Air Quality Impact Assessment Report

Contract RFS-2019-NAFC-110

PO 214244

HDR Project 10206938

Ontario Line Technical Advisor

Toronto, Ontario

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Executive Summary

ES.1 Project Overview and Study Purpose

Metrolinx, an agency of the Province of Ontario, is proceeding with the planning and development of the Ontario Line (the Project), extending from Exhibition/Ontario Place to the Ontario Science Centre in the City of Toronto.

The Project is being assessed in accordance with Ontario Regulation 341/20: Ontario Line Project under the Environmental Assessment Act. Ontario Regulation 341/20: Ontario Line Project outlines a Project-specific environmental assessment process that includes an Environmental Conditions Report, Environmental Impact Assessment Report, and an opportunity for Early Works Report(s) for assessment of works that are ready to proceed in advance of the Environmental Impact Assessment Report. The Environmental Conditions Report documents the local environmental conditions of the Ontario Line Study Area and provides a preliminary description of the potential environmental impacts from the Project. Information outlined in the Environmental Conditions Report is used to inform the Early Works Report(s) and Environmental Impact Assessment Report, which study environmental impacts in further detail and confirm and refine preliminary mitigation measures identified in the Environmental Conditions Report.

The Project is a new approximately 15.6-kilometre subway line with connections to Line 1 (Yonge-University) subway service at Osgoode and Queen Stations, Line 2 (Bloor-Danforth) subway service at Pape Station, and Line 5 (Eglinton Crosstown) Light Rail Transit (LRT) service at the future Science Centre Station. Fifteen stations are proposed, with additional connections to three GO Transit lines (Lakeshore East, Lakeshore West and Stouffville), and the Queen, King, Bathurst, Spadina, Harbourfront, and Gerrard/Carlton streetcar routes. The Project will reduce crowding on Line 1 and provide connections to new high-order rapid transit neighbourhoods. The Project will be constructed in a dedicated right-of-way (RoW) with a combination of elevated (i.e., above existing rail corridor/roadway), tunnelled (i.e., underground), and at-grade (i.e., at the same elevation as the existing rail corridor) segments at various locations.

ES.2 Air Quality Assessment - Construction

Sections 5.1.1 and 6.1.1 present the qualitative assessment conducted for the construction phase that incudes 15 stations, the Operations, Maintenance, and Storage Facility (OMSF), and above-ground and tunnelled portions of the Project. The construction phase is expected to be 2022 to 2029.

During the construction phase, emissions to the atmosphere will occur, primarily originating from fuel combustion associated with vehicles and equipment used for construction, and from fugitive dust from construction activities. Sensitive and critical[1] receptor locations were identified close to construction activities and staging areas. Metrolinx will develop and implement construction best management practices during the construction phase and conduct ambient air monitoring to confirm the effectiveness of the mitigation measures. With the proper mitigation measures implemented, emissions from the construction phase and resulting adverse changes in local air quality can be controlled and reduced.

The air quality assessment for the construction phase is being conducted in a two-stage process: A qualitative assessment is included in this report and is conducted based on the conceptual design of the Project, considering the construction activities associated with the Project and the locations of sensitive and critical receptors. The general air quality impacts of construction activities are well-known and appropriate mitigation has been recommended based on the elements of the conceptual design available at the time of this report. A second stage quantitative assessment is recommended when construction sequencing details are finalized, to estimate emissions and model the air quality effects of construction activities. Based on the quantitative air quality predictions, additional mitigation measures or the implementation of design specific mitigation will be recommended where appropriate.

[1] Sensitive receptors are residential dwellings, and critical receptors include retirement homes, childcare centres, schools, and similar institutional buildings (MTO 2020)

ES.3 Air Quality Assessment - Operation

Sections 5.1.2 and 6.1.2 present the qualitative assessment for the operations phase of the Project which compares two scenarios: Project Future Build (i.e., with operation of the Project) and Future No-build (i.e., without the Project). In the Future No-build scenario, without the Project, traffic volumes will increase as vehicle congestion will worsen over time (Metrolinx 2020a). Project operation is expected to start in 2030 and is part of the overall provincial objective to encourage a shift towards a more sustainable mode of transportation, with an estimated reduction of 266,000 km travelled by private vehicles per day (Metrolinx 2020a) as people shift to taking the Ontario Line Subway. The shift in travel mode will lead to 1) reductions in combustion exhaust and road dust emissions because fewer vehicles will be travelling on city roads and 2) improved fuel efficiency from less congestion and vehicle idling for those vehicles that remain on the road (Metrolinx 2008). There is an additional positive impact on air quality with the shift to travelling by electrically powered trains that do not have direct emissions from burning fuel. The reduction in exhaust emissions from shift in travel modes (such as private vehicles) will translate into a reduction in the local levels of air pollutants in the vicinity of the Project Footprint.

The assessed emissions that are expected from operations are described in Section 6.1.2 and are as follows: 1) particulate matter and metals from wear on the subway rails, subway car wheels and brake linings, 2) an increase in indirect emissions from electricity generation to power the trains, 3) emissions from the stations and OMSF including natural gas/diesel -fired combustion emissions, emissions from cleaning, paint booth, welding and other maintenance activities, and 4) potential increase in emissions due to changes in bus routes and bus schedules. Because many of the proposed station locations are already serviced by buses, streetcars, or a subway line, minimal changes to bus routes and services are expected. Additionally, the City’s bus fleet will transition to zero-emissions by 2040 (TTC 2020).

Although electricity generation for the train fleet will result in an increase in emissions on a regional basis, about 71% of the generated power in Ontario comes from sources with no direct air emissions (e.g., hydroelectric, nuclear, wind, and solar). Emissions from other sources (i.e., gas-fired power plants) (IESO 2020) that will be transferring power to the Project are expected to result in a minimal change to local air quality. Minor increases in emissions associated with power generation for the Project Future Build scenario will be more than offset by the reduction in tailpipe exhaust emissions and road dust from the estimated 266,000 fewer kilometres travelled by private vehicles per day (Metrolinx 2020a).

Therefore, an overall positive impact on air quality is expected from the Project Future Build scenario compared with the Future No-build scenario.

Table ES-1. Summary of Potential Impacts, Mitigation and Monitoring

Environmental Component	Potential Impact	Mitigation Measure(s)	Monitoring
Construction	Potential air quality impacts could include effects from fuel combustion and particulate emissions.	• A quantitative assessment will be conducted once sufficient detail on the construction planning is available. The quantitative assessment will be used to update the construction mitigation plan and will be submitted to the Ministry of the Environment, Conservation and Parks (MECP) for review prior to the start of construction activities. • Prior to commencement of construction, develop and implement a detailed Construction Air Quality Management Plan (AQMP). A copy of the AQMP will be provided to the MECP. The AQMP will: ○ demonstrate compliance with the specific air quality criteria and limits per Ontario Ambient Air Quality Criteria, Canadian Ambient Air Quality Standards and Ontario Regulation 419/05 . ○ define the Project's air quality impact zone and identify applicable sensitive receptors in this area. ○ assess the baseline air quality by continuous measurement of local ambient concentrations of $PM_{2.5}$ and PM_{10} for more than 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 in the air quality impact zone, develop appropriate mitigation measures, demonstrate their effectiveness, and commit to their timely implementation. ○ include explicit commitment to the implementation of all applicable best practices identified in the document, *Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities* (ECCC 2005), and the MECP's Technical Bulletin Management Approaches for Industrial Fugitive Dust Sources (MECP 2017). • Develop a Communications Protocol and a Complaints Protocol to respond to issues that develop during construction. • Schedule construction related activities to avoid overlapping construction activities where possible. • Reduce the number of machines operating in any one area at any given point in time. • Implement applicable mitigation measures identified in the AQMP. The AQMP will include applicable mitigation measures for each of the construction activities (refer to Table 6-2 for further detail), such as: ○ Site Preparation, Excavation and Grading ○ Demolition ○ Material Storage ○ Material Handling and Transfer ○ Road Surfaces (in and around Construction Sites) ○ On-site Fabrication Processes ○ Tunneling - Tunnel Boring Machine (TBM) or Sequential Excavation Method (SEM) ○ Construction Vehicles and Equipment	Metrolinx will develop and implement air quality monitoring as part of the AQMP to 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 anticipated air pollutants that may be produced as a result of the work. • The applicable criteria for air contaminants of concern are to be found in the various schedules of *Ontario Regulation 419/05, the Ontario Ambient Air Quality Criteria, and the Canadian Ambient Air Quality Standards*. • Establish "alert level" and "action level" thresholds that are below the applicable regulatory limits for each monitored contaminant, so that action can be taken to prevent exceedances of the regulatory limits. Measurements above a threshold will require remedial action including investigation for the cause of the exceedance and/or implementation of mitigation measures. Both alert and action levels will be set out in the contracts and in the AQMP. Establish procedures for investigating the cause of measurements above thresholds or exceedances , implementing mitigation measures and reporting. • Siting of the monitors should generally follow the guidelines provided in the MECP *Operations Manual for Air Quality Monitoring in Ontario* (2018a). • For Project construction locations that are considered short-duration projects (i.e., less than 30 days), periodic opacity monitoring for particulate matter (see ECCC 2005) at the active construction zone boundary and at closest sensitive receptor may be sufficient. • For long duration Project construction locations where sensitive receptors are identified 5 to 10 m from the active construction zone, continuous monitoring of PM_{10} and $PM_{2.5}$ is recommended at locations upwind and downwind of the active construction zone, where possible. Monitoring should also be conducted at selected sensitive receptors where there are persistent complaints. Monitoring will commence for more than one week prior to the start of any construction activities to establish pre-construction levels and continue through the active phase of the construction project. Application of "alert level" and "action level" triggers for implementation of appropriate mitigation activities for construction activities as identified in the AQMP. As the active construction zone moves or changes, the locations of the monitoring equipment will follow to maintain its relevance.

Environmental Component	Potential Impact	Mitigation Measure(s)	Monitoring
			• Monitoring setup will include meteorological station (for measuring wind speed and direction) and datalogger/modem for downloading data, power/battery source, and capability to send alarm notifications at “alert level” and “action level” thresholds, as applicable. • If laboratory work is required, consult the Standards Council of Canada (SCC) or the Canadian Association for Laboratory Accreditation (CALA) for a list of accredited Ontario analytical laboratories to perform specific air analyses. • Calibration of the instruments will be included as part of the monitoring program. • The monitoring program will include the preparation of Weekly Air Quality Monitoring Reports for documenting air quality monitoring results, monitoring activities, assessment of compliance and effectiveness of mitigation activities. • In addition, relevant construction monitoring activities from the guidelines *Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities* (ECCC 2005) will be implemented during construction.
Construction - Contaminated soils/materials	Construction activities could expose contaminated soils/materials and/or result in the spreading of contaminated materials. Emissions from the contaminated materials may pose risks to human health and wellbeing.	• Prior to commencement of construction, Metrolinx will develop a Soil and Excavated Materials Management Plan (SEMMP) for the handling, management, and disposal of all excavated material (i.e., soil, rock, and waste). The SEMMP will describe how to address the management of the excavated or imported materials, including contaminated materials. Metrolinx will follow appropriate best management practices to manage, transport, or dispose of the contaminated materials. • Visual and olfactory inspections will be conducted during excavation or for incoming loads to screen for odour, visible staining, or debris per the MECP’s Management of Excess Soils: A Guide for Best Management Practices (MECP 2019b). If contaminated soil or materials are suspected, Metrolinx will conduct further investigation and soil analysis to confirm if contamination is present and what contaminants are present. Metrolinx will take appropriate preventive actions or suspend activities to reduce potential adverse impacts, including odour or air emissions, from contaminated materials. • Where applicable, consultation with the MECP Central Region Office will be conducted to discuss the requirements in dealing with contamination issues and ambient monitoring requirements.	• Additional ambient air monitoring may be required if contaminated soils are encountered during construction activities. The list of contaminants and monitoring requirements will be assessed at that time based on the results of investigation and soil/material analysis. • If laboratory work is required, consult the SCC or the CALA for a list of accredited Ontario analytical laboratories to perform specific air/soil analyses.

Operational	Potential air quality impacts from operations at the OMSF and mobile maintenance crew could include effects from fuel combustion and maintenance activities.	• Metrolinx will apply for air approval for the OMSF operations and air emission sources as applicable. Emissions will be assessed and modelled following MECP guidance and must comply with applicable Ontario Regulation 419/05 standards (with the exception of emissions from equipment or activities exempted by *O. Reg. 524/98 Environmental Compliance Approvals – Exemptions from Section 9 of the Act)*.
		• A detailed Operations Air Quality Management Plan will be developed and implemented to document the controls and methods that will be implemented during project operations at the OMSF to limit the generation and dispersion of airborne particulate matter and air contaminants associated with the project operations.
		• Where practicable, the following mitigation measures will be implemented to reduce air contaminant emissions intensity (amount of pollutant emitted per passenger kilometre travelled):
		  ○ selecting a less polluting form of energy or fuel (i.e., electricity or hydrogen rather than diesel fuel) for equipment used at the OMSF.
		  ○ selecting equipment (such as backup generators) with engines and propulsion systems that meet higher emission standards (i.e., Tier 4 rather than a lower tier).
		  ○ maintaining engines and emission control equipment to manufacturers’ specifications.
		  ○ selecting vehicles that have lower emissions for the mobile maintenance crew.
			• On-site inspections will be undertaken to confirm the implementation of the mitigation measures and identify corrective actions if required.

Environmental Component	Potential Impact	Mitigation Measure(s)	Monitoring
Operational	Station vents exhausting air from the tunnels	• Metrolinx will apply for air approvals for the station operations and for air emission sources as applicable. Emissions from the station will need to be assessed and modelled following MECP guidance and must comply with applicable Ontario Regulation 419/05 standards (with the exception of emissions from equipment or activities exempted by *O. Reg. 524/98 Environmental Compliance Approvals – Exemptions from Section 9 of the Act)*. • A detailed Operations Air Quality Management Plan will be developed and implemented to document the controls and methods that will be implemented during project operations at the stations and tunnels to limit the generation and dispersion of airborne particulate matter and air contaminants associated with the project operations.	• The expected impacts from operations will be effectively mitigated provided that mitigation measures established in the Air Quality Management Plan are followed. No operational ambient air quality monitoring is proposed.

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Figures

Tables

Appendices

Abbreviations

AAQC	ambient air quality criteria
AQ	air quality
AQMP	Air Quality Management Plan
CAAQS	Canadian Ambient Air Quality Standards
CALA	Canadian Association for Laboratory Accreditation
CCME	Canadian Council of Ministers of the Environment
COI	contaminant of interest
ECCC	Environment and Climate Change Canada
ECR	Environmental Conditions Report
EEB	Emergency Egress Building
EIAR	Environmental Impact Assessment Report
LRT	Light Rail Transit
MECP	Ontario Ministry of the Environment, Conservation and Parks
MTO	Ministry of Transportation - Ontario
NAPS	National Air Pollution Surveillance
NPRI	National Pollutant Release Inventory
OCS	Overhead Catenary System
OLN	Ontario Line North
OLS	Ontario Line South
OLW	Ontario Line West
OMSF	Operations, Maintenance, and Storage Facility
RoW	Right-of-Way
SCC	Standards Council of Canada
SEM	Sequential Excavation Method

TBM	tunnel boring machine
TPSS	Traction Power Sub-station
TSP	total suspended particulate matter
TTC	Toronto Transit Commission

Units of Measurement

µg	microgram,1 x 10^{-6} grams
°C	degrees Celsius
m^3	cubic metre 1 m^3 = 1 x 10^3 L
ppb	parts per billion

Elements and Compounds

B(a)P	benzo(a)pyrene
CO	carbon monoxide
NO_x	nitrogen oxides
NO_2	nitrogen dioxide
$PM_{2.5}$	particulate matter, with particles of diameter equal to or less than 2.5 microns
PM_{10}	particulate matter, with particles of diameter equal to or less than 10 microns
SiO_2	silicon dioxide / crystalline silica
SO_2	sulphur dioxide
VOC	volatile organic compounds

1 Introduction

1.1 Project Overview

Metrolinx, an agency of the Province of Ontario, is proceeding with the planning and development of the Ontario Line (the Project), extending from Exhibition/Ontario Place to the Ontario Science Centre in the City of Toronto.

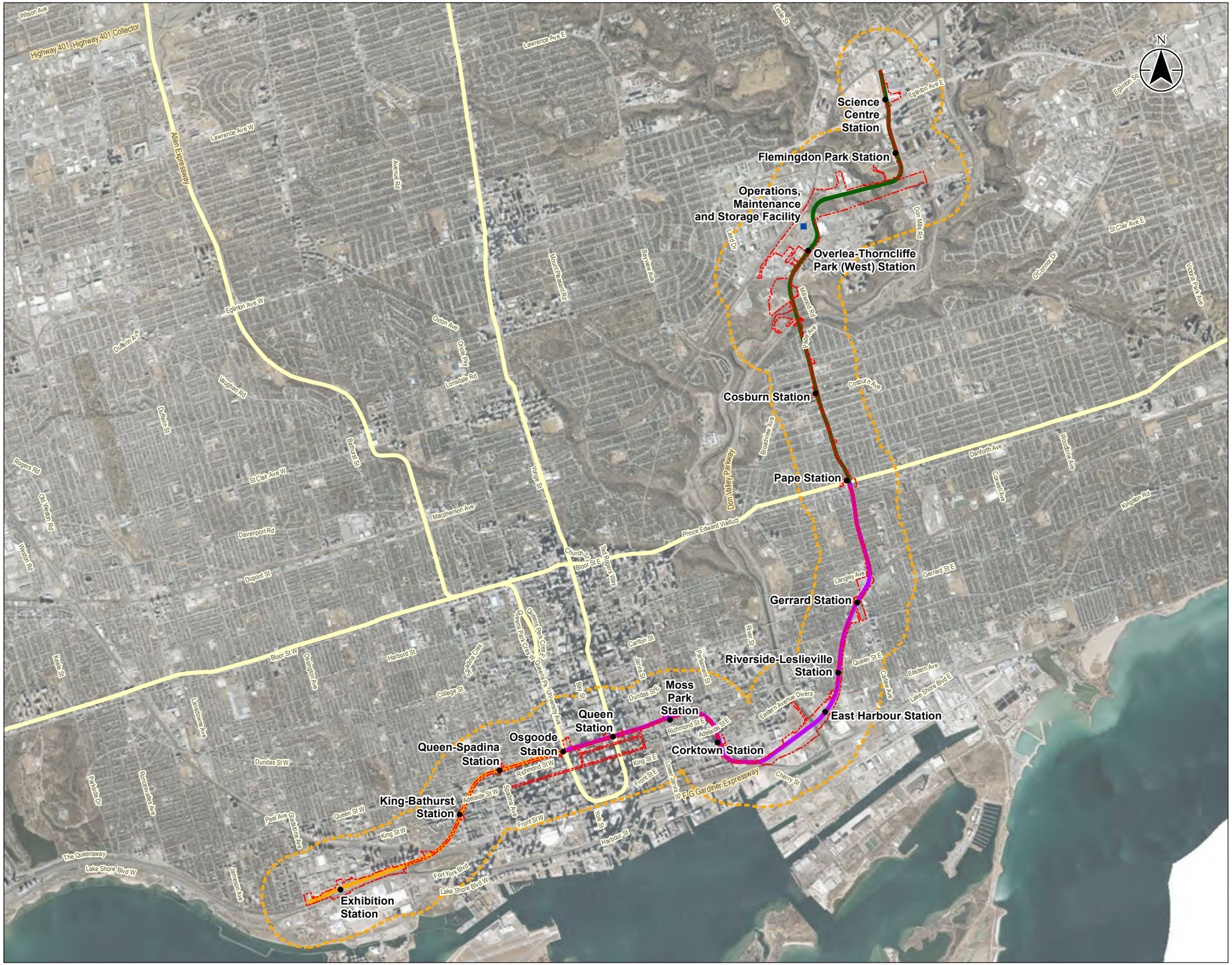
The Project is a new approximately 15.6-kilometre subway line with connections to Line 1 (Yonge-University) subway service at Osgoode and Queen Stations, Line 2 (Bloor-Danforth) subway service at Pape Station, and Line 5 (Eglinton Crosstown) Light Rail Transit (LRT) service at the future Science Centre Station. Fifteen stations are proposed, with additional connections to three GO Transit lines (Lakeshore East, Lakeshore West and Stouffville), and the Queen, King, Bathurst, Spadina, Harbourfront, and Gerrard/Carlton streetcar routes. The Project will reduce crowding on Line 1 and provide connections to new high-order rapid transit neighbourhoods. The Project will be constructed in a dedicated right-of-way (RoW) with a combination of elevated (i.e., above existing rail corridor/roadway), tunnelled (i.e., underground), and at-grade (i.e., at with the same elevation as the existing rail corridor) segments at various locations.

An overview of the Project Footprint is shown in Figure 1-1 and detailed figures showing footprint and project components are shown in Appendix A Figures A-2 to A-19.

1.2 Purpose of the Ontario Line Environmental Impact Assessment Report

The Project is being assessed in accordance with Ontario Regulation 341/20: Ontario Line Project under the *Environmental Assessment Act*. Ontario Regulation 341/20: Ontario Line Project outlines a Project-specific environmental assessment process that includes an Environmental Conditions Report (ECR), Environmental Impact Assessment Report (EIAR), and an opportunity for Early Works Report(s) for assessment of works that are ready to proceed in advance of the EIAR. The ECR documents the local environmental conditions of the Ontario Line Study Area and provides a preliminary description of the potential environmental impacts of the Project. Information provided in the ECR is used to inform the Early Works Report(s) and the EIAR, which study environmental impacts in further detail and confirm and refine preliminary mitigation measures identified in the ECR.

The EIAR includes environmental impact assessment results, proposed mitigation measures, proposed monitoring activities, potentially required permits and approvals and a record of consultation, among other information, to meet Ontario Regulation 341/20: Ontario Line Project requirements.



Stantec

Legend

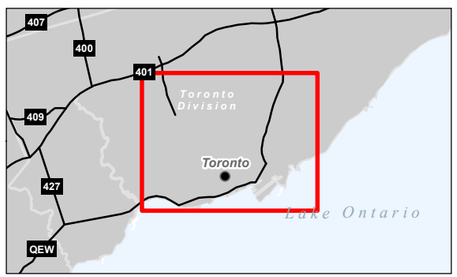
- Project Footprint
- Study Area (500 m Buffer)
- Station Location
- Operations, Maintenance and Storage Facility
- Ontario Line West
- Ontario Line South
- Ontario Line North
- Existing Subway

0 1 2 km

1:47,500 (At original document size of 11x17)

Notes

1. Coordinate System: NAD27 MTM zone 10
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2020.
3. City of Toronto data licensed under the Open Government. Licence - Toronto,



Project Location
City of Toronto, ON

160560009 REV4
Prepared by BCC on 2022-01-28
Technical Review by CL on 2021-06-10

Client/Project
HDR CORPORATION
ONTARIO LINE TA

Figure No.
1-1

Title
Project Overview

1.3 Purpose of the Air Quality Impact Assessment Report

This Report (Air Quality Impact Assessment Report) forms part of the EIAR and has been prepared to assess potential air quality impacts and identify proposed mitigation measures and monitoring activities to verify mitigation effectiveness.

The purpose of this Report is to

- assess the potential impacts on air quality associated with the construction of the Project
- assess the potential impacts on air quality associated with the operation of the Project
- identify mitigation measures and monitoring activities for any negative impacts to air quality as a result of the construct and operation activities

Assessment of greenhouse gas emissions from the Project was conducted as part of the Metrolinx Ontario Line Preliminary Design Business Case (Metrolinx 2020a) and is not included in this report.

This Report has been prepared in accordance with Ontario Regulation 341/20: Ontario Line Project and contains the information outlined in Table 1-1.

Table 1-1. Report Contents in Accordance with Ontario Regulation 341/20: Ontario Line Project

Reg. Section	Requirement	Report Section
Section 15(2)4	A description of the local environmental conditions at the site of the Ontario Line Project.	Section 4
Section 15(2)6	Metrolinx's assessment and evaluation of the impacts that the preferred method of carrying out the Ontario Line Project and other methods might have on the environment, and Metrolinx's criteria for assessment and evaluation of those impacts.	Section 6
Section 15(2)7	A description of any measures proposed by Metrolinx for mitigating any negative impacts that the preferred method of carrying out the Ontario Line Project might have on the environment.	Section 6
Section 15(2)8	A description of the means Metrolinx proposes to use to monitor or verify the effectiveness of mitigation measures proposed.	Section 6
Section 15(2)9	A description of any municipal, provincial, federal or other approvals or permits that may be required for the Ontario Line Project.	Section 7

The air quality assessment was completed in a two-stage process consisting of:

- Stage 1 - A qualitative assessment for air quality based on preliminary information from the conceptual design (which provides a general approach to project design) available at the time of this report. It is anticipated that there will be updates to the conceptual design as the project planning advances. However, the changes are expected to be generally consistent with the types of impacts identified in this report. The Stage 1 assessment includes the following:
    - discussion of existing conditions and additional anticipated sources from the Project that may lead to impacts on air quality.
    - identifying air contaminants of concern for construction and operations activities.
    - using historical ambient monitoring data to assess background air quality levels in the study area.
    - identifying sensitive and critical receptors in the study area.
    - qualitatively assessing the potential for adverse air quality impacts from project construction and operation at sensitive and critical receptors.
    - recommending mitigation measures to control construction emissions.
- Stage 2 - A quantitative assessment of the construction phase including the following:
    - estimating construction emissions of the contaminants of concern identified in the qualitative assessment.
    - using air dispersion modelling to assess the potential air quality impacts of construction emissions in the study area.
    - predicting changes in cumulative air quality relative to baseline conditions at the sensitive and critical receptors.
    - providing recommendations for mitigation measures, if required.

The contents of this report follow stage one outlined above for a qualitative air quality assessment. The quantitative air quality assessment for construction has yet to be completed pending the results and recommendations of the qualitative assessment detailed in this report, and pending the finalization of design details. As such, further descriptions of methodology and results from the quantitative air quality assessment are not included in this report.

1.4 Project Description

For readability, the Project has been divided into three sections: Ontario Line West (OLW), Ontario Line South (OLS), and Ontario Line North (OLN).

Select Project components are proposed to proceed before the completion of the Environmental Impact Assessment process and have been assessed under separate cover, as part of the Ontario Line Early Works Reports. These include early works at Exhibition Station, Corktown Station, Lower Don Bridge and Don Yard, East Harbour Station, and the Lakeshore East Joint Corridor.

Ontario Line West

The OLW section extends from Exhibition Station (a terminus and interchange point with the Lakeshore West GO Transit corridor) to the TTC Line 1 interchange at Osgoode Station.

At Exhibition Place, the OLW tracks and platform will be located at-grade on the north side of the Lakeshore West GO Transit corridor. An above-grade concourse is planned to span both sets of tracks to facilitate cross-track access to the Ontario Line and GO Transit platforms. As the tracks extend eastwards from Exhibition Station they gradually descend, and the tracks will be below-grade before entering the portal to transition the subway underground. Between Exhibition Station and the portal, retaining walls will be installed to facilitate the gradual descent of the subway line. The location of supporting structures will be confirmed as design advances, but based on current information, it is anticipated that a traction power substation may be located east of the Exhibition portal, and an EEB may be located in the Ordnance Park area.

The subway tunnel continues underground at an approximate depth of 30 m to King/Bathurst Station. Beyond King/Bathurst Station, the tunnel continues northeast before curving to arrive at Queen/Spadina Station. From there, the tunnel extends east under Queen Street to an interchange station under the existing TTC Osgoode Station. The Ontario Line Osgoode Station will be an interchange station with the existing TTC Line 1 Osgoode Station.

Ontario Line South

The OLS section extends from the east side of Osgoode Station to just south of Pape Station.

The OLS tracks continue from Osgoode Station through the subway tunnels east under Queen Street to an interchange station under the existing TTC Line 1 Queen Station. The Ontario Line Queen Station will be connected with TTC Line 1 Queen Station and the PATH system. An underground track crossover will be constructed east of Queen Station for maintenance and emergency diversion purposes. East of the crossover, the tunnels continue under Queen Street East to the Moss Park Station, located on the north side of Queen Street East between George Street and Sherbourne Street. From Moss Park Station the tunnels turn south and travels underground to Corktown Station near the intersection of Berkeley Street and King Street East. An EEB connected to the station will be located on the east side of Berkeley Street, north of Front Street. From Corktown Station, the tunnels turn southeast and travels under Distillery Lane.

An EEB will be located west of Cherry Street in the Metrolinx Union Station Rail Corridor RoW with emergency access provided from Cherry Street and Lakeshore Boulevard East. An additional EEB is proposed at the foot of Tannery Road in the Metrolinx Union Station Rail Corridor ROW. The tunnels reach the surface at the Don Yard Portal, located just west of the Don River, to the north of the existing GO Transit Union Station Rail Corridor and Don Yard train storage facility and to the southeast of Mill Street. Retaining walls will be constructed from the portal face on both sides of the tracks as the elevation ascends from below grade to at-grade. The tracks will cross the Lower Don River on a new bridge, the Lower Don Rail Bridge, that will be constructed on the north side of the existing rail bridge. Once the tracks cross the Lower Don

River, the tracks will be located on the northwest side of the Joint Corridor that runs from the Don Valley Parkway in the south to Gerrard Street East in the north.

The East Harbour Station will be located south of Eastern Avenue and Broadview Avenue and will support transfer between Ontario Line and GO transit through the station concourse. Moving northeast along the Joint Corridor, the tracks will enter the Riverside/Leslieville Station at Queen Street East. The tracks continue into Gerrard Station at Gerrard Street East and Carlaw Avenue, with a new rail bridge at the intersection of Gerrard Street East and Carlaw Avenue to accommodate the tracks. North of Gerrard Station, the tracks begin to descend from the Gerrard portal underground. The Gerrard portal is situated south of the intersection of Pape Avenue and Langley Street immediately north of the Joint Corridor. Once underground at the Gerrard portal, the subway tunnels will continue north along Pape Avenue to Pape Station at Danforth Avenue and Pape Avenue. An EEB is planned to be located at Bain Avenue and Pape Avenue.

Ontario Line North

The OLN section extends from Pape Station to Science Centre Station.

Pape Station will interchange with the existing TTC Line 2 Pape Station. North of Pape Station, under Pape Avenue, between Browning Avenue and Sammon Avenue, an underground track crossover, the Sammon Avenue Crossover, will be constructed for maintenance and emergency diversion purposes. From the Sammon Avenue Crossover, the tunnel continues north crossing under Pape Avenue to run along the west side of Pape Avenue RoW to Cosburn Station which is planned to be located on the west side of Pape Avenue at Cosburn Avenue. The tunnel continues north to the Minton Place portal, which includes an EEB. The portal face is on the southern valley wall of the Don Valley, north of Hopedale Avenue.

The underground segment of OLN will emerge from the southern valley wall of the Don Valley west of the Don Valley Crossing Bridge on an elevated structure that will span the Don Valley Parkway and the Don River. The elevated guideway will continue along the northwest side of Overlea Boulevard to the Thorncliffe Park Station, located at Thorncliffe Park Drive. East of Thorncliffe Park Station, the elevated guideway turns north, then east, crossing over Beth Nealson Drive (which will run underneath the guideway) and crossing the west branch of the West Don River to arrive at Flemingdon Park Station. Flemingdon Park Station is located on the west side of Don Mills Road, just north of Gateway Boulevard. North of Flemingdon Station, a crossover will be constructed for maintenance and emergency diversion purposes. The elevated guideway then travels north crossing from the west side to the east side of Don Mills Road to Science Centre Station, located at Don Mills Drive and Eglinton Avenue East. This station will have an underground tunnel connection to the existing TTC Line 5 (the Eglinton Crosstown LRT). North of Science Centre Station, a crossover will be constructed for maintenance and emergency diversion purposes.

The Operations, Maintenance and Storage Facility (OMSF) will be located north of Thorncliffe Park Station. The OMSF will provide storage, inspection, maintenance, and repair services for the Project.

2 Methodology

2.1 Overview

The scope of this study is based on the preliminary Project design information and construction schedule available at the time of the assessment (November 23, 2021). Where applicable, guidance from the Ministry of Transportation (MTO) Environmental Guide for Assessing and Mitigating the Air Quality Impacts and Greenhouse Gas Emissions of Provincial Transportation Projects (MTO Guide), (MTO 2020) were followed for the air quality assessment. The methodology used in this air quality study consisted of:

Study Area, Contaminants of Interest and Regulatory Framework

- establishing a study area for the Project
- identifying air emissions associated with construction of the Project, the operation of the Project (i.e., the Future Build scenario), as well as without the Project (i.e., the Future No-build scenario)
- identifying the air contaminants of interest (COI)
- reviewing applicable air quality regulatory requirements / objectives

Existing Conditions

- reviewing existing conditions based on Air Quality Qualitative Assessment - Environmental Conditions Report, Ontario Line Project (AQ Environmental Conditions Report) (AECOM 2020a), for background air quality concentrations, meteorological conditions, existing emission sources in the study area, and sensitive / critical receptors in the study area
- addressing data gaps identified in the AQ Environmental Conditions Report by reviewing additional data from the representative National Air Pollution Surveillance Network (NAPs), National Pollutant Release Inventory (NPRI), and zoning maps for baseline data for the Project study area

Emission Sources, Potential Impacts, Mitigation Measures and Monitoring Activities

- conducting a qualitative air quality assessment for the construction phase of the above-ground and tunneled portions of the Project, and other Project components such as stations, portals and the OMSF. The qualitative assessment considered the construction activities, locations of sensitive and critical receptors, and typical construction mitigation measures

- conducting a qualitative air quality assessment for the operation phase of the Project. Project Future Build and Future No-build emission sources were identified:
    - equipment associated with the operation of electric trains, train stations, and the OMSF
    - emissions related to the shift in mode of transportation due to Project implementation
    - emissions that would have existed without the Project due to background conditions and existing sources
- providing recommendations for mitigation measures to be implemented to manage and mitigate emissions associated with Project operation and construction, and providing recommendations for ambient air monitoring, if required

2.2 Project Footprint and Study Area

A study area has been identified based on the Project Footprint and geographic limits in which the air quality impacts are assessed.

The Project Footprint was established based on a conceptual design for the Project, which will be refined and updated as Project planning progresses through detailed design. The conceptual design is intended to identify the potential location of Project components as well as temporary lands that may be required during construction. The Project Footprint includes the total area potentially affected by the proposed construction activities and operations of the Project, which includes the three subway corridor sections (Ontario Line West, Ontario Line South, and Ontario Line North) and the OMSF. The extent of proposed physical works from construction and operation includes, but is not limited to, temporary laydown and staging areas, potential road detours, new bridges, tunnelling and associated openings (including vent shafts and emergency egress buildings), new stations and platforms, portals, retaining walls and barriers, railway track alignments/realignments, the OMSF, new power supply and transformers, and utility relocations. The construction phase of some Project components was assessed as part of the Ontario Line Early Works (AECOM 2021a, b, c, d, e) and are, therefore, not assessed in this report. However, the operation phases of these components are assessed in this report.

Per MTO guide (MTO 2020), transportation related impacts are expected to be limited to the area within approximately 500 m surrounding a project. For the purpose of this report, the study area for the air quality assessment encompasses the Project Footprint and the land in a 500 m radius of its boundaries. The study area is shown in Appendix B Figure B-1-1 to Figure B-1-7.

3 Air Contaminants of Interest and Regulatory Overview

3.1 Air Contaminants of Interest

Ambient air quality in the Project study area is influenced by emissions from local commercial/industrial sources and vehicular traffic. The air COI for the Project construction and train operation are, thus, the products of diesel and gasoline combustion (from road traffic and construction equipment), dust generated from construction operations, and particulate matter from wear on the train rails, wheels, and brake linings. The COI expected from station and OMSF operations come from natural gas and diesel combustion products (e.g., from comfort heating units, emergency generators), potential volatile organic compounds (VOCs) (e.g., from paint booths, cleaning and maintenance chemicals), dust and metals from maintenance operations (e.g., from lathe and welding, sanding of trains).

The COI selected for the assessment were based on the expected Project activities and associated releases to the atmosphere during construction and operation. Those activities are regularly assessed in construction and transportation assessments in Ontario. Their selection was based on guidance from the MTO Guide (MTO 2020). The VOCs and metals associated with operations at the OMSF are not included as part of this assessment because there is currently no information on the paints, chemicals or welding materials that will be used.

For this assessment, the COI are therefore:

- nitrogen dioxide (NO_2)
- carbon monoxide (CO)
- sulphur dioxide (SO_2)
- total suspended particulate matter (TSP)
- particulate matter less than 10 microns (PM_{10})
- particulate matter less than 2.5 microns ($PM_{2.5}$)
- crystalline silica
- acrolein
- benzene
- 1,3-butadiene
- acetaldehyde
- formaldehyde
- benzo(a)pyrene [B(a)P]

3.2 Regulatory Framework - Air Contaminants

A summary of the pertinent air quality objectives, guidelines, and standards for the COIs is presented in Table 3-1 according to the following applicable air contaminant guidelines from relevant agencies and organizations in Canada:

- Ontario Ambient Air Quality Criteria (AAQC) (Ministry of the Environment, Conservation, and Parks (MECP) 2019a)
- Canadian Ambient Air Quality Standards (CAAQS) (CCME 2020)

The Ontario AAQC, current 2020 CAAQS, proposed 2025 CAAQS are listed in Table 3-1. The 2020 CAAQS are applicable to the existing ambient conditions. The proposed 2025 CAAQS will be applicable when the Project begins operations in 2030.

Table 3-1. Applicable Air Quality Objectives

Air Contaminant	Averaging Time	AAQC ($\mu g/m^3$)	2020 CAAQS ($\mu g/m^3$)	2025 CAAQS ($\mu g/m^3$)
NO_2	1 hour	400	113 [a]	79 [b]
	24 hours	200	-	-
	Annual	-	32 [a]	23 [b]
CO	1 hour	36,200	-	-
	8 hours	15,700	-	-
TSP	24 hours	120	-	-
	Annual	60	-	-
PM_{10}	24 hours	50	-	-
$PM_{2.5}$	24 hours	27 [c]	27 [d]	-
	Annual	-	8.8 [d]	-
Crystalline silica	24-hour	5	-	-
SO_2	10 minute	180 [e]		
	1 hour	100 [e]	183 [f]	170 [g]
	Annual	10 [e]	13 [f]	10.5 [g]
1, 3 Butadiene	24 hours	10	-	-
	Annual	2	-	-
Acetaldehyde	½ hour	500	-	-
	24 hours	500	-	-
Acrolein	1 hour	4.5	-	-
	24 hours	0.4	-	-
Benzene	24 hours	2.3	-	-
	Annual Mean	0.45	-	-
B(a)P	24-hour	0.00005	-	-
	Annual Mean	0.00001	-	-
Formaldehyde	24-hour	65	-	-

Notes:

[a] 1 Hour and Annual CAAQS for NO_2, effective by 2020 (CCME 2020). The 1-hour CAAQS is referenced to the 3-year average of the annual 98th percentile of the daily maximum 1-hour average concentrations. The annual CAAQS is the average over a single calendar year of all 1-hour average concentrations. The criteria were converted from ppb to $\mu g/m^3$ based on standard temperature of 10°C and pressure of 1 atm as per MTO Guide (MTO 2020).

[b] 1 hour and annual CAAQS for NO_2, effective by 2025 (CCME 2020). The 1-hour CAAQS is referenced to the 3-year average of the annual 98th percentile of the daily maximum 1-hour average concentrations. The annual CAAQS is the average over a single calendar year of all 1-hour average concentrations. The criteria were converted from ppb to $\mu g/m^3$, based on a standard temperature of 10°C and pressure of 1 atm as per MTO Guide (MTO 2020).

[c] The AAQC of 27 $\mu g/m^3$ is based on the CAAQS and reflects a 3-year average of the annual 98th percentile of the daily 24-hr average concentrations. Per the AAQC guidance, this AAQC can also be compared directly to 24-hour average air quality measurement data.

[d] 24 hour and annual CAAQS for respirable particulate matter, effective by 2020 (CCME 2020). The 24-hour CAAQS is referenced to the 98th percentile daily average concentration averaged over 3 consecutive years. The annual CAAQS is referenced to the 3-year average of the annual average concentrations.

[e] Updated SO_2 AAQC per Ontario Standards for Sulphur Dioxide (MECP 2019a), effective 2023.

[f] 1 Hour and Annual CAAQS for SO_2, effective by 2020 (CCME 2020). The 1-hour CAAQS is the 3-year average of the annual 99th percentile of the SO_2 daily maximum 1-hour average concentrations. The annual CAAQS is referenced to the average over a single calendar year of all 1-hour average concentrations. The criteria were converted from ppb to $\mu g/m^3$ based on a standard temperature of 10°C and pressure of 1 atm as per MTO Guide (MTO 2020).

