.1 Potential Effects & Mitigation Measures- General

The mitigation measures outlined in Section 7.4.1.1 will be implemented during construction.

7.6.1.2 Integrated Vegetation Management (IVM)

The mitigation measures outlined in Section 7.4.1.2 will be implemented during construction.

7.6.1.3 Vegetation Removals & Compensation Plan

The mitigation measures outlined in Section 7.4.1.3 will be implemented during construction.

7.6.1.4 Tree Removals

The mitigation measures outlined in Section 7.4.1.4 will be implemented during construction.

7.6.1.5 Wildlife

The processes and mitigation measures outlined in Section 7.4.1.5 will be adhered to.

7.6.1.6 Species at Risk

The processes and mitigation measures outlined in Section 7.4.1.6 will be adhered to.

7.6.2 Hydrogeological

7.6.2.1 Potential Effects & Mitigation Measures - General

The mitigation measures outlined in Section 7.4.2.1 will be implemented during construction.

Construction for the new station platforms will likely include excavations that are anticipated to be shallow (<2m in depth). Excavations for any elevator shafts may extend to depths greater than 2m, however detailed plans were not available for review for any of the new platforms at the time of this report. There is potential for the need for dewatering of excavations, and further evaluation of the requirement for permits and water management plans will need to be completed during detailed design. However, any construction dewatering is anticipated to be short-term and groundwater elevations would be expected to return to stabilized conditions after dewatering operations are complete.

Excavations may encounter existing contaminated soils and/or groundwater during construction. There is potential for impact to groundwater quality due to accidental leaks and spills from fuel handling, storage and onsite equipment maintenance activities, however these can be managed with appropriate best management practices/mitigation measures such training, and spill response plans. In addition, contractors working at the site should ensure that construction equipment is in good working order.

Any imported materials used to backfill excavations or for site grading purposes should be evaluated to ensure that the material is suitable for use and meets the applicable regulations and standards for quality.

7.6.2.2 Potential Effects & Mitigation Measures- Oshawa GO Station (LSE-4)

There are 5 well records listed in the MECP database as being for domestic water use within 500 m of the Oshawa GO Station. An additional 61 wells are for monitoring/observation purposes with 14 wells listed as being abandoned. Two well record does not list the well's use. As the site is located within an

urbanized area and municipal water services are available, and the shallow extent of excavations that may require dewatering, minimal impact to local water users is anticipated.

Depending on the proposed depth of pedestrian tunnels and elevator shafts to service the new platforms, the station is sited in an area with saturated lacustrine soils over dense till could result in the need for local excavation dewatering. However, as no detailed plans for the platform construction were available the need for a Permit to Take Water, dewatering plans and estimated water volumes will be further evaluated during detailed design.

Corbett Creek is located west of the Oshawa GO Station, and suitable sedimentation controls should be in place to help control and reduce the turbidity of run-off water which may flow towards the surface water features. Consideration should also be given to management of any discharge water during dewatering activities to minimize impact to the creek.

7.6.2.3 Potential Effects & Mitigation Measures- Mount Joy GO Station (ST-3; ST-4)

The Mount Joy GO Station is located within a developed area, and although a number of well records within 500 m of the Site are listed in the MECP Database for water supply, including 7 for domestic use, 2 for commercial use, 5 for industrial use and one well for irrigation purposes, the availability of municipal services mitigates the potential impact o these water users.

Mountjoy Creek is located along the eastern edge of the rail line Right of Way (ROW). Sedimentation controls should be in place to help manage and reduce the turbidity of run-off water which may flow towards the creek during construction. Design plans were not available for the new platforms at the time of this report, and evaluation on the potential impact on water quality and quantity in the creek will be required during detailed design.

A stormwater management (SWM) pond (Mountjoy Lake) is also located immediately adjacent to the rail line ROW. No construction details for the SWM Pond were available for review. There is potential for hydraulic connection to the SWM pond during excavations for the pedestrian tunnels and elevator shafts (should they be included in construction for the new platform). Additional evaluation for dewatering will be completed during detailed design.