[g] 1 hour and annual CAAQS for SO_2, effective by 2025 (CCME 2020). The 1 Hour CAAQS is the 3-year average of the annual 99th percentile of the SO_2 daily maximum 1-hour average concentrations. The annual CAAQS is the average over a single calendar year of all 1-hour average concentrations. The criteria were converted from ppb to $\mu g/m^3$, based on a standard temperature of 10°C and pressure of 1 atm as per MTO Guide (MTO 2020).

4 Existing Conditions

4.1 Ambient Air Quality Background Levels

Background concentrations of COI in the study area are analyzed and presented in this section. The background concentrations represent the effect of existing emissions sources (i.e., both anthropogenic and biogenic) in the area. The MTO Guide (MTO 2020) recommends that the background pollutant concentration levels used for an assessment are the 90th percentiles of the most recently measured and complete concentration data from the nearest MECP or Environment Canada monitoring stations.

The background levels of $PM_{2.5}$, PM_{10}, NO_2, SO_2, CO, polycyclic aromatic hydrocarbons (benzo(a)pyrene), VOCs (benzene and 1,3-butadiene), and carbonyl (acrolein, acetaldehyde and formaldehyde), presented in this section are based on the data presented in the AQ Environmental Conditions Report (AECOM 2020a) as well as data from an additional NAPS station (Toronto East) analyzed by Stantec, as this station is representative of ambient conditions for the OLN Section. The NAPS stations selected for each air contaminant and the years reviewed in the report are presented in Table 4-1. The background concentrations used in the assessment are presented in Table 4-2. According to the AQ Environmental Conditions Report, the 1-hour and 24-hour ambient background concentrations for the data analyzed by the AQ Environmental Conditions Report were obtained from the 90th percentile hourly measurements from the monitoring stations following methodology outlined in the MTO Guide (MTO 2020). Data analyzed by Stantec also followed the MTO methodology. Where data from multiple stations was analyzed, the highest measured level for each COI over all the stations was used as the background concentration.

The background levels for PM_{10} and TSP were estimated by assuming a ratio of $PM_{2.5}/PM_{10}$ = 0.54 and $PM_{2.5}$/TSP = 0.30 (Lall et al. 2004).

Crystalline silica was not included in the AQ Environmental Conditions Report. However, as it is a potential constituent of some construction related dust, it has been included in this report. Ambient monitoring data for silicon from the available NAPS monitoring stations (presented in Table 4-1) located closest to, or most representative of the Project location, were analyzed and used to conservatively estimate background crystalline silica levels, which are included in Table 4-2. The locations of these monitoring stations are presented in Appendix B Figure B-2. The 90th percentile value for the 24-hour concentration was calculated for the five most recent years of available data at each selected monitoring station.

Table 4-1. NAPS Locations and Data Considered in the Assessment

COI	NAPS Station ID	Station, Address	Years Reviewed for Background	Excluded Data Sets (note 1)
NO_2, $PM_{2.5}$	60433	Toronto Downtown Bay and Wellesley Street, Toronto	2013 - 2017	N/A
	60410	Toronto East Kennedy Road and Lawrence Avenue [3]	2013 - 2017	N/A
CO, SO_2	60430	Toronto West 125 Resources Road, Toronto	2013 - 2017	N/A
1,3-butadiene, Benzene	60427	Gage Institute 223 College Street, Toronto	2011 - 2014	N/A
B(a)P	60427	Gage Institute 223 College Street, Toronto	2011 - 2014	N/A
	60439	Roadside Wallberg (University of Toronto) 200 College Street, Toronto	2015	N/A
Acetaldehyde, Acrolein, Formaldehyde	60439	Roadside Wallberg (University of Toronto) 200 College Street, Toronto	2014 - 2017	N/A
Silicon [2, 3]	60435	461 Kipling Avenue, Toronto (Etobicoke)	2012 - 2016 (2017 - no data)	N/A
	60427	Gage Institute 223 College Street, Toronto	2012	N/A
	60439	Roadside Wallberg (University of Toronto) 200 College Street, Toronto	2013 - 2017	2013, 2014, 2017

Notes:

1 Data sets for these years had less than 75% recovery rate and are, therefore, not considered valid according to MECP guidelines (MECP 2018a).

2 Background concentrations of crystalline silica (SiO_2) are conservatively based on ambient monitoring data for silicon (Si) converted to SiO_2 based on their molecular weights. This approach is expected to be conservative as it assumes all measured silicon is in the form of crystalline silica.

3 Additional monitoring station analyzed by Stantec representative of the Project study area.

Background ambient air quality concentrations used here are considered representative of actual ambient concentrations in the Project study area because the air quality stations are near the study area.

The background ambient air quality concentrations are compared with applicable AQ objectives in Table 4-2. Current criteria applicable to Ontario, as well as any more stringent federal criteria are shown in this table for comparison.

Background levels for COI are well below their applicable objectives, with the exception of benzene and B(a)P. The annual background concentration of benzene exceeds the criteria by 36%. Background concentrations of B(a)P for both 24-hour and annual averaging periods are more than twice and six times the criteria, respectively. Exceedances are common in southern Ontario (including rural areas), and they are not unique to the study area. Based on the Air Quality In Ontario 2017 Report (MECP 2019c), the mean annual benzene concentrations measured at the seven MECP monitoring stations ranged from 0.34 µg/m^3 to 0.60 µg/m^3, and they exceeded the annual AAQC of 0.45 µg/m^3 at two of the seven monitoring stations. However, over the ten-year period, from 2008 to 2017, there is a downward trend in benzene levels and measured concentrations have decreased 24% in Ontario (MECP 2019).

Table 4-2. Summary of Background Ambient Air Quality Concentrations

COI	Averaging Period (hours)	Background Concentration (µg/m³)	Air Quality Objectives (µg/m³)	% of Criteria
NO_2	1	51.5	112.8 [1]	46%
			400 [2]	13%
	24	42.5	200	21%
	Annual	26.7	32	83%
CO	1	446	36,200	1%
	8	419	15,700	3%
SO_2	10-minute	6.7	180 [2]	4%
	1	5.5	100 [2]	6%
	Annual	1.8	10 [2]	18%
TSP [3]	24	46.3	120	39%
	Annual	26.5	60	44%
PM_{10} [3]	24	25.8	50	52%

COI	Averaging Period (hours)	Background Concentration (µg/m³)	Air Quality Objectives (µg/m³)	% of Criteria
$PM_{2.5}$	24	14.3	27	53% [5]
	Annual	7.99	8.8	91% [5]
Crystalline silica [6]	24	2.6	5	52%
Benzene	24	0.92	2.3	40%
	Annual	0.61	0.45	136%
1,3-butadiene	24	0.1	10	1%
	Annual	0.06	2	3%
Acrolein	1 4	0.17	4.5	4%
	24	0.07	0.4	18%
Acetaldehyde	0.5 [4]	5.0	500	1%
	24	1.7	500	0.3%
Formaldehyde	24	3.2	65	5%
B(a)P	24	1.21E-04	0.5E-04	242%
	Annual	6.72E-05	1.0E-05	672%

Notes:

1 NO_2 2020 CAAQS

2 NO_2 AAQC / SO_2 updated AAQC

3 Background concentrations for TSP and PM_{10} were based on PM2.5 monitoring data converted by assuming a ratio of $PM_{2.5}/PM_{10}$ = 0.54 and $PM_{2.5}$/TSP = 0.30 (Lall et. al. 2004).

4 Concentration for this averaging period is converted based on the MECP recommended conversion factor/methodology (MECP 2018b).

5 Background concentrations (i.e., 90th percentiles and annual average) of $PM_{2.5}$ were compared with the 24-hour and annual CAAQS for reference only. It should be noted that $PM_{2.5}$ CAAQS are referenced to the 98th percentile daily average concentration averaged over 3 consecutive years, and 3-year average of the annual average concentrations, respectively.

6 The background concentration of crystalline silica is conservatively based on ambient monitoring data for silicon converted to silica based on the ratio of their molecular weights. Crystalline silica (SiO_2) molecular weight - 60, Silicon (Si) molecular weight – 28. This approach is expected to be conservative as it assumes all measured silicon is in the form of crystalline silica.

4.2 Meteorological Conditions

Meteorological data from the Toronto City Centre station (Station ID 71265) and Toronto Pearson International Airport (Station ID 61587) were reviewed in the AQ Environmental Conditions Report (AECOM 2020a) for local meteorological conditions. Meteorological conditions from the Toronto City Centre station are representative of the Ontario Line West section, while the data from Toronto Pearson International Airport are more representative of the Ontario Line South and Ontario Line North sections. According to the AQ Environmental Conditions Report, the most frequent single wind direction measured at the Toronto City Centre station is from the east-northeast, but with . winds blowing most frequently from westerly directions (northwest to southwest). The predominant wind directions measured at the Toronto Pearson International Airport are from the north-northwest and west, with lower windspeeds occurring for winds predominantly blowing from the southwest.

4.3 Zoning and Land Use Information

A summary of the zoning and land use information for each Ontario Line section is presented in the sub-sections below. Zoning maps of each location are included in Appendix C.

4.3.1 Ontario Line West Section

The study area consists of a mix of land uses including Employment Industrial, Residential, Commercial Residential, Open Space, and Utility and Transportation zones (see Appendix C, Figures C-1 – C-5).

4.3.2 Ontario Line South Section

Land uses in the study area include commercial residential, residential, open space, employment industrial, residential, and utility and transportation zones (see Appendix C, Figures C-5 – C-12).

4.3.3 Ontario Line North Section

The study area contains a mix of residential, commercial residential, open space, institutional, residential apartment, employment industrial, and utility and transportation zones (see Appendix C, Figures C-13 – C-19).

4.3.4 Operations, Maintenance, and Storage Facility

Zoning around the OMSF includes employment industrial, open space, utility and transportation, and commercial residential zones (see Appendix C, Figures C-16 – C-19).

4.4 Receptors

Receptors are locations where human activity regularly takes place. Receptors near the Project Footprint and in the study area were identified and characterized as part of the assessment. Based on the MTO Guide (MTO 2020), receptors are characterized as sensitive and critical receptors. Sensitive receptors include residential dwellings. Critical receptors include, for example, schools, hospitals, retirement homes, and childcare centres, and similar institutional buildings (MTO 2020). Land uses that contain critical receptors and representative sensitive receptors in the study area were identified for this assessment.

The receptors include those identified in the AQ Environmental Conditions Report (AECOM 2020a), where applicable. Additional review of available aerial imagery and maps was conducted to confirm receptors and identify additional receptors in the study area. Potential future sensitive receptors and critical receptors were identified, based on the City of Toronto's active development applications summarized in the Environmental Conditions Report Socio-Economic and Land Use Characteristics Report (AECOM 2020b). The active development applications include recent, ongoing, and proposed development; however, not all of these development proposals will be approved and constructed. They were conservatively assumed to all be constructed and considered as receptors in the assessment.

Summaries of current sensitive receptors and current critical receptors and potential future sensitive receptors and future critical receptors located near the Project Footprint are presented in Table 4-3 to Table 4-6 for the OLW, OLS, and OLN sections and the OMSF, respectively. Detailed listings and figures showing the current and potential future receptors (both sensitive and critical) are presented in Appendix D and Appendix E.

Table 4-3. Receptor Summary - Ontario Line West Section

Project Component	Location/Boundary	Sensitive Receptors (current and future)	Critical Receptors (current and future)
Exhibition Station	Bound by Dufferin Street on the west side Exhibition Station at Gardiner Expressway and Jefferson Avenue	Residential houses and an apartment building are on the west side of Dufferin Street, less than 20 m to the west of the construction staging area footprint. Several condominiums are less than 10 m north of the construction staging area footprint, located north of Gardiner Expressway between Hanna Avenue and Strachan Avenue. Centennial Park and Exhibition Place to the south. Proposed office and live-work units northeast of Fraser Avenue and Gardiner Expressway, to be located on the construction staging area.	School (literacy and adult learning centre) at King Street West and Dufferin Street located 380 m north of construction staging area. Nursing home at Tyndall Avenue located 350 m northwest of construction staging area. Proposed sports training centre on Strachan Avenue south of Gardiner Expressway, located approximately 50 m southeast of the construction staging area.
Below-grade section east of Exhibition Station	Between Exhibition Station Portal and Bathurst - King Station	Condominiums currently under construction 40 m to the north (on Ordnance Street) and 150 m to the north (Wellington St West and Stanley Terrace) of the footprint. Condominium on Stanley Terrace, approximately 250 m to the northwest. Garrison Common Park and Fort York National Historic Site are to the south. Mainly residential area with houses, condominiums and townhouses near the footprint at Wellington Street West and Tecumseth Street area. Proposed mixed use building (commercial on lower levels and residential on upper levels) is to be located at Ordnance Park 20 m north of footprint.	School at Bathurst Street near Niagara Street about 120 m southeast of footprint.

Project Component	Location/Boundary	Sensitive Receptors (current and future)	Critical Receptors (current and future)
Bathurst - King Station	Bathurst Street and King Street West	Mixed-use buildings, condominiums and townhouses are 5 m to 40 m to the north, south, east and west of the construction staging areas of the Bathurst - King Station. Proposed mixed-use building at the southeast corner of Bathurst Street and King Street West is to be located on the Bathurst-King Station footprint. Proposed condominium building at the northwest corner of Portland Street and King Street West, approximately 100 m east of the station footprint. Proposed mixed-use building at the northwest corner of Bathurst Street and Wellington Street West is to be located 35 m west of the station footprint.	Place of worship located at Bathurst Street and Adelaide Street West about 100 m northwest of the footprint. School at Portugal Square about 200 m northwest of the footprint. School at Bathurst Street near Niagara Street about 200 m southwest of the footprint. School at Niagara Street near Adelaide Street about 400 m northwest of the footprint.
Below grade section	Between Bathurst - King Station and Queen-Spadina Station	Commercial and residential areas along the below-grade section footprint. Several proposed mixed-use buildings located less than 30 m from the below-grade section footprint.	School on Brant Street near Adelaide Street West, approximately 200 m southeast of the footprint. School (language school) located on Portland Street near Richmond Street West located 20 m east of the footprint. Business college located 80 m to the south of the footprint.

Project Component	Location/Boundary	Sensitive Receptors (current and future)	Critical Receptors (current and future)
Queen-Spadina Station	Queen Street West and Spadina Avenue	Mainly commercial buildings or mixed-use buildings surrounding the station footprint. Residential townhouses located northeast of Spadina Avenue and Phoebe Street and on Bulwer Street, approximately 120 m to the northeast of the station footprint. Mixed-use and residential condominium located west of the intersection of Spadina Avenue and Phoebe Street and located 50 m northwest of station footprint. Condominiums at Spadina Avenue and Richmond Street West are 50 m to the south of the station footprint. A hostel is at Queen Street West and McDougall Lane, approximately 80 m west of the station. Proposed hotel and a proposed mixed-use building west of Bulwert Street and Spadina Avenue intersection, to be located approximately 50 m northeast of the station. Two proposed mixed-use buildings located northeast of Richmond Street West and McDougall Lane, approximately 50 m southwest of station.	School on Phoebe Street approximately 50 m to the northeast of the station footprint. A college (CanPacific College of Business and English) located in a commercial building on Richmond Street West and Brant Street located 100 m southwest of station footprint.

Project Component	Location/Boundary	Sensitive Receptors (current and future)	Critical Receptors (current and future)
Below grade section along Queen Street	Between Spadina Avenue and Yonge Street	Mixed-use buildings 5 m to 10 m along both north and south of the footprint.	School on Phoebe Street is approximately 70 m north of the footprint. Daycare/school (Kinder College Early Learning Centre) on Richmond Street West is located 50 m to the south of the footprint. Daycare is inside the commercial building at Pullan Place and Simcoe Street 50 m to the north of the footprint. Proposed potential daycare within a mixed use building at John Street and Richmond Street West, approximately 100 m south of the footprint.
Osgoode Station	Queen Street West and University Avenue	Mainly commercial buildings and mixed-use buildings surrounding the station. Mixed-use building located above the construction staging area footprint. Proposed mixed-use building and proposed addition of condominium units at southwest intersection of University Avenue and Queen Street West to be located immediately south of Osgoode Station footprint.	Institutional building (Osgoode Hall) is less than 5 m to the east of the construction staging area with air intake on the wall facing the construction laydown area. Daycare/school (Kinder College Early Learning Centre) is on Richmond Street West and approximately 50 m southwest of the construction staging area. Daycare is inside the commercial building at Pullan Place and Simcoe Street 150 m west of the construction staging area.

Table 4-4. Receptor Summary - Ontario Line South Section

Project Component	Location/Boundary	Sensitive Receptors (current and future)	Critical Receptors (current and future)
Below-grade section along Queen Street West/Queen Street East	Between University Avenue and Yonge Street	Mainly commercial buildings located on both sides of the footprint along Queen Street. A hotel is located on the south side of Queen Street, approximately 5 m to the south of the footprint along Queen Street.	Institutional (government) buildings including city hall, Osgoode Hall and library located on the north side of the footprint along Queen Street.
Queen Station	Queen Street West and Yonge Street	Mixed-use commercial residential buildings are on the south side of Queen Street at Victoria Street and are approximately 40 m south of the station footprint. Proposed addition of residential units above an existing commercial building at the northwest corner of Albert Street and James Street, approximately 20 m northwest of construction staging area footprint at James Street. Proposed condominium on Yonge Street, approximately 100 m north of Queen Station footprint.	St. Michael's Hospital is on the north side of Queen Street East at Victoria Street, 20 m northeast of the station footprint. St. Michael's Health Centre/Pediatric clinic is on the south side of Queen Street at Victoria Street and Berit Street, 100 m southeast of the station footprint. A place of worship is on the north side of Queen Street at Bond Street less than 150 m northeast of the station footprint.

Project Component	Location/Boundary	Sensitive Receptors (current and future)	Critical Receptors (current and future)
Below-grade section along Queen Street East	Yonge Street to George Street	Mainly commercial, mixed-use, institutional buildings. Mixed-use building southwest of Jarvis Street and Queen Street East, immediately south of the below-grade section footprint. Apartment/condominium at Mutual Street approximately 60 m to the north of below-grade section footprint. Mixed-use commercial residential buildings at Shuter Street and Dalhousie Street are 100 m to the north of the below-grade section footprint. Three proposed mixed-use buildings northeast of Church Street and Queen Street East, and Mutual Street and Queen Street East to be located less than 20 m north of the below-grade section footprint.	A place of worship is located 60 m north of the station footprint. St. Michael's Hospital is on the north side of Queen Street East at Victoria Street immediately north of the footprint. St. Michael's Health Centre/Pediatric clinic is located immediately south of the footprint. A place of worship is on the north side of Queen Street at Bond Street less than 150 m northeast of the station footprint.

Project Component	Location/Boundary	Sensitive Receptors (current and future)	Critical Receptors (current and future)
Moss Park Station	Queen Street East and Sherbourne Street	Residential houses, apartments, condominiums are a block to the north of the footprint near Shuter Street and Pembroke Street, approximately 120 m to the north of the Moss Park Station footprint. Apartments are on Sherbourne and on Shuter Street, approximately 50 m to the north of the footprint. Mixed-use commercial/condominium buildings are on the east and west side of Sherbourne Street at Richmond Street East less than 20 m south/southeast of the station construction staging footprint.	Sports field and arena are immediately north of Moss Park Station footprint. Community recreation centre is less than 40 m north of the footprint. An institution (place of worship, homeless shelter and health services) is 25 m to the east of the Moss Park Station construction staging footprint. George Brown College - St. James Campus East Building is near Britain Street and Sherbourne Street less than 60 m south of the station footprint. Several buildings in the George Brown College campus on Adelaide Street East/ Frederick Street and King Street East/ Frederick Street are located approximately 200 m to 300 m to the south of the station footprint.
Below-grade section	Between Moss Park Station and Corktown Station	Mix of commercial and residential buildings along the footprint, including mixed-use commercial/residential apartment on Ontario Street/Brigden Place and on Berkeley Street south of Queen Street East, located along the footprint. Two proposed mixed-use buildings located southwest of Berkeley Street and Queen Street East and at Mcfarrens Lane and Queen Street East, approximately 5 to 10 m north and south of the footprint. Two proposed mixed-use buildings on Ontario Street, south of Richmond Street East, and located 50 m to 80 m west of the footprint.	A place of worship is on the south side of Richmond Street East, west of Berkeley Street, and less than 10 m south of the footprint. A school is on Parliament Street, north of Richmond Street East, approximately 90 m to the northeast of the footprint. A place of worship and a school are at Queen Street East and Power Street over 200 m to the northeast of the footprint. A school located at Sackville Street and Richmond Street East is over 200 m to the northeast of the footprint.

Project Component	Location/Boundary	Sensitive Receptors (current and future)	Critical Receptors (current and future)
Corktown Station	Front Street East and Berkeley Street	Mixed-use commercial/residential building at King Street East and Parliament Street is 15 m to the north of the station construction staging footprint. Mixed-use commercial/residential building at King Street East and Berkeley Street is 20 m to the west of construction staging footprint. Residential houses/townhouses on Trinity Street, approximately 150 m to the east of the footprint. Proposed mixed-use building at the southeast corner of Berkeley Street and King Street East, to be located on the Corktown Station and construction staging area footprint. Proposed mixed-use building northwest of King Street East and Berkeley Street, and approximately 80 m northwest of Corktown Station footprint.	George Brown College at King Street East and Berkeley Street is 100 m to the west of the construction staging footprint. A place of worship at King Street East and Trinity Street, approximately 100 m to the east of the footprint. Market Lane Junior and Senior Public School and a sports complex at The Esplanade west of Berkeley Street, approximately 100 m west of the construction staging footprint. A school at Lower Jarvis Street and The Esplanade approximately 500 m from the footprint. Daycare on Distillery Lane less than 100 m southeast of the construction staging footprint.

Project Component	Location/Boundary	Sensitive Receptors (current and future)	Critical Receptors (current and future)
Below-grade section along Distillery Lane	From Corktown Station to Don Yard	Residential buildings and mixed-use commercial/residential buildings in this area, such as commercial/residential building at Distillery Lane and Parliament Street located less than 5 m north of footprint; apartments at Longboat Avenue west of Parliament Street and less than 10 m southwest of footprint, and at Distillery Lane and Cherry Street, 30 m north of the footprint. Two mixed-use commercial and residential buildings located on Mill Street less than 10 m from the Trinity Street and Front Street East construction staging area. Mixed-use commercial and residential buildings southeast of Cooperage and Palace Street, approximately 140 m to the northeast of Trinity Street and Front Street East construction staging area. Three proposed mixed-use buildings on the north and south side of Distillery Lane, east of Parliament Street, and located immediately north and south of the footprint. Proposed hotel at Trinity Street and Mill Street to be located immediately south of the Trinity Street and Front Street East construction staging area.	Day care at Distillery Lane and Parliament located less than 5 m north of footprint. School at Gristmill Lane located 40 m north of the footprint. School located at Sackville Street, approximately 460 m north of the footprint. Student residence for George Brown College southwest of Cooperage Street and Palace Street approximately 300 m to the north of the footprint.

Project Component	Location/Boundary	Sensitive Receptors (current and future)	Critical Receptors (current and future)
Don Yard Portal	Northwest of Don Valley Parkway and Gardiner Expressway	Footprint is currently a parking lot and the GO Transit Don Yard. Mixed-use commercial/residential building at Distillery Lane and Cherry Street 50 m west of the Don Yard portal construction staging footprint. Condominium at Mill Street and Rolling Mills Road less than 30 m north of the construction staging footprint. Proposed hotel at the northeast corner of Mill Street and Trinity Street, less than 10 m north of construction staging area at Trinity Street and Front Street East. Proposed mixed-use building southeast of Cherry Street and Mill Street, and to be located immediately west of the construction staging area. Proposed West Don Lands development, including residential housing, school, and childcare centres to be located in the area around the Don Yard Portal.	Student residence for George Brown College southwest of Cooperage Street and Palace Street is approximately 150 m to the north of construction staging area for Don Yard Portal. Proposed West Don Lands development, including residential housing, school, and childcare centres to be located in the area around the Don Yard Portal.
East Harbour Station	Eastern Avenue and Don Valley Parkway	Footprint is currently a car dealership, parking lot, and commercial and industrial buildings. Mainly industrial and commercial to the east and south of East Harbour Station. Residential houses 5 to 10 m from the north edge of the East Harbour Station construction staging footprint.	A community centre located at Queen Street East and Saulter Street is about 200 m north of the construction staging footprint.

Project Component	Location/Boundary	Sensitive Receptors (current and future)	Critical Receptors (current and future)
Riverside/Leslieville Station	Queen Street East and De Grassi Street	Residential areas 5 to 30 m to the east and west of the Riverside/Leslieville Station footprint. Proposed residential townhouses on De Grassi Street 5 to 10 m from the construction staging area footprint.	Recreation centre located at Queen Street East and McGee Street 5 m northeast of Riverside/Leslieville Station footprint. Three schools located near Dundas Street East and Boulton Avenue over 200 m northwest of the footprint. Community centre at Queen Street East and Saulter Street about 100 m west of footprint.
Above grade joint corridor north of Riverside/Leslieville Station	Between Riverside/Leslieville Station and Gerrard Station	Residential houses 20 m to 50 m from the west and east extents of the footprint.	Recreation centre located at Queen Street East and McGee Street 5 m from the eastern edge of the footprint. Three schools located near Dundas Street East and Boulton Avenue are over 200 m to the west of the footprint.
Gerrard Station and Gerrard Station Portal	Gerrard Street East and Carlaw Avenue	Residential houses are 5 to 20 m east and west of the construction staging footprint. An apartment at Poucher Street and Pape Avenue 25 m to the east of construction staging footprint. Proposed residential building at Logan Avenue and south of Gerrard Street East, approximately 50 m from construction staging area footprint. Proposed mixed-use building at Pape Avenue north of Gerrard Street East, to be located at the construction staging area footprint.	A daycare and school are at Langley Avenue and Pape Avenue immediately adjacent to the footprint. School located at Boultbee Avenue 250 m northeast of construction staging footprint. Three places of worship, one with a daycare, at First Avenue near De Grassi Street, First and West Avenue, and Simpson Avenue and Howland Road, are approximately 200 to 300 m west of the construction staging footprint. A school at Gerrard Street East and De Grassi Street is over 300 m to the west of the construction staging footprint.

Project Component	Location/Boundary	Sensitive Receptors (current and future)	Critical Receptors (current and future)
Below grade section along Pape Avenue	Between Gerrard Station Portal and Pape Station	Residential houses and commercial buildings are on both sides of Pape Avenue and 5 to 10 m from the footprint of the below grade section. Proposed residential development northwest of Pape Avenue and Riverdale Avenue less than 10 m from the western extent of footprint.	School at Strathcona Avenue and Jones Avenue, and community centre at Blake Street over 200 m to the east of footprint. Proposed daycare southeast of Pape Avenue and Riverdale Avenue, immediately east of footprint.

Table 4-5. Receptor Summary - Ontario Line North Section

Project Component	Location/Boundary	Sensitive Receptors (current and future)	Critical Receptors (current and future)
Pape Station	Pape Avenue and Danforth Avenue	Residential houses and commercial buildings on both sides of Pape Avenue are 5 to 10 m from the construction staging footprint.	There are two places of worship at Danforth Avenue and Gough Avenue, 10 m to 60 m to the west of the Pape Station construction staging footprint. A place of worship on Pape Avenue near Gertrude Place is 60 m to the west of the construction staging footprint.
Below-grade section along Pape Avenue	Between Pape Station and Cosburn Station	Residential houses and commercial buildings on both sides of Pape Avenue are 5 m to 10 m from the footprint.	Place of worship at Pape Avenue and Aldwych Avenue is immediately east of the EEB footprint. A school located at Carlaw Avenue and Mortimer Avenue, about 100 m west of the footprint. A place of worship is on Floyd Avenue, about 25 m west of the footprint. Two schools and a daycare at Gowan Avenue and Carlaw Avenue are approximately 200 m to the west of the footprint.

Project Component	Location/Boundary	Sensitive Receptors (current and future)	Critical Receptors (current and future)
Cosburn Station	Cosburn Avenue and Pape Avenue	Apartments and houses are 5 m to 10 m from the Cosburn Station footprint.	A place of worship is at Cosburn Avenue and Pape Avenue, 20 m east of the Cosburn Station footprint. A place of worship is on Floyd Avenue, about 70 m southwest of the footprint. A daycare is along Cosburn Avenue and 120 m east of the footprint. There are two schools and a daycare at Gowan Avenue and Carlaw Avenue, approximately 200 m southwest of the footprint.
Below-grade section along Pape Avenue	Between Cosburn Station and Minton Place Portal	The footprint of the below-grade section is mainly surrounded by residential houses and commercial buildings on both sides of Pape Avenue are 5 m to 10 m from the footprint.	A community centre, school and daycare are northeast of Torrens Avenue and Pape Avenue, 10 m to 50 m east of the footprint. A school located northwest of O'Connor Drive and Pape Avenue is less than 5 m west from the footprint.
Minton Place Portal	Pape Avenue and Minton Place	Residential houses are 5 m to 10 m from the Minton Place Portal construction staging footprint. North of Minton Place portal is Don Valley Parkway and green space.	N/A
Thorncliffe Park (West) Station	Thorncliffe Park Drive and Overlea Boulevard	Mainly commercial and residential area in the Thorncliffe area near the Thorncliffe Park (West) Station. Residential townhouses and apartments/ condominiums are 40 m east/southeast of the footprint.	Two places of worship on Thorncliffe Park Drive are 200 m and 450 m to the southeast of construction staging footprint. Two schools on Thorncliffe Park Drive are 350 m to the southeast of the construction staging footprint.

Project Component	Location/Boundary	Sensitive Receptors (current and future)	Critical Receptors (current and future)
Elevated section	Between Thorncliffe Park (West) Station and Flemingdon Park Station	Condominiums at Overlea Boulevard and Thorncliffe Park Drive are over 300 m to the south of the footprint. Condominiums at Don Mills Road and Gateway Boulevard are 200 m to the south of the footprint.	A retirement home, places of worship and senior's centre are on William Morgan Drive over 200 m south of the footprint. Two schools at Overlea Boulevard are 250 m and 400 m to the south of the footprint.
Flemingdon Park Station	Don Mills Road and Gateway Boulevard	Apartment/condominiums are on the east side of Don Mills Road, approximately 70 m east of the footprint. A proposed residential development will be on St. Dennis Drive, approximately 350 m east of Flemingdon Park Station.	A place of worship, daycare and school are at Gateway Boulevard and Grenoble Drive, over 200 m east of the footprint. Several schools are at Overlea Boulevard and Don Mills Road, over 250 m south of the footprint.

Project Component	Location/Boundary	Sensitive Receptors (current and future)	Critical Receptors (current and future)
Science Centre Station	Eglinton Avenue East and Don Mills Road	Residential houses located on Ferrand Drive, south of Eglinton Avenue East, are 100 m southeast of the construction staging footprint. A proposed community with residential buildings will be northwest of Don Mills Road and Eglinton Avenue East, 50 m to the west of Scient Centre Station. Proposed mixed-use commercial/residential towers and a potential daycare will be located southeast and southwest of Eglinton Avenue East and Don Mills Road, which would be to the southeast and southwest of the Science Centre Station. A proposed residential development will be located on Ferrand Drive, south of Eglinton Avenue East, and 100 m south of the construction staging footprint.	A place of worship and Institute of Holistic Nutrition are 10 m to 100 m east of the Science Centre Station construction staging area. Sutherland-Chan School of Massage Therapy is 40 m east of the construction staging footprint. A daycare is 200 m to the east of the construction staging footprint. A place of worship and a community centre are over 300 m to the east of the footprint. A place of worship located on Ferrand Drive south of Eglinton Avenue East is 100 m southeast of the construction staging footprint. A potential daycare in a proposed mixed-use commercial/residential tower will be located southeast and southwest of Eglinton Avenue East and Don Mills Road, to be located southeast and southwest of the Science Centre Station footprint.

Table 4-6. Receptor Summary - Operations, Maintenance, and Storage Facility

Project Footprint/ Component	Location/Boundary	Sensitive Receptors	Critical Receptors
Operations, Maintenance, and Storage Facility	Banigan Drive / Overlea Boulevard near Thorncliffe Park Station, and Beth Nealson Drive	Residential townhouses and apartments / condominiums are 10 to 20 m southeast of the footprint near Overlea Boulevard. Residential houses are approximately 300 - 400 m to the west and northwest of the footprint. A residential development along Vanderhoof Avenue is approximately 450 m to the northwest of the footprint near Beth Nealson Drive. Residential apartments / condominiums at Don Mills Road and Overlea Boulevard are located approximately 25 m to 150 m to the south of the footprint.	Two places of worship on Thorncliffe Park Drive are 200 m and 450 m to the southeast of the footprint near Overlea Boulevard. Two schools on Thorncliffe Park Drive are 350 m to the southeast of the footprint near Overlea Boulevard. A retirement home is located approximately 80 m south of the footprint near Beth Nealson Drive. Places of worship and senior's centre are on William Morgan Drive approximately 150 m south of the footprint near Beth Nealson Drive. Two schools at Don Mills Road and Overlea Boulevard are located approximately 120 m and 250 m to the south of the footprint. A school at Gateway Boulevard is located approximately 100 m to the southeast.

4.5 Existing Emission Sources

The AQ Environmental Conditions Report (AECOM 2020a) and 2018 NPRI Facility Reported Data (NPRI 2020) were reviewed for existing emission sources in the study areas of the OLW, OLS, and OLN sections (including the OMSF). Sources of emissions include existing road traffic emissions from buses and passenger vehicles, emissions from diesel locomotives travelling along the rail corridors, and industrial emissions in the study area. The study area is serviced by the TTC as well as GO Service buses and trains.

A summary of the review is presented below.

4.5.1 Ontario Line West Section

The main traffic flows are along Queen Street West, Spadina Avenue, King Street West, Bathurst Street, Liberty Street, Dufferin Street, Lakeshore Boulevard, and the Gardiner Expressway. The study area is currently serviced by approximately 10 TTC bus routes, and 4 GO bus routes including the Lakeshore West Line, Kitchener Line, Milton Line, and Barrie Line. GO train services include the Lakeshore West Line, Kitchener Line, Milton Line, Barrie Line and UP Express.

The AQ Environmental Conditions Report (AECOM 2020a) identified the following sectors/ industries that currently report emissions to the NPRI:

- power/energy - Enwave Energy Corporation

The main pollutants reported to the NPRI by this industry are particulate matter, CO, and nitrogen oxides (NOx).

4.5.2 Ontario Line South Section

Main traffic flows are along the Lakeshore Boulevard, the Gardiner Expressway, Parliament Street, Sherbourne Street, Jarvis Street, Adelaide Street, Queen Street East, and Richmond Street East. There are approximately 11 TTC bus routes servicing the study area. GO train service includes the Lakeshore East GO line, Richmond Hill GO line and Stouffville GO line (AECOM 2020a).

The AQ Environmental Conditions Report (AECOM 2020a) and 2018 NPRI Data (NPRI 2020) identified the following sectors/industries that currently report emissions to the NPRI:

- power/energy - Toronto Hydro Electric System Limited, Portlands Energy Centre LP
- food manufacturing - Redpath Sugar Ltd.
- concrete - Dufferin Concrete

The main pollutants released from these industries are particulate matter, CO, NOx, SO_2, metals and VOCs.

4.5.3 Ontario Line North Section

Main traffic flows are along Don Mills Road, Overlea Boulevard, Millwood Road, Pape Avenue, and Danforth Avenue. Stantec identified Eglinton Avenue as another main traffic flow in the study area. There are 10 TTC bus routes servicing the study area (AECOM 2020a).

Industrial sources identified to report to NPRI in the study area are:

- electronics manufacturing - Celestica
- machinery manufacturing - WESCAM-APS

The following facilities have also been identified as being in the study area (NPRI 2020):

- chemical manufacturing - Siltech Corporation (225 Wicksteed Avenue)
- paint, coating and adhesive manufacturing - RPM Canada Company, Tremco Canada Division (220 Wicksteed Avenue)
- metals and machinery - Lincoln Electric Co. of Canada LP (179 Wicksteed Avenue)
- printing - TI Group Inc. (115 Thorncliffe Park Drive)
- truck manufacturing - Unicell Ltd. (50 Industrial Street)

Pollutants emitted by these industries include metals, sulphuric acid and VOCs (NPRI 2020).

5 Sources of Air Contaminants

Air contaminants may be released to the atmosphere from the Project during the construction and operation phases. Emission sources associated with each phase of the Project are identified in the following sections.

5.1 Sources of Air Contaminants

5.1.1 Construction Phase

Construction activities include movements of heavy construction equipment and trucks to move building materials and earth and to construct the infrastructure components. Emissions to the atmosphere will occur primarily due to fuel combustion from vehicles and construction equipment, as well as fugitive dust from construction activities.

Description of Project Construction Activities

Construction activities expected for the Project and their associated emissions sources include:

- Site preparation requires mobilization of equipment, clearing and grubbing of vegetation and erection of temporary/permanent fences.
- Site servicing requires relocation and/or extension of services and utilities onto the site, including both underground and aerial services and utilities (e.g., sewers, water, electrical, communication, gas, etc.). This activity also involves installation of new utilities at the site.
- Movement of construction equipment and heavy vehicles along unpaved roads.
- Excavation and grading involve earthmoving and rock moving activities, including loading/unloading and stockpiling of excavated material, cutting of existing roads/pavement, offsite disposal or reuse at another site, filling and site grading.
- Demolition entails removal of existing structures to allow for Project infrastructure.
- Structure construction refers to construction of buildings/structures, including foundations for the Project infrastructure, construction of portals, shafts, elevated segments of the alignment such as the elevated guideway from Don Valley Crossing Bridge to Pat Moore Drive, and buildings such as the stations, EEBs, TPSSs.
- Bridge span installation requires the placement of bridge spans. Piling is required for constructing new bridges.
- Track work involves track installation and realignment for the subway corridor.
- Tunnelling uses tunnel boring machines (TBMs) or Sequential Excavation Method (SEM) and road headers, which includes activities such as transferring/handling, stockpiling and removal of excavated spoils (soil and rock excavated from the tunnel).

- As Queen Street is proposed to be closed to vehicular traffic and transit access from Bay Street to Victoria Street during the construction period, a temporary detour route will be established for the Queen streetcar route. Diversion onto York Street is proposed and York Street will be converted from a one-way street to a two-way street from Richmond to Adelaide to accommodate the southbound streetcar movement.
- Liberty New Street is a proposed east-west, two-lane street from Strachan Avenue to Dufferin Street, just north of Exhibition Station in the Liberty Village neighborhood. Air quality impacts associated with this new road was assessed in the Municipal Class Environmental Assessment (City of Toronto 2016). With the construction of OL, the alignment of the proposed Liberty New Street will be shifted slightly north.
- Hydro One infrastructure relocations are planned to resolve conflicts with planned Ontario Line infrastructure.

The main components are below-grade track, at-grade track, elevated track, subway stations, EEBs, diversion of the Queen Streetcar onto York Street, the OMSF and bridges. Bridge construction is expected at Don Yard, Eastern Avenue, along the Joint Corridor, Millwood Road, and near the OMSF. Construction or upgrade of some Project components were assessed as part of the Ontario Line Early Works assessment (AECOM 2021 a, b, c, d, e). These include:

- Lower Don Rail Bridge and Don Yard - construction of a new rail bridge north of the existing Lakeshore East rail corridor bridge over the Lower Don River that will carry the Ontario Line tracks, shifting of the GO tracks in the Don Yard and nearby rail corridor to accommodate Ontario Line infrastructure, modifications to the existing Lakeshore East rail corridor bridge to accommodate Lakeshore East GO track shifts to accommodate Ontario Line infrastructure, and utility and signal infrastructure relocation/protection. The exit portal for the subway at Don Yard is not under Early Works. (AECOM 2021c)
- Exhibition Station - modifications and improvements to the existing Exhibition GO Station, such as extension of the existing passenger tunnel, construction of vertical accesses, construction of a new north platform, shifting of the two northern-most GO tracks, construction of a temporary pedestrian bridge and relocating utilities. The entry portal for the subway and the TBM entry shaft at the Exhibition Station are not under Early Works. (AECOM 2021a)
- Corktown Station - demolition of existing buildings, removal of other structures and asphalt (where required), decommissioning of utilities, and soil removal and/or remediation (where required). The TBM entry shaft at the Corktown Station is not under Early Works. (AECOM 2021b)
- East Harbour Station - reconfiguration of the existing Lakeshore East GO tracks to accommodate station facilities and future Ontario Line tracks, construction of station facilities such as platforms and entrances, as well as replacement and expansion of the existing Eastern Avenue Rail Bridge to accommodate four Lakeshore East GO tracks and two future Ontario Line tracks. (AECOM 2021e)

- Lakeshore East Joint Corridor - reconfiguration of existing GO tracks to support future Ontario Line infrastructure, replacement of existing bridges at Queen Street East, Dundas Street East and Logan Avenue, construction of two new bridges at Dundas Street East and Logan Avenue to support future Ontario Line tracks. It also includes the construction of the foundations for GO Overhead Catenary System (OCS) poles and supporting infrastructure to accommodate future fourth GO track, construction of retaining walls, and noise barriers. (AECOM 2021d)

The construction phase of these components, which were already assessed under Early Works, are not included in this assessment. Components that were included under the Ontario Line Early Works assessment are identified in Table 5-1.

Table 5-1 lists the main Project components to be constructed.

Table 5-1. Construction - Key Components

Section	New Station EEB/ Construction	Tunnel Portal Construction	Entry/Exit Shafts and TBM Launch Site	Bridge / Elevated Guideway/ Overpass / Diversion Construction
Ontario Line West	• Exhibition Station (note 1) • King-Bathurst Station • Queen-Spadina Station • Osgoode Station • Ordnance Park EEB	• entry portal will be constructed at Exhibition Station. The subway line is below-ground from Exhibition Station to Don Yard.	• entry shaft at Exhibition Station • exit shaft at Osgoode Station • launch shafts will be constructed on the north side of the existing GO Lakeshore West Corridor for the beginning of the subway tunnels. Spoils (i.e., excavated soil and rock) from tunnel excavation will be managed at the construction laydown area(s) at Exhibition Station. • between Osgoode and Queen, the SEM will be used	• Queen Streetcar diversion onto York Street

Section	New Station EEB/ Construction	Tunnel Portal Construction	Entry/Exit Shafts and TBM Launch Site	Bridge / Elevated Guideway/ Overpass / Diversion Construction
Ontario Line South	• Queen Station • Moss Park Station • Corktown Station (note 1) • East Harbour Station (note 2) • Riverside/Leslieville Station • Gerrard Station • Don Yard EEB • Cherry Street EEB • Baine Avenue EEB	• Don Yard Portal - Exit portals will be constructed on the north and south sides of the GO tracks in the Don Yard (note 1) • Gerrard Station Portal - An entry portal will be constructed at the south end of Pape Street	• exit shaft at Queen Station • entry shaft at Corktown Station. Spoils from tunnel excavation will be managed at the construction laydown area(s) at Corktown Station. • between Corktown and Don Yard; SEM is used • entry shaft at Gerrard Station • potential TBM launch site at Gerrard Portal with spoils managed at the construction laydown areas at Gerrard Station • exit shaft at Minton Place (north of Cosburn)	• Lower Don Rail Bridge (note 2) • Eastern Avenue Rail Bridge (note 2) • Queen Street East Rail Bridge (note 2) • Queen Street Intersection Bridge • Dundas Street Rail East Bridge (note 2) • Logan Avenue Rail Bridge (note 2) • Carlaw Avenue/Gerrard Street East Intersection Bridge
Ontario Line North	• Pape Station • Cosburn Station • Thorncliffe Park (West) Station • Flemingdon Park Station • Science Center Station • EEB - Minton Place Portal	• Minton Place Portal	• entry shaft at Pape Station • potential TBM launch site at Pape Station with spoils managed at the construction laydown areas at Pape Station • exit shaft at Pape Station • potential TBM launch site at Minton Place Portal. Spoils will be managed at the construction laydown areas at the Minton Place Portal.	• elevated guideway from the terminus of the Minton Place Don Valley Crossing Bridge through the Thorncliffe Station to Pat Moore Drive • Don Valley Crossing Bridge • Walmsley Brook Crossing Bridge • Beth Nealson Drive Overpass - road grade separation at Beth Nealson Drive with rail

Section	New Station EEB/ Construction	Tunnel Portal Construction	Entry/Exit Shafts and TBM Launch Site	Bridge / Elevated Guideway/ Overpass / Diversion Construction
				overpass and road at grade. • West Don River Crossing Bridge
Operations, Maintenance, and Storage Facility Components				
Section	**Construction for Train Maintenance**	**Construction for Track Maintenance**	**Buildings/Bridge Construction**	**Others**
OMSF	• train maintenance facility – platforms, inspection and maintenance bays, and a painting booth	• track maintenance facilities and test tracks	• office and warehouse building • bridge near Pat Moore Drive • bridge near Beth Nealson Drive	• storage tracks • Hydro One infrastructure relocations

Notes:

1 Part of the construction phase of this component was assessed under the Ontario Line Early Works (AECOM 2021a, b, c). Assessment of the construction and operation phases of this component are included in this report.

2 The construction phase of this component was assessed as part of the Ontario Line Early Works (AECOM, 2021c, d, e), and it is not assessed in this report. Assessment of the operation phase is included in this report.

5.1.2 Operation Phase

The Project provides uninterrupted travel between destinations with no gridlock and frequent services with an estimated 40 trains per hour during peak hours, 24 trains per hour during off-peak, and 18 trains per hour at night (per direction service levels). It will connect to existing and in-delivery rapid transit, including GO rail lines, subways, light rail transit, streetcars, and transit buses.

With the implementation of the Project, the following changes are expected that may cause impacts on local air quality:

- A shift in transportation mode is expected because the Project will relieve congestion on the current Line 1 and Line 5 subway lines. There will be an estimated reduction in automobile vehicle travel of 266,000 km per day (Metrolinx 2020a) – this will result in less tailpipe exhaust and road dust emissions.
- Potential changes in traffic patterns will occur in the study area and an overall decrease in emissions from decreased traffic is expected due to fewer cars on the road.
- Emissions from electric trains are considered to be negligible because there are no combustion emissions from the trains. However, there will be non-exhaust emissions of particulate matter from wear on rails, wheels, and brake linings.
- An increase in indirect emissions from electricity generation to power the trains will occur outside of the Project study area.
- There will be changes in emissions from buses due to re-routing of bus routes to access the new subway stations or increased service in bus schedules.
- Emissions associated with the new stations and EEBs include combustion emissions from natural gas-fired comfort heating units and diesel backup generators; and from ventilation shafts exhausting air from the tunnel to the outside.
- Emissions expected from the OMSF will include:
    - combustion emissions from natural gas-fired comfort heating units
    - combustion emissions from two natural gas-fired emergency generators rated at 400 kW each, a diesel-fired emergency generator rated at 600 kW, and a diesel emergency fire pump rated estimated to have a rating of approximately 200 kW
    - VOC emissions from the parts paint booth and the train paint booth
    - emissions from chemicals and lubricants used for train cleaning, maintenance, and repairs
    - particulate and metal emissions from welding, wheel truing with lathe and welding, and sanding of trains
- Tailpipe exhaust and road dust from the Project trucks and Project vehicles are expected, and these may include light diesel tractors with cranes, flatcar trailers and flatcar trailers with cranes, rail grinders, re-railing vehicles, and trucks/vans.

- The OL alignment between Fraser Avenue to Strahan Avenue has shifted the alignment of the proposed Liberty New Street north. Liberty New Street will be a new east-west, two-lane street from Strachan Avenue to Dufferin Street, just north of the Union Station Rail Corridor in the Liberty Village neighborhood. There may be potential changes in traffic patterns due to the new alignment.

6 Potential Impacts, Mitigation Measures and Monitoring Activities

The following sections present the anticipated potential impacts associated with construction and operation of the Project, and recommended mitigation and monitoring measures for the construction and operation phases for the Project.

6.1 Air Contaminants

6.1.1 Construction Phase

The preliminary impacts from the construction phase identified in the Environmental Conditions Report (AECOM 2020c) included:

- Construction related air quality impacts (i.e., creation of vapors and particulate) are of a temporary nature and not likely to result in significant effects. Potential air quality impacts could include impacts from diesel combustion and particulate matter emissions.

Due to the potential for changes in air quality from Project construction activities and the sensitive / critical receptors identified in proximity to the Project components, this study included an assessment of the potential air quality impacts from the conceptual construction methods at each Project component. A qualitative assessment for the construction phase of the stations, the new alignment of the proposed Liberty New Street, OMSF, above ground and tunneled portions of the Project is presented below.

The estimated construction period will be 8 years, from 2022 to 2029, and the Project will begin operations in 2030.

Construction Activities

As described in Section 5.1.1, air emissions are expected from activities associated with the construction of the stations and portals, elevated or at-grade train corridor, bridge construction/upgrades, Queen Streetcar diversion onto York Street, construction of the OMSF, and tunneling. Construction of these components requires site preparation and site servicing, demolition of existing structures at some locations, excavation/grading and construction of structures and track work. The York Street diversion will likely require utility relocation, site works to remove existing track castings for replacement/tie in, installation of tracks, installation of OCS poles and wiring, reconfiguration of lanes, and curb modifications. Emissions from these construction activities are mainly due to tailpipe emissions from construction equipment and heavy vehicles, such as diesel generators, pumps, dozers, cranes, and dump trucks; fugitive emissions from earth moving and material handling, dust containing silica may be released from cutting of concrete during demolition of existing structures, and tailpipe emissions from on-road haul trucks or traffic in the area due to road detours or congestion caused by construction activities.

The impacts on air quality during the construction phase of the original alignment of the Liberty New Street were addressed qualitatively in the Municipal Class Environmental Assessment (City of Toronto 2016). Due to the construction of the OL platform at Exhibition Station, the proposed Liberty New Street alignment will be shifted slightly to the north. The alignment shift is less than 10 m to the north between Fraser Avenue and Pirandello Street. Construction of the new road will require site preparation, demolition, and removal of the existing surface, grading and sloping, preparation of the sub-base, and paving of the asphalt surface. Air quality impacts from the construction phase are expected to be similar to those identified and addressed in the previous Municipal Class Environmental Assessment (City of Toronto 2016).

Tunnelling

There are two below-grade sections: one section is between Exhibition Station and Don Yard and the second section is between Gerrard Station and Minton Place. The tunneling for each section will be completed using two 7-m diameter TBMs, one per tunnel. Each section of the tunnel requires two entry and two exit shafts for the TBMs. The entry and exit shafts for each section are:

Ontario Line West

- entry shaft at Exhibition Station (Figure A-1), exit shaft at Osgoode Station (Figure A-4, Figure A-5)

Ontario Line South

- entry shaft at Corktown Station (Figure A-7), exit shaft at Queen Station (Figure A-5)
- entry shaft at Gerard Station portal (Figure A-11), exit shaft at Pape Station (Figure A-12, Figure A-13)

Ontario Line North

- entry shaft is at Pape Station (Figure A-12, Figure A-13), exit shaft at Cosburn Station (Figure A-14)
- entry shaft is at Cosburn Station (Figure A-14), exit shaft at Minton Place (Figure A-15)

The TBM is a horizontal drill, typically with a circular rotating “cutting head” that creates the tunnel by breaking the material as it moves underground, without removing surface material; therefore, it limits the disturbance to the surrounding ground.

As the TBM cuts through the material below ground, the excavated spoil is transferred by a belt conveyor system that runs through the machine to a system of conveyors and then removed from the tunnel. The components of the TBM will be assembled at the entry shaft and lowered into the ground. Typically, there is temporary duct work at the entry portal area. Depending on the set-up selected by Metrolinx, the temporary duct work can be used either as an intake for air supply into the tunnel, while emissions exhaust by the tunnel opening; or, the duct work can be used as exhaust vents where emissions are vented out and air supply is drawn through the open tunnel. If the temporary duct work is used as exhaust vents, additional controls such as

dust collectors or scrubbers can be attached to the ventilation system for emission control. There will be no other vents and therefore no emissions along the rest of the tunnel.

The entry shafts for the TBMs will have secondary staging areas to accommodate equipment required for the TBM operations and the excavated spoil. Excavation spoils are transferred from the underground tunnel via conveyors and stored at construction staging areas near the entry shaft locations. Spoils will be temporarily stockpiled, then hauled offsite by trucks or rail cars for disposal.

Tunneling between Osgoode and Queen Stations, and Corktown and Don Yard will be completed by SEM and road headers. The road header has a boom-mounted cutting head used for excavation. The SEM tunneling is carried out in increments using the road header to excavate a small section of the tunnel, followed by installation of support. Similar to TBM operations, tunnel emissions may be exhausted by temporary duct work and emissions can be controlled using dust collectors or scrubbers or via the tunnel opening. SEM tunneling has more open-faced excavated surfaces than using the TBM, and airborne dust may be generated from these open excavated areas.

A grout plant will likely be located at the construction staging area. The grout is used for constructing the support and lining in the tunnel.

Dust containing silica can be released during tunneling when the rock is being cut; during transporting of the spoils on conveyor belts; and during handling/transferring and storage of the material. Airborne dust may also be generated by the grout plant from material filling and handling.

Summary of Potential Emission Sources and Impacts

Sensitive receptors and critical receptors for each route section of the Project are identified in Section 4.4 and Appendices D and E. The tables in Section 4.4 list the current receptors and future receptors that are near construction areas of the main Project components, including the stations, TBM entry and exit shafts, OMSF, and portals. A qualitative assessment of the potential for adverse air quality impacts was conducted based on the construction activities and proximity of sensitive and critical receptors near the construction area. The assessment identifies whether the potential for adverse air quality impacts are low, medium or high, based on the following:

- Low indicates no substantive sources of emissions were identified from the construction activities, and/or where there are no sensitive receptors and no critical receptors close to the construction area (within approximately 100 m).
- Medium indicates some substantive emissions sources were identified from the construction activities, and sensitive receptors were identified nearby, but critical receptors were not located adjacent to the construction area.
- High indicates multiple substantive emissions sources were identified from the construction activities, and multiple sensitive receptors or critical receptors were located close to the construction area (within approximately 100 m).

Table 6-1 presents a summary of the main construction locations, potential emission sources, sensitive receptors and critical receptors identified nearby, and the potential for adverse air quality impacts, without mitigation.

Table 6-1. Summary of Construction Areas, Emission Sources, Receptors and Potential for Adverse Air Quality Impacts

Project Component	Potential Emission Sources	Sensitive Receptors and Critical Receptors (current and future)	Potential for Adverse Impacts without Mitigation Measures [1]
Ontario Line West Section			
Exhibition Station and Exhibition Station Portal • entry portal for subway • TBM entry shaft for TBM section between Exhibition Station and Osgoode Station	Construction activities associated with station construction may include site preparation, site servicing, demolition, excavating/grading, structure construction, and track work. Construction activities associated with the TBM entry shaft may include site preparation, site servicing, excavating/ grading, structure construction, exhaust from tunnel, transporting excavated spoils on conveyor belts, and handling/transferring/storage of excavated spoils and materials.	Sensitive: Residential houses and an apartment are less than 20 m to the west. Several condominiums located less than 10 m to the north. Critical: A proposed sports training centre will be on Strachan Avenue south of Gardiner Expressway, located approximately 50 m southeast of the construction staging area.	High: Emission sources are from station construction and TBM associated activities. Multiple sensitive receptors and a proposed critical receptor (sports training centre) are/will be located close to the construction site. However, it is unknown when the proposed sports training centre will be constructed.
Liberty New Street alignment	Construction activities associated with road construction may include demolition/removal, site preparation, grading and sloping, sub-base preparation, asphalt paving.	Sensitive: Several condominiums located less than 10 m to the north between Hanna Avenue and Strachan Avenue. Critical: A proposed sports training centre will be on Strachan Avenue south of Gardiner Expressway, located approximately 130 m south of the proposed road.	Medium: Emission sources are from road construction. Multiple sensitive receptors are within 10 m of the construction site.
Below-grade section east of Exhibition Station • Ordnance Park EEB located west of Bathurst-King Station	Tunneling will use TBM along the below-grade section. No emission sources identified.	Sensitive: Residential area is less than 10 m from the footprint.	Medium: Emission sources from EEB and ESB construction. Some sensitive receptors are close to construction site.
Bathurst – King Station	Construction activities are associated with station construction, and may include site preparation, site servicing, demolition, excavating/grading, structure construction, track work.	Sensitive: Mixed-use buildings, condominiums and townhouses are 5 m to 40 m to the north, south, east and west. Critical: A place of worship is about 100 m to the northwest.	Medium: Emission sources are from station construction. Multiple sensitive receptors are close to the construction site, and a critical receptor is 100 m away.
Below-grade section	Tunneling using TBM along below-grade section. No emission sources identified.	Sensitive: A residential area is 5 m to 10 m from the footprint for the below-grade section. Critical: Language school located 20 m to the east and business college located 80 m to the south of the below-grade section footprint.	Low: No substantive emission sources. There are two critical receptors, one close to site and one farther away.
Queen-Spadina Station	Construction activities are associated with station construction, and may include site preparation, site servicing, demolition, excavating/grading, structure construction, track work.	Sensitive: Mixed-use buildings and condominiums are 5 m to 10 m Critical: A school is 50 m to the northeast and a business college is 100 m to the southwest of the construction staging area.	Medium: Emission sources are from station construction. Multiple sensitive receptors are close to the construction site. There are two critical receptors, one close to the site and one farther away.
Below-grade section along Queen Street	Tunneling using TBM is along the below-grade section. No emission sources identified.	Sensitive: Mixed-use buildings are 5 m to 10 m from the footprint of the below-grade section. Critical: Daycare and two schools located 50 m to 70 m to the north and south of the footprint.	Low: No substantive emission sources. Some sensitive receptors are close to the construction site. There are three critical receptors, one close to the site, and the other two farther away.

Project Component	Potential Emission Sources	Sensitive Receptors and Critical Receptors (current and future)	Potential for Adverse Impacts without Mitigation Measures [1]
Osgoode Station • TBM exit shaft for the section between Exhibition Station and Osgoode Station • SEM tunneling between Osgoode Station and Queen Station	Construction activities are associated with SEM, and may include site preparation, site servicing, excavating/grading, and structure construction.	Sensitive: Mixed-use building is less than 20 m to the west of the construction staging area. Critical: Osgoode Hall is 5 m to the east and a daycare is 150 m to the west of the construction staging area. Another daycare is 50 m to the southwest of the construction staging area.	Medium to High: Multiple emission sources. One critical receptor is close to the construction site. The other critical receptors are farther away.
York Street Queen Streetcar diversion	Construction activities are associated with the diversion, and may include utility relocation, removal of existing track castings, installation of track, installation of OCS poles and wiring, and curb modifications.	Sensitive: A hotel is located immediately east of the footprint at York Street and Queen Street West. Several hotels and mixed use buildings with apartments / condominiums are located along Adelaide Street West. A hotel is located immediately south of the footprint at Richmond Street East and Victoria Street. Several condominiums are also located along Richmond Street East and West. Critical: Daycare inside a commercial building located immediately northeast of the footprint at York Street and Adelaide Street West A women's shelter and a place of worship/event hall are located immediately southwest and southeast of the footprint at Church Street and Adelaide Street East A school is located 15 m to the south of the footprint at Toronto Street and Adelaide Street East. A place of worship is located inside a commercial building at Bay Street and Richmond Street Wet and is 30 m south of the Richmond Street West footprint. A hospital located at Bond Street and Queen Street East is 80 m to the north of the footprint. A Health Centre/pediatric clinic located at Berth Street and Queen Street East is 40 m to the north of the footprint.	Medium: Emission sources are from construction of the diversion. Multiple sensitive receptors are located close to the construction footprint along York Street, Adelaide Street West, Richmond Street East and West, and Church Street. Several critical receptors are located within 50 m of the footprint, while another critical receptor (hospital) is located 80 m away.
Ontario Line South Section			
Below-grade section along Queen Street West/Queen Street East	Tunneling will use SEM along below-grade section. Emission sources may include excavation, exhaust from tunnel, transporting/handling/transferring/storage of excavated spoils and materials.	Sensitive: Hotel is located 5 m south of the footprint. Critical: Several government buildings are 40 m to 50 m north of this section.	High: Emission sources are from SEM tunneling. Multiple critical receptors are close to the construction site.
Queen Station • TBM exit shaft for the subway section between Corktown Station and Queen Station • SEM tunneling between Osgoode Station and Queen Station	Construction activities are associated with station construction, and may include site preparation, site servicing, demolition, excavating/grading, structure construction, track work. Tunneling using SEM. Emission sources may include excavation, exhaust from tunnel, transporting/handling/transferring/storage of excavated spoils and materials.	Sensitive: Mixed-use buildings are less than 40 m southeast of Queen Station. Critical: A hospital is 20 m to the northeast of the Queen Station. Health Centre/pediatric clinic is 100 m to the southeast. A place of worship 150 m to the northeast of Queen Station.	Medium to High: Emission sources are from SEM tunneling. A critical receptor is close to the construction site. The other critical receptors are farther away.

Project Component	Potential Emission Sources	Sensitive Receptors and Critical Receptors (current and future)	Potential for Adverse Impacts without Mitigation Measures [1]
Below-grade section along Queen Street East	Tunneling will use TBM along the below-grade section. No emission sources identified.	Sensitive: Mixed-use building is located immediately south of the below-grade section footprint. Several mixed-use buildings or condominiums are located within 40 m to 60 m north and south of the footprint. Critical: A hospital is located immediately north and a health centre/ pediatric clinic is located immediately south of the below-grade section footprint. A place of worship is 60 m north of the footprint.	Low: No substantive emission sources. Some sensitive receptors and three critical receptors are close to the footprint.
Moss Park Station	Construction activities are associated with station construction, and may include site preparation, site servicing, demolition, excavating/grading, structure construction, track work.	Sensitive: A mixed-use commercial and condominium structure is 20 m to south/southeast of the construction staging area. Residential areas are 120 m to the north of this component. Critical: A community recreation centre is less than 40 m north of construction staging area. Homeless shelter/place of worship is 25 m east of the construction staging area. A school is 60 m south of construction staging area.	High: Emission sources are from station construction. Multiple critical receptors are close to the construction site.
Below-grade section between Moss Park Station and Corktown Station	Tunneling uses TBM along the below-grade section. No emission sources identified.	Sensitive: Mixed-use buildings are less than 5 m from the Project Footprint. Critical: A place of worship is 10 m to the south of this component. A school is located 90 m to the northeast.	Low: No substantive emission sources. Some sensitive receptors and a critical receptor are close to the construction site.
Corktown Station • TBM entry shaft for the subway section between Corktown Station and Queen Station • SEM tunneling between Osgoode Station and Queen Station)	Construction activities are associated with station construction, and may include site preparation, site servicing, demolition, excavating/grading, structure construction, track work. Construction activities are associated with TBM entry shaft, and may include site preparation, site servicing, excavating/grading, structure construction, exhaust from tunnel, transporting excavated spoils on conveyor belts, handling/transferring/storage of excavated spoils and materials. Tunneling will use SEM. Emission sources may include excavation, exhaust from tunnel, transporting/handling/ transferring/storage of excavated spoils and materials.	Sensitive: Mixed-use buildings are 15 m to the north and 40 m to the west of construction staging area. Condominiums are located 60 m to the southeast. Critical: A college is 100 m to the west and a public school and recreation centre are approximately 100 m to the west of construction staging areas. A daycare is less than 100 m southeast and a place of worship is located 100 m east of the construction staging area.	High: Emission sources are from station construction, TBM tunneling activities, and SEM tunneling activities. Multiple critical receptors and sensitive receptors are close to the construction site.
Below-grade section along Distillery Lane • Cherry Street EEB	Tunneling will use SEM along the below-grade section. Emission sources may include excavation, exhaust from tunnel, transporting/handling/transferring/storage of excavated spoils and materials.	Sensitive: Residential and mixed-use buildings are 5 m to 30 m north and southwest of the footprint. Critical: A daycare is 5 m and a school is 40 m to the north of this section.	High: Emission sources are from SEM tunneling. Multiple sensitive receptors and two critical receptors are close to the construction site.
Don Yard Portal • Don Yard EEB • Exit portal for the subway	Construction activities are associated with portal construction, and may include site preparation, site servicing, excavating/grading, track work.	Sensitive: Residential condominium and mixed-use buildings are 30 m to 50 m north and west of the Portal. Critical: Student residence located 150 m to the north.	Medium: Emission sources are from portal construction. Several sensitive receptors are close to the construction site.

Project Component	Potential Emission Sources	Sensitive Receptors and Critical Receptors (current and future)	Potential for Adverse Impacts without Mitigation Measures [1]
Riverside/Leslieville Station • Queen Street East Rail Bridge	Construction activities are associated with station construction, and may include site preparation, site servicing, demolition, excavating/grading, structure construction, track work.	Sensitive: Residential areas are 5 m to 30 m east and west of the station. Critical: A recreation centre is 5 m to the northeast of the footprint. A community centre is about 100 m west of the footprint. Three schools are over 200 m northwest of the footprint.	Medium: Emission sources are from station construction. Multiple sensitive receptors are close to construction site. A critical receptor is close to the construction site and several other critical receptors are farther away.
Gerrard Station and Gerrard Station Portal • TBM entry shaft for the subway section between Gerrard Station and Pape Station • Carlaw Avenue/Gerrard Street East Intersection Bridge	Construction activities associated with station construction and utility relocation, and may include site preparation, site servicing, demolition, excavating/grading, structure construction, track work. Construction activities are associated with the TBM entry shaft, and may include site preparation, site servicing, excavating/grading, structure construction, exhaust from tunnel, transporting excavated spoils on conveyor belts, handling/transferring/storage of excavated spoils and materials.	Sensitive – Multiple residential houses, apartments/condominiums are located 5 to 50 m east and west of the construction staging footprint. Critical: A daycare and school are immediately adjacent to the footprint.	High – Emission sources from station construction, and TBM associated activities. Multiple sensitive receptors and two critical receptors located 5 to 10 m northwest.
Below grade section along Pape Avenue between Gerrard Station Portal and Pape Station • Bain Avenue EEB located north of Gerrard Station	Tunneling using TBM along below grade section. No emission sources identified.	Sensitive: Residential houses are 5 m to 10 m from the footprint.	Low: No substantive emission sources. Some sensitive receptors are close to construction site.
Ontario Line North Section			
Pape Station • TBM exit shaft for the subway section between Gerrard Station and Pape Station • TBM entry shaft for the subway section between Pape Station and Cosburn Station	Construction activities are associated with station construction, and may include site preparation, site servicing, demolition, excavating/grading, structure construction, track work. Construction activities are associated with TBM entry shaft, and may include site preparation, site servicing, excavating/grading, structure construction, exhaust from tunnel, transporting excavated spoils on conveyor belts, handling/transferring/storage of excavated spoils and materials.	Sensitive: Residential houses are 5 m to 10 m from the Pape Station footprint. Critical: Three places of worship are 10 m to 60 m west of Pape Station construction staging footprint.	High: Emission sources are from station construction, and TBM associated activities. Multiple sensitive receptors and three critical receptors are close to the construction site.
Below-grade section along Pape Avenue between Pape Station and Cosburn Station	Tunneling will use TBM along below-grade section. No emission sources identified.	Sensitive: Residential houses are 5 m to 10 m from the footprint. Critical: Place of worship is 25 m to the west of this component. School located 100 m to the west. Place of worship is immediately east of the EEB footprint.	Medium: Some sensitive receptors and a critical receptor are close to the EEB construction site.

Project Component	Potential Emission Sources	Sensitive Receptors and Critical Receptors (current and future)	Potential for Adverse Impacts without Mitigation Measures [1]
Cosburn Station • TBM exit shaft for the subway section between Pape Station and Cosburn Station • TBM entry shaft for the subway section between Cosburn Station and Minton Place	Construction activities are associated with station construction, and may include site preparation, site servicing, demolition, excavating/grading, structure construction, track work. Construction activities are associated with the TBM entry shaft, and may include site preparation, site servicing, excavating/grading, structure construction, exhaust from tunnel, transporting excavated spoils on conveyor belts, handling/transferring/storage of excavated spoils and materials.	Sensitive: Residential houses and apartments are 5 m to 10 m from the footprint. Critical: A place of worship is 20 m to the east of the footprint and another place of worship is 70 m to the southwest. A daycare is 120 m east of the footprint. Two schools and a daycare are 200 m to the southwest.	High: Emission sources are from station construction, and TBM associated activities. Multiple sensitive receptors and three critical receptors are close to construction site.
Below-grade section along Pape Avenue between Cosburn Station and Minton Place Portal	Tunneling will use TB M along the below-grade section. No emission sources identified.	Sensitive: Residential houses are 5 to 10 m from the footprint. Critical: A community centre, school and daycare are 10 m to 50 m east of the footprint. Another school is within 5 m west of the footprint.	Low: No substantive emission sources.
Minton Place Portal • TBM exit shaft for the subway section between Cosburn Station and Minton Place • Exit portal where the subway line transitions to an elevated guideway • Minton Place portal EEB • Don Valley Crossing Bridge	Construction activities are associated with portal construction, and may include site preparation, site servicing, excavating/grading, track work.	Sensitive: Residential houses are 5 m to 10 m from the footprint.	Medium: Emission sources are from portal construction. Multiple sensitive receptors are close to the construction site.
Thorncliffe Park (West) Station	Construction activities are associated with station construction, and may include site preparation, site servicing, demolition, excavating/grading, structure construction, track work.	Sensitive: Residential townhouses and apartments/condominiums are 40 m east/southeast of the footprint.	Medium: Emission sources are from station construction. Multiple sensitive receptors are close to the construction site.
Elevated section between Thorncliffe Park (West) Station and Science Centre Station • Walmsley Brook Crossing Bridge • Beth Nealson Drive Overpass • West Don River Crossing Bridge	Construction activities are associated with elevated corridor, and may include site preparation, excavating/grading, track work.	Critical: Retirement home, places of worship and senior's centre are over 200 m south of the footprint.	Medium: Emission sources are from elevated corridor construction. Several critical receptors are over 200 m to the south of this section.
Flemingdon Park Station	Construction activities are associated with station construction, and may include site preparation, site servicing, demolition, excavating/grading, structure construction, track work.	Sensitive: Apartment/condominiums are approximately 70 m east of the footprint. Critical: Place of worship, daycare and school are over 200 m east of the footprint. Several schools are over 200 m south of the footprint.	Medium: Emission sources are from station corridor construction. Sensitive receptors are close to the construction site, and several critical receptors are over 200 m away.
Science Centre Station	Construction activities are associated with station construction, and may include site preparation, site servicing, demolition, excavating/grading, structure construction, track work.	Sensitive: Residential houses are 100 m to the southeast of the construction staging area. Critical: A place of worship is 10 m east of the Science Centre Station construction staging area. Institute of Holistic Nutrition is 100 m to the east of the construction staging area. A school is 40 m to the east. A daycare is over 200 m to the east of the construction staging area.	High: Emission sources are from station construction. Multiple sensitive receptors and critical receptors are close to the construction site.

Project Component	Potential Emission Sources	Sensitive Receptors and Critical Receptors (current and future)	Potential for Adverse Impacts without Mitigation Measures [1]
Operations, Maintenance, and Storage Facility			
OMSF	Construction activities are associated with the office and storage buildings, test tracks, storage tracks, platforms, inspection and maintenance bays, painting booths. Construction activities are also associated with relocation of Hydro One infrastructure, including removal of existing structures and associated components of a portion of the transmission line and installation of new structures.	Sensitive: Residential townhouses and apartments/condominiums 10 to 20 m southeast of the footprint. Critical: A school, retirement home, place of worship and senior's centre are approximately 80 m to 150 m to the south of the footprint. Additional critical receptors such as schools and places of worship are located 200 m to 450 m to the south of the footprint.	High: Emission sources are from OMSF construction. Multiple sensitive receptors are located close to the construction site, and several critical receptors are within 100 m of the footprint.

Note:

1 Criteria for assessing potential adverse impacts (without mitigation measures)
Low = No substantive emissions sources/no sensitive receptors are close (within approximately 100 m) to the site and there are no critical receptors
Med = A few substantive emissions sources/sensitive receptors are close (within approximately 100 m) to the site and one or more critical receptors but are not located adjacent to site
High = Multiple substantive emissions sources/multiple sensitive receptors or critical receptors are close (within approximately 100 m) to site

Mitigation Measures and Monitoring Requirements

While construction phase emissions have the potential to cause a nuisance to nearby receptors, with the proper mitigation measures implemented, emissions from construction phase can be controlled to reduce adverse impacts to the local air quality.

The guideline “Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities” (ECCC 2005) provides recommendations for mitigation measures to reduce construction emissions. These measures include material wetting or use of chemical suppressants to reduce dust, use of wind barriers and limiting exposed areas which may be a source of dust, equipment washing, proper maintenance of construction equipment and vehicles, and introduction of a no-idling policy to control construction vehicle emissions where applicable. It is recommended that construction best management practices be developed and implemented during the construction phase. Metrolinx will follow this guideline on ambient monitoring of dust or combustion gases (e.g., NO_2), to measure contaminant concentrations, detect potential exceedances of a standard, adjust mitigation measures according to the conditions at the time and confirm effectiveness.

Where the potential for adverse air quality impacts was assessed to be medium or high in Table 6-1, additional mitigation measures and monitoring requirements for potential impacts during the construction phase are suggested in Table 6-2.

Table 6-2. Summary of Potential Impacts, Mitigation Measures and Monitoring for Construction Phase

Project Activity	Potential Impact	Mitigation Measure(s)	Monitoring
Construction	Potential air quality impacts could include effects from fuel combustion and particulate matter emissions. Construction related air quality impacts (i.e., creation of airborne vapours and particulate matter) can be controlled and reduced with implementation of proper mitigation measures.	• A quantitative assessment will be conducted once sufficient detail on the construction planning is available. The quantitative assessment will be used to update the construction mitigation plan and will be submitted to MECP for review prior to the start of construction activities. • Prior to commencement of construction, develop and implement a detailed Construction Air Quality Management Plan (AQMP). A copy of the AQMP will be provided to the MECP. The AQMP will: ○ demonstrate compliance with the specific air quality criteria and limits per Ontario AAQC, CAAQS, and Ontario Regulation 419/05. ○ define the Project's air quality impact zone and identify applicable sensitive receptors in this area. ○ assess the baseline air quality by continuous measurement of local ambient concentrations of $PM_{2.5}$ and PM_{10} for more than 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 in the air quality impact zone, develop appropriate mitigation measures, demonstrate their effectiveness, and commit to their timely implementation. ○ include explicit commitment to the implementation of all applicable best practices identified in the ECCC document, *Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities* (ECCC 2005), and the MECP's Technical Bulletin Management Approaches for Industrial Fugitive Dust Sources (MECP 2017). • Develop a Communications Protocol and a Complaints Protocol to respond to issues that develop during construction. • Schedule construction related activities to avoid overlapping construction activities where possible. • Reduce the number of machines operating in any one area at any given point in time. Implement applicable mitigation measures identified in the AQMP. The AQMP will include applicable mitigation measures for each of the construction activities, such as: • Site Preparation, Excavation and Grading ○ grade construction site in phases to maintain vegetation and cover intact until just prior to construction. ○ use temporary wind fencing (windbreaks and/or fabric fences) for projects with a fixed geographical location and duration of over one year. Fencing should be 1-2 metres high, have a 50% or less porosity, should be maintained in an upright and functional condition, and should be visually inspected and washed as needed to maintain effectiveness. ○ apply water (or approved chemical dust suppressant) in sufficient quantity to prevent generation of dust plumes. Frequency of water/dust suppressant application will depend on ambient conditions (wind/humidity), effectiveness of the suppressant, and construction activities. If using water, it should be applied more than twice a day during dry/windy conditions. ○ when using chemical suppressants, MECP recommends use of non-chloride dust suppressants. ○ compact and stabilize disturbed soil throughout the construction site. ○ maintain stability of soil through pre-watering prior to clearing and grubbing as well as cut and fill activities and stabilize soil during and immediately after. ○ stabilize surface soils where trencher, excavator or support equipment will operate and at the completion of trenching operations. • Demolition ○ stabilize wind erodible surfaces, surfaces where equipment and vehicles will operate, and loose soil and demolition debris ○ deconstruct rather than demolish	Metrolinx will develop and implement air quality monitoring as part of the AQMP to 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 anticipated air pollutants that may be produced as a result of the work. • The applicable criteria for air contaminants of concern are to be found in the various schedules of Ontario Regulation 419/05, Ontario AAQC and CAAQS. • Siting of the monitors should generally follow the guidelines provided in the MECP *Operations Manual for Air Quality Monitoring in Ontario* (2018). • Establish "alert level" and "action level" thresholds that are below the applicable regulatory limits for each monitored contaminant, so that action can be taken to prevent exceedances of the regulatory limits. Measurements above a threshold will require remedial action including investigation for the cause of the exceedance and/ or implementation of mitigation measures. Both alert and action levels will be set out in the contracts and in the AQMP. Establish procedures for investigating cause of measurements above thresholds or exceedances, implementing mitigation measures and reporting • For Project construction locations that are considered short-duration projects (i.e., less than 30 days), periodical opacity monitoring for particulate matter (see ECCC 2005) at the active construction zone boundary and at closest sensitive receptor may be sufficient. • For long duration Project construction locations where sensitive receptors are identified 5 to 10 m from the active construction zone, continuous monitoring of PM_{10} and $PM_{2.5}$ is recommended at locations upwind and downwind of the active construction zone, where possible. Monitoring should be conducted at selected sensitive receptors if there are persistent complaints. Monitoring will commence for more than one week prior to the start of any construction activities to establish pre-construction levels and continue through the active phase of the construction project. Application of "alert level" and "action level" triggers for implementation of appropriate mitigation activities for construction activities as identified in the AQMP. As the active construction zone moves or changes, the locations of the monitoring equipment will follow to maintain its relevance. • Monitoring setup will include meteorological station (for measuring wind speed and direction) and datalogger/modem for downloading data, power/battery source, and capability to send alarm notifications at "alert level" and "action level" thresholds, as applicable. • Where laboratory work is required, consult the Standards Council of Canada (SCC) or the Canadian Association for Laboratory Accreditation (CALA) for a list of accredited Ontario analytical laboratories to perform specific air analyses. • Calibration of the instruments will be included as part of the monitoring program. • The monitoring program will include the preparation of Weekly Air Quality Monitoring Reports for documenting air quality monitoring results, monitoring activities, assessment of compliance and effectiveness of mitigation activities. The Weekly Air

Project Activity	Potential Impact	Mitigation Measure(s)	Monitoring
		○ reduce drop heights for debris during demolition and loading ○ enclose chutes and cover bins ○ use fogging systems ○ avoid blasting ○ vacuum debris ○ use proper personal protective equipment (e.g., respirator, eye protection) when cutting concrete or other materials that potential emit dust / silica • Material Storage ○ conduct storage pile activities downwind side of storage pile ○ use enclosures/coverings or wind fences/screens/vegetation as wind break or apply chemical stabilizers/water to at least 80% of the surface area of the pile on a daily basis when there is evidence of wind driven fugitive dust ○ stockpiles within 30 m of offsite occupied buildings must not be greater than 3 m in height or must have a road bladed to the top to allow water truck access or must have an operational water irrigation system that is capable of complete stockpile coverage • Material Handling and Transfer ○ apply water to soil not more than 15 minutes prior to moving ○ stabilize material while loading, transporting, and unloading ○ maintain at least 15 cm of freeboard on haul vehicles ○ limit material drop heights to 2 metres at transfer points and use enclosures wherever practical ○ secure and cover loads on haul trucks ○ reduce material handling operations, particularly under windy conditions ○ increase the frequency of watering or implement other additional fugitive dust mitigation measures during high wind conditions • Road Surfaces (in and around Construction Sites) ○ establish on-site vehicle restrictions ○ apply and maintain surface improvements to unpaved road surfaces ○ reduce fugitive dust from de-icing operations by minimizing use of de-icers through careful planning, minimizing silt content and silt formation, plowing instead of sanding, and sweeping up de-icing materials for re-use ○ stabilize off-road traffic and parking areas as well as haul routes ○ direct construction traffic over established haul routes ○ water unpaved roads under active use by vehicle traffic 3 times per 8-hour work period or restrict vehicle speeds to 20 km/h or apply chemical stabilizer in sufficient quantity and frequency to maintain a stabilized surface ○ place gravel on access road approaches and track-out control devices such as shaker plates at the intersection of unpaved access roads and paved roads ○ conduct a visual inspection of vehicle wheels and wheels of the equipment loaded upon each vehicle to assess the presence of dirt. If caked dirt or mud is present, such shall be removed to the extent feasible ○ track-out onto paved roads shall be removed at the conclusion of the workday or evening shift with water sweepers if visible soil material from the construction site or unpaved access road is carried onto adjacent public roads ○ track-out of materials onto paved roads that exceed 10 metres shall be removed immediately • On-site Fabrication Processes ○ reduce dust from cutting, grinding and drilling by applying water sprays/dust extraction and using prefabricated materials ○ perform cutting and grinding with appropriate tolerances/interfaces, optimum concrete pour volumes, using bonding agents, and using wet grit blasting ○ use curtains or shrouds to surround the work area ○ use pre-mixed, pre-cast and prefabricated materials and components where possible	Quality Monitoring Reports will be submitted to Metrolinx within a timeline approved by Metrolinx. • In addition, relevant construction monitoring activities from the guidelines *Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities* (ECCC 2005) will be implemented during construction.