7.6.2.4 Potential Effects & Mitigation Measures- Unionville GO Station (ST-1; ST-2)

In the MECP well records, a total of 77 records are listed within 500 m of the Unionville GO Station. Three 11 wells are reportedly used for domestic water supply, two wells for commercial water and one well for dewatering purposes. The remaining wells are listed as either monitoring/observation holes (42 wells), abandoned (15 wells) or of unknown use (6 wells). Due to the presence of municipal services in the area, no impact to the availability of water as a result of construction is anticipated.

One well abandonment record (Well ID 7114520) of a 32 m well on the GO Station property in 2008 indicated a static water level of about 5.7m below grade. Details on the proposed depths of any pedestrian tunnels and/or elevator shafts was not available for review at the time of this report, however groundwater seepage can be expected in excavations and will require management.

A SWM pond is located west of the station. The pond does not appear to be engineered, although it lies in low permeability Newmarket till soils and therefore not likely to be lined. Therefore, there is only remote potential for hydraulic connection of the SWM pond and excavations for the pedestrian tunnels and elevator shafts. Additional evaluation for dewatering will be completed during detailed design to ensure this is the case.

The Rouge River, located approximately 400 m northwest of the station, is of sufficient distance from the proposed construction, and is separated by municipal infrastructure, that runoff and drainage impacts to the river are not expected.

7.6.3 Land Use/Socio-Economic

7.6.3.1 Potential Effects & Mitigation Measures

The mitigation measures outlined in Section 7.4.3.1 will be implemented during construction.

7.6.4 Property

7.6.4.1 Potential Effects & Mitigation Measures

The mitigation measures outlined in Section 7.4.4.1 will be implemented during construction.

7.6.5 Visual/Aesthetics

7.6.5.1 Potential Effects & Mitigation Measures

The mitigation measures outlined in Section 7.4.5.1 will be implemented during construction.

7.6.6 Cultural Heritage

7.6.6.1 Potential Effects & Mitigation Measures

The mitigation measures outlined in Section 7.4.6.1 will be implemented during construction.

Construction of new GO Station platforms will occur at Mount Joy GO Station (Stouffville Rail Corridor), Oshawa GO Station (Lakeshore East Rail Corridor), and Unionville GO Station (Stouffville Rail Corridor. All three Metrolinx-owned properties were assessed as part of this TPAP and were determined to not have potential for Cultural Heritage Value or Interest (CHVI).

7.6.7 Archaeology

7.6.7.1 Potential Effects & Mitigation Measures

The mitigation measures outlined in Section 7.4.7.1 will be implemented during construction.

7.6.8 Stormwater Management/Site Drainage

7.6.8.1 Potential Effects & Mitigation Measures

The mitigation measures outlined in Section 7.4.8.1 will be implemented during construction.

7.6.9 Traffic

7.6.9.1 Potential Effects & Mitigation Measures

The mitigation measures outlined in Section 7.4.9.1 will be implemented during construction.

7.6.10 Utilities

7.6.10.1 Potential Effects & Mitigation Measures

The mitigation measures outlined in Section 7.4.10.1 will be implemented during construction.

7.6.11 Noise

7.6.11.1 Potential Effects & Mitigation Measures

The mitigation measures outlined in Section 7.4.11.1 will be implemented during construction.

7.6.12 Vibration

7.6.12.1 Potential Effects & Mitigation Measures

The mitigation measures outlined in Section 7.4.12.1 will be implemented during construction.

7.6.13 Air Quality

7.6.13.1 Potential Effects & Mitigation Measures

The mitigation measures outlined in Section 7.4.13.1 will be implemented during construction.

7.6.14 Contaminated Soils & Excavated Materials

7.6.14.1 Potential Effects & Mitigation Measures – General

The mitigation measures outlined in Section 7.4.14.1 will be implemented during construction.