Project Activity	Potential Impact	Mitigation Measure(s)	Monitoring
		○ vacuum work site frequently • Tunneling (TBM or SEM) (Safe Work Australia 2013) ○ ensure ventilation requirements in tunnel is adequate ○ air filtration or dust collector or scrubber unit at exhaust vents ○ dust suppression or water sprays on conveyor belts or during handling/transferring/loading ○ reducing spillage from conveyors by ensuring conveyors are correctly aligned, and by regulating conveyor feed rate, belt speed, or enclosing conveyors • Construction Vehicles and Equipment ○ where practicable, use electricity powered equipment, and reduce the use of diesel and gasoline powered equipment ○ maintain diesel and electric equipment and their emission control systems to manufacturers' specifications ○ the off-road diesel-powered equipment used during the Project must meet the Canadian Non-Road (Off-Road) Compression Ignition Engine Exhaust Emission Standards or Canadian Non-Road (Off-Road) Spark Ignition Engine Exhaust Emission Standards. These standards are aligned with corresponding US EPA standards ○ the road vehicles will meet applicable Canadian road vehicle exhaust and evaporative emission standards ○ Metrolinx must certify that all equipment meets applicable emissions standards and are maintained to manufacturers' specifications ○ where feasible, and where sensitive receptors are identified in close proximity (less than 50 m) to the construction area, reduce the number or limit the usage time of construction vehicles and equipment, or schedule their use at different times ○ where feasible, and where sensitive receptors are identified in close proximity (less than 50 m) to the construction area, consider construction vehicles and an equipment fleet that meets US EPA Tier 4 emission standards ○ heavy-duty diesel equipment and vehicles shall employ catalyzed particulate traps (filters) or a combination of oxidation catalysts and particulate traps ○ heavy-duty diesel equipment shall pass an annual emissions test demonstrating compliance with original equipment emission standards within a tolerance of 10% ○ limit equipment and vehicle idling time to less than 10 minutes deploy less polluting alternatives to vehicle main engine idling for heating and air conditioning. These alternatives include cab heaters and HVAC units powered by auxiliary electricity generators	
Construction - Contaminated soils/materials	Construction activities could expose contaminated soils/materials and/or result in the spreading of contaminated materials. Emissions from the contaminated materials may pose risks to human health and wellbeing.	• Prior to commencement of construction, Metrolinx will develop a Soil and Excavated Materials Management Plan (SEMMP) for the handling, management and disposal of all excavated material (i.e., soil, rock and waste). The SEMMP will describe how to address the management of the excavated or imported materials, including contaminated materials. Metrolinx will follow appropriate best management practices to manage, transport, or dispose of the contaminated materials. • Visual and olfactory inspections will be conducted during excavation or for incoming loads to screen for odour, visible staining or debris per the MECP's Management of Excess Soils: A Guide for Best Management Practices (MECP 2019b). If contaminated soil or materials are suspected, Metrolinx shall conduct further investigation and soil analysis to confirm if contamination is present and what contaminants are present. Metrolinx will take appropriate preventive actions or suspend activities to reduce potential adverse impacts, including odour or air emissions, from contaminated materials. • Where applicable, consultation with the MECP's Central Region Office will be conducted to discuss the requirements in dealing with contamination issues and ambient monitoring requirements.	• Additional ambient air monitoring may be required if contaminated soils are encountered during construction activities. The list of contaminants and monitoring requirements will be assessed at that time based on the results of investigation and soil/material analysis. • Where laboratory work is required, consult the SCC or the CALA for a list of accredited Ontario analytical laboratories to perform specific air/soil analyses.

6.1.2 Operations Phase

This section provides a qualitative assessment for the operations phase. Sources of air contaminants of interest are identified for the Project Future Build and Future No-build scenarios, including equipment/sources associated with the operation of electric trains, train stations, and maintenance. The changes in emissions related to the shift in mode of travel due to Project implementation, and potential changes in bus routes and traffic patterns are also described.

The original alignment of the Liberty New Street was assessed in the Municipal Class Environmental Assessment (City of Toronto 2016). The proposed improvements include: two general purpose lanes (one in each direction) for cars and buses; a two-way separated cycle track; and sidewalks on both sides of the street for the entire length of the street. New bus stops for TTC routes 29 (Dufferin) and 63 (Ossington) will be accommodated along Liberty New Street, westbound between Jefferson and Atlantic Avenue and eastbound just east of Atlantic Avenue. With the construction of the OL platform at Exhibition Station, Liberty New Street alignment will be shifted slightly to the north. As the alignment shift is small (less than 10 m shift to the north between Fraser Avenue and Pirandello Street), air quality impacts are expected to be similar to those described and assessed in the previous Municipal Class Environmental Assessment (City of Toronto 2016).

Travel Mode Shift

The benefits of a high quality (fast, convenient, comfortable and well-integrated) transit system include reducing the number of private vehicles on the road, thereby reducing congestion and overall emissions to the atmosphere (VTPI 2020). New public transit systems or improvements in public transit typically leads to a shift from trips in private vehicles to participation in public transit. A shift in travel mode leads to reductions in exhaust and road dust emissions due to fewer vehicles travelling on the road. Various studies have shown a reduction of between 1.4 to 9 vehicle-miles per transit passenger-mile (VTPI 2020).

In addition, there is a reduction in emissions from improved fuel efficiency due to reduced congestion and fewer vehicles idling in traffic. Fuel use can be 20% to 40% less when travelling at posted city speed limits of 40 km/hr to 50 km/hour than at lower travel speeds of 15 km/hr to 25 km/hour (Metrolinx 2008) in congested traffic conditions.

For the Project Future Build scenario, a shift in travel mode is expected with Project implementation (Metrolinx 2020a). The proposed stations and connections to existing and in-delivery public buses/street cars/subway lines will provide riders with a convenient, fast and well integrated public transit option. With Project implementation, there will be an estimated reduction of 266,000 automobile vehicle kilometers travelled per day (Metrolinx 2020a). Estimation from the Ontario Line Preliminary Design Business Case Summary indicates that this is equivalent to a reduction of 7.2 million litres of fuel per year or approximately 120,000 fill ups at the pump per year (Metrolinx 2020a). A positive impact on air quality is, therefore, expected compared with the Future No-build Scenario where vehicle traffic is not reduced.

Electrically Powered Trains

In addition to reduced emissions due to the shift in travel mode, trips will be made by electrically powered trains instead of private vehicles, which are mainly gasoline fueled. Such trains do not have direct exhaust emissions from burning fuel; therefore, a positive effect is expected on the local air quality.

Non-exhaust emissions of particulate matter from wear on rails, wheels, brake linings can be expected from the trains. However, there will be an estimated reduction of 266,000 km travelled by private vehicles per day in the Project Future Build scenario compared with the Future No-build scenario. The non-exhaust particulate matter emissions from the trains will be offset by the reduction of particulate emissions from tailpipe exhaust, road dust and brake wear from the reduction of 266,000 km travelled by private vehicles per day. Non-exhaust particulate emissions are typically only about 1-2% of the total particulate emissions (European Environment Agency, 2021) from a diesel locomotive of similar power to the proposed electric trains and therefore, the contribution of Ontario Line trains to ambient particulate levels is expected to be insignificant relative to emissions from existing diesel locomotives and other sources such as road traffic, or industrial emissions. The particulate emissions from the trains are, therefore, considered to have an insignificant impact on air quality.

Indirect Emissions from Electricity Generation

The Project requires electricity to power the train fleet, stations and OMSF. Emissions from the generation of electricity, although indirect, will result in increased emissions on the regional air quality.

Electricity generation in Ontario (based on installed energy capacity by fuel type) mainly comes from nuclear power plants (34%), gas/oil (29%), and hydro (23%). The remaining 14% comes from wind, biofuel and solar power plants (IESO 2020).

Although electric generation for the Project will result in emissions, because 29% of Ontario's generating capacity still produces air emissions, the impact to air quality is low when compared with other forms of transportation, such as private vehicles or diesel-powered public vehicles. For the Project Future Build scenario, emissions from electric generation will be offset by the reduction in emissions from the large number of private vehicles taken off the road relative to the Future No-build scenario.

As an example of the potential benefit of shifting to public transit, it has been estimated that a typical household reduces its energy consumption by about 45% in shifting from automobile-dependent to a transit-oriented mode of transport (VTPI 2020). A similar reduction in emissions of air contaminants is expected.

Bus Re-Routing

There may be changes in the air quality due to the potential re-routing of buses to access the new subway stations.

Based on TTC bus schedules, many of the proposed stations are already serviced by 10-minute buses, streetcars, or subway. Currently, TTC has not announced their plans for bus route or schedule changes due to the Project. It is expected that changes in bus routes or increases in bus services will be minor. Further, the TTC's Green Bus Program will transition the City's fleet to zero-emissions by 2040. The Green Bus Program was approved in 2017 with the target to procure only zero-emission buses starting in 2025 and achieving an entirely zero-emissions bus fleet by 2040 (TTC 2020). With electrification of buses, a further reduction of emissions is expected. Increases in bus services due to Project implementation in 2030 should be offset by the phase-in of the TTC's zero emission buses.

Emissions from Stations, Maintenance and Storage Facility and Maintenance Crew

The Project Future Build scenario will include 15 new stations, an OMSF, and maintenance crews who are essential for supporting the administrative functions and maintenance of the train fleet.

The new stations are expected to have natural gas-fired comfort heating units, diesel-fired standby generators, and ventilation shafts to vent the air inside tunnels to the outside. Potential air contaminants in the tunnel may come from maintenance activities or wear and tear from the wheels, rails, and brake pads, which may contribute to particulate matter and metal emissions.

Expected emissions from the OMSF and activities by maintenance crews include natural gas/diesel-fired combustion emissions, emissions from cleaning, paint booth, welding and other maintenance activities, as well as trucks and vehicles used by the maintenance crews.

The station and OMSF emission sources will require air/noise approvals (i.e., Environmental Compliance Approval or Environmental Sector Activity Registry) for their operations. However, certain equipment or operations may be exempt from air/noise approvals - these sources/activities are specified in O. Reg. 524/98 *Environmental Compliance Approvals – Exemptions from Section 9 of the Act*. Emissions from the stations and OMSF will need to be assessed and modelled following MECP guidance and must comply with applicable Ontario Regulation 419/05 standards to support the application for the air/noise approvals. The application for air/noise approvals will be conducted when the designs are finalized and prior to installation/start of operations. Prior to the start of operations, an Operations Air Quality Management Plan will be prepared to document the controls, methods, maintenance and mitigation measures to be implemented so that the generation and dispersion of airborne particulate matter and air contaminants associated with the operations will be reduced. The operations of the stations and OMSF are, therefore, expected to not result in adverse air quality impacts.

Mitigation Measures and Monitoring Requirements

Mitigation measures and monitoring suggested for the operations phase are presented in Table 6-3.

Table 6-3. Summary of Potential Impacts, Mitigation and Monitoring for Operation Phase

Environmental Component	Potential Impact	Mitigation Measure(s)	Monitoring
Operational	Potential air quality impacts from operations at the OMSF and mobile maintenance crew could include effects from fuel combustion and maintenance activities.	• Metrolinx will apply for air approval for the OMSF operations and air emission sources as applicable. Emissions will be assessed and modelled following MECP guidance and must comply with applicable Ontario Regulation 419/05 standards (with the exception of emissions from equipment or activities exempted by *O. Reg. 524/98 Environmental Compliance Approvals – Exemptions from Section 9 of the Act)*. • A detailed Operations Air Quality Management Plan will be developed and implemented to document the controls and methods that will be implemented during project operations at the OMSF to limit the generation and dispersion of airborne particulate matter and air contaminants associated with the project operations. • Where practicable, the following mitigation measures will be implemented to reduce air contaminant emissions intensity (amount of pollutant emitted per passenger kilometre travelled): ○ selecting a less polluting form of energy or fuel (i.e., electricity or hydrogen rather than diesel fuel) for equipment used at the OMSF. ○ selecting equipment (such as backup generators) with engines and propulsion systems that meet higher emission standards (i.e., Tier 4 rather than a lower tier). ○ maintaining engines and emission control equipment to manufacturers' specifications. ○ selecting vehicles that have lower emissions for the mobile maintenance crew.	• On-site inspections will be undertaken to confirm the implementation of the mitigation measures and identify corrective actions if required.
Operational	Station vents exhausting air from the tunnels	• Metrolinx will apply for air approvals for the station operations and for air emission sources as applicable. Emissions from the station, will need to be assessed and modelled following MECP guidance and must comply with applicable Ontario Regulation 419/05 standards (with the exception of emissions from equipment or activities exempted by *O. Reg. 524/98 Environmental Compliance Approvals – Exemptions from Section 9 of the Act)*.Metrolinx to develop and submit a detailed Operations Air Quality Management Plan to document the controls and methods that Metrolinx will implement during project operations at the stations and tunnels to limit the generation and dispersion of airborne particulate matter and air contaminants associated with the project operations.	• The expected impacts from operations will be effectively mitigated provided that mitigation measures established in the Air Quality Management Plan are followed. No operational ambient air quality monitoring is proposed.

7 Permits and Approvals

Environmental Compliance Approval(s) are required for equipment held by contractors, owners and operators of that equipment, which will be obtained in advance of construction, as necessary.

Approvals (i.e., Environmental Compliance Approval or Environmental Sector Activity Registry) for the stations, EEBs, TPSSs, and the Maintenance and Storage Facility air emission sources, with the exception of equipment or activities exempted by O. Reg. 524/98 *Environmental Compliance Approvals – Exemptions from Section 9 of the Act*, may be required prior to their construction and operation. The application for approvals will be conducted when the designs are finalized and prior to installation/start of operations.

8 Conclusions

A qualitative assessment of potential impacts to air quality was conducted for the construction phase of the stations, the OMSF, and the above-ground and tunnelled portions of the Project. The construction period is expected to be from 2022 to 2029. During the construction phase of the Project, emissions to the atmosphere will occur primarily due to fuel combustion from vehicles and equipment used for construction, as well as fugitive dust from construction activities. Sensitive and critical receptors were identified close to the construction staging areas. The potential for impacts can be effectively controlled through the implementation of the identified mitigation measures and construction best management practices during the construction phase, and by conducting ambient air monitoring on an ongoing basis to confirm the effectiveness of the implemented mitigations and take action when needed.

A qualitative assessment of the potential impacts to air quality was conducted for the operation phase of the Project to compare Project Future Build and Future No-build scenarios. Project operation, which is expected to start in 2030, will encourage a shift towards a more sustainable mode of transportation with a reduction of automobile vehicle kilometers travelled by 266,000 km per day (Metrolinx 2020a). Shift in travel mode leads to reduction in exhaust and road dust emissions due to fewer vehicles travelling on the road and improved fuel efficiency due to less congestion and vehicle idling. Also, there is a positive impact to the air quality with the shift to travelling by electrically powered trains, which do not have exhaust emissions from burning fuel.

Emissions expected from Project implementation include non-exhaust emissions of particulate matter and metal from wear and tear on rails, wheels, brake linings; potential increase in emissions due to changes in bus routes and bus schedules; emissions from natural gas/diesel - fired combustion and maintenance activities at the stations and the Maintenance and Storage Facility; and an increase in indirect emissions from the generation of electricity to power the trains. Because many of the proposed stations are already serviced by 10-minute buses, streetcars, or subway, minimal changes in bus routes and services are expected. Although electricity generation for the train fleet will increase emissions of air contaminants on a regional basis, the impact to air quality is much lower than the emissions from trips made by private

vehicles in the Project Future No-build scenario, especially in the near term. Minor increases in emissions from the Project Future Build scenario will be offset by the reduction of tailpipe exhaust emissions and road dust from the estimated reduction of 266,000 kilometers travelled by private vehicles per day. Therefore, an overall positive impact on air quality is expected from the Project Future Build scenario compared with the Project Future No-build scenario.

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Sign-Off Sheet

This document entitled Air Quality Impact Assessment Report was prepared by Stantec Consulting Ltd. (“Stantec”) as part of the Ontario Line Technical Advisor for the account of HDR Inc. (the “Client”) and its end client Metrolinx. The material in it reflects Stantec’s professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

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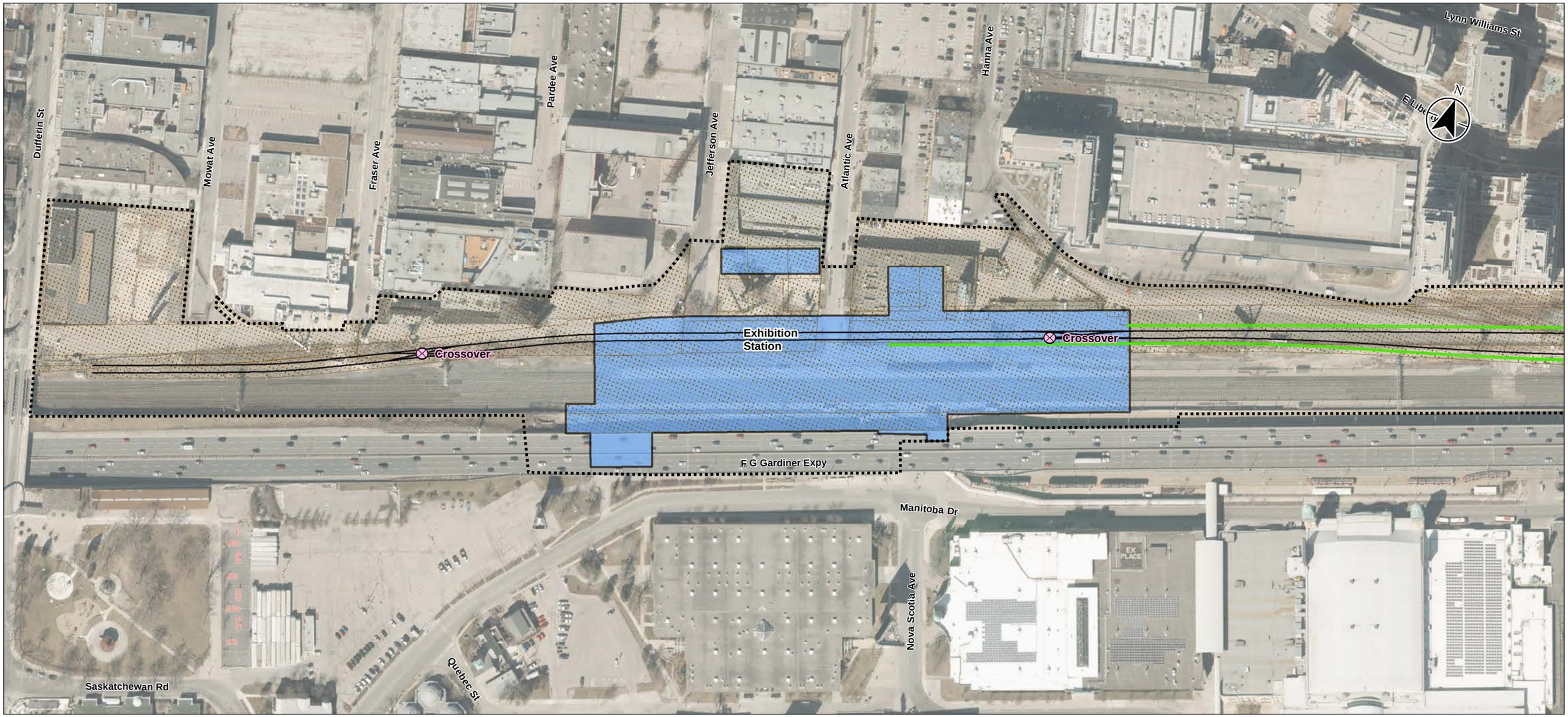
(signature)
Mark Knight, MA, MCIP, RPP
Senior Associate, Environmental Planner

Appendix A. Figures - Project Footprint and Project Components



Legend

- Project Footprint

Alignment - Current

- Track Alignment Centerline
- Portal
- Crossover
- Station
- Construction Staging and Construction Area

0 40 80 metres

1:2,500 (At original document size of 11x17)

Notes

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Project Location
Toronto, ON

Prepared by BCC on 2022-04-11
Technical Review by CL on 2021-06-10

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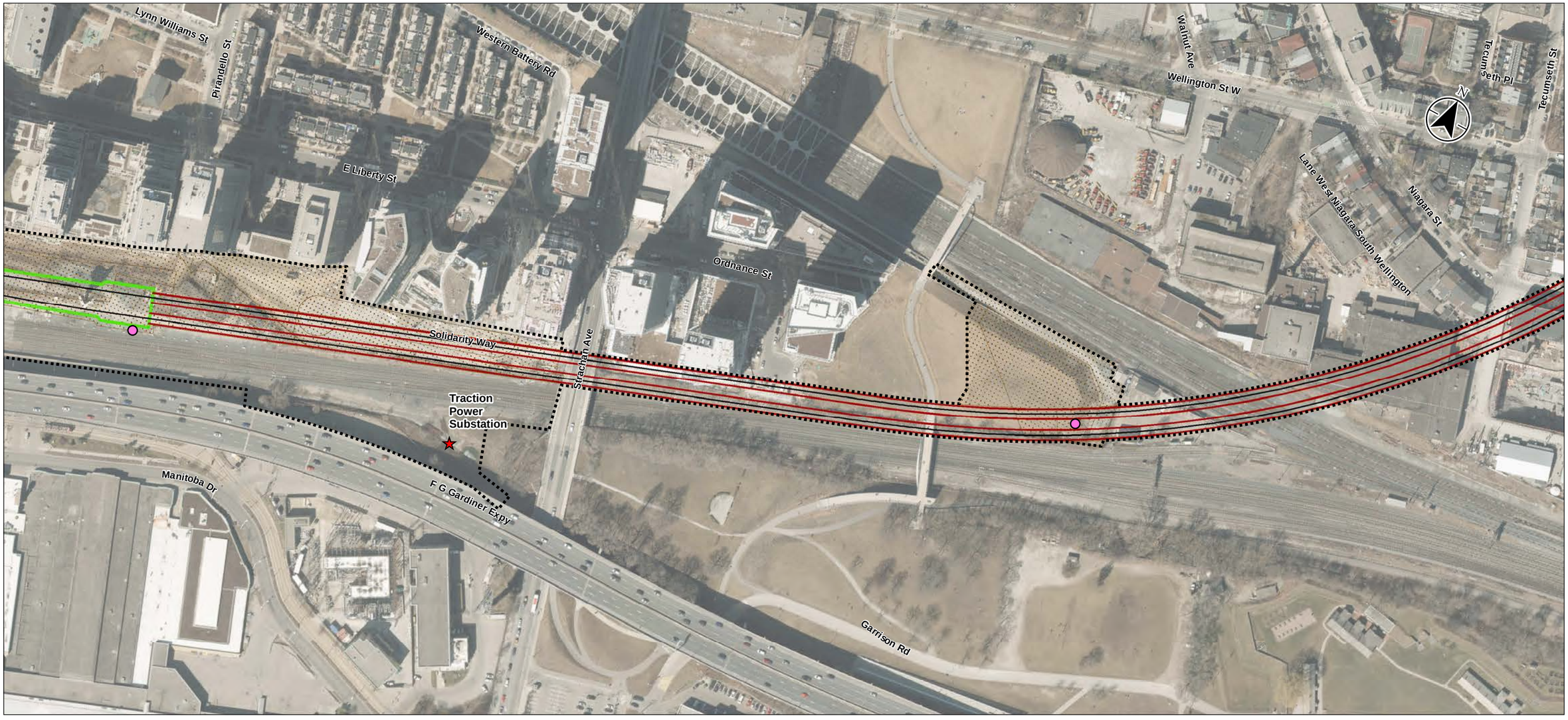
Figure No.
A-1

Title
Project Footprint and Project Components



Legend

- Project Footprint

Alignment - Current

- Track Alignment Centerline
- Tunnels
- Portal
- Emergency Egress Building (EEB)
- Traction Power Substation
- Construction Staging and Construction Area

0 40 80 metres

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Project Footprint and Project Components

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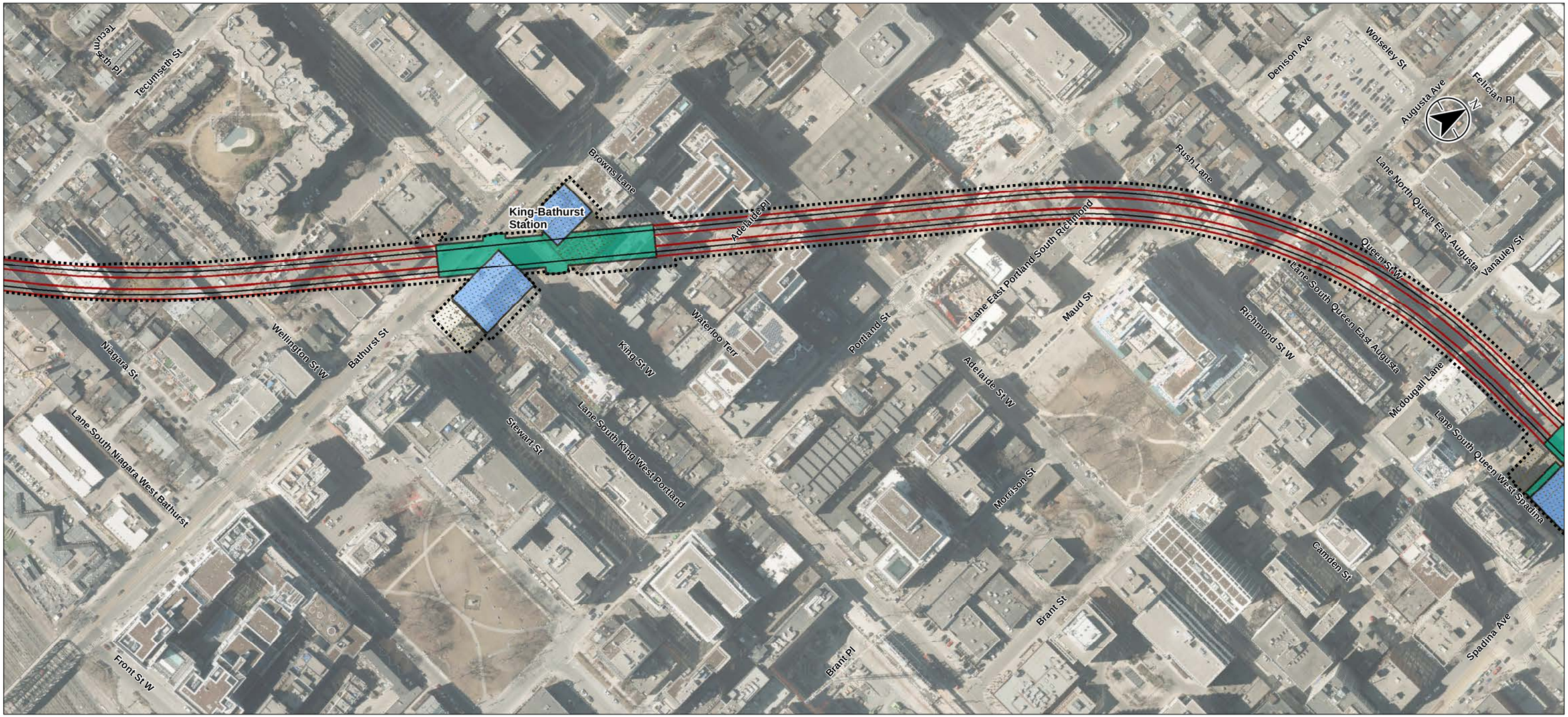

Legend

- Project Footprint

Alignment - Current

- Track Alignment Centerline
- Tunnels
- Station
- Station Platform - Subsurface Level
- Construction Staging and Construction Area

0 40 80 metres

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Figure No.
A-3

Title
Project Footprint and Project Components

Legend

- Project Footprint

Alignment - Current

- Track Alignment Centerline
- Tunnels
- Station
- Station Platform - Subsurface Level
- Construction Staging and Construction Area
- Streetcar Diversion

0 50 100 metres

1:3,000 (At original document size of 11x17)

Notes

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A-4

Title
Project Footprint and Project Components

Osgoode Station
Queen St W
James St
Queen Station
Queen St E
N
Lane South Queen West Simcoe
Richmond St W
Richmond St E
Twilight Lane
Nelson St
Simcoe St
University Ave
York St
Sheppard St
Temperance St
Bay St
Yonge St
Ching Lane
Victoria St
Lombard St
Adelaide St W
Adelaide St E
Pearl St
Grand Opera Lane
King St W
King St E
Emily St
Jordan St

Legend

- Project Footprint

Alignment - Current

- Track Alignment Centerline
- Tunnels
- Station
- Station Platform - Subsurface Level
- Construction Staging and Construction Area
- Streetcar Diversion

0 40 80 metres

1:2,500 (At original document size of 11x17)

Notes

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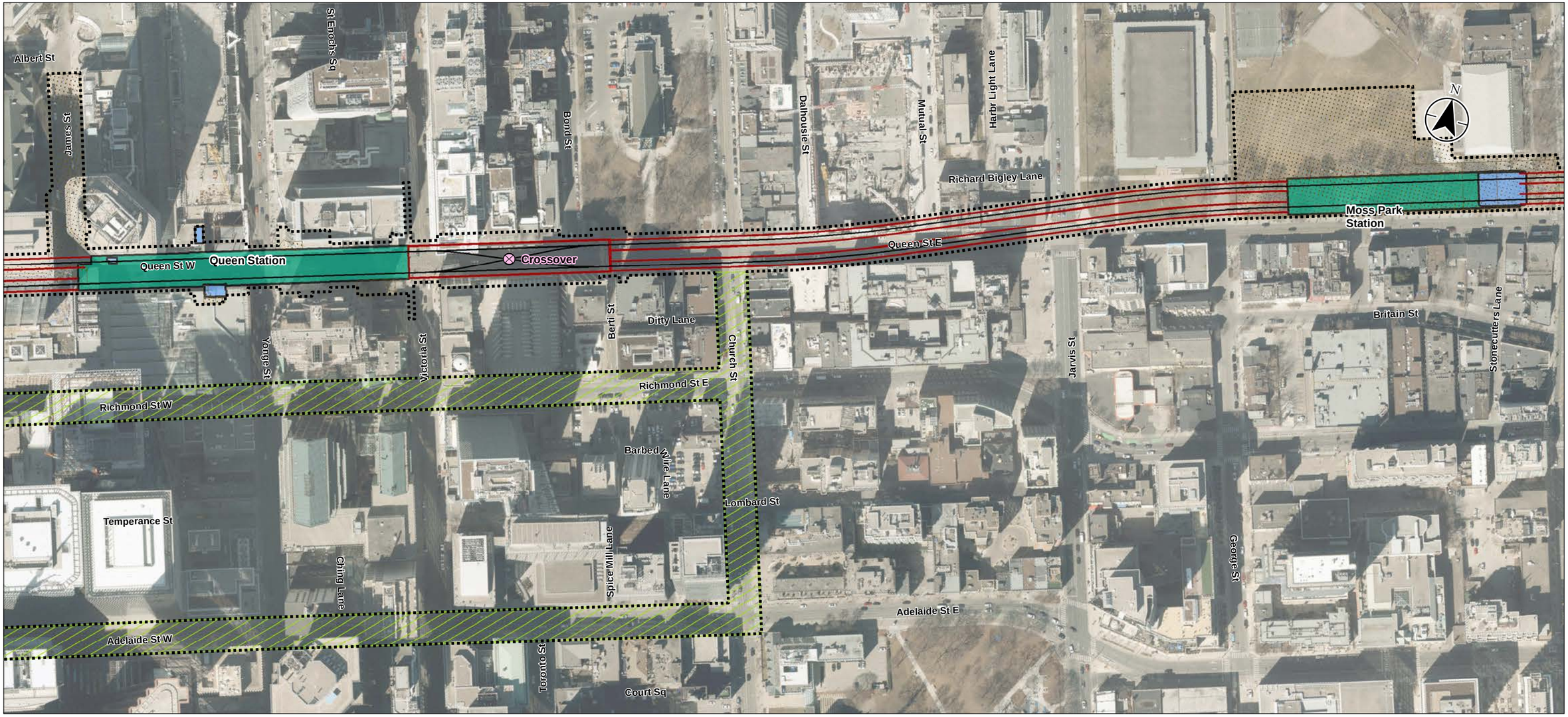
Title
Project Footprint and Project Components



Legend

- Project Footprint

Alignment - Current

- Track Alignment Centerline
- Tunnels
- Crossover
- Station
- Station Platform - Subsurface Level
- Construction Staging and Construction Area
- Streetcar Diversion

0 40 80 metres

1:2,500 (At original document size of 11x17)

Notes

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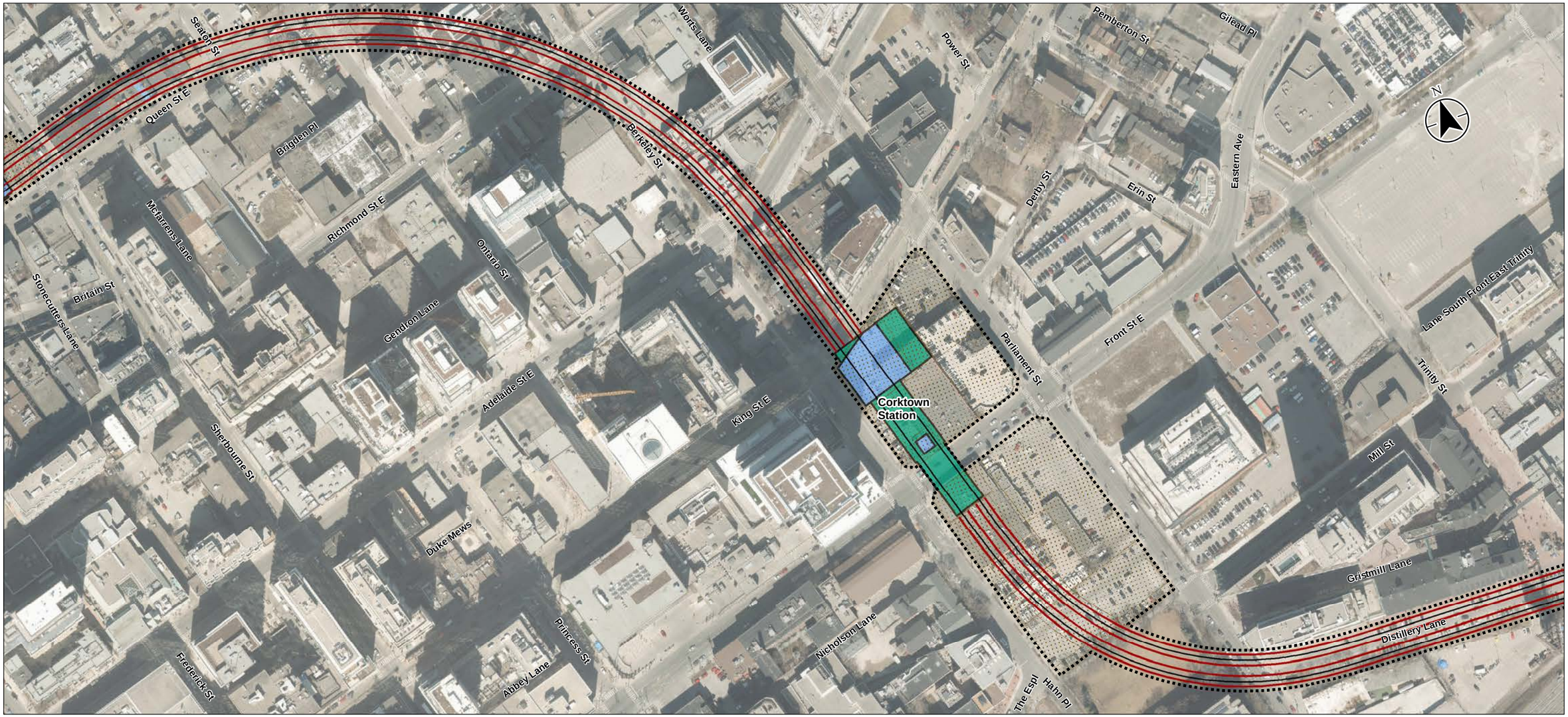
Figure No.
A-6

Title
Project Footprint and Project Components



Legend

- Project Footprint

Alignment - Current

- Track Alignment Centerline
- Tunnels
- Station
- Station Platform - Subsurface Level
- Construction Staging and Construction Area

0 40 80 metres

1:2,500 (At original document size of 11x17)

Notes

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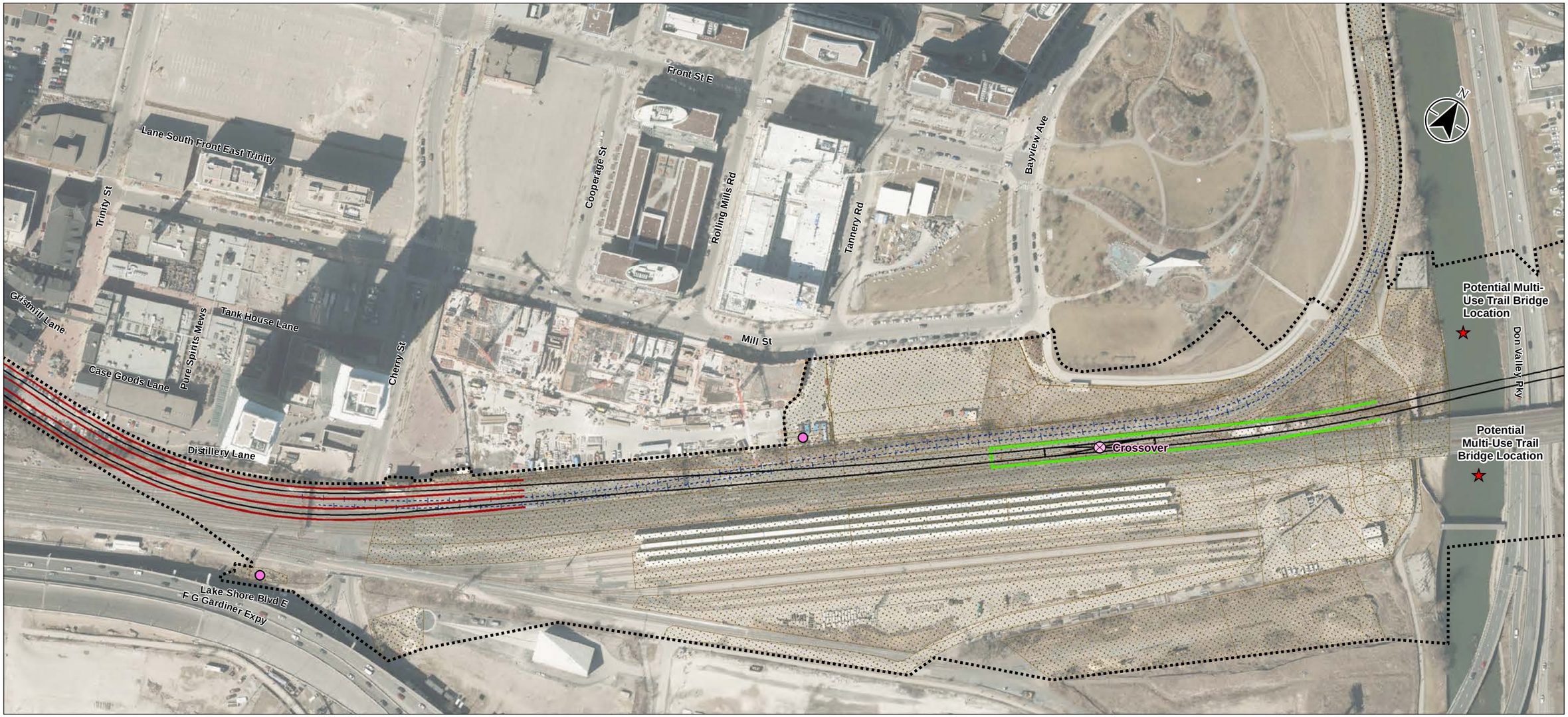
Figure No.
A-7

Title
Project Footprint and Project Components



Legend

- Project Footprint

Alignment - Current

- Track Alignment Centerline
- Tunnels
- Portal
- Emergency Egress Building (EEB)
- Crossover
- Potential Multi-Use Trail Bridge Location
- RH Final Alignment
- Construction Staging and Construction Area

0 40 80 metres

1:2,500 (At original document size of 11x17)

Notes

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ONTARIO LINE TECHNICAL ADVISOR