7.7 Construction of Thickson Road Bridge Expansion

The following typical construction activities and equipment have been identified as potentially required to complete the expansion of the Thickson Road Bridge:

- Pile-driving machine for installing the H-Piles;
- Caisson machine for temporary shoring;
- Excavators/bulldozers for excavation;
- Dump trucks for soil removal;
- Concrete pumps for pouring concrete;
- Compactors for soil compaction before installing concrete elements or paving the road;
- Pavement machine for pouring asphalt and paving the roadway below the bridge; and
- Cranes for lifting different construction elements in the site.

7.7.1 Natural Environment

7.7.1.1 Potential Effects & Mitigation Measures- General

The mitigation measures outlined in Section 7.4.1.1 will be implemented during construction.

7.7.1.2 Integrated Vegetation Management (IVM)

The mitigation measures outlined in Section 7.4.1.2 will be implemented during construction.

7.7.1.3 Vegetation Removals & Compensation Plan

The mitigation measures outlined in Section 7.4.1.3 will be implemented during construction.

7.7.1.4 Tree Removals

The mitigation measures outlined in Section 7.4.1.4 will be implemented during construction.

7.7.1.5 Wildlife

The processes and mitigation measures outlined in Section 7.4.1.5 will be adhered to.

7.7.1.6 Species at Risk

The processes and mitigation measures outlined in Section 7.4.1.6 will be adhered to.

7.7.1.7 Potential Effects & Mitigation Measures – Project Specific

Potential effects and mitigation measures for the proposed Thickson Road South bridge expansion are discussed under Project segments LSE-9 and LSE-10 of this Report. In general, no significant impacts to the natural environment are anticipated during construction provided the recommended avoidance strategies and mitigation techniques provided in Chapter 5, Table 5-101 are implemented.

Sediment and erosion control will be required to ensure that construction activities do not impact water quality within the Corbett Creek or its associated riparian marsh community. A Construction Monitoring Plan (CMP) and Best Management Practices (BMP) should be in place to ensure control measures are present, installed correctly and not in need of maintenance.

7.7.2 Hydrogeological

7.7.2.1 Potential Effects & Mitigation Measures – General

The mitigation measures outlined in Section 7.4.2.1 will be implemented during construction.

7.7.2.2 Potential Effects & Mitigation Measures – Project Specific

Potential hydrogeological impacts related to construction of the Thickson Road South Bridge Expansion would be limited to construction dewatering, foundation stability and potential for groundwater contamination resulting from accidental leaks and spills from fuel handling, storage and onsite equipment maintenance activities.

Review of drill logs for wells located at the station generally show sands extending to depths of at least 5 m (e.g. Well ID 7200923) in the area of the proposed works, with soils that were classified as wet. Excavations may encounter groundwater seepage and require construction dewatering. Additional evaluation of potential dewatering flows and preparation of water management plans will be required during detailed design.

Review of the MECP Well databased identified a total of 55 well records within 500 m of the Study area segment (LSE-9). Of these, only three wells are listed as being used for domestic water supply, with the remaining wells listed as either monitoring/observation wells (37 wells), abandoned (9 wells) or of unknown use (6 wells). Domestic supply wells (Well ID 4603067 and 4603073) are located about 300 m south (downgradient) and 500 m north (upgradient), respectively of the proposed works. The well record for 4603067 indicates a 6 m deep (20 ft) dug well completed in 1954 extending through primarily sand soils. A second well record (Well ID 4603068) reports extension of the well in 1957 to a depth of 32 m (106 ft) through clay. Well record 4603073 indicates a 7.3 m deep dug well completed in 1961 clayey soils. The area is now fully developed with industrial uses that have municipal water servicing, and therefore it is expected that the well is no longer in use for water supply, however no decommissioning records were found. As the area is suppled with municipal water, and no permanent dewatering required for the infrastructure footprint, no adverse impacts are anticipated.

7.7.3 Land Use

The mitigation measures outlined in Section 7.4.3.1 will be implemented during construction.

7.7.4 Property

7.7.4.1 Potential Effects & Mitigation Measures

The mitigation measures outlined in Section 7.4.4.1 will be implemented during construction.

7.7.5 Visual/Aesthetics

7.7.5.1 Potential Effects & Mitigation Measures

The mitigation measures outlined in Section 7.4.5.1 will be implemented during construction.

7.7.6 Cultural Heritage

7.7.6.1 Potential Effects & Mitigation Measures

The mitigation measures outlined in Section 7.4.6.1 will be implemented during construction.

Thickson Road South Bridge and surrounding properties were not identified as having potential for CHVI.

7.7.7 Archaeology

7.7.7.1 Potential Effects & Mitigation Measures

The mitigation measures outlined in Section 7.4.7.1 will be implemented during construction.

There are no anticipated archaeological impacts associated with the proposed Thickson Road bridge expansion based on the information available at the time of preparing this EPR.

7.7.8 Stormwater Management/Site Drainage

7.7.8.1 Potential Effects & Mitigation Measures

The mitigation measures outlined in Section 7.4.8.1 will be implemented during construction.

7.7.9 Traffic

7.7.9.1 Potential Effects & Mitigation Measures

Thickson Road shall remain open to traffic throughout the Project, except for any brief closures that may be necessary for specific construction activities. A conceptual staging arrangement has been developed for the Thickson Road South Bridge Expansion, as shown in Figure 7-4. Please note that this conceptual arrangement has been developed for discussion purposes only, and that Metrolinx and its Contractors will finalize construction staging during future project phases, and in cooperation with the relevant authorities having jurisdiction.