Project Location
Toronto, ON

Prepared by BCC on 2022-04-11
Technical Review by CL on 2021-06-10

Client/Project
HDR CORPORATION
ONTARIO LINE TA

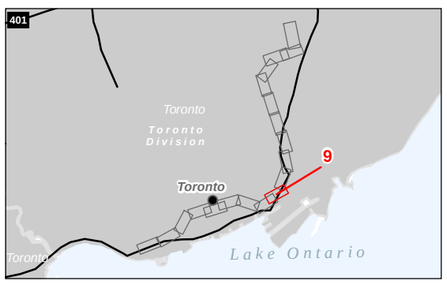
160560009 REVA

Figure No.
A-8

Title
Project Footprint and Project Components

\\ed1215.f01\work_group\01605\active\160560009\11_data\gis_cad\gis\mxds\atmospheric\report_figures\20200908_Air_Work_Plan\160560009_AW_Fig\A1-19_ProjectFootprint

Revised: 2022-04-11 By: bcowper



Legend

- Project Footprint
- **Alignment - Current**
- Track Alignment Centerline
- Portal
- Crossover
- Potential Multi-Use Trail Bridge Location
- RH Final Alignment
- Station
- Construction Staging and Construction Area

0 40 80 metres

1:2,500 (At original document size of 11x17)

Notes

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HDR CORPORATION
ONTARIO LINE TA

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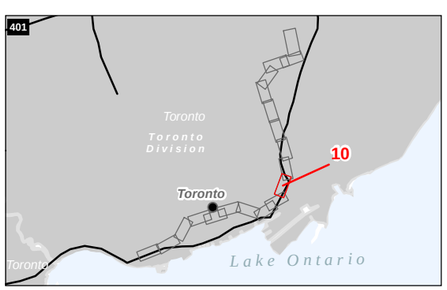
Figure No.
A-9

Title
Project Footprint and Project Components



Legend

- Project Footprint
- **Alignment - Current**
- Track Alignment Centerline
- Station
- Construction Staging and Construction Area

0 40 80 metres

1:2,500 (At original document size of 11x17)

Notes

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Technical Review by CL on 2021-06-10

Client/Project
HDR CORPORATION
ONTARIO LINE TA

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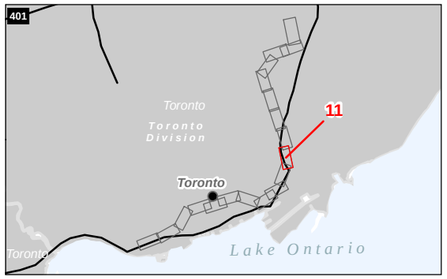
Figure No.
A-10

Title
Project Footprint and Project Components

Logan Ave
1st Ave
Lane West Carlaw South Gerrard
Dickens St
Thackeray St
Gerrard Station
Gerrard St E
Simpson Ave
Lane South Victor West Carlaw
Victor Ave
Lane West Carlaw North Victor
Lane East Logan North Victor
Lane East Logan South Riverdale
Lane East Logan North Riverdale
Lane East Logan South Bain
Lane South Bain West Carlaw
Lane North Bain West Carlaw
Lane North Bain East Carlaw
Carlaw Ave
Langley Ave
Riverdale Ave
Withrow Ave
Vasos Lane
Bain Ave
Dundas St E
Badgerow Ave
Boston Ave
Filmic Lane
Lane West Pape North Badgerow
Langley Sewer Relocation
Pape Ave
Lane East Pape South Riverdale
N



Legend

- Project Footprint

Alignment - Current

- Track Alignment Centerline
- Tunnels
- Portal
- Emergency Egress Building (EEB)
- Proposed Sewer Relocation
- Station
- Construction Staging and Construction Area

0 40 80 metres

1:2,500 (At original document size of 11x17)

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Project Location
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Client/Project
HDR CORPORATION
ONTARIO LINE TA

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Figure No.
A-11

Title
Project Footprint and Project Components

Notes
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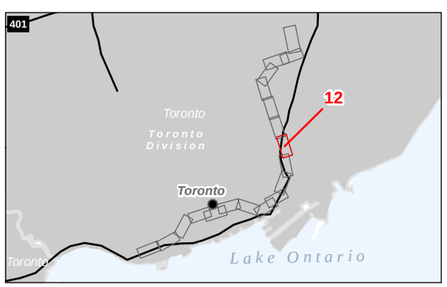

Legend

- Project Footprint

Alignment - Current

- Track Alignment Centerline
- Tunnels
- Portal
- Emergency Egress Building (EEB)
- Station
- Station Platform - Subsurface Level
- Construction Staging and Construction Area

0 40 80 metres

1:2,500 (At original document size of 11x17)

Notes

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Project Location
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Client/Project
HDR CORPORATION
ONTARIO LINE TA

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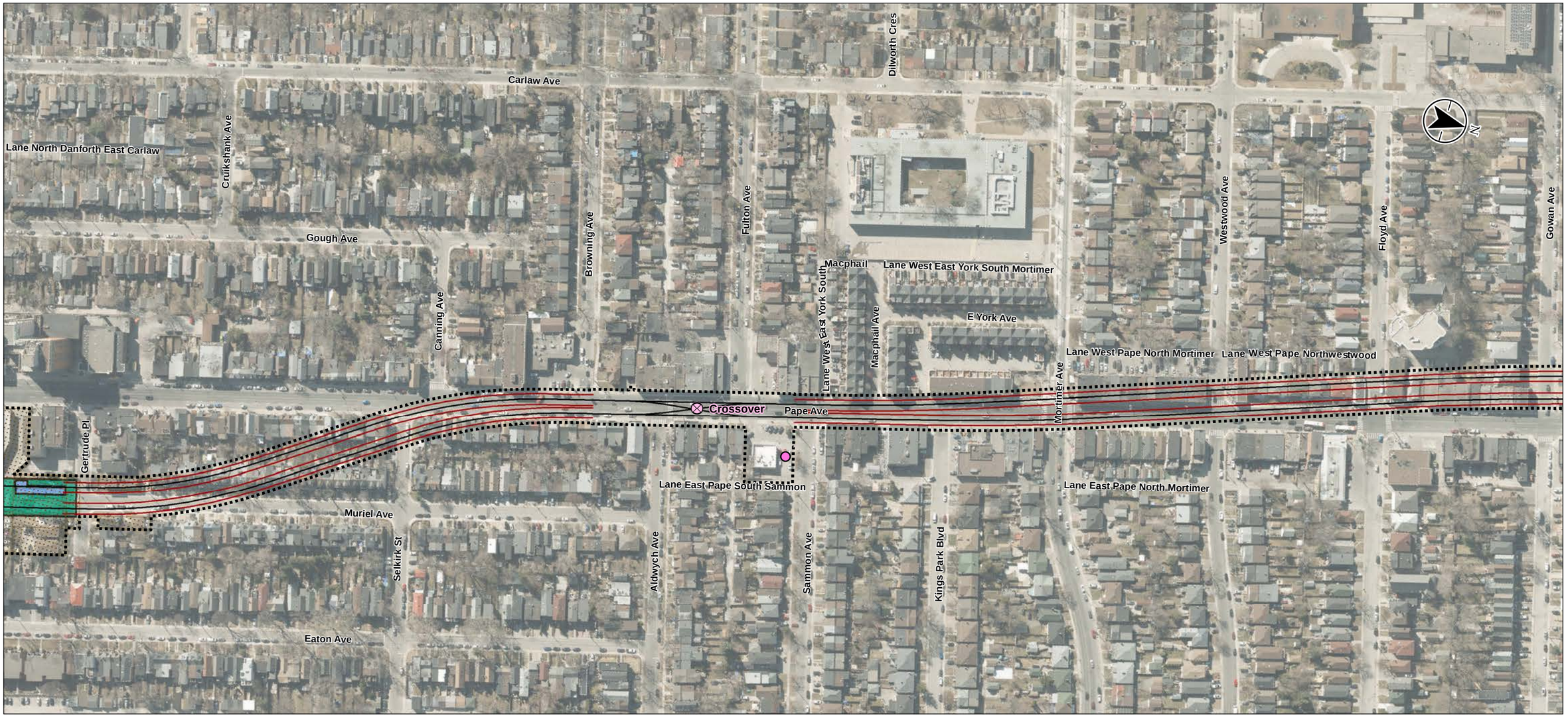
Figure No.
A-12

Title
Project Footprint and Project Components



Legend

- Project Footprint
- **Alignment - Current**
- Track Alignment Centerline
- Tunnels
- Emergency Egress Building (EEB)
- Crossover
- Station
- Station Platform - Subsurface Level
- Construction Staging and Construction Area

0 40 80 metres

1:2,500 (At original document size of 11x17)

Notes

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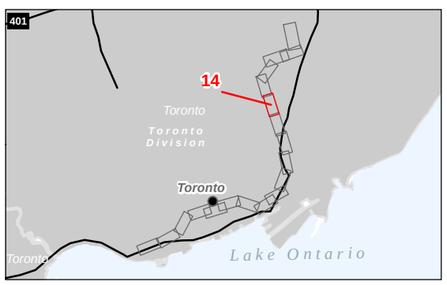
ONTARIO LINE TA

160560009 REVA

Figure No.
A-13

Title
Project Footprint and Project Components



Legend

- Project Footprint

Alignment - Current

- Track Alignment Centerline
- Tunnels
- Station
- Station Platform - Subsurface Level
- Construction Staging and Construction Area

0 40 80 metres

1:2,500 (At original document size of 11x17)

Notes

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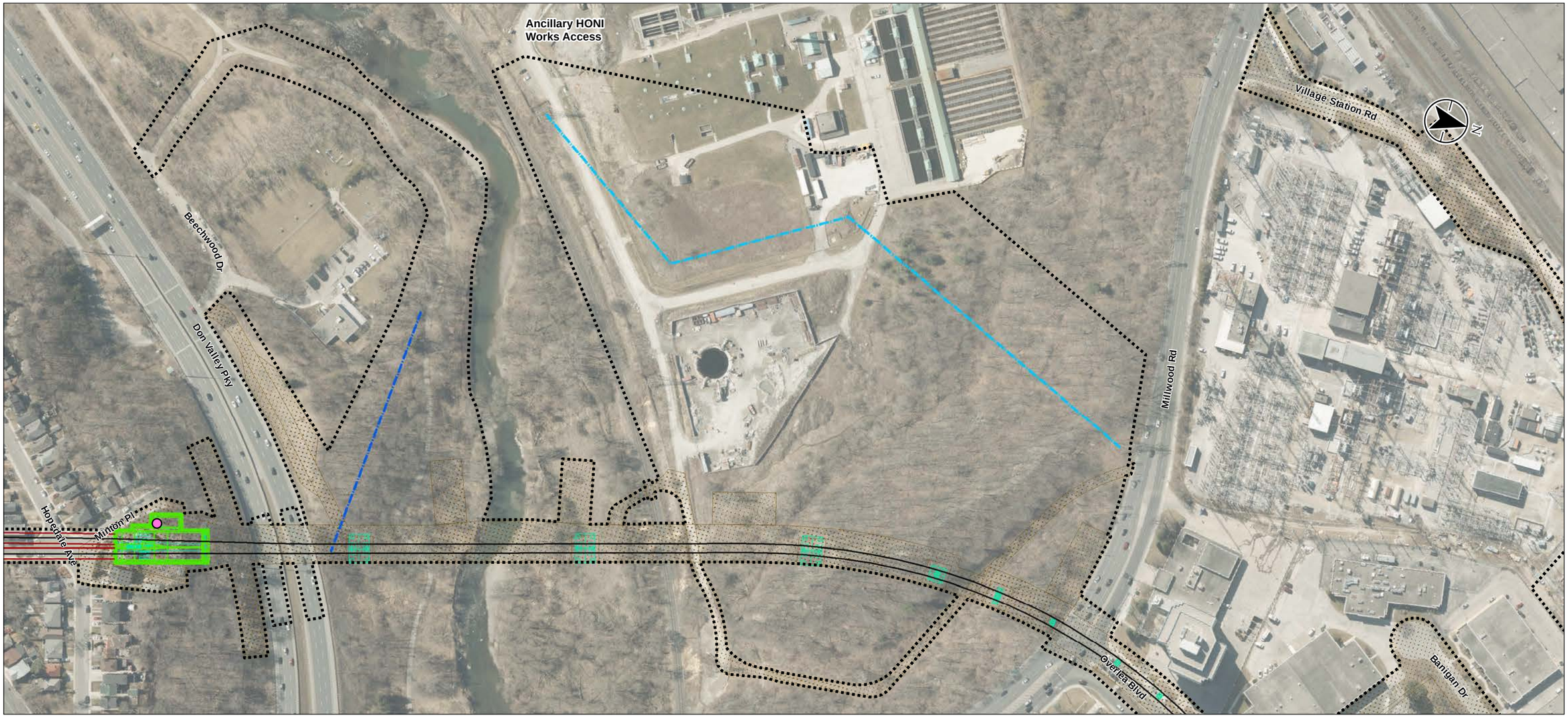
Client/Project
HDR CORPORATION
ONTARIO LINE TA

160560009 REVA

Figure No.
A-14

Title
Project Footprint and Project Components



Notes
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Legend
- Project Footprint

Alignment - Current
- Track Alignment Centerline
- Tunnels
- Portal
- Elevated Guideway
- Emergency Egress Building (EEB)
- Proposed HONI Realignment
- Proposed Sewer Bypass
- Construction Staging and Construction Area

0 40 80 metres
1:2,500 (At original document size of 11x17)

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Project Location
Toronto, ON

Prepared by BCC on 2022-04-11
Technical Review by CL on 2021-06-10

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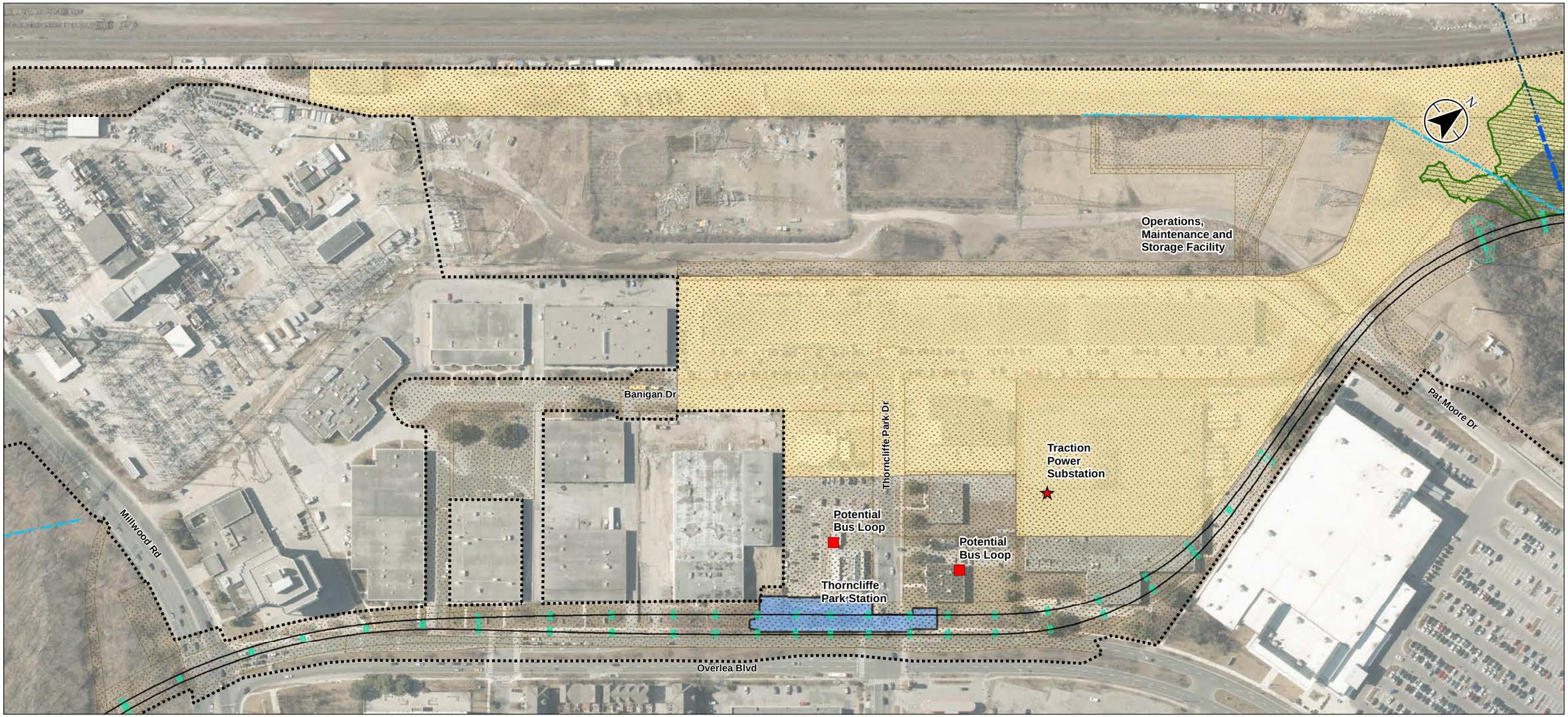
HDR CORPORATION
ONTARIO LINE TA

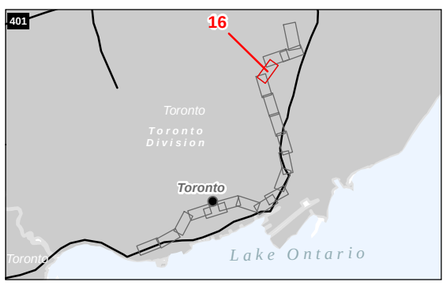
160560009 REVA

Figure No.
A-15

Title
Project Footprint and Project Components

\\cd1215-f01\work_group\01605\active\160560009\11_data\gis_cad\gis\mxd\atmospheric\report_figures\20200908_Air_Work_Plan\160560009_ANV_Fig4.1-19_ProjectFootprintMap.mxd Revised: 2022-04-11 By: bcrowper





Notes
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Legend

- Project Footprint
- **Alignment - Current**
- Track Alignment Centerline
- Elevated Guideway
- Potential Bus Loop
- Traction Power Substation
- Proposed HONI Realignment
- Existing Storm Sewer
- Storm Sewer Extension
- Station
- Operations, Maintenance and Storage Facility
- OMSF Bridge Fill Area
- Construction Staging and Construction Area

0 40 80 metres
1:2,500 (At original document size of 11x17)

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ONTARIO LINE TECHNICAL ADVISOR

Project Location
Toronto, ON

Prepared by BCC on 2022-04-11
Technical Review by CL on 2021-06-10

Client/Project
HDR CORPORATION
ONTARIO LINE TA

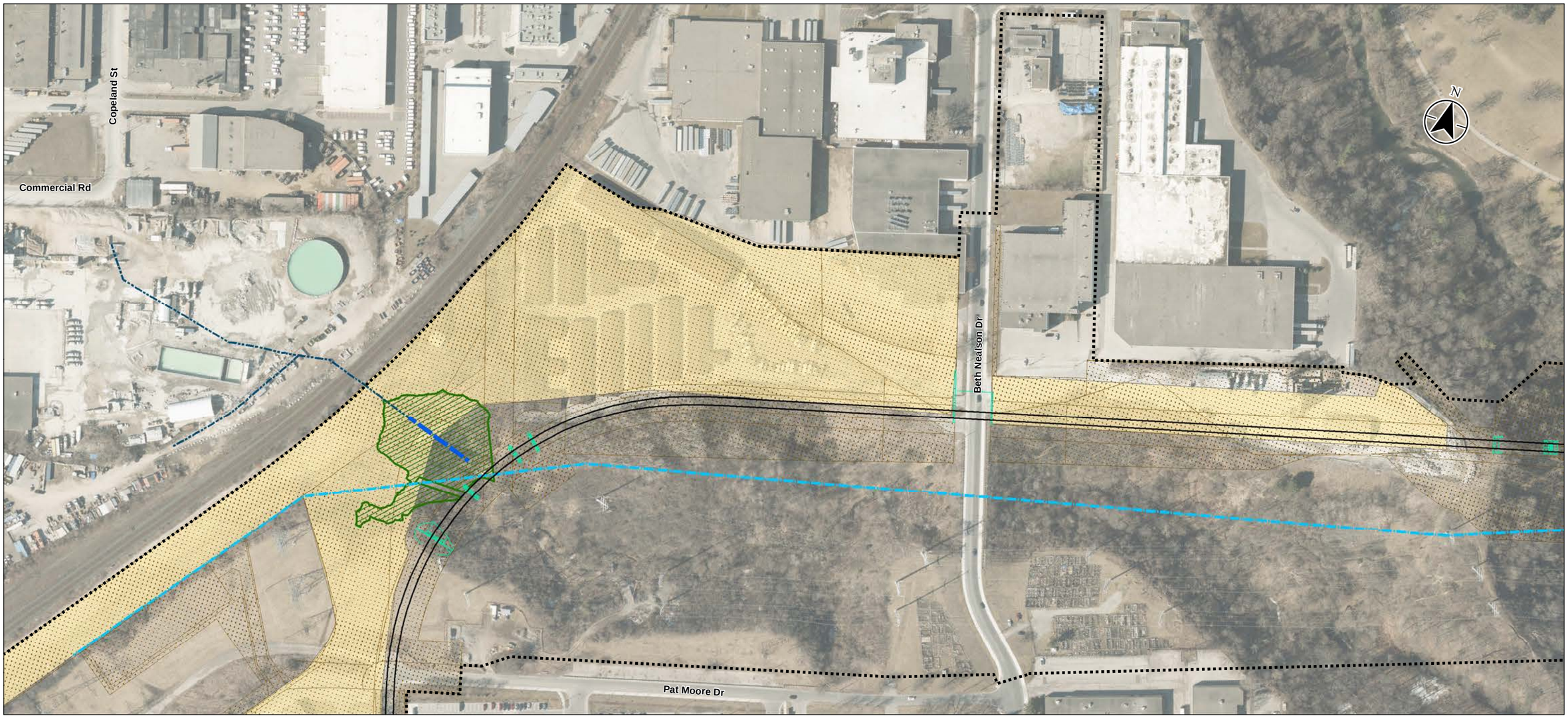
160560009 REVA

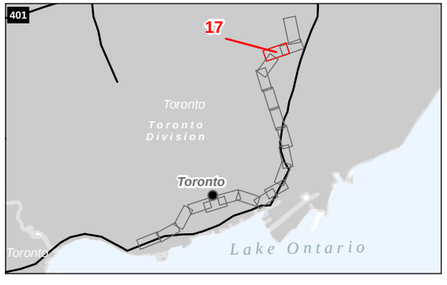
Figure No.
A-16

Title
Project Footprint and Project Components

\\cd1215-f01\work_group\01605\active\160560009\11_data\gis_cad\gis\mxds\atmospheric\report_figures\20200908_Air_Work_Plan\160560009_AW_Fig4.1-16_ProjectFootprint

Revised: 2022-04-11 By: bcowper





Legend

- Project Footprint

Alignment - Current

- Track Alignment Centerline
- Elevated Guideway
- Proposed HONI Realignment
- Existing Storm Sewer
- Storm Sewer Extension
- Operations, Maintenance and Storage Facility
- OMSF Bridge Fill Area
- Construction Staging and Construction Area

0 50 100 metres

1:2,750 (At original document size of 11x17)

Notes

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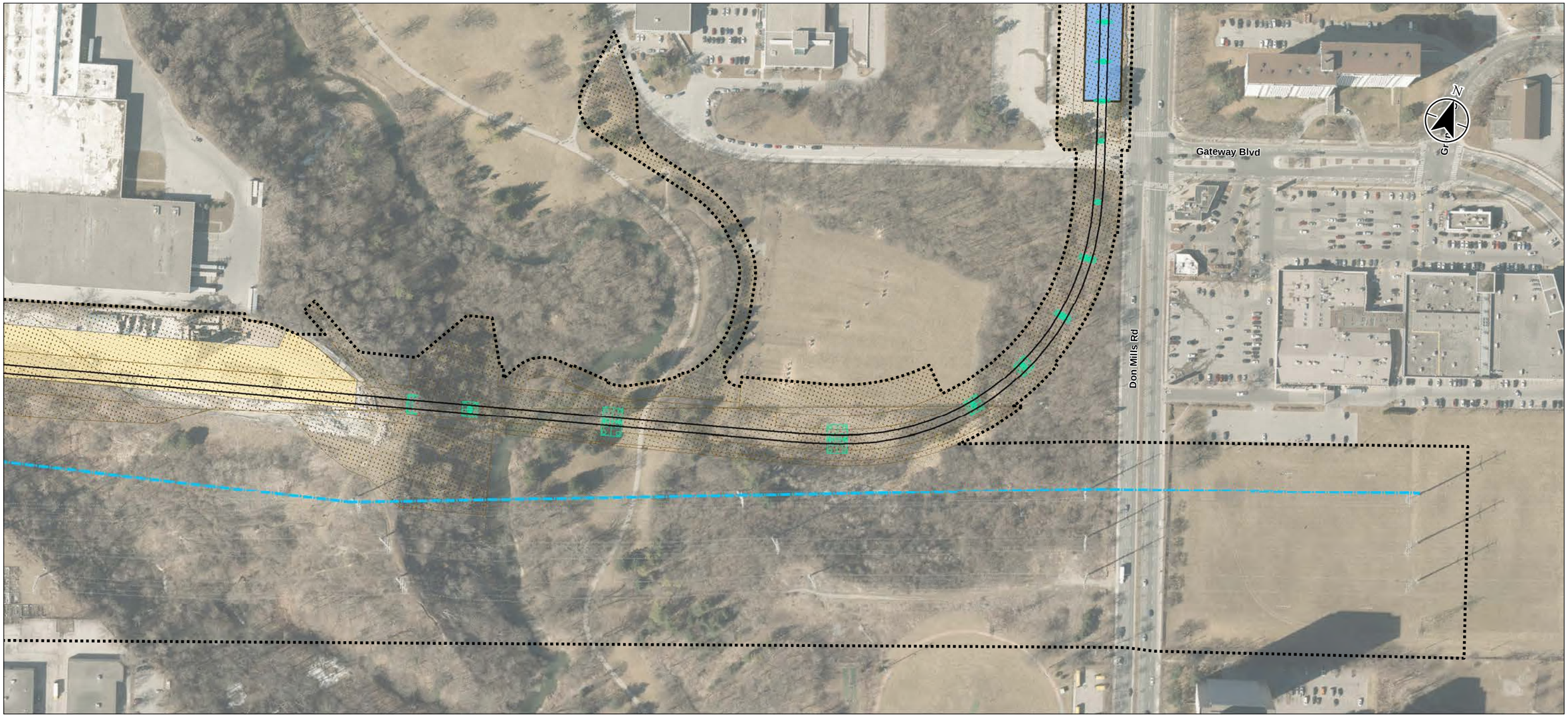
Prepared by BCC on 2022-04-11
Technical Review by CL on 2021-06-10

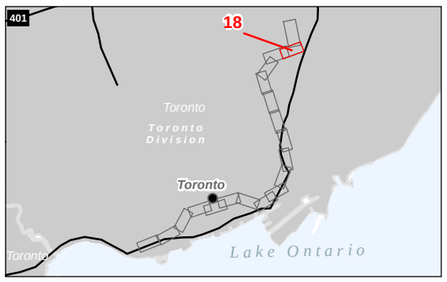
Client/Project
HDR CORPORATION
ONTARIO LINE TA

160560009 REVA

Figure No.
A-17

Title
Project Footprint and Project Components





Legend

- Project Footprint

Alignment - Current

- Track Alignment Centerline
- Elevated Guideway
- Proposed HONI Realignment
- Station
- Operations, Maintenance and Storage Facility
- Construction Staging and Construction Area

0 40 80 metres

1:2,500 (At original document size of 11x17)

Notes

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Project Location
Toronto, ON

Prepared by BCC on 2022-04-11
Technical Review by CL on 2021-06-10

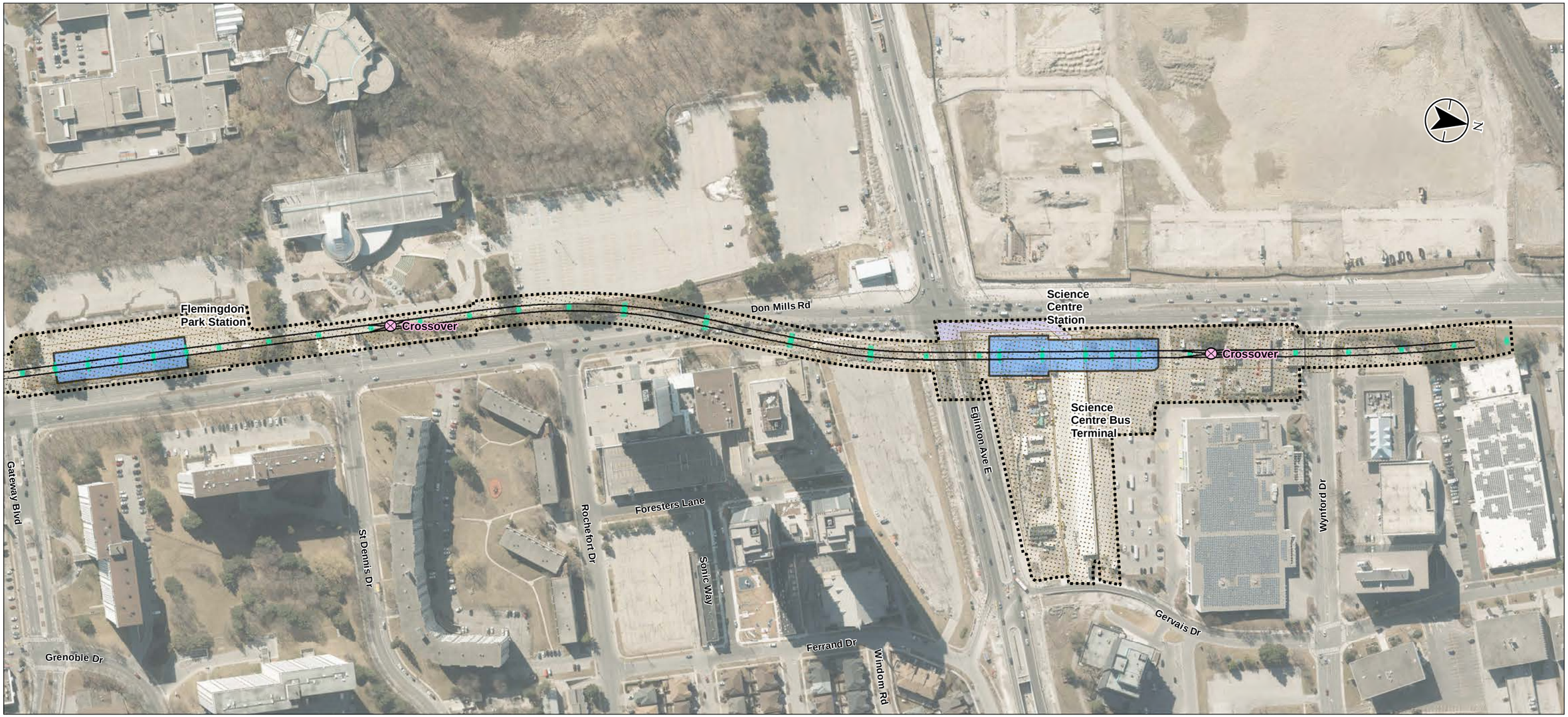
Client/Project
HDR CORPORATION
ONTARIO LINE TA

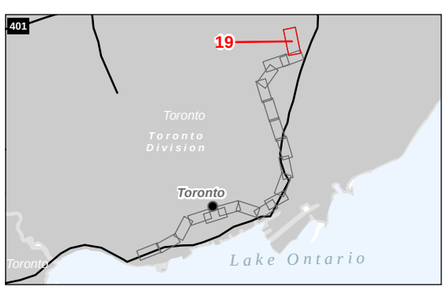
160560009 REVA

Figure No.
A-18

Title
Project Footprint and Project Components

\\cd1215-f01\work_group\01605\active\160560009\11_data\gis_cad\gis\mxds\atmospheric\report_figures\20200908_Air_Work_Plan\160560009_AW_FigA1-19_ProjectFootprintMapbook.mxd Revised: 2022-04-11 By: bcowper





Legend

- Project Footprint

Alignment - Current

- Track Alignment Centerline
- Elevated Guideway
- Crossover
- Station
- Pedestrian Tunnel
- Construction Staging and Construction Area

0 50 100 metres

1:3,000 (At original document size of 11x17)

Notes

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Project Location
Toronto, ON

Prepared by BCC on 2022-04-11
Technical Review by CL on 2021-06-10

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HDR CORPORATION
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Figure No.
A-19

Title
Project Footprint and Project Components

Appendix B. Figures - Project Study Area and NAPS Monitoring Station Locations

1:10,000 (At original document size of 11x17)

Stantec

Legend

- Project Footprint
- Study Area (500 m Buffer)
- Waterbody

Notes

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Project Location
City of Toronto, ON

160560009 REV4
Prepared by BCC on 2022-01-28
Technical Review by ABC on yyyy-mm-dd
Independent Review by ABC on yyyy-mm-dd

Client/Project
HDR CORPORATION
ONTARIO LINE TA

Figure No.
B-1-1

Title
Project Study Area

Stantec

Legend

- Project Footprint
- Study Area (500 m Buffer)
- Waterbody

Notes

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Project Location
City of Toronto, ON

160560009 REV4
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Technical Review by ABC on yyyy-mm-dd
Independent Review by ABC on yyyy-mm-dd

Client/Project
HDR CORPORATION
ONTARIO LINE TA

Figure No.
B-1-2

Title
Project Study Area

Stantec

Legend
- Project Footprint
- Study Area (500 m Buffer)
- Waterbody

Notes
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Project Location
City of Toronto, ON

160560009 REV4
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Independent Review by ABC on yyyy-mm-dd

Client/Project
HDR CORPORATION
ONTARIO LINE TA

Figure No.
B-1-3

Title
Project Study Area

Legend

- Project Footprint
- Study Area (500 m Buffer)
- Waterbody

Notes

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Project Location
City of Toronto, ON

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Independent Review by ABC on yyyy-mm-dd

Client/Project
HDR CORPORATION
ONTARIO LINE TA

Figure No.
B-1-4

Title
Project Study Area

Stantec

Legend

- Project Footprint
- Study Area (500 m Buffer)
- Waterbody

Notes

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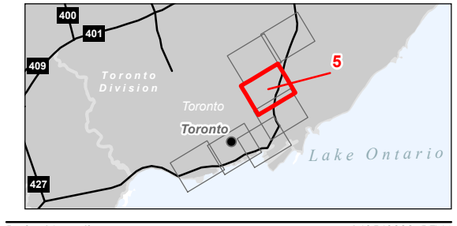


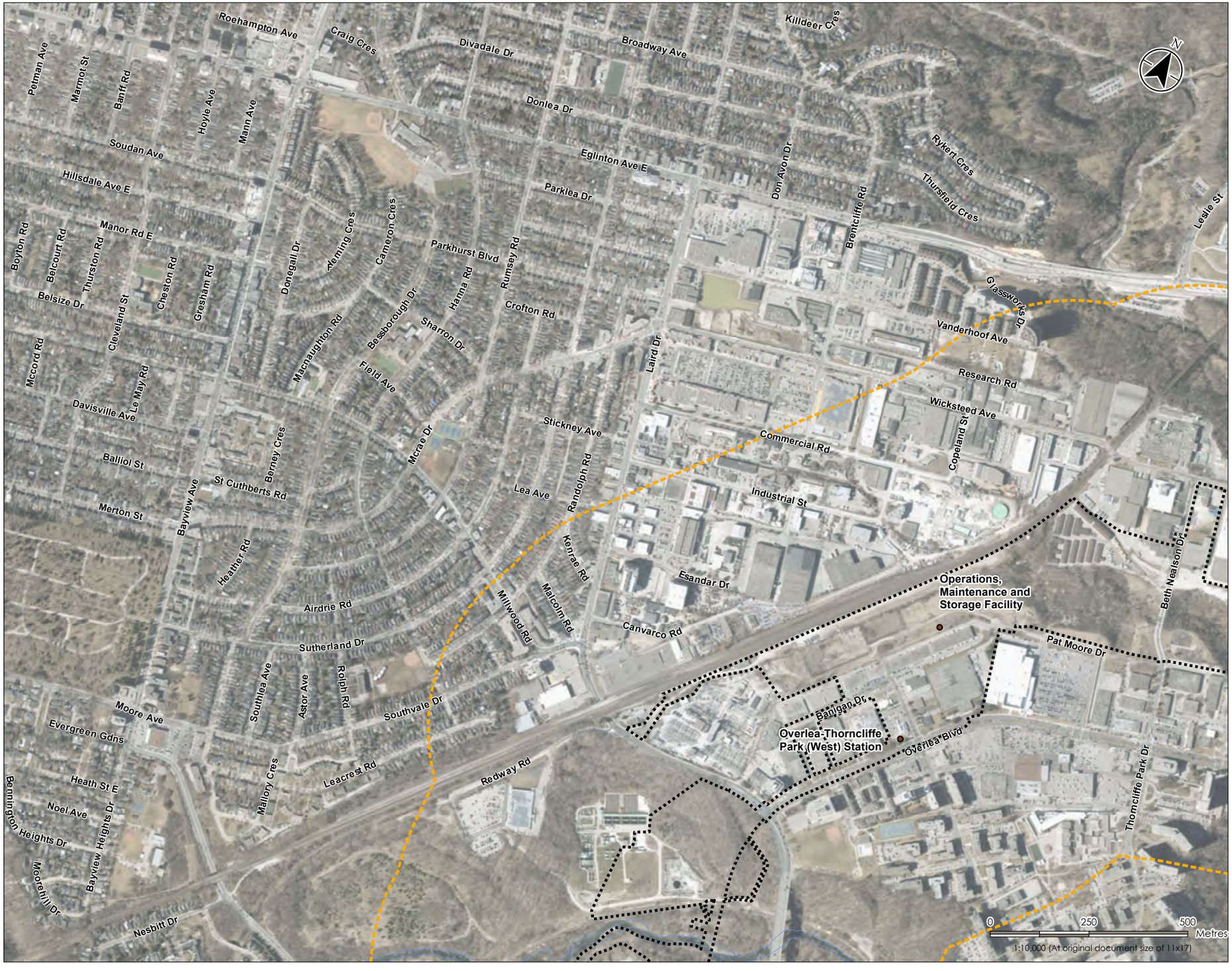
Project Location
City of Toronto, ON

160560009 REV4
Prepared by BCC on 2022-01-28
Technical Review by ABC on yyyy-mm-dd
Independent Review by ABC on yyyy-mm-dd

Client/Project
HDR CORPORATION
ONTARIO LINE TA

Figure No.
B-1-5

Title
Project Study Area



Stantec

Legend
- Project Footprint
- Study Area (500 m Buffer)
- Waterbody

Notes
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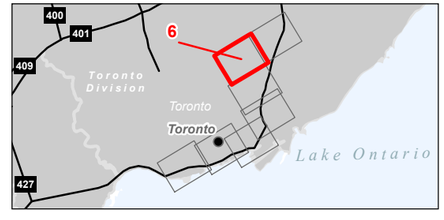

Project Location
City of Toronto, ON

160560009 REV4
Prepared by BCC on 2022-01-28
Technical Review by ABC on yyyy-mm-dd
Independent Review by ABC on yyyy-mm-dd

Client/Project
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ONTARIO LINE TA

Figure No.
B-1-6

Title
Project Study Area

Stantec

Legend
- Project Footprint
- Study Area (500 m Buffer)
- Waterbody

Notes
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Project Location
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Independent Review by ABC on yyyy-mm-dd

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ONTARIO LINE TA

Figure No.
B-1-7

Title
Project Study Area

Stantec

Legend

- Study Area (500 m Buffer)
- Project Footprint
- NAPS Monitoring Station

0 1,800 3,600 Metres

1:75,000 (At original document size of 11x17)

Notes

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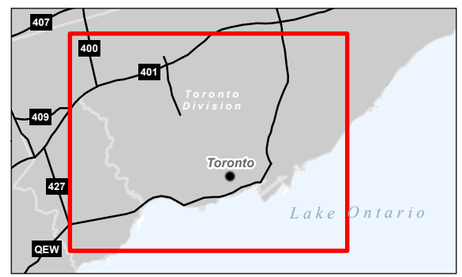

Project Location
City of Toronto, ON

160560009 REV4
Prepared by BCC on 2022-01-28
Technical Review by ABC on yyyy-mm-dd
Independent Review by ABC on yyyy-mm-dd