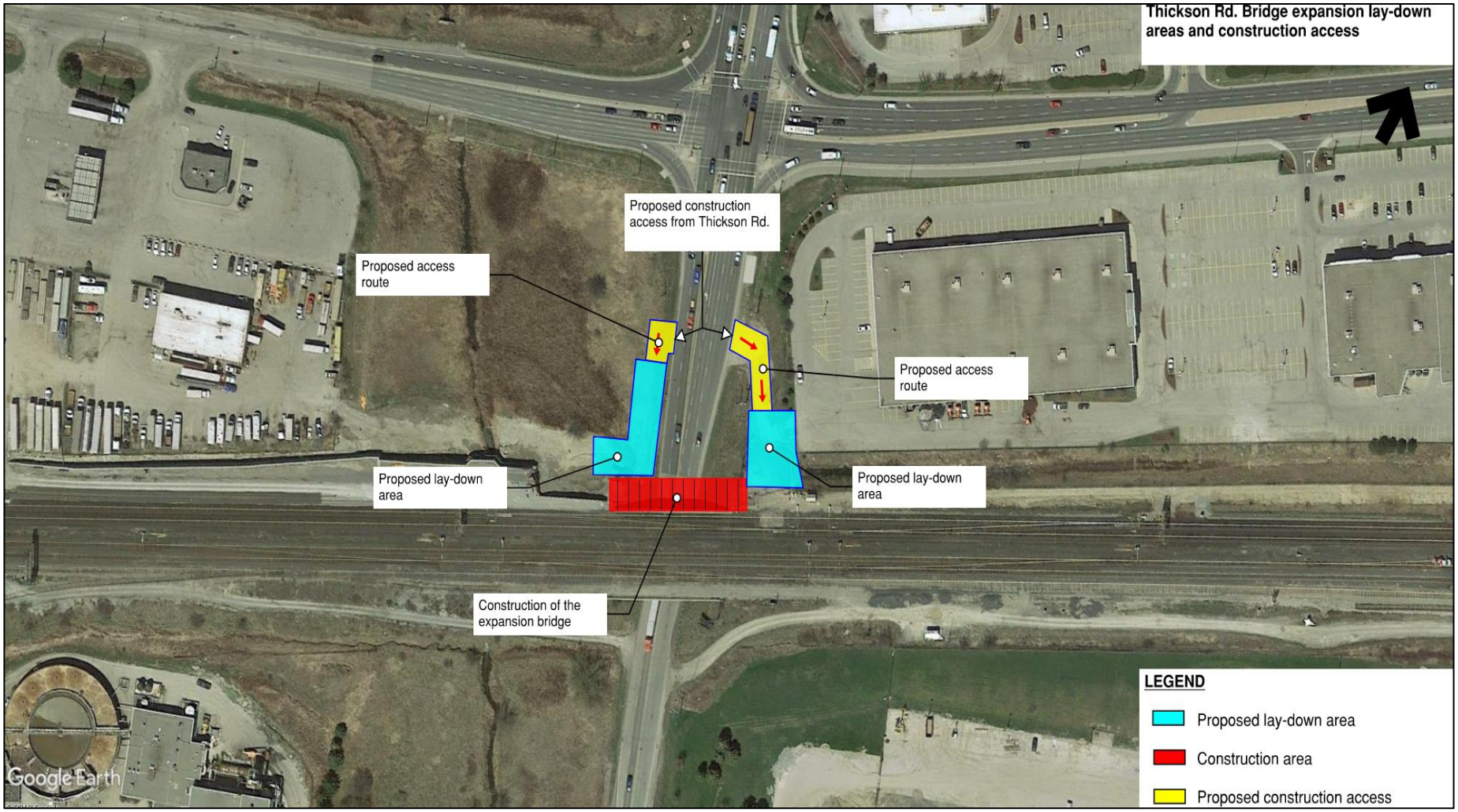

FIGURE 7-4 CONCEPTUAL THICKSON ROAD CONSTRUCTION STAGING ARRANGEMENT

7.7.10 Utilities

7.7.10.1 Potential Effects & Mitigation Measures

The mitigation measures outlined in Section 7.4.10.1 will be implemented during construction.

7.7.11 Noise

7.7.11.1 Potential Effects & Mitigation Measures

The mitigation measures outlined in Section 7.4.11.1 will be implemented during construction.

7.7.12 Vibration

7.7.12.1 Potential Effects & Mitigation Measures

The mitigation measures outlined in Section 7.4.12.1 will be implemented during construction.

7.7.13 Air Quality

7.7.13.1 Potential Effects & Mitigation Measures

The mitigation measures outlined in Section 7.4.13.1 will be implemented during construction.

7.7.14 Contaminated Soils & Excavated Materials

7.7.14.1 Potential Effects & Mitigation Measures – General

The mitigation measures outlined in Section 7.4.14.1 will be implemented during construction.

7.8 Installation of Overhead Contact System - Electrification of Richmond Hill Corridor

The primary typical construction activities associated with installation of OCS are described as follows:

OCS Foundation Installation

The OCS foundation sizes are dependent on the type of OCS structure to be installed (i.e., portal, cantilever), however typical sizes are estimated to be as follows be: 36” (900mm) diameter (single track cantilever), 42” (1050mm) diameter (two track cantilever), 42” (1050mm) diameter (portal structure<24 metres wide), 48” (1200mm) (portal structure >24 metres wide). Excavation will be required to install OCS foundations at an approximate depth of 5m.

Install OCS Support Structures

Once foundations have been established, OCS support structures will be installed. For both portal and cantilevers, the structures are pre-assembled and ready to lift using a rail crane. For cantilevers, brackets can be installed on the poles before sending to the site, whereas portals are more complex to install, as they require access to all lines (similar to a signal bridge).

Install OCS Wiring

The installation of OCS wiring involves running the contact and messenger wires together under tension along the corridor. This is typically completed using a four vehicle wiring unit, where the base vehicle dispenses wire, the second vehicle with working platform is equipped to allow messenger to be installed onto cantilever, the third vehicle with working platform is equipped to allow contact wire to be installed, and a fourth vehicle installs hangers.

Installation of Grounding and Bonding of the OCS

Grounding and bonding within the rail ROW is required for OCS support structure locations. The construction of grounding and bonding elements will occur concurrently with OCS structure foundation

installation and OCS wiring installation, since each OCS structure will be individually grounded and interconnected through the static wire.

7.8.1 Natural Environment

A Natural Environment Impact Assessment Report was prepared as part of the New Track & Facilities TPAP. Mitigation measures and commitments are outlined in Chapter 5, Table 5-101. Refer to **Appendix B2** for additional detail.

7.8.1.1 Potential Effects & Mitigation Measures- General

The mitigation measures outlined in Section 7.4.1.1 will be implemented during construction.

7.8.1.2 Potential Effects & Mitigation Measures – Project Specific

The following measures will be adhered to during construction in order to avoid or minimize potential adverse effects on wildlife, breeding birds, and Species at Risk.

- Ensure a wildlife awareness and management program is developed and employed during construction to identify and avoid harmful encounters to SAR turtles or their eggs; and
- Perform vegetation removal outside the typical breeding period for birds with consideration of potential occupation of treed roosts (individual trees) by bats and milkweed by Monarch caterpillars from March to September.

7.8.1.3 Integrated Vegetation Management (IVM)

The mitigation measures outlined in Section 7.4.1.2 will be implemented during construction.

7.8.1.4 Vegetation Removals & Compensation Plan

The mitigation measures outlined in Section 7.4.1.3 will be implemented during construction.

7.8.1.5 Tree Removals

The mitigation measures outlined in Section 7.4.1.4 will be implemented during construction.

7.8.1.6 Wildlife

The processes and mitigation measures outlined in Section 7.4.1.5 will be adhered to.

7.8.1.7 Species at Risk

The processes and mitigation measures outlined in Section 7.4.1.6 will be adhered to.

7.8.2 Hydrogeological

7.8.2.1 Potential Effects & Mitigation Measures – General

The mitigation measures outlined in Section 7.4.2.1 will be implemented during construction.

7.8.3 Land Use

The mitigation measures outlined in Section 7.4.3.1 will be implemented during construction.

7.8.4 Property

7.8.4.1 Potential Effects & Mitigation Measures

The mitigation measures outlined in Section 7.4.4.1 will be implemented during construction.

7.8.5 Visual/Aesthetics

7.8.5.1 Potential Effects & Mitigation Measures

The mitigation measures outlined in Section 7.4.5.1 will be implemented during construction.

7.8.6 Cultural Heritage

7.8.6.1 Potential Effects & Mitigation Measures

The mitigation measures outlined in Section 7.4.6.1 will be implemented during construction.

7.8.7 Archaeology

7.8.7.1 Potential Effects & Mitigation Measures

The mitigation measures outlined in Section 7.4.7.1 will be implemented during construction.

7.8.8 Stormwater Management/Site Drainage

7.8.8.1 Potential Effects & Mitigation Measures

The mitigation measures outlined in Section 7.4.8.1 will be implemented during construction.

7.8.9 Traffic

7.8.9.1 Potential Effects & Mitigation Measures

The mitigation measures outlined in Section 7.4.9.1 will be implemented during construction.

7.8.10 Utilities

7.8.10.1 Potential Effects & Mitigation Measures

The mitigation measures outlined in Section 7.4.10.1 will be implemented during construction.

7.8.11 Noise

7.8.11.1 Potential Effects & Mitigation Measures

The mitigation measures outlined in Section 7.4.11.1 will be implemented during construction.

7.8.12 Vibration

7.8.12.1 Potential Effects & Mitigation Measures

The mitigation measures outlined in Section 7.4.12.1 will be implemented during construction.

7.8.13 Air Quality

7.8.13.1 Potential Effects & Mitigation Measures

The mitigation measures outlined in Section 7.4.13.1 will be implemented during construction.

7.8.14 Contaminated Soils & Excavated Materials

7.8.14.1 Potential Effects & Mitigation Measures – General

The mitigation measures outlined in Section 7.4.14.1 will be implemented during construction.