Client/Project
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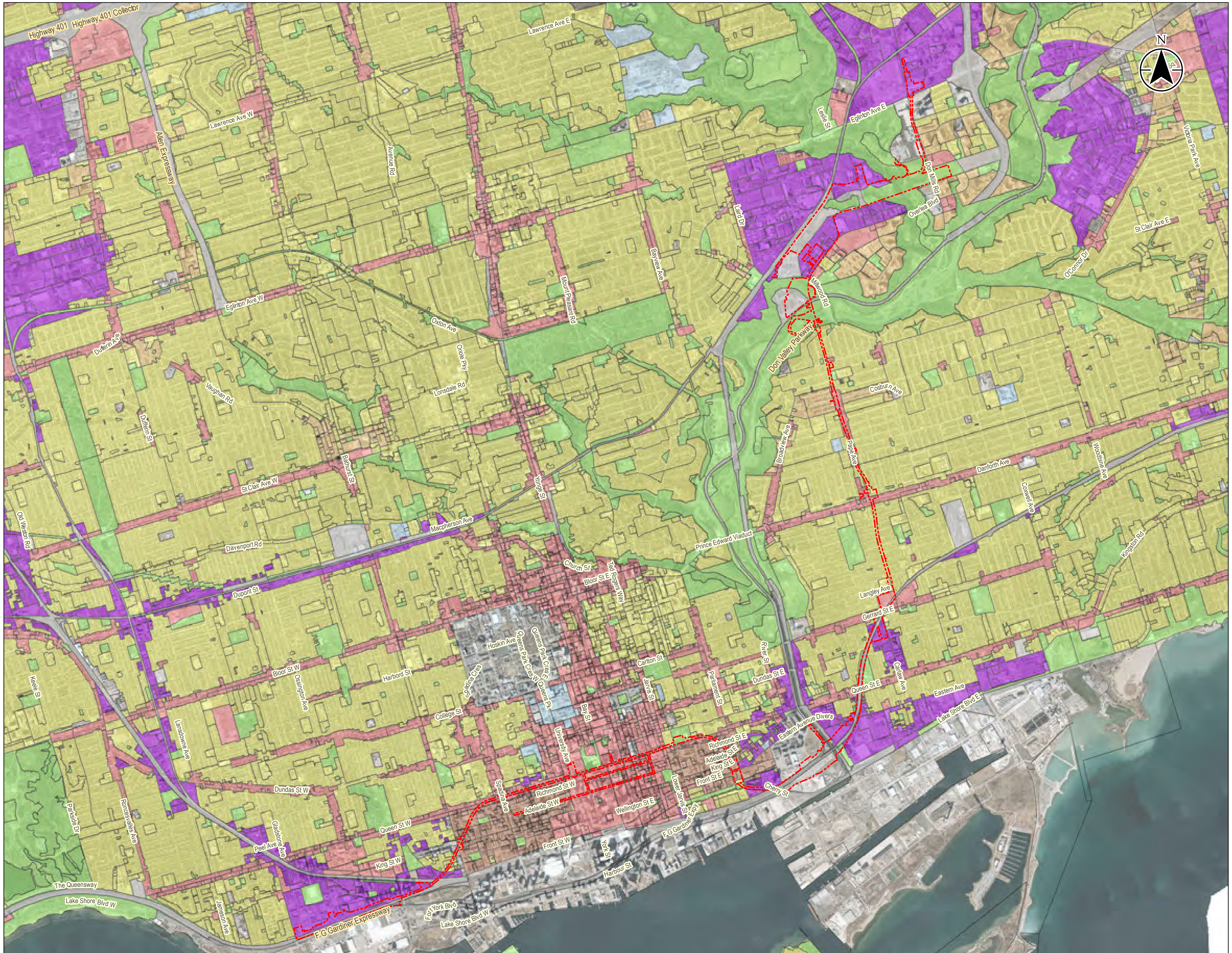
ONTARIO LINE TA

Figure No.
B-2

Title
Locations of NAPS Monitoring Stations

Appendix C. Zoning Maps



Stantec

Legend

Project Footprint

City of Toronto Zoning Categories

- Residential
- Residential Apartment
- Commercial
- Commercial Residential
- Commercial Residential Employment
- Employment Industrial
- Institutional
- Open Space
- Utility and Transportation
- Area Not Classified by City of Toronto

0 | 1,100 | 2,200 Metres

1:45,000 (At original document size of 11x17)

Notes

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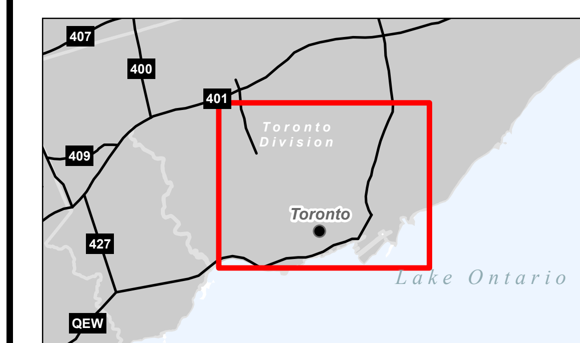


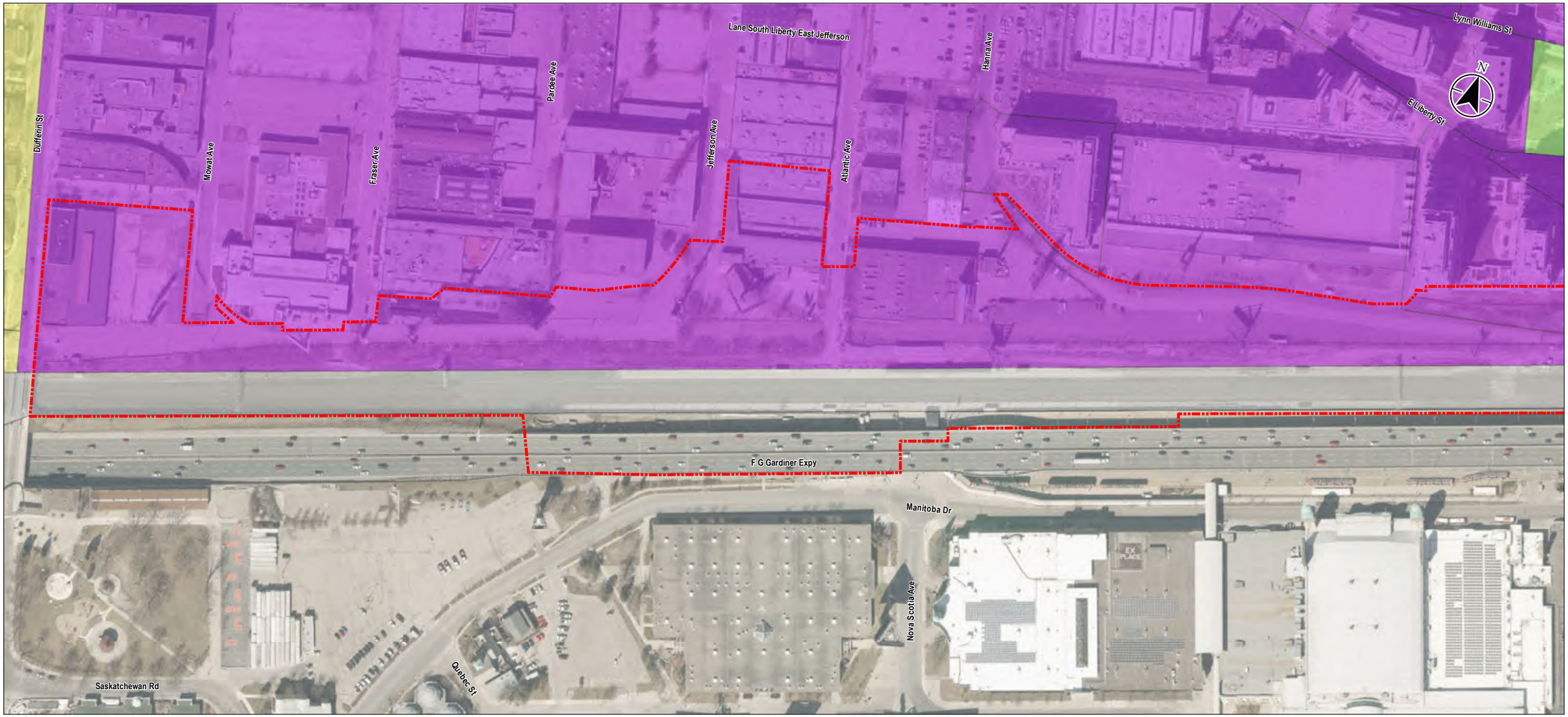
Project Location
City of Toronto, ON

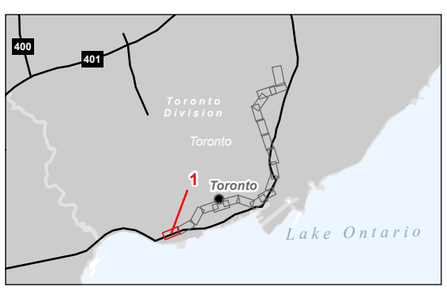
160560009 REV4
Prepared by BCC on 2022-01-28

Client/Project
HDR CORPORATION
ONTARIO LINE TA

Figure No.
C-0

Title
City of Toronto Zoning Categories - Overview





Legend

Project Footprint

City of Toronto Zoning Categories

- Residential
- Employment Industrial
- Open Space
- Utility and Transportation
- Area Not Classified by City of Toronto

0 40 80 metres

1:2,500 (At original document size of 11x17)

Notes

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Project Location
Toronto, ON

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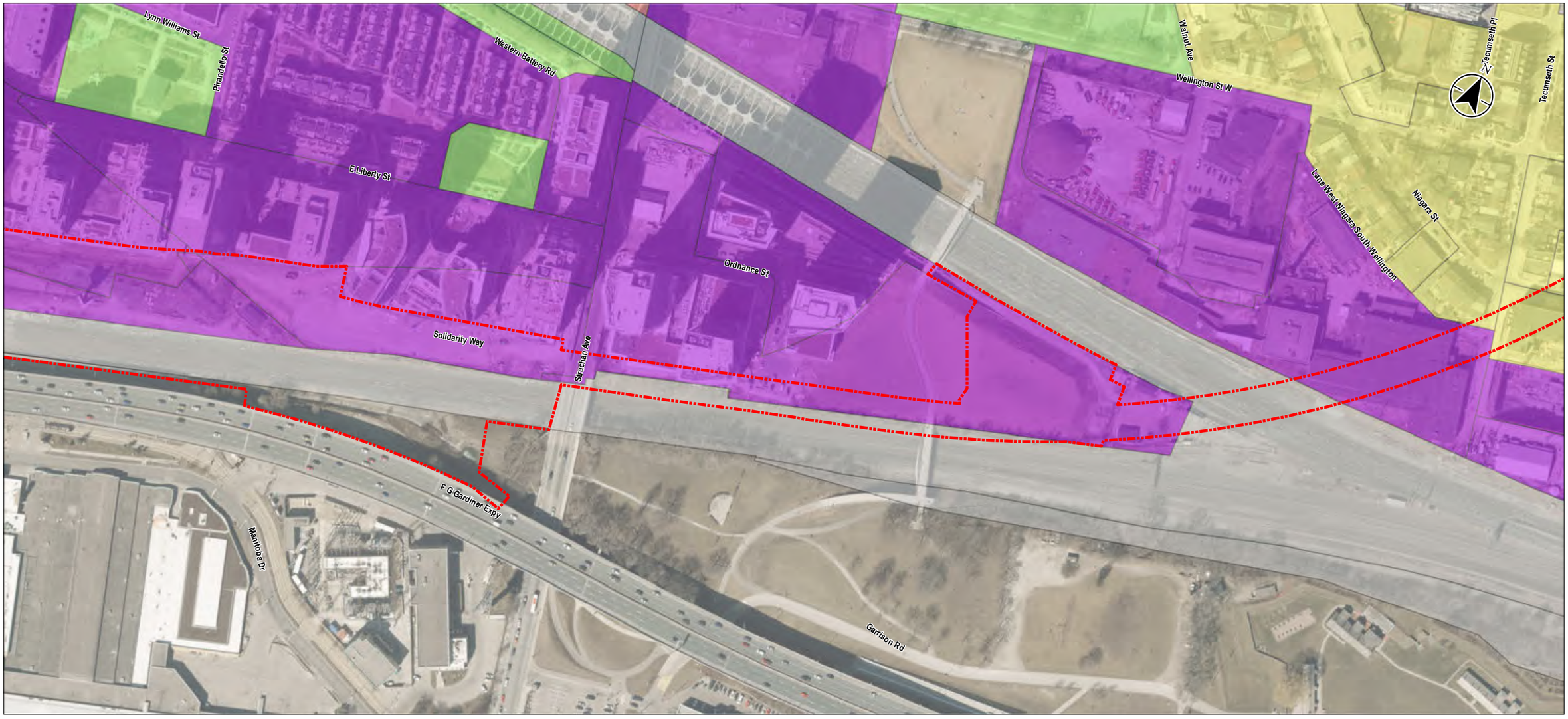
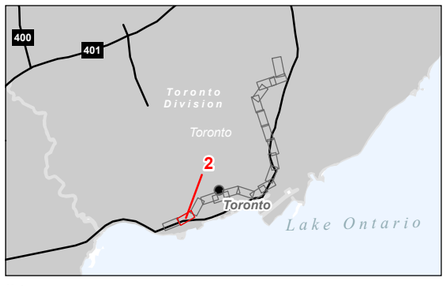
Client/Project
HDR CORPORATION
ONTARIO LINE TA

160560009 REVA

Figure No.
C-1

Title
City of Toronto Zoning Categories





Legend

- Project Footprint

City of Toronto Zoning Categories

- Residential
- Commercial Residential
- Employment Industrial
- Open Space
- Utility and Transportation
- Area Not Classified by City of Toronto

0 40 80 metres

1:2,500 (At original document size of 11x17)

Stantec

Project Location
Toronto, ON

Prepared by BCC on 2022-01-28
TR by ABC on yyyy-mm-dd

Client/Project
HDR CORPORATION
ONTARIO LINE TA

160560009 REVA

Figure No.
C-2

Title
City of Toronto Zoning Categories

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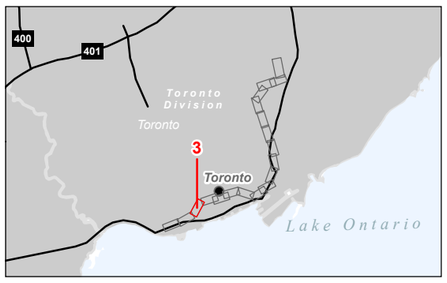

Legend

- Project Footprint

City of Toronto Zoning Categories

- Residential
- Commercial Residential
- Commercial Residential Employment
- Employment Industrial
- Open Space
- Utility and Transportation
- Area Not Classified by City of Toronto

0 40 80 metres

1:2,500 (At original document size of 11x17)

Stantec

Project Location
Toronto, ON

Prepared by BCC on 2022-01-28
TR by ABC on yyyy-mm-dd

Client/Project
HDR CORPORATION
ONTARIO LINE TA

160560009 REVA

Figure No.
C-3

Title
City of Toronto Zoning Categories

Notes
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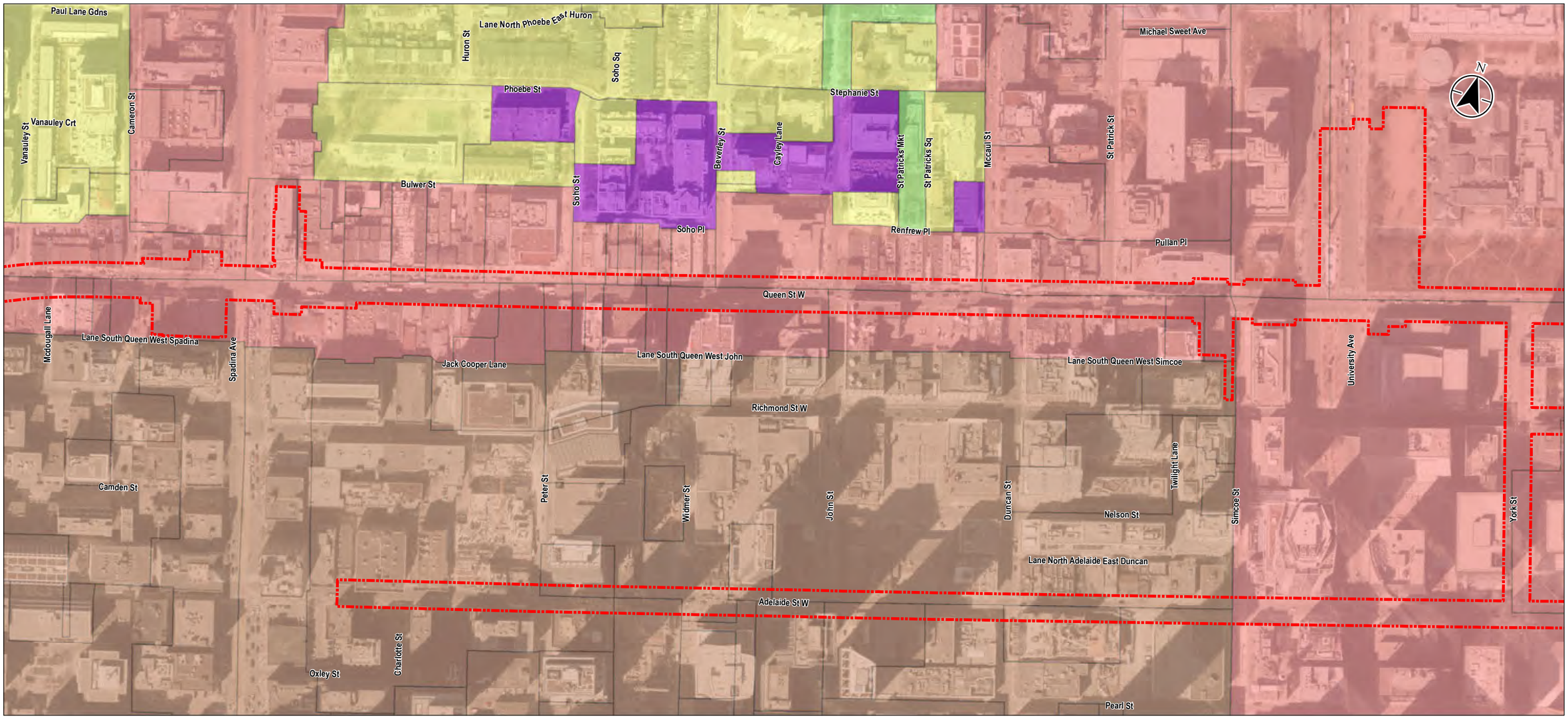

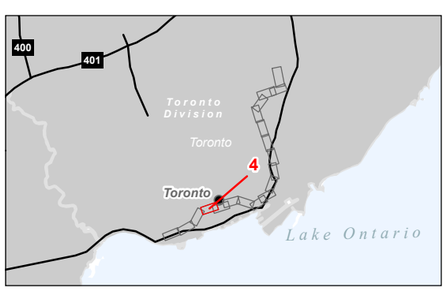

Legend

- Project Footprint

City of Toronto Zoning Categories

- Residential
- Commercial Residential
- Commercial Residential Employment
- Employment Industrial
- Open Space

0 50 100 metres

1:3,000 (At original document size of 11x17)

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Project Location
Toronto, ON

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Client/Project
HDR CORPORATION
ONTARIO LINE TA

160560009 REVA

Figure No.
C-4

Title
City of Toronto Zoning Categories

Notes
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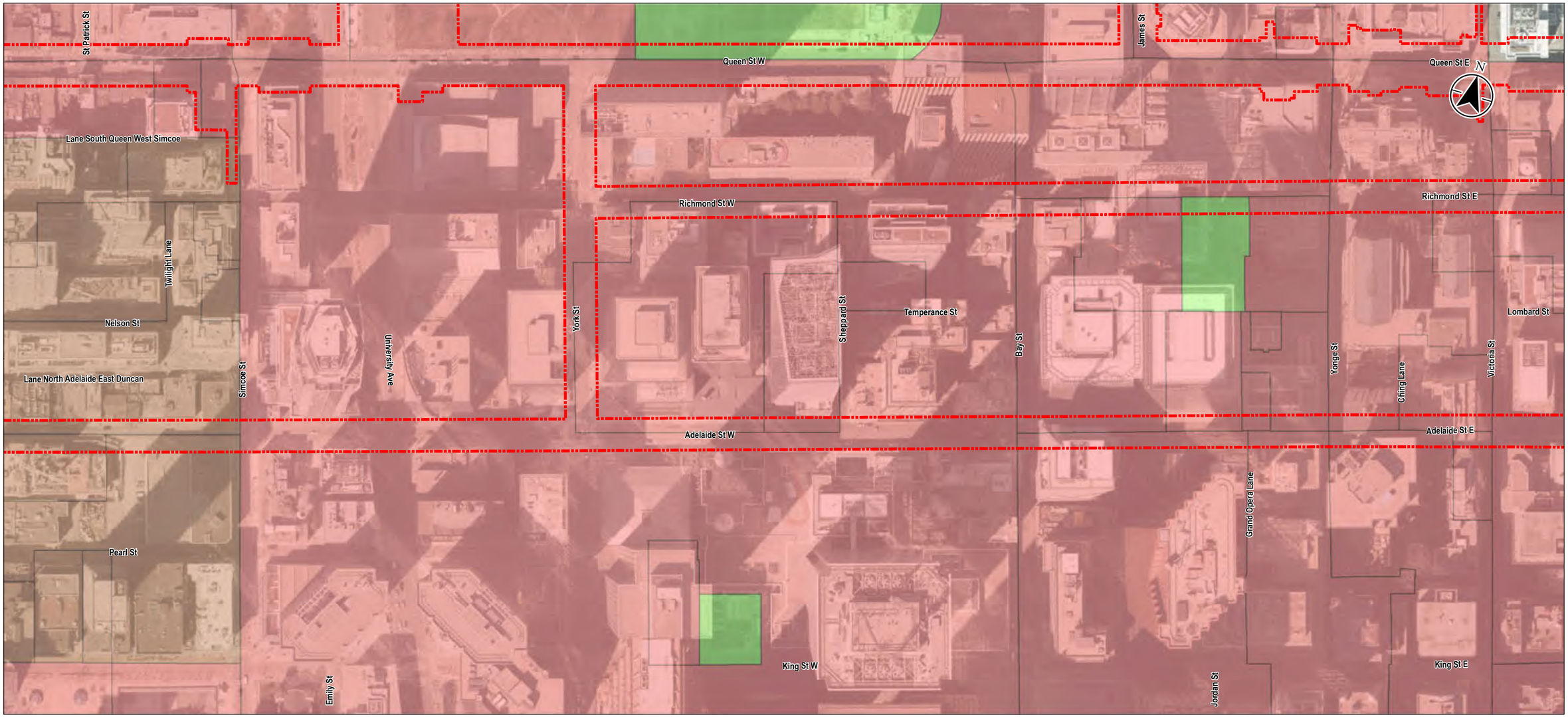

Legend

- Project Footprint

City of Toronto Zoning Categories

- Commercial Residential
- Commercial Residential Employment
- Open Space
- Area Not Classified by City of Toronto

0 40 80 metres

1:2,500 (At original document size of 11x17)

Notes

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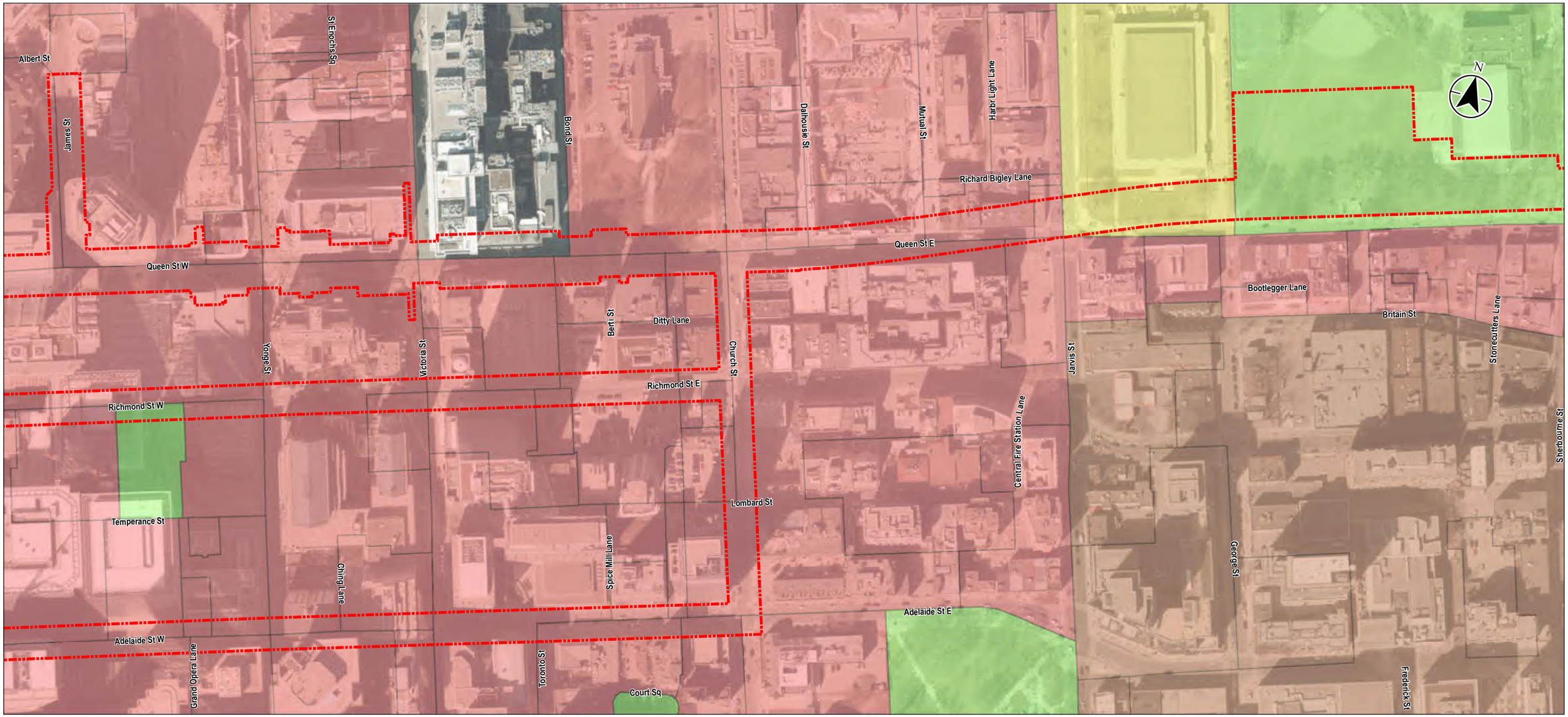
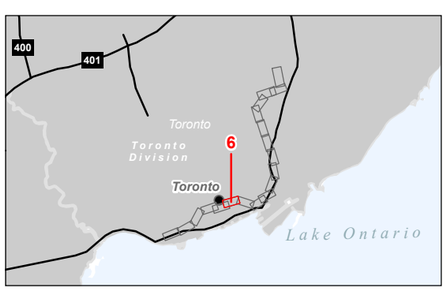
HDR CORPORATION
ONTARIO LINE TA

160560009 REVA

Figure No.
C-5

Title
City of Toronto Zoning Categories





Legend

- Project Footprint

City of Toronto Zoning Categories

- Residential
- Commercial Residential
- Commercial Residential Employment
- Open Space
- Area Not Classified by City of Toronto

0 40 80 metres

1:2,500 (At original document size of 11x17)

Stantec

Project Location
Toronto, ON

Prepared by BCC on 2022-01-28
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ONTARIO LINE TA

160560009 REVA

Figure No.
C-6

Title
City of Toronto Zoning Categories

Notes
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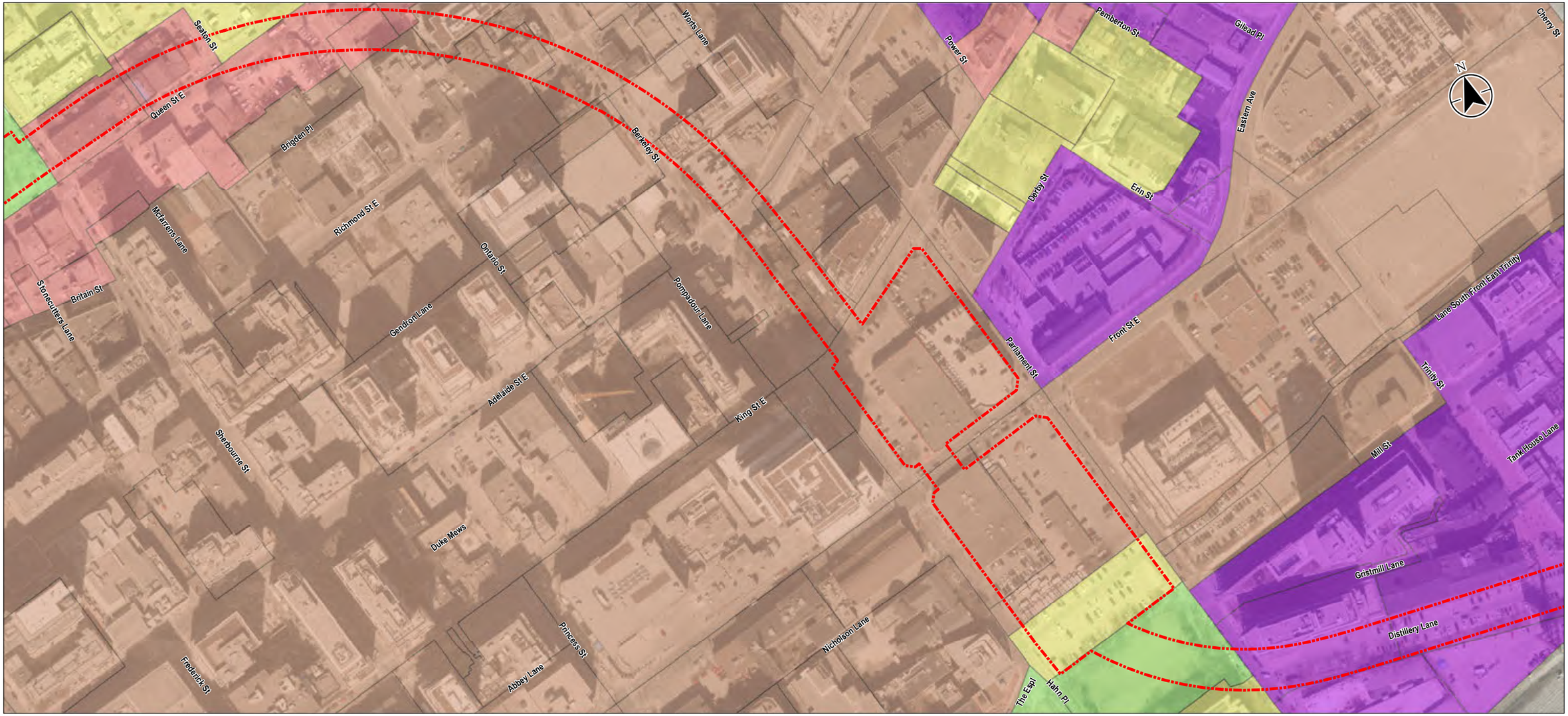

Legend

- Project Footprint

City of Toronto Zoning Categories

- Residential
- Commercial Residential
- Commercial Residential Employment
- Employment Industrial
- Open Space
- Area Not Classified by City of Toronto

0 40 80 metres

1:2,500 (At original document size of 11x17)

Stantec

Project Location
Toronto, ON

Prepared by BCC on 2022-01-28
TR by ABC on yyyy-mm-dd

Client/Project
HDR CORPORATION
ONTARIO LINE TA

160560009 REVA

Figure No.
C-7

Title
City of Toronto Zoning Categories

Notes
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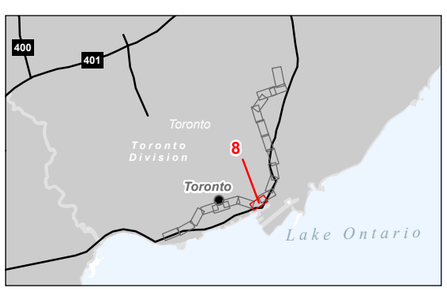

Legend

- Project Footprint

City of Toronto Zoning Categories

- Commercial Residential Employment
- Employment Industrial
- Utility and Transportation
- Area Not Classified by City of Toronto

0 40 80 metres

1:2,500 (At original document size of 11x17)

Notes

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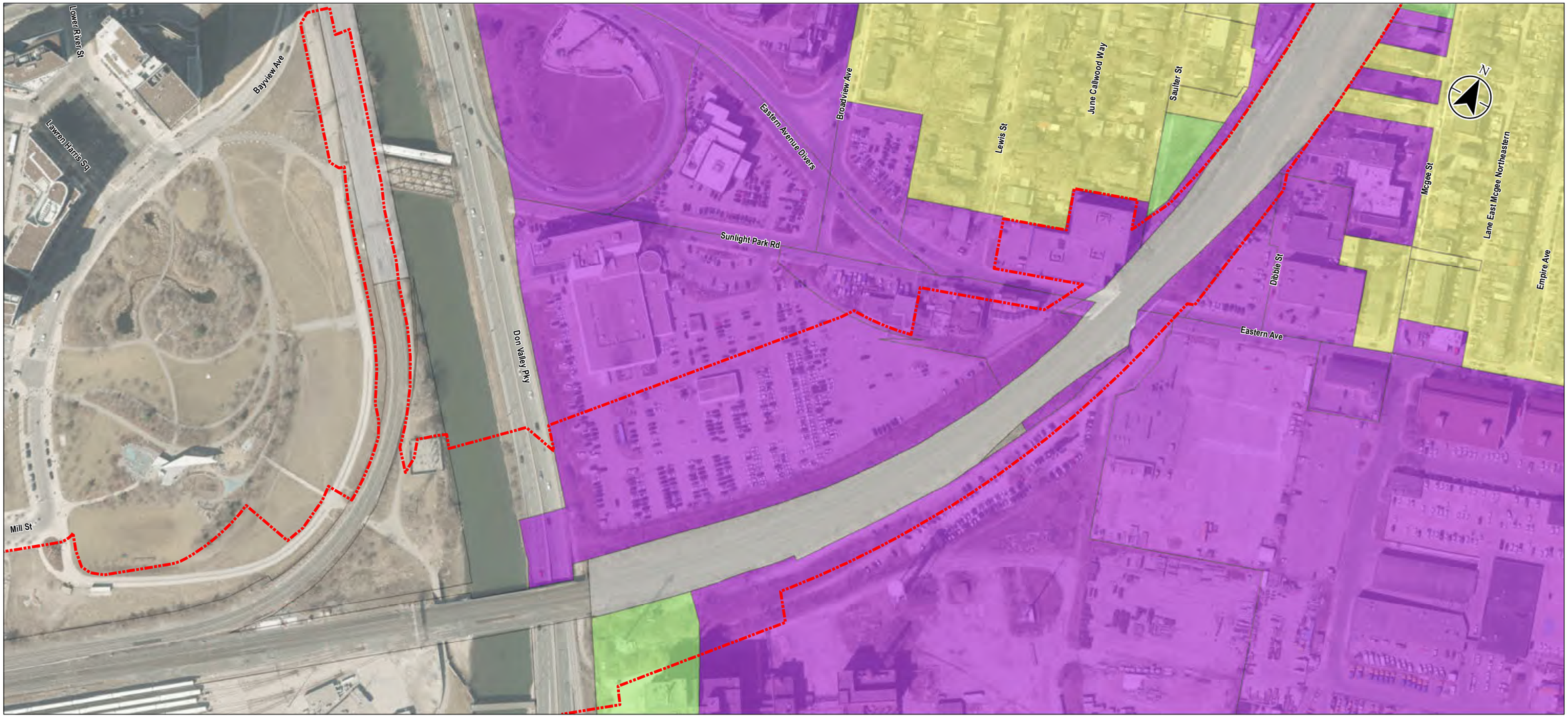
Client/Project
HDR CORPORATION
ONTARIO LINE TA

160560009 REVA

Figure No.
C-8

Title
City of Toronto Zoning Categories

\\cd1215-f01\work_group\01605\active\160560009\11_data\gis_cad\gis\mxds\atmospheric\report_figures\20200908_Air_Work_Plan\160560009_AW_FigC1-19_ZoningMap.mxd Revised: 2022-01-28 By: bcowper



Legend

- Project Footprint

City of Toronto Zoning Categories

- Residential
- Employment Industrial
- Open Space
- Utility and Transportation
- Area Not Classified by City of Toronto

0 40 80 metres

1:2,500 (At original document size of 11x17)

Notes

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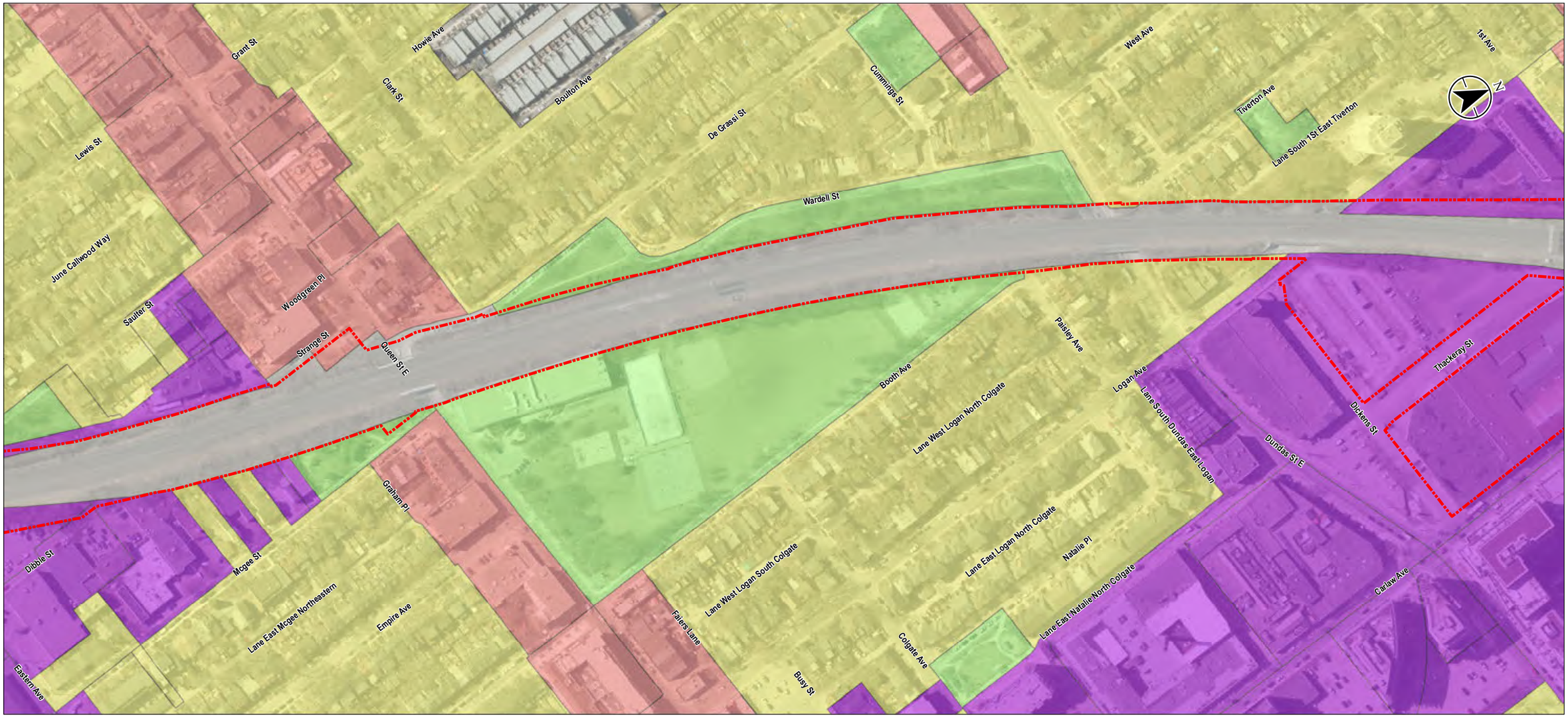
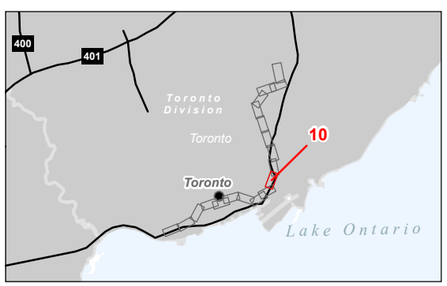
Client/Project
HDR CORPORATION
ONTARIO LINE TA

160560009 REVA

Figure No.
C-9

Title
City of Toronto Zoning Categories





Legend

- Project Footprint

City of Toronto Zoning Categories

- Residential
- Commercial Residential
- Employment Industrial
- Open Space
- Utility and Transportation
- Area Not Classified by City of Toronto

0 40 80 metres

1:2,500 (At original document size of 11x17)

Stantec

Project Location
Toronto, ON

Prepared by BCC on 2022-01-28
TR by ABC on yyyy-mm-dd

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ONTARIO LINE TA

160560009 REVA

Figure No.
C-10

Title
City of Toronto Zoning Categories

Notes
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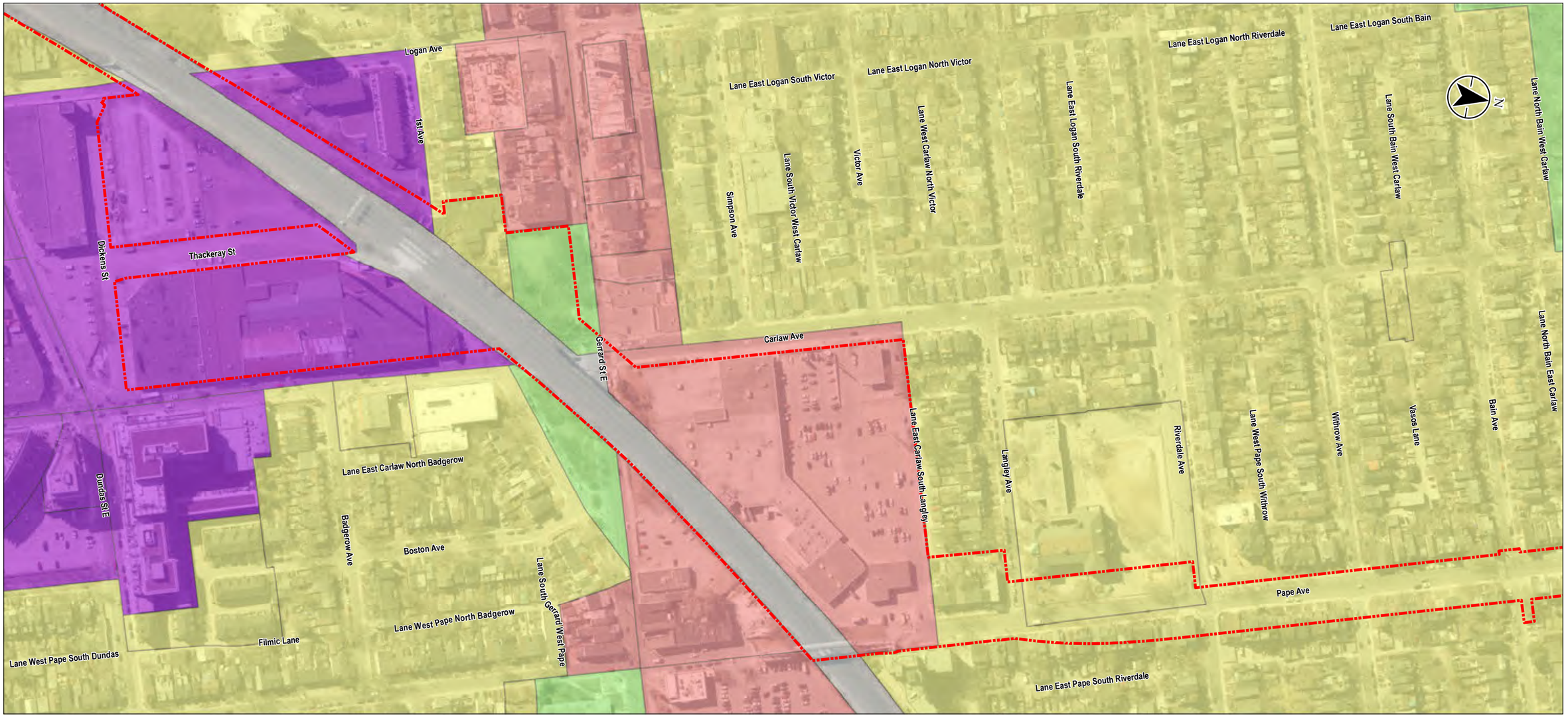

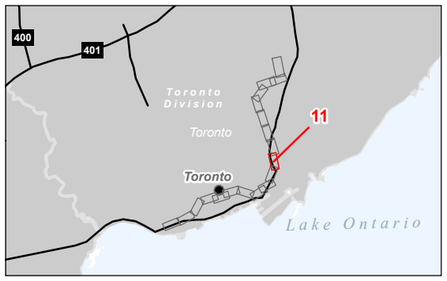

Legend

- Project Footprint

City of Toronto Zoning Categories

- Residential
- Commercial Residential
- Employment Industrial
- Open Space
- Utility and Transportation

0 40 80 metres

1:2,500 (At original document size of 11x17)

Notes

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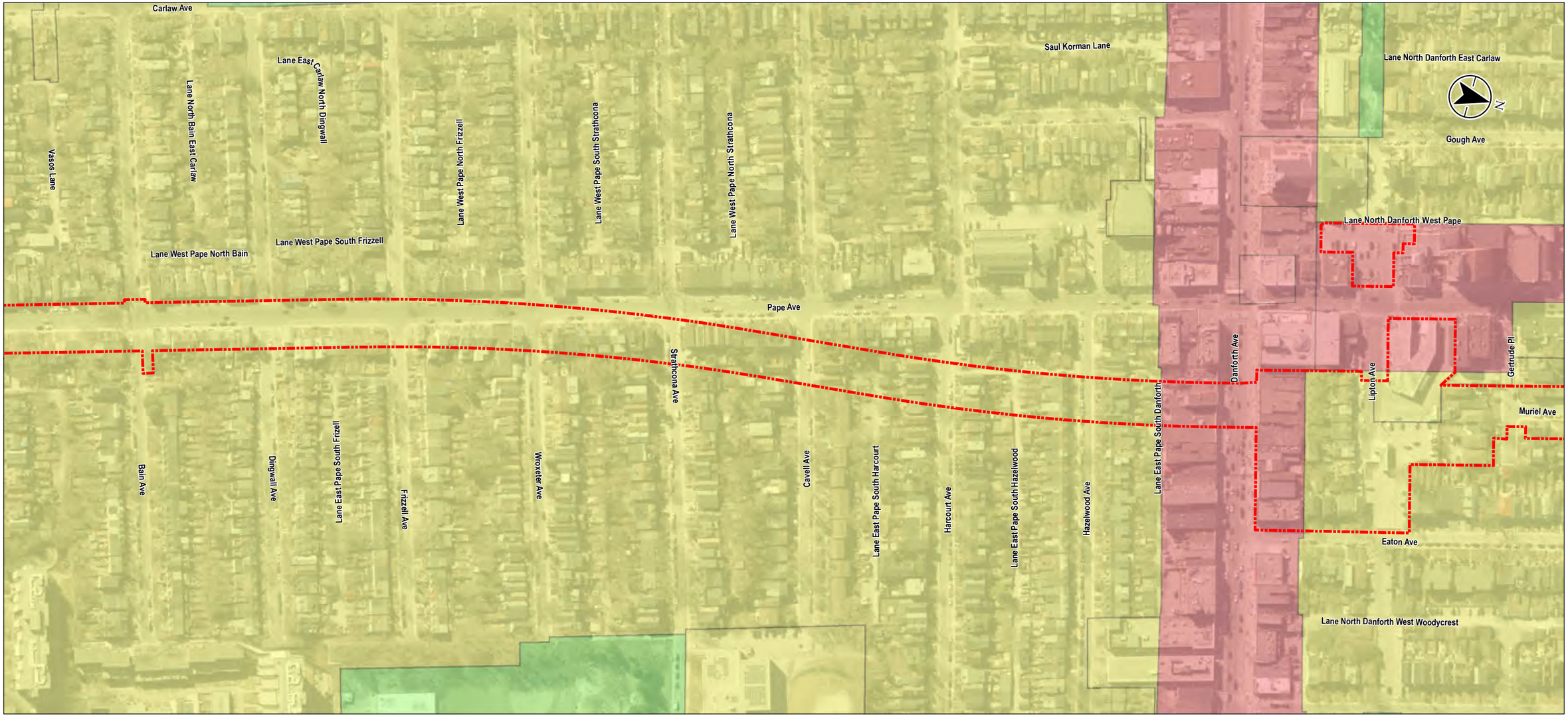
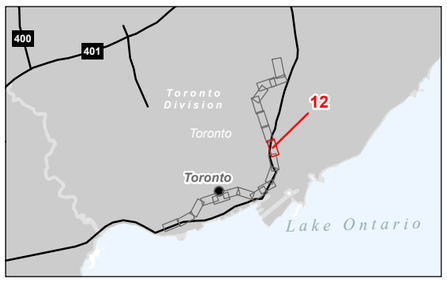
ONTARIO LINE TA

160560009 REVA

Figure No.
C-11

Title
City of Toronto Zoning Categories





Legend

- Project Footprint

City of Toronto Zoning Categories

- Residential
- Commercial Residential
- Open Space

0 40 80 metres

1:2,500 (At original document size of 11x17)

Stantec

Project Location
Toronto, ON

Prepared by BCC on 2022-01-28
TR by ABC on yyyy-mm-dd

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ONTARIO LINE TA

160560009 REVA

Figure No.
C-12

Title
City of Toronto Zoning Categories

Notes
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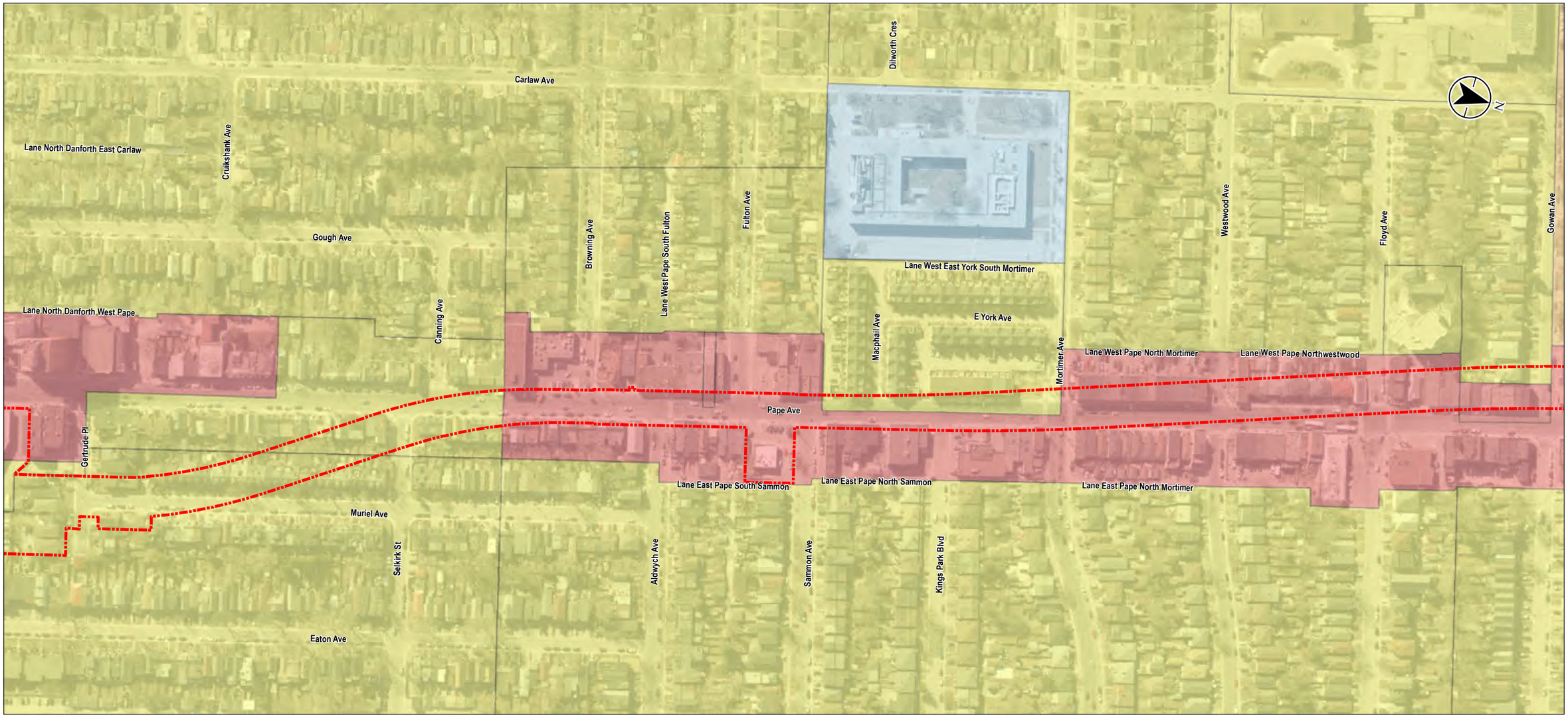

Legend

- Project Footprint

City of Toronto Zoning Categories

- Residential
- Residential Apartment
- Commercial Residential
- Institutional

0 40 80 metres

1:2,500 (At original document size of 11x17)

Notes

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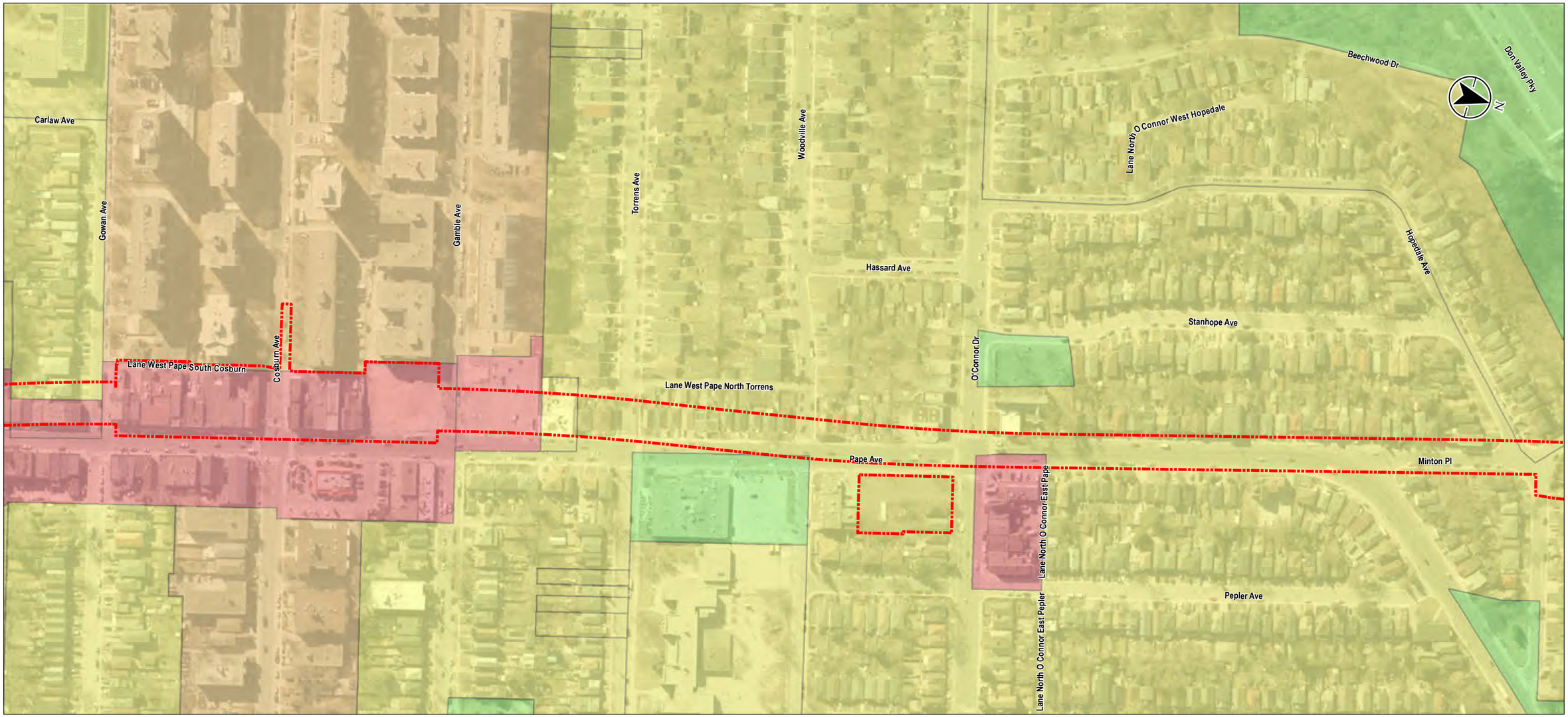
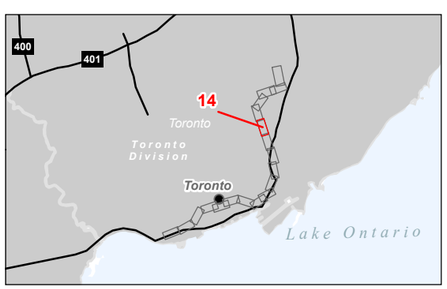
ONTARIO LINE TA

160560009 REVA

Figure No.
C-13

Title
City of Toronto Zoning Categories





Legend

- Project Footprint

City of Toronto Zoning Categories

- Residential
- Residential Apartment
- Commercial Residential
- Open Space

0 40 80 metres

1:2,500 (At original document size of 11x17)

Notes

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Toronto, ON

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TR by ABC on yyyy-mm-dd

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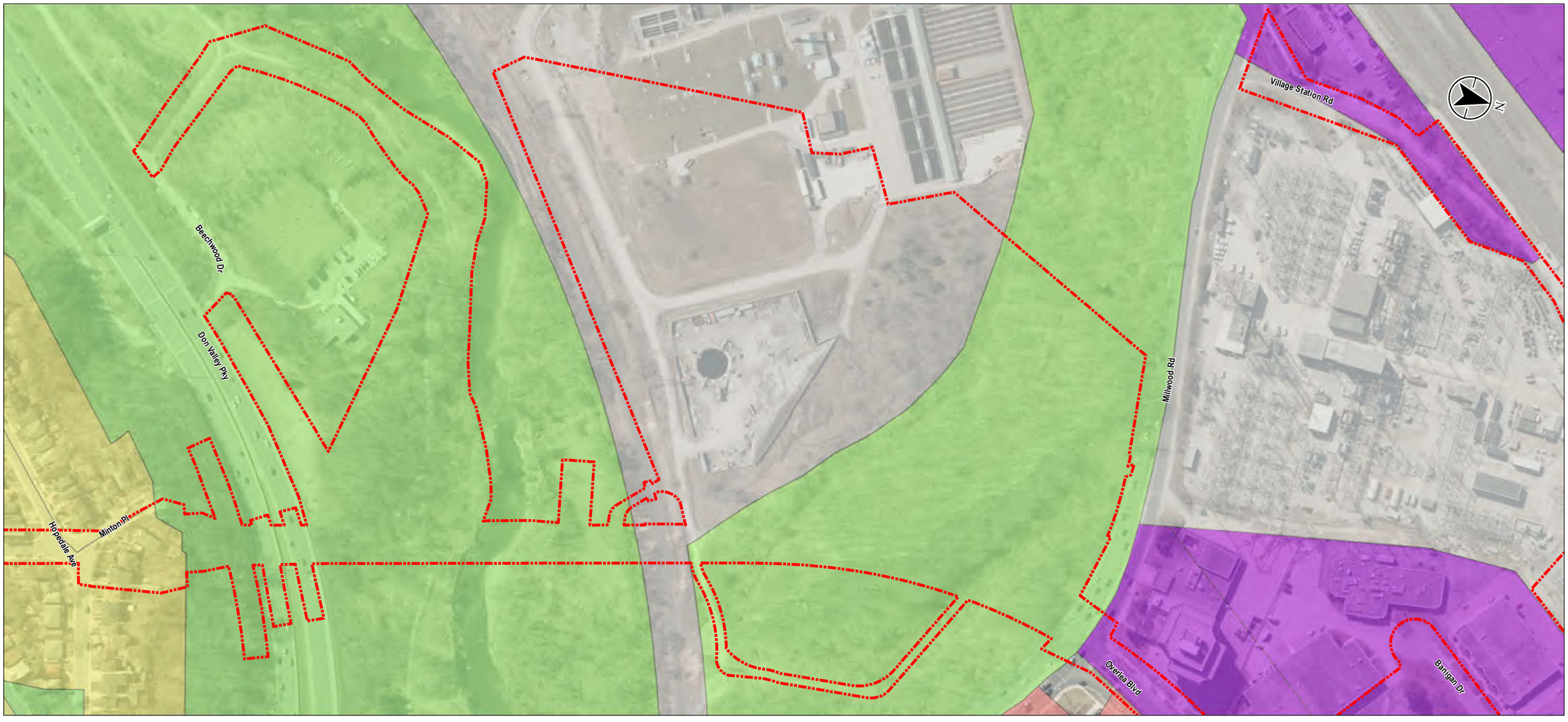
HDR CORPORATION
ONTARIO LINE TA

160560009 REVA

Figure No.
C-14

Title
City of Toronto Zoning Categories



Legend

- Project Footprint

City of Toronto Zoning Categories

- Residential
- Commercial Residential
- Employment Industrial
- Open Space
- Utility and Transportation
- Area Not Classified by City of Toronto

0 40 80 metres

1:2,500 (At original document size of 11x17)

Stantec

Project Location
Toronto, ON

Prepared by BCC on 2022-01-28
TR by ABC on yyyy-mm-dd

Client/Project
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ONTARIO LINE TA

160560009 REVA

Figure No.
C-15

Title
City of Toronto Zoning Categories

Notes
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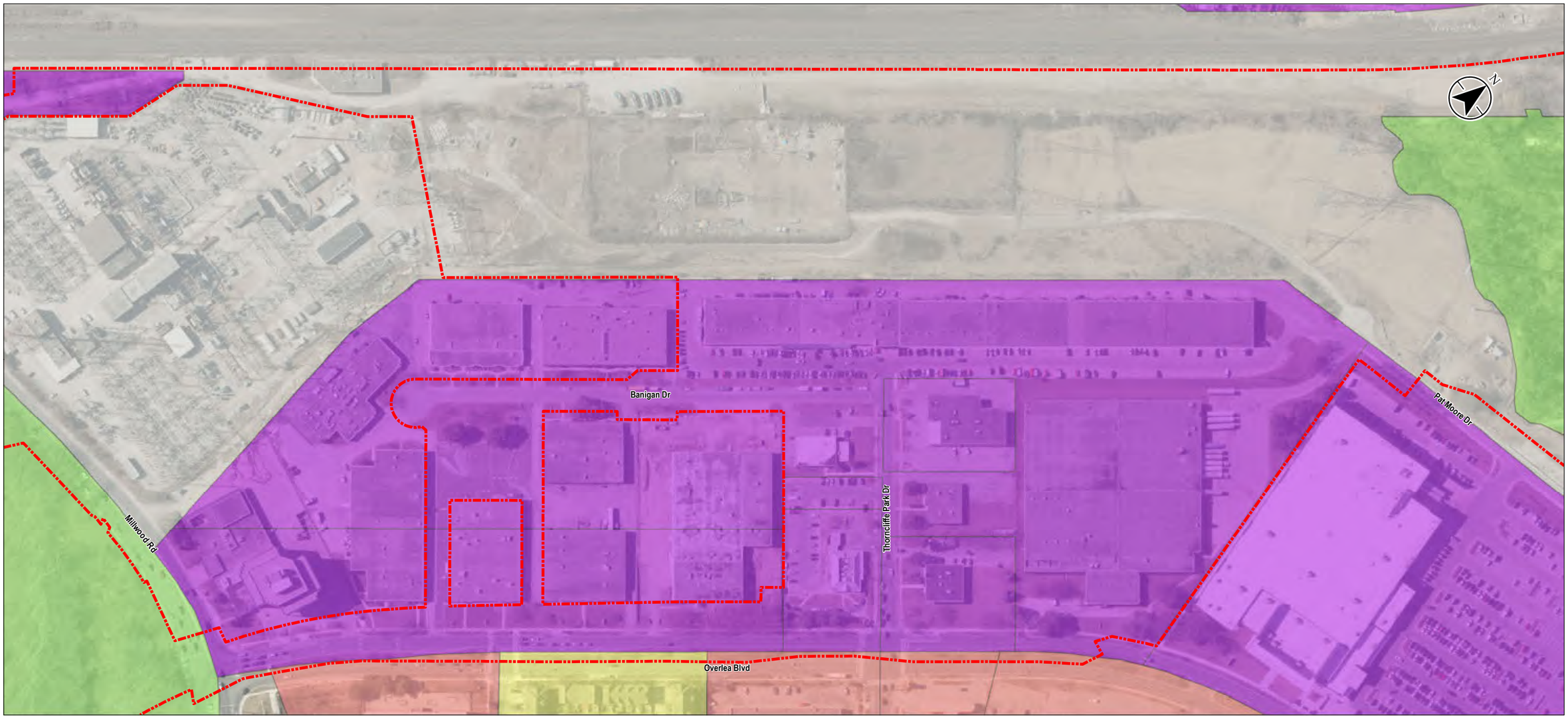

Legend

- Project Footprint

City of Toronto Zoning Categories

- Residential
- Commercial Residential
- Employment Industrial
- Open Space
- Utility and Transportation
- Area Not Classified by City of Toronto

0 40 80 metres

1:2,500 (At original document size of 11x17)

Stantec

Project Location
Toronto, ON

Prepared by BCC on 2022-01-28
TR by ABC on yyyy-mm-dd

Client/Project
HDR CORPORATION
ONTARIO LINE TA

160560009 REVA

Figure No.
C-16

Title
City of Toronto Zoning Categories

Notes
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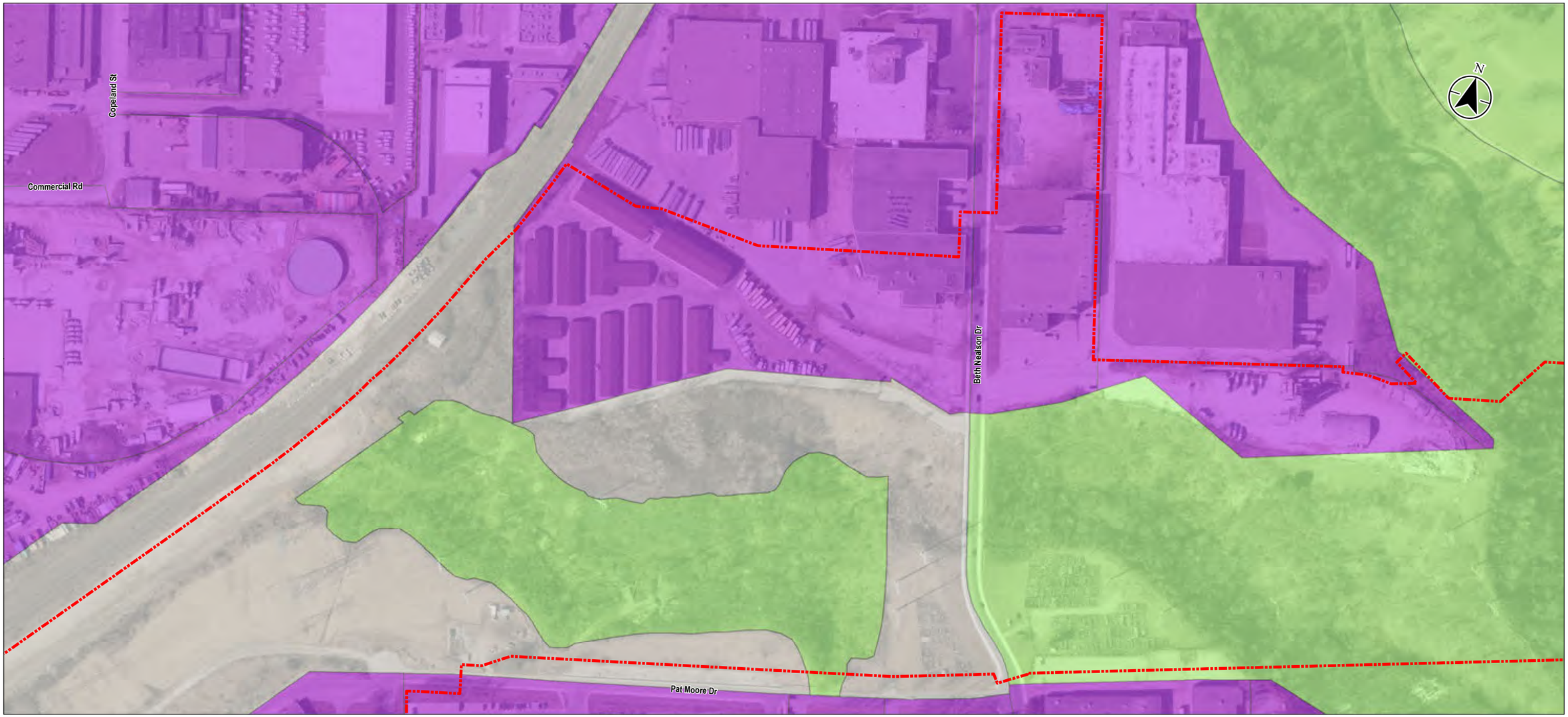

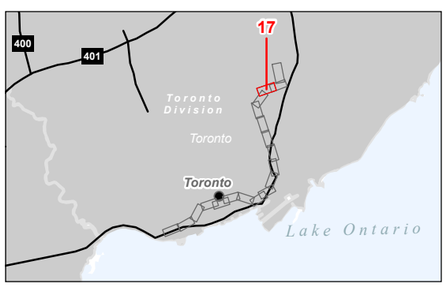

Legend

Project Footprint

City of Toronto Zoning Categories

- Employment Industrial
- Open Space
- Utility and Transportation

0 50 100 metres

1:2,750 (At original document size of 11x17)

Notes

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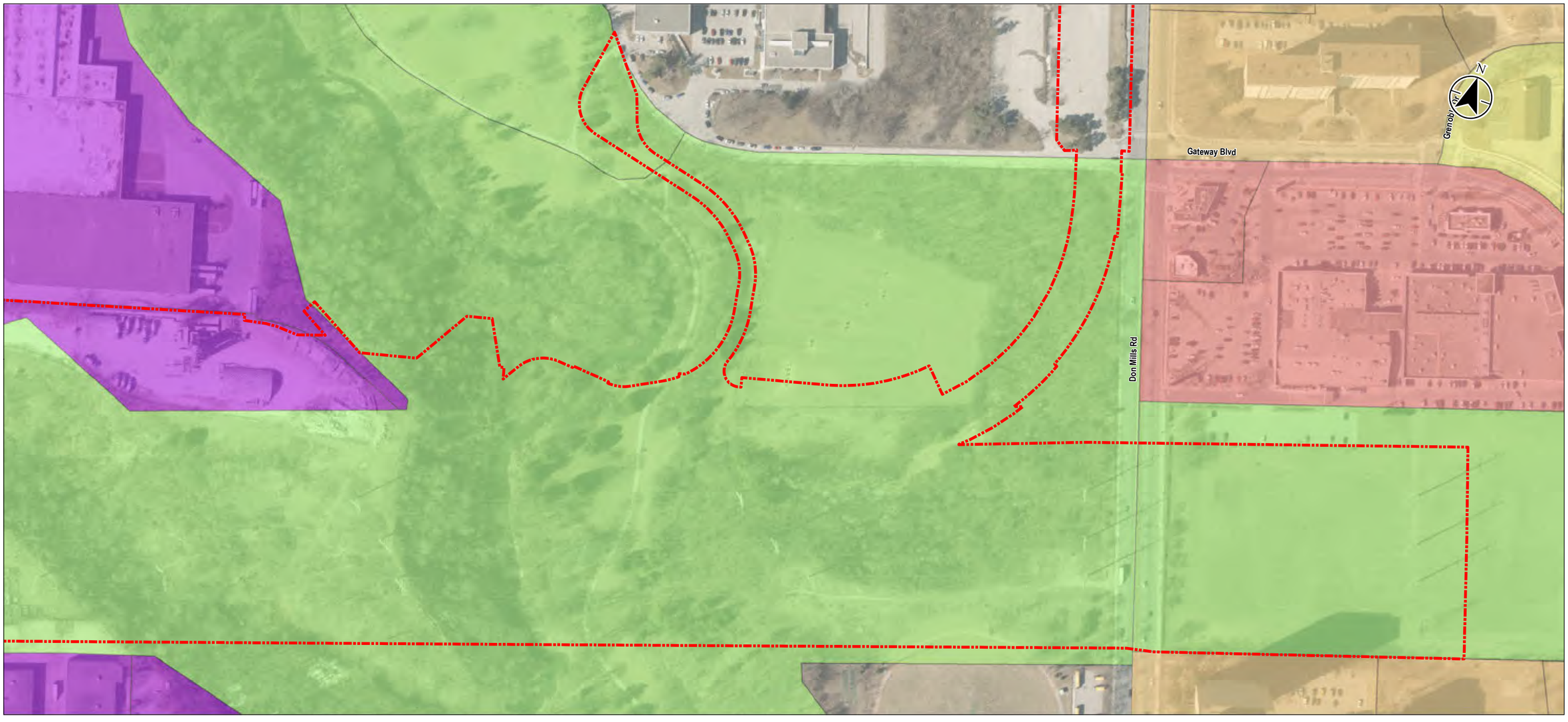
HDR CORPORATION
ONTARIO LINE TA

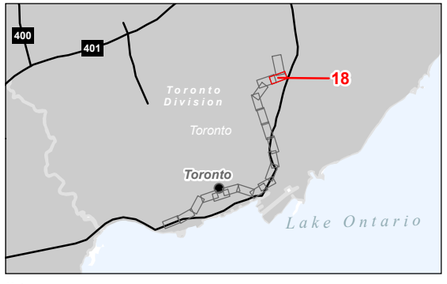
160560009 REVA

Figure No.
C-17

Title
City of Toronto Zoning Categories

\\cd1215-f01\work_group\01605\active\160560009\11_data\gis_cad\gis\mxds\atmospheric\report_figures\20220908_Air_Work_Plan\160560009_AW_FigC1-19_ZoningMapbook.mxd Revised: 2022-01-28 By: bcowper





Legend

- Project Footprint

City of Toronto Zoning Categories

- Residential
- Residential Apartment
- Commercial Residential
- Employment Industrial
- Open Space
- Area Not Classified by City of Toronto

0 40 80 metres

1:2,500 (At original document size of 11x17)

Stantec

Project Location
Toronto, ON

Prepared by BCC on 2022-01-28
TR by ABC on yyyy-mm-dd

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Figure No.
C-18

Title
City of Toronto Zoning Categories

Notes
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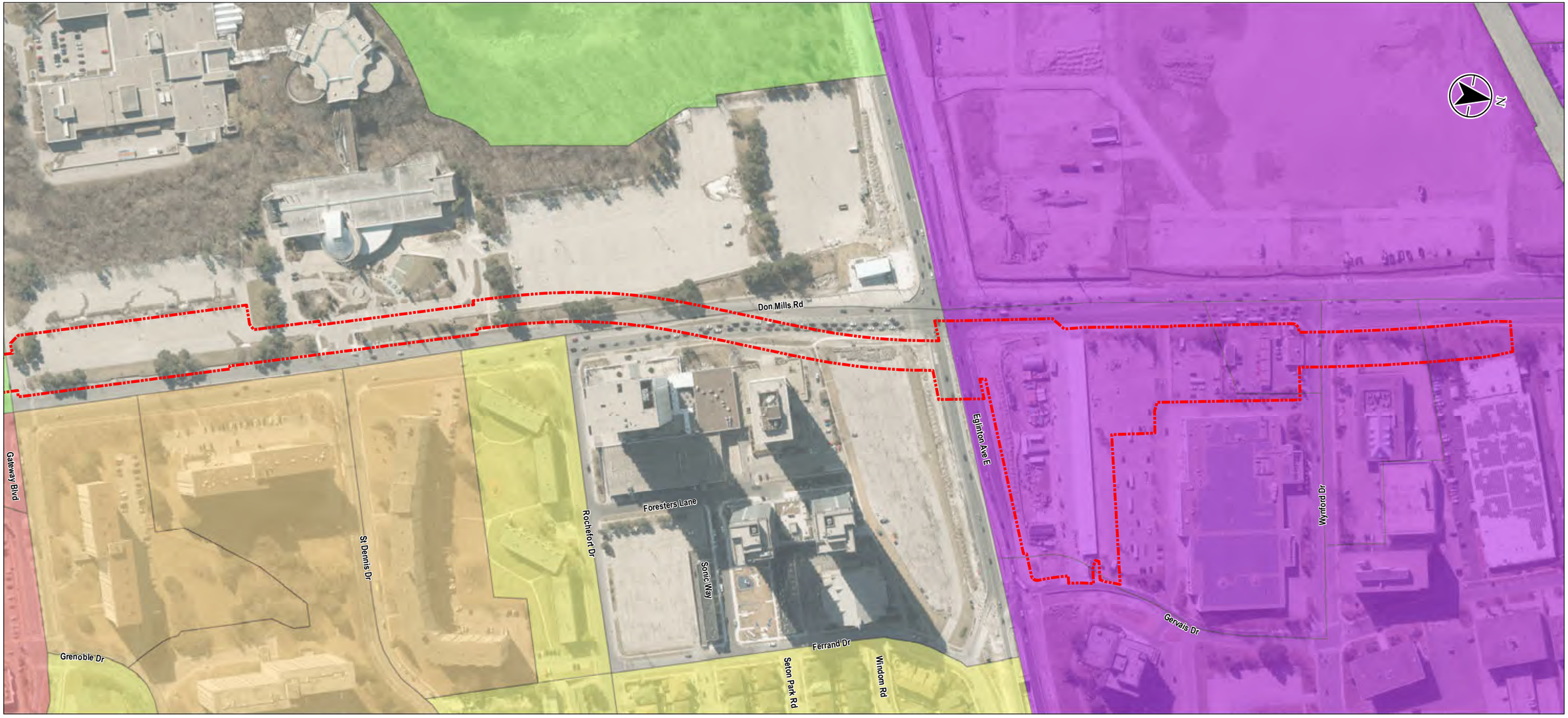

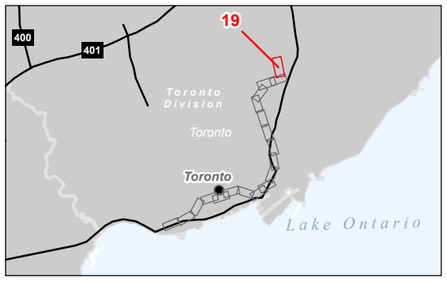

Legend

- Project Footprint

City of Toronto Zoning Categories

- Residential
- Residential Apartment
- Commercial Residential
- Employment Industrial
- Open Space
- Utility and Transportation
- Area Not Classified by City of Toronto

0 50 100 metres

1:3,000 (At original document size of 11x17)

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Project Location
Toronto, ON

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160560009 REVA

Figure No.
C-19

Title
City of Toronto Zoning Categories

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Appendix D. List and Locations of Current Sensitive Receptors

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Legend

- Project Footprint
- Study Area (500 m Buffer)
- Critical Receptor
- Sensitive Receptor

0 250 500 Metres

1:10,000 (At original document size of 11x17)

Notes

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Project Location
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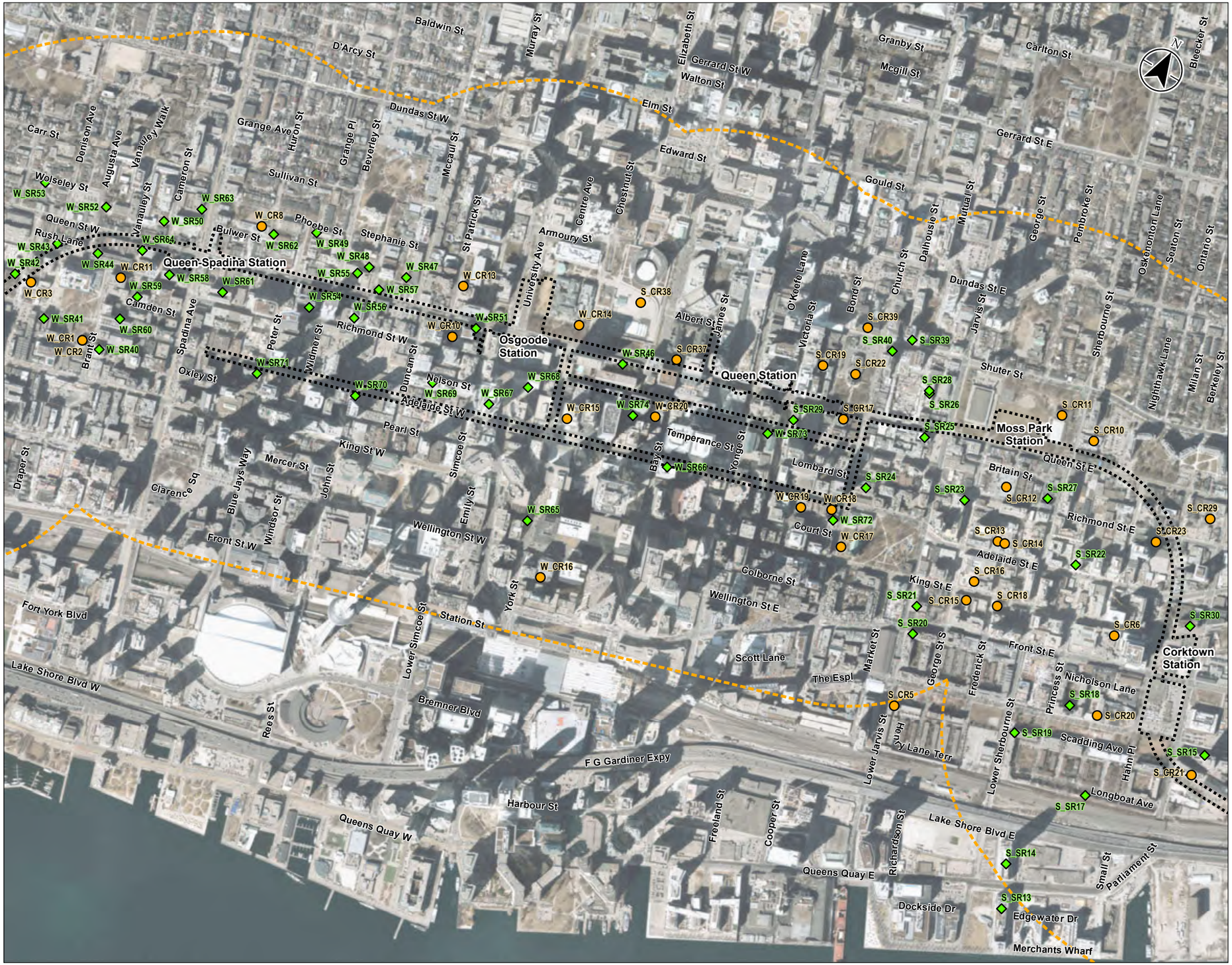
ONTARIO LINE TA