7.8.15 Electromagnetic Fields/Electromagnetic Interference (EMF/EMI)

An EMI/EMF Impact Assessment Report was undertaken for the New Track & Facilities TPAP. Mitigation measures and commitments were characterized and grouped as outlined in Chapter 5, Table 5-111**.** Additional details can be found in **Appendix N.**

7.8.15.1 Potential Effects & Mitigation Measures

There are no anticipated impacts along the Richmond Hill Corridor during the construction phase, therefore no mitigation measures have been proposed.

7.9 Construction of Bridge Modifications- Electrification of Richmond Hill Corridor

The following typical construction activities are anticipated as part of carrying out the bridge modification works along the Richmond Hill corridor:

- OCS attachments to bridge structures (road over rail), will be done via railcar with a raising working platform from track level to install attachments to the bottom of the bridge structure;
- Installation of grounding grids/flash plates may be done via railcar by raising the working platform from track level to attach the flash plates to the bottom of the overhead structure; and
- With regard to construction of bridge protection barriers, this will be completed on top of the bridge structure, in the same manner as other bridge related civil construction works. It is noted that temporary road (traffic lanes may be reduced) and/or pedestrian walkway closures may be required during construction of the protection barriers.

7.9.1 Natural Environment

A Natural Environment Assessment Report was undertaken for the New Track & Facilities TPAP. Mitigation measures and commitments are outlined in Chapter 5, Table 5-101. Refer to **Appendix B2** for further detail.

7.9.1.1 Potential Effects & Mitigation Measures – General

The mitigation measures outlined in Section 7.4.1.1 will be implemented during construction.

7.9.1.2 Potential Effects & Mitigation Measures – Project specific

The construction of bridge modifications such as the installation of grounding grids/flash plates to bridge structures (road over rail) as part of the OCS have the potential to impact wildlife such as nesting Barn Swallows. No evidence of Barn Swallow nesting was observed on any of the structures along the Richmond Hill Project area segments during field studies performed in 2019 as part of this study.

Notwithstanding this them following mitigation measures will be adhered to:

- Screening of all structures prior to construction will be carried out to determine the presence of roosting bats or nesting Barn Swallows and any required removals will be undertaken as per provincial registration process.

7.9.1.3 Integrated Vegetation Management (IVM)

The mitigation measures outlined in Section 7.4.1.2 will be implemented during construction.

7.9.1.4 Vegetation Removals & Compensation Plan

The mitigation measures outlined in Section 7.4.1.3 will be implemented during construction.

7.9.1.5 Tree Removals

The mitigation measures outlined in Section 7.4.1.4 will be implemented during construction.

7.9.1.6 Wildlife

The processes and mitigation measures outlined in Section 7.4.1.5 will be adhered to.

7.9.1.7 Species at Risk

The processes and mitigation measures outlined in Section 7.4.1.6 will be adhered to.

7.9.1.8 Hydrogeological

7.9.1.9 Potential Effects & Mitigation Measures

No adverse impacts are anticipated due to bridge modification construction activities; therefore, no mitigation measures have been proposed.

7.9.2 Land Use & Socio-Economic

7.9.2.1 Property Potential Effects & Mitigation Measures

The mitigation measures outlined in Section 7.4.3.1 will be adhered to.

7.9.3 Property

7.9.3.1 Property Potential Effects & Mitigation Measures

The mitigation measures outlined in Section 7.4.4.1 will be adhered to.

7.9.4 Visual/Aesthetics

The mitigation measures outlined in Section 7.4.5.1 will be adhered to.

7.9.5 Cultural Heritage

Cultural Heritage studies were undertaken as part of the New Track & Facilities TPAP. Mitigation measures and commitments are outlined in Chapter 5, Table 5-105. Refer to **Appendix F2** for further detail.

7.9.5.1 Potential Effects & Mitigation Measures – Project Specific

Electrification of the Richmond Hill corridor has the potential to impact three (3) BHRs. Table 7-13 summarizes the potential impacts and mitigation measures.

TABLE 7-13 POTENTIAL CULTURAL HERITAGE IMPACTS- ELECTRIFICATION OF RICHMOND HILL CORRIDOR

Reference Number (and Location)	Type and Description of Potential/ Anticipated Impact	Mitigation Measures
#RH-01 (Queen Street East Bridge, Toronto, Mile 1.98) *Segment RH-01*	Direct impacts to potential heritage attribute(s) of this bridge are expected due to the proposed attachment of wires to the bridge, and the bridge protection barrier to be either added or modified.	• Preferred Option: Avoid alterations to the bridge. • Alternative Option: Should it be determined that there is no other technically feasible option other than to modify the bridge to accommodate electrification, it is recommended that a CHER be undertaken to determine if this potential CHR has CHVI. If the bridge is determined to have CHVI, an HIA is required to determine appropriate site-specific mitigation measures.
#RH-02 (Dundas Street East Bridge, Toronto, Mile 2.26) *Segment RH-02*	Direct impacts to potential heritage attribute(s) of this bridge are expected due to the proposed attachment of wires to the bridge, and the bridge protection barrier to be either added or modified.	• Preferred Option: Avoid alterations to the bridge. • Alternative Option: Should it be determined that there is no other technically feasible option other than to modify the bridge to accommodate electrification, it is recommended that a CHER be undertaken to determine if this potential CHR has CHVI. If the bridge is determined to have CHVI, an HIA is required to determine appropriate site-specific mitigation measures.
#RH-03 (Gerrard Street East Bridge, Toronto, Mile 2.45) *Segment RH-02*	Direct impacts to potential heritage attribute(s) of this bridge are expected due to the proposed attachment of wires to the bridge, and the bridge protection barrier to be either added or modified.	• Preferred Option: Avoid alterations to the bridge. • Alternative Option: Should it be determined that there is no other technically feasible option other than to modify the bridge to accommodate electrification, it is recommended that a CHER be undertaken to determine if this potential CHR has CHVI. If the bridge is determined to have CHVI, an HIA is required to determine appropriate site-specific mitigation measures.

A CHER has been completed to date for the three (3) BHRs listed above. Further detail can be found in Chapter 6, Section 6.6.1 and **Appendix F3**.

7.9.6 Archaeology

7.9.6.1 Potential Effects & Mitigation Measures

No adverse impacts are anticipated due to bridge modification construction activities. Notwithstanding this, the processes and mitigation measures outlined in Section 7.4.7.1 will be adhered to.

7.9.7 Stormwater Management/Site Drainage

7.9.7.1 Potential Effects & Mitigation Measures

No adverse impacts are anticipated due to bridge modification construction activities; therefore, no mitigation measures have been proposed.

7.9.8 Traffic

7.9.8.1 Potential Effects & Mitigation Measures

The processes and mitigation measures outlined in 7.4.9.1 will be adhered to.

7.9.9 Utilities

7.9.9.1 Potential Effects & Mitigation Measures

The mitigation measures outlined in Section 7.4.10.1 will be implemented during construction.

7.9.10 Noise

7.9.10.1 Potential Effects & Mitigation Measures

The mitigation measures outlined in Section 7.4.11.1 will be implemented during construction.

7.9.11 Vibration

7.9.11.1 Potential Effects & Mitigation Measures

The mitigation measures outlined in Section 7.4.12.1 will be implemented during construction.

7.9.12 Air Quality

7.9.12.1 Potential Effects & Mitigation Measures

The mitigation measures outlined in Section 7.4.13.1 will be implemented during construction.

7.9.13 Contaminated Soils & Excavated Materials

7.9.13.1 Potential Effects & Mitigation Measures

The mitigation measures outlined in Section 7.4.14.1 will be implemented during construction.

7.9.14 Electromagnetic Fields/Electromagnetic Interference (EMF/EMI)

7.9.14.1 Potential Effects & Mitigation Measures

There are no anticipated impacts of the proposed bridge modifications along the Richmond Hill Corridor, therefore no mitigation measures have been proposed.