Figure No.
D-1

Title
Locations of Current Critical and Sensitive Receptors



Stantec

Legend
- Project Footprint
- Study Area (500 m Buffer)
- Critical Receptor
- Sensitive Receptor

0 250 500 Metres

1:10,000 (At original document size of 11x17)

Notes
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Project Location
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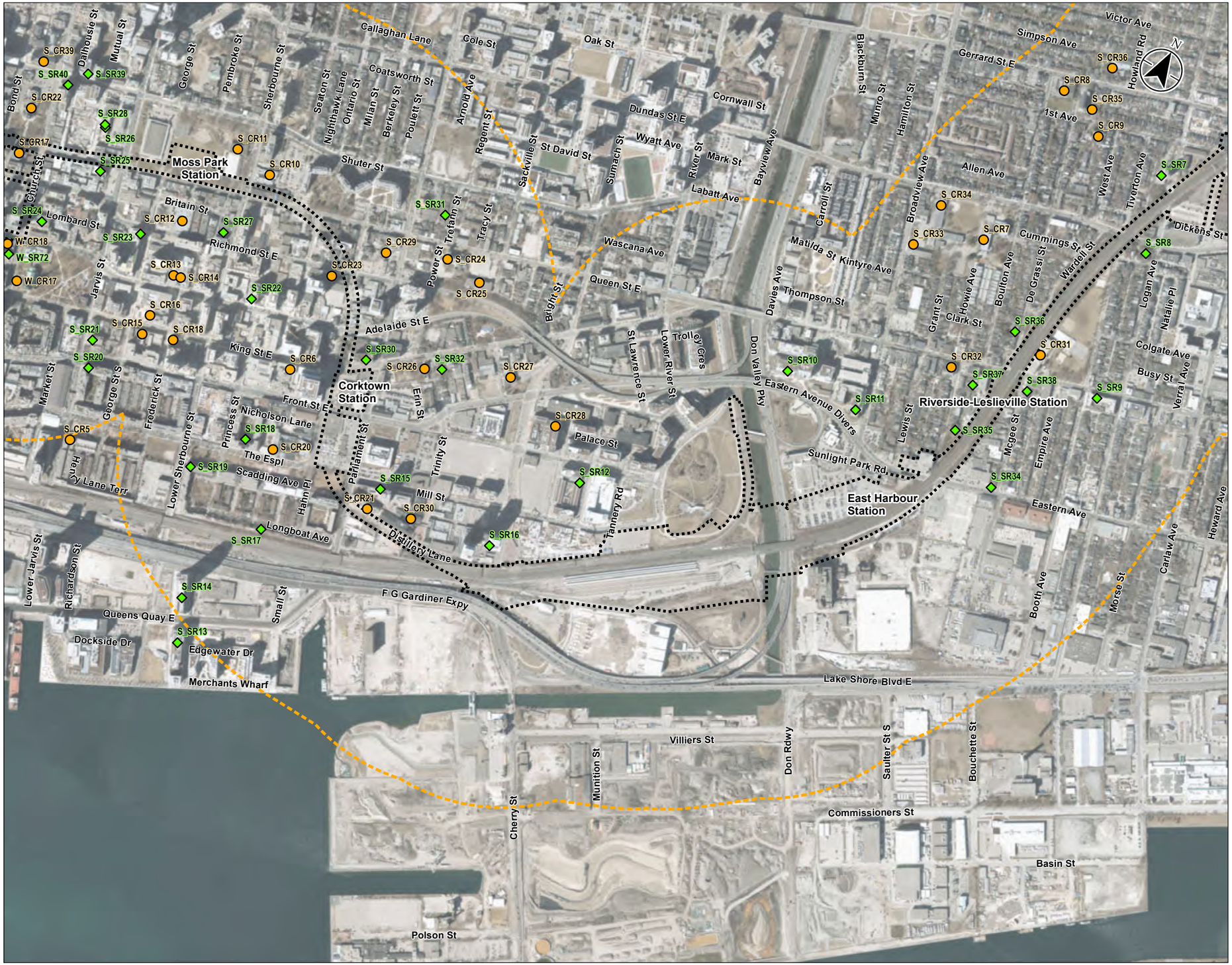
Figure No.
D-2

Title
Locations of Current Critical and Sensitive Receptors



Stantec

Legend

- Project Footprint
- Study Area (500 m Buffer)
- Critical Receptor
- Sensitive Receptor

0 250 500 Metres

1:10,000 (At original document size of 11x17)

Notes

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Project Location
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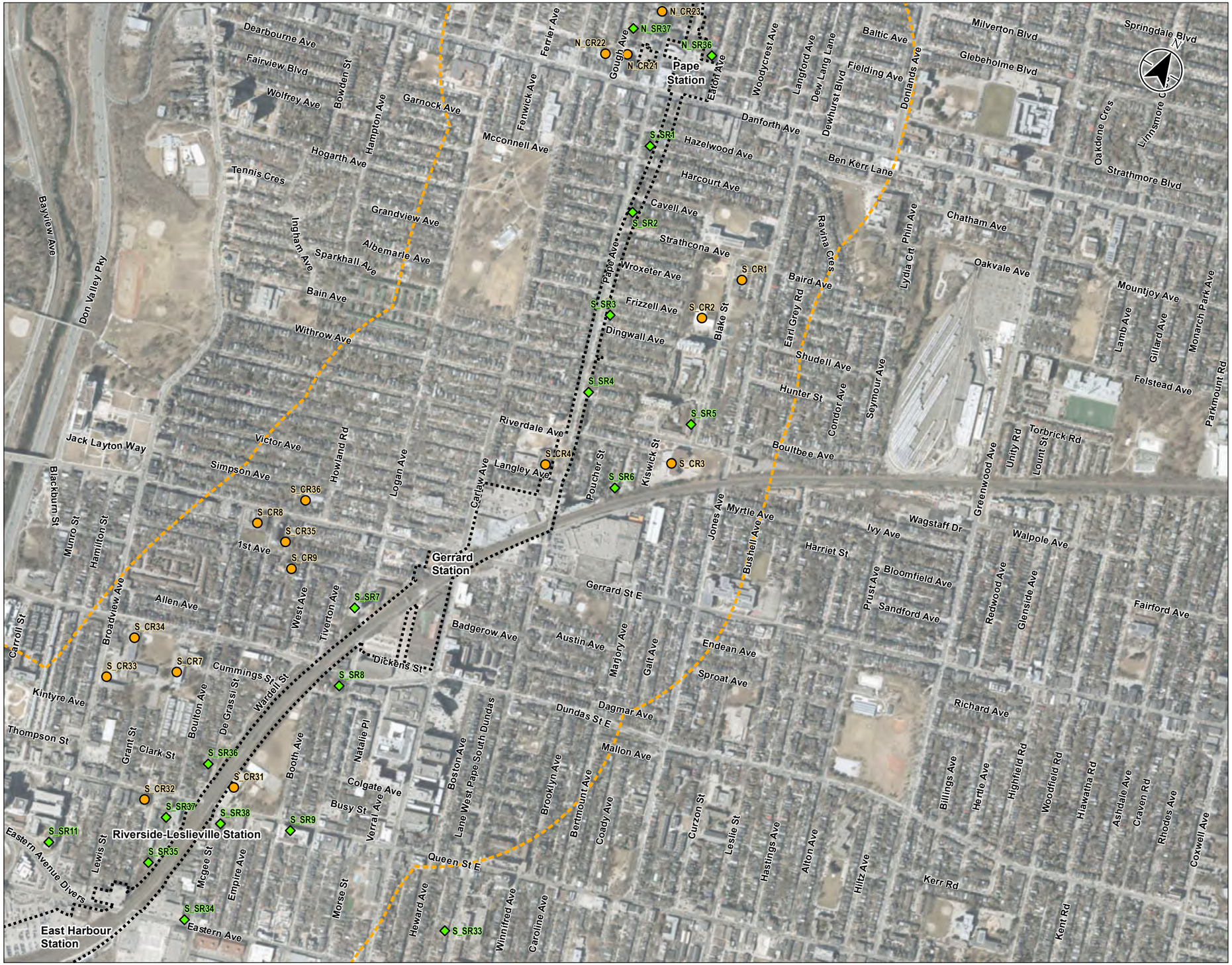
ONTARIO LINE TA

Figure No.
D-3

Title
Locations of Current Critical and Sensitive Receptors



Stantec

Legend
- Project Footprint
- Study Area (500 m Buffer)
- Critical Receptor
- Sensitive Receptor

0 250 500 Metres

1:10,000 (At original document size of 11x17)

Notes
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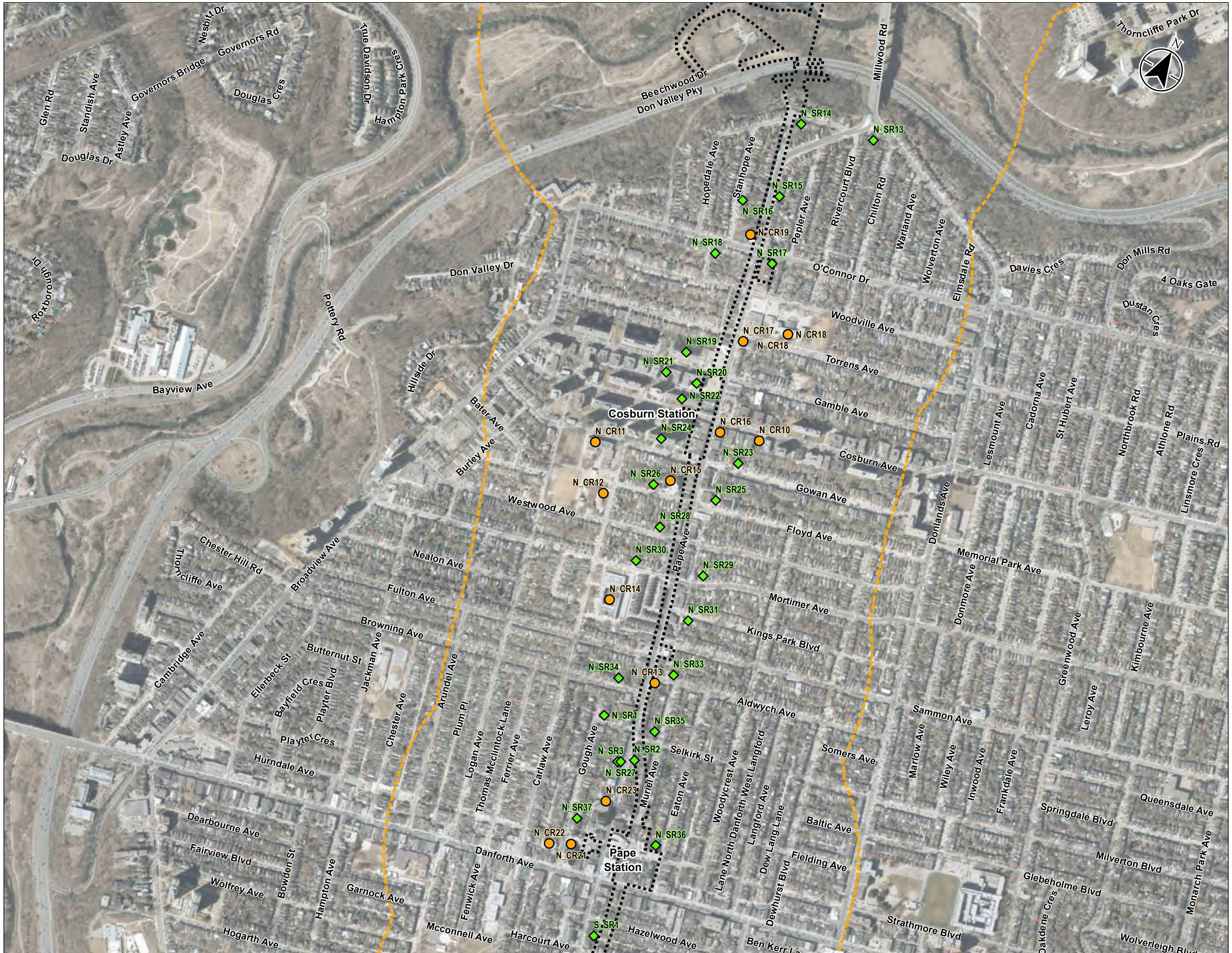
Figure No.
D-4

Title
Locations of Current Critical and Sensitive Receptors



Stantec

Legend

- Project Footprint
- Study Area (500 m Buffer)
- Critical Receptor
- Sensitive Receptor

0 250 500 Metres

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Notes

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ONTARIO LINE TA

Figure No.
D-5

Title
Locations of Current Critical and Sensitive Receptors

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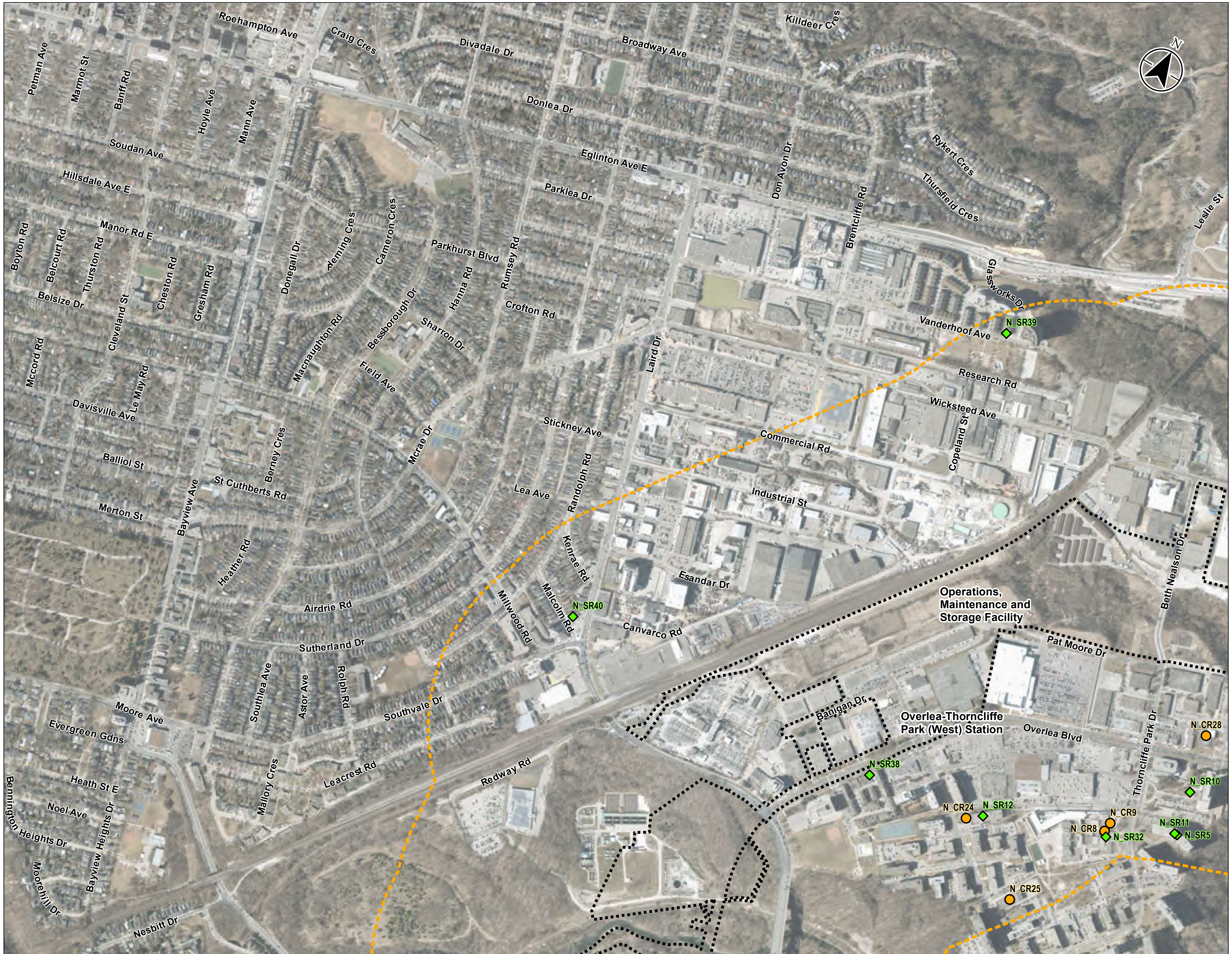

Stantec

Legend
- Project Footprint
- Study Area (500 m Buffer)
- Critical Receptor
- Sensitive Receptor

0 250 500 Metres

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Notes
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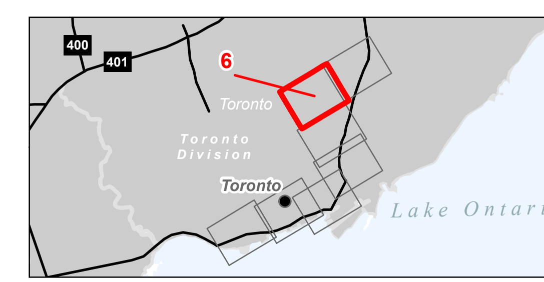

Project Location
City of Toronto, ON

160560009 REV4
Prepared by BCC on 2022-01-28

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Figure No.
D-6

Title
Locations of Current Critical and Sensitive Receptors

Stantec

Legend
- Project Footprint
- Study Area (500 m Buffer)
- Critical Receptor
- Sensitive Receptor

0 250 500 Metres

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Notes
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Project Location
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Client/Project
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ONTARIO LINE TA

Figure No.
D-7

Title
Locations of Current Critical and Sensitive Receptors

Ontario Line Subway

Table D1: List of Sensitive and Critical Receptors - Ontario Line West Segment

Receptor ID#	Address	Critical / Sensitive	Receptor Description
W_CR1	20 Brant Street	Critical	Alpha Alternative Junior School
W_CR2	20 Brant Street	Critical	Oasis Alternative Secondary School
W_CR3	127 Portland Street	Critical	EF International Language Campus
W_CR4	588 Adelaide Street West	Critical	Place of worship
W_CR5	1209 King Street West	Critical	Parkdale Project Read (literacy and adult learning centre)
W_CR6	222 Niagara Street	Critical	Niagara Street Junior Public School
W_CR7	20 Portugal Square	Critical	St. Mary Elementary School
W_CR8	33 Phoebe Street	Critical	Ogden Junior Public School
W_CR9	122 Tyndall Avenue	Critical	Norwood Nursing Home
W_CR10	218 Richmond Street West	Critical	Kinder College Early Learning Centre
W_CR11	477 Richmond Street West	Critical	CanPacific College of Business & English
W_CR12	34 Bathurst Street	Critical	City Kids Early Learning & Child Care Centre
W_CR13	180 Simcoe Street, Suite 102	Critical	Life Bridge Childcare
W_CR14	130 Queen Street West	Critical	Osgoode Hall
W_CR15	130 Adelaide Street West	Critical	Richmond Adelaide Child Care Centre
W_CR16	95Wellington St W, Unit 201	Critical	Kids and Company
W_CR17	65 Church Street	Critical	Place of worship and event hall
W_CR18	67 Adelaide St East	Critical	Adelaide Resource Centre for Women
W_CR19	23 Toronto St	Critical	Keystone International School
W_CR20	360 Bay Street, Unit 200	Critical	Place of wroship
W_SR1	7 Springhurst Avenue	Sensitive	Residential house
W_SR2	8 Springhurst Avenue	Sensitive	Residential townhouse
W_SR3	7 Thorburn Avenue	Sensitive	Residential townhouse
W_SR4	8 Thorburn Avenue	Sensitive	Residential townhouse
W_SR5	15 Temple Avenue	Sensitive	Residential townhouse
W_SR6	16 Temple Avenue	Sensitive	Residential townhouse
W_SR7	200 Dufferin Street	Sensitive	Residential apartments/condominium
W_SR8	300 Dufferin Street	Sensitive	Residential apartments/condominium
W_SR9	165 Dufferin Street	Sensitive	Residential apartments/condominium
W_SR10	219 Dufferin Street	Sensitive	Residential apartments/condominium
W_SR11	5 Hannah Avenue	Sensitive	Residential apartments/condominium
W_SR12	75 East Liberty Street	Sensitive	Residential apartments/condominium
W_SR13	57 East Liberty Street	Sensitive	Residential apartments/condominium
W_SR14	24 Tecumseth Street	Sensitive	Residential townhouse
W_SR15	Wellington and Stanley Terrace	Sensitive	Residential apartments/condominium under construction
W_SR16	Ordnance Street	Sensitive	Residential apartments/condominium under construction
W_SR17	Strachan Avenue and East Liberty Street	Sensitive	Residential apartments/condominium under construction
W_SR18	642 Wellington Street West	Sensitive	Residential townhouse
W_SR19	801 Niagara Street	Sensitive	Residential apartments/condominium
W_SR20	29 Tecumseth Street	Sensitive	Residential house
W_SR21	64 Niagara Street	Sensitive	Residential apartments/condominium
W_SR22	85 Niagara Street	Sensitive	Residential apartments/condominium and houses
W_SR23	51 Bathurst Street	Sensitive	Residential apartments/condominium
W_SR24	81 Wolseley Street	Sensitive	Residential townhouse
W_SR25	11 Portugal Square	Sensitive	Residential townhouse
W_SR26	575 Adelaide Street West	Sensitive	Residential apartments/condominium
W_SR27	720 King Street West	Sensitive	Residential apartments/condominium
W_SR28	60 Bathurst Street	Sensitive	Residential apartments/condominium
W_SR29	57 Niagara Street	Sensitive	Residential apartments/condominium
W_SR30	753 King Street West	Sensitive	Residential apartments/condominium
W_SR31	741 King Street West	Sensitive	Residential apartments/condominium
W_SR32	55 Tecumseth Street	Sensitive	Residential townhouse
W_SR33	600 Wellington Street West	Sensitive	Residential townhouse
W_SR34	52 Tecumseth Street	Sensitive	Residential townhouse
W_SR35	705 King Street West	Sensitive	Residential apartments/condominium
W_SR36	570 Wellington Street West	Sensitive	Residential townhouse
W_SR37	32 Stewart Street	Sensitive	Residential apartments/condominium
W_SR38	7 Adelaide Place	Sensitive	Residential townhouse
W_SR39	140 Bathurst Street	Sensitive	Residential apartments/condominium
W_SR40	19 Brant Street	Sensitive	Residential apartments/condominium
W_SR41	461 Adelaide St West	Sensitive	Residential apartments/condominium
W_SR42	132 Portland Street	Sensitive	Residential house
W_SR43	544 Richmond Street West	Sensitive	Residential townhouses and apartments
W_SR44	500 Richmond Street West	Sensitive	Residential townhouse
W_SR45	608 Richmond Street West	Sensitive	Residential apartments/condominium
W_SR46	123 Queen Street West	Sensitive	Hotel
W_SR47	11 St Patrick Square	Sensitive	Residential house
W_SR48	170 John Street	Sensitive	Residential apartments/condominium
W_SR49	13 Phoebe St	Sensitive	Residential apartments/condominium
W_SR50	16 Cameron Street	Sensitive	Residential house

Ontario Line Subway

Table D1: List of Sensitive and Critical Receptors - Ontario Line West Segment

Receptor ID#	Address	Critical / Sensitive	Receptor Description
W_SR51	215 Queen Street West	Sensitive	Residential apartments/condominium
W_SR52	17 Augusta Avenue	Sensitive	Residential house
W_SR53	29 Wolseley Street	Sensitive	Residential townhouse
W_SR54	330 Richmond Street West	Sensitive	Residential apartments/condominium
W_SR55	13 Beverly Street	Sensitive	Residential apartments/condominium
W_SR56	150 John Street	Sensitive	Residential apartments/condominium
W_SR57	155 John Street	Sensitive	Residential apartments/condominium
W_SR58	438 Richmond Street West	Sensitive	Residential apartments/condominium
W_SR59	52 Camden Street	Sensitive	Residential apartments/condominium
W_SR60	At Adelaide Street and Brant Street	Sensitive	Residential apartments/condominium
W_SR61	413 Adelaide Street West	Sensitive	Residential apartments/condominium
W_SR62	24 Bulwer Street	Sensitive	Residential townhouse
W_SR63	186 Spadina Avenue	Sensitive	Mixed use /residential apartments
W_SR64	485 Queen Street West	Sensitive	Hostel
W_SR65	74 York Street	Sensitive	Residential apartments/condominium
W_SR66	325 Bay Street	Sensitive	Hotel
W_SR67	188 Universtiy Avenue	Sensitive	Hotel
W_SR68	145 Richmond Steet West	Sensitive	Hotel
W_SR69	21 Nelson Street	Sensitive	Residential apartments/condominium
W_SR70	283 Adelaide Street West	Sensitive	Residential apartments/condominium
W_SR71	92 Peter Street	Sensitive	Hotel
W_SR72	76 Church Street	Sensitive	Hostel
W_SR73	15 Richmond St E	Sensitive	Hotel
W_SR74	70 Temperance St	Sensitive	Residential condominium

Ontario Line Subway
Table D2: List of Sensitive and Critical Receptors - Ontario Line South Segment

Receptor ID#	Address	Critical / Sensitive	Receptor Description
S_CR1	123 Strathcona Avenue	Critical	Earl Grey Senior Public School
S_CR2	86 Blake Street	Critical	Community Centre
S_CR3	21 Boultbee Avenue	Critical	East Alternative School of Toronto
S_CR4	220 Langley Avenue	Critical	Pape Avenue Junior Public School and Pape Children's House daycare
S_CR5	85 Lower Jarvis Street	Critical	St. Michael's Catholic School
S_CR6	341 King Street East	Critical	George Brown College School of English as a Second Language
S_CR7	935 Dundas St East	Critical	Dundas Junior Public School
S_CR8	701 Gerrard St East	Critical	Eastdale Collegiate Institute
S_CR9	135 First Avenue	Critical	Place of worship with daycare
S_CR10	135 Sherbourne Street	Critical	Salvation Army Maxwell Meighen Centre (Place of worship and homeless shelter)
S_CR11	150 Sherbourne Street	Critical	Moss Park Arena and John Innes Community Recreation Centre
S_CR12	230 Richmond St E	Critical	George Brown School of Hospitality & Tourism Management, School of Media (St. James Campus East)
S_CR13	290 Adelaide St E	Critical	George Brown Centre for Business
S_CR14	300 Adelaide St E	Critical	George Brown Centre for Hospitality and Culinary Arts
S_CR15	193 King Street East	Critical	George Brown Makeup and Esthetics
S_CR16	200 King Street East	Critical	George Brown St. James Campus Main Building / Applied Arts & Tech
S_CR17	61 Queen Street East	Critical	St. Michael's Health Centre
S_CR18	215 King Street East	Critical	George Brown College The Chefs' House, Centre for Hospitality & Culinary Arts
S_CR19	30 Bond Street	Critical	St. Michael's Hospital
S_CR20	246 The Esplanade / 230 The Esplanade	Critical	Market Lane Junior and Senior Public School / Community Recreation Centre
S_CR21	8 Distillery Lane	Critical	Distillery District Early Learning Centre
S_CR22	56 Queen Street East	Critical	Place of worship
S_CR23	461 Richmond Street East	Critical	Place of worship
S_CR24	83 Power Street	Critical	Place of worship
S_CR25	80 Sackville Street	Critical	St. Paul Catholic School
S_CR26	425 King Street East	Critical	Place of worship
S_CR27	19 Sackville Street	Critical	Inglenook Community School
S_CR28	80 Cooperage Street	Critical	Student Residence for Geroge Brown College
S_CR29	162 Parliament Street	Critical	Liberty Prep School
S_CR30	50 Gristmill Lane	Critical	Voice Integrative School
S_CR31	870 Queen Street East	Critical	Recreation Centre
S_CR32	765 Queen Street East	Critical	Recreation Centre
S_CR33	181 Broadview Avenue	Critical	Queen Alexandra Middle School
S_CR34	885 Dundas Street East	Critical	Seed Alternative School
S_CR35	120 First Avenue	Critical	Place of worship
S_CR36	115 Simpson Avenue	Critical	Place of worship
S_CR37	60 Queen Street West	Critical	Ontario Court of Justice / Ontario Provincial Offences
S_CR38	100 Queen Street West	Critical	Toronto City Hall
S_CR39	65 Bond Street	Critical	Place of worship
S_SR1	669 Pape Avenue	Sensitive	Residential apartments/condomium
S_SR2	619 Pape Avenue	Sensitive	Residential house
S_SR3	525 Pape Avenue	Sensitive	Residential house
S_SR4	469 Pape Avenue	Sensitive	Residential house
S_SR5	38 Blake Street	Sensitive	Residential apartments/condomium
S_SR6	8 Egan Avenue	Sensitive	Residential house
S_SR7	444 Logan Avenue	Sensitive	Residential apartments/condomium
S_SR8	374 Logan Avenue	Sensitive	Residential house
S_SR9	855 Queen Street East	Sensitive	Residential apartments/condomium
S_SR10	132 Eastern Avenue	Sensitive	Residential apartments/condomium
S_SR11	90 Broadview Avenue	Sensitive	Residential apartments/condomium
S_SR12	40 Rolling Mills Road	Sensitive	Residential apartments/condomium
S_SR13	15 Merchants' Wharf	Sensitive	Residential apartments/condomium
S_SR14	12 Bonnycastle Street	Sensitive	Residential apartments/condomium

Ontario Line Subway
Table D2: List of Sensitive and Critical Receptors - Ontario Line South Segment

Receptor ID#	Address	Critical / Sensitive	Receptor Description
S_SR15	25 Mill Street	Sensitive	Residential apartments/condomium
S_SR16	90 Distillery Lane	Sensitive	Residential apartments/condomium
S_SR17	55 Tom Longboat Lane	Sensitive	Residential apartments/condomium
S_SR18	222 The Esplanade	Sensitive	Residential apartments/condomium
S_SR19	11 Lower Sherbourne	Sensitive	Residential apartments/condomium
S_SR20	105 Front Street East	Sensitive	Residential apartments/condomium
S_SR21	35 Jarvis Street	Sensitive	Residential apartments/condomium
S_SR22	400 Adelaide Street	Sensitive	Residential apartments/condomium
S_SR23	130 George Street	Sensitive	Residential apartments/condomium
S_SR24	63 Lombard Street	Sensitive	Residential apartments/condomium
S_SR25	127 Queen Street East	Sensitive	Residential apartments/condomium
S_SR26	25 Mutual Street	Sensitive	Residential apartments/condomium
S_SR27	114 Sherbourne Street	Sensitive	Residential apartments/condomium
S_SR28	299 Shuter Street	Sensitive	Residential apartments/condomium
S_SR29	105 Victoria Street	Sensitive	Mixed use / Apartment
S_SR30	326 King Street East	Sensitive	Mixed use / Apartment
S_SR31	18 Trefann Street	Sensitive	Residential townhouse
S_SR32	123 Trinity Street	Sensitive	Residential townhouse
S_SR33	36 Pape Avenue	Sensitive	Residential apartment
S_SR34	2 Mcgee Street	Sensitive	Residential townhouse
S_SR35	33 Saulter Street	Sensitive	Residential house
S_SR36	28 De Grassi Street	Sensitive	Residential townhouse
S_SR37	6 Woodgreen Place	Sensitive	Residential townhouse
S_SR38	87 Mcgee Street	Sensitive	Residential townhouse
S_SR39	68 Shuter Street	Sensitive	Mixed use / Apartment
S_SR40	65 Shuter Street	Sensitive	Mixed use / Apartment

Ontario Line Subway
Table D3: List of Sensitive and Critical Receptors - Ontario Line North Segment

Receptor ID#	Address	Critical / Sensitive	Receptor Description
N_CR1	6 Garamond Crescent	Critical	Japanese Canadian Cultural Centre
N_CR2	29 Gervais Drive	Critical	Engaging Minds Child Care
N_CR3	9 Grenoble Drive	Critical	Grenoble Public School and Childcare
N_CR4	5 Grenoble Drive	Critical	Place of worship
N_CR5	55 Gateway Boulevard	Critical	Gateway Public School
N_CR6	130 Overlea Boulevard	Critical	Valley Park Middle School
N_CR7	135 Overlea Boulevard	Critical	Marc Garneau Collegiate Institute
N_CR8	80 Thorncliffe Park Drive	Critical	Thorncliffe Park Public School
N_CR9	82 Thorncliffe Park Drive	Critical	Fraser Mustard Early Learning Academy
N_CR10	123 Cosburn Avenue	Critical	Child's Nest Infant Day Care Centre
N_CR11	115 Gowan Avenue	Critical	Chester Elementary School and Toronto Chester YMCA Child Care Centre
N_CR12	994 Carlaw Avenue	Critical	Westwood Middle School
N_CR13	871 Pape Avenue	Critical	Place of worship
N_CR14	951 Carlaw Avenue	Critical	Centennial College – Story Arts Centre
N_CR15	156 Floyd Avenue	Critical	Place of worship
N_CR16	1041 Pape Avenue	Critical	Place of worship
N_CR17	1081 ½ Pape Avenue	Critical	Community Centre
N_CR18	100 Torrens Avenue	Critical	William Burgess Elementary School & YMCA Childcare Centre
N_CR19	126 O'Connor Drive	Critical	Petite Maison Montessori
N_CR20	14 William Morgan Drive	Critical	Retirement Home
N_CR21	71 Gough Avenue	Critical	Place of worship
N_CR22	66 Gough Avenue	Critical	Place of worship
N_CR23	746 Pape Avenue	Critical	Place of worship
N_CR24	16 Thorncliffe Park Avenue	Critical	Place of worship and Montessori Education Centre
N_CR25	30 Thorncliffe Park Avenue	Critical	Place of worship
N_CR26	76 Overlea Boulevard	Critical	Place of worship
N_CR27	86 Overlea Boulevard	Critical	Place of worship
N_CR28	1 William Morgan Drive	Critical	SPRINT Senior's Care
N_CR29	15 Gervais Drive	Critical	Sutherland-Chan School of Massage Therapy
N_CR30	18 Wynford Drive	Critical	The Institute of Holistic Nutrition
N_CR31	50 Wynford Drive	Critical	Place of worship
N_CR32	49 Wynford Drive	Critical	The Ismaili Centre
N_CR33	24 Ferrand Drive	Critical	Place of worship
N_CR34	150 Gateway Boulevard	Critical	Place of worship
N_CR35	849 Don Mills Road	Critical	Place of worship
N_SR1	179 Gough Avenue	Sensitive	Residential house
N_SR2	803 Pape Avenue	Sensitive	Residential house
N_SR3	782 Pape Avenue	Sensitive	Residential house
N_SR4	7 Rochefort Drive	Sensitive	Residential apartments/condomium
N_SR5	7 St. Dennis Drive	Sensitive	Residential apartments/condomium
N_SR6	200 Gateway Boulevard	Sensitive	Residential apartments/condomium
N_SR7	725 Don Mills Road	Sensitive	Residential apartments/condomium
N_SR8	715 Don Mills Road	Sensitive	Residential apartments/condomium
N_SR9	701 Don Mills Road	Sensitive	Residential apartments/condomium
N_SR10	85 Thorncliffe Park Drive	Sensitive	Residential apartments/condomium
N_SR11	79 Thorncliffe Park Drive	Sensitive	Residential apartments/condomium
N_SR12	18 Thorncliffe Park Drive	Sensitive	Residential apartments/condomium
N_SR13	1361 Pape Avenue	Sensitive	Residential house
N_SR14	157 Hopedale Avenue	Sensitive	Residential house
N_SR15	1295 Pape Avenue	Sensitive	Residential house
N_SR16	17 Stanhope Avenue	Sensitive	Residential house
N_SR17	131 O'Connor Drive	Sensitive	Residential house
N_SR18	17 Hassard Avenue	Sensitive	Residential house
N_SR19	100 Gamble Avenue	Sensitive	Residential apartments/condomium
N_SR20	95 Gamble Avenue	Sensitive	Residential apartments/condomium
N_SR21	85 Gamble Avenue	Sensitive	Residential apartments/condomium
N_SR22	100 Cosburn Avenue	Sensitive	Residential apartments/condomium

Ontario Line Subway
Table D3: List of Sensitive and Critical Receptors - Ontario Line North Segment

Receptor ID#	Address	Critical / Sensitive	Receptor Description
N_SR23	150A Gowan Avenue	Sensitive	Residential house
N_SR24	130 Gowan Avenue	Sensitive	Residential apartments/condomium
N_SR25	172 Floyd Avenue	Sensitive	Residential house
N_SR26	148 Floyd Avenue	Sensitive	Residential house
N_SR27	210 Westwood Avenue	Sensitive	Residential house
N_SR28	194 Westwood Avenue	Sensitive	Residential house
N_SR29	218 Mortimer Avenue	Sensitive	Residential house
N_SR30	190 Mortimer Avenue	Sensitive	Residential house
N_SR31	5 Kings Park Boulevard	Sensitive	Residential house
N_SR32	12 Macphail Avenue	Sensitive	Residential house
N_SR33	6 Aldwych Avenue	Sensitive	Residential house
N_SR34	230 Browning Avenue	Sensitive	Residential house
N_SR35	62 Muriel Avenue	Sensitive	Residential house
N_SR36	30 Eaton Avenue	Sensitive	Residential house
N_SR37	95 Gough Avenue	Sensitive	Residential house
N_SR38	17 Overlea Boulevard	Sensitive	Residential townhouses
N_SR39	152 Glassworks Drive	Sensitive	Residential townhouses
N_SR40	26 Malcolm Road	Sensitive	Residential house

Appendix E. List and Locations of Potential Future Sensitive Receptors

Stantec

Legend

- Project Footprint
- Study Area (500 m Buffer)
- Critical Receptor
- Sensitive Receptor

Notes

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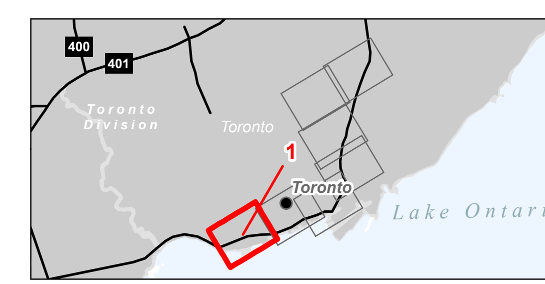

Project Location
City of Toronto, ON

160560009 REV4
Prepared by BCC on 2022-01-28
Technical Review by ABC on yyyy-mm-dd

Client/Project
HDR CORPORATION
ONTARIO LINE TA

Figure No.
E-1

Title
Locations of Potential Future Critical and Sensitive Receptors

Stantec

Legend
- Project Footprint
- Study Area (500 m Buffer)
- Critical Receptor
- Sensitive Receptor

Notes
1. Coordinate System: NAD27 MTM zone 10
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2020.

Project Location
City of Toronto, ON

160560009 REV4
Prepared by BCC on 2022-01-28
Technical Review by ABC on yyyy-mm-dd

Client/Project
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ONTARIO LINE TA

Figure No.
E-2

Title
Locations of Potential Future Critical and Sensitive Receptors

Stantec

Legend
- Project Footprint
- Study Area (500 m Buffer)
- Critical Receptor
- Sensitive Receptor

Notes
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Project Location
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Client/Project
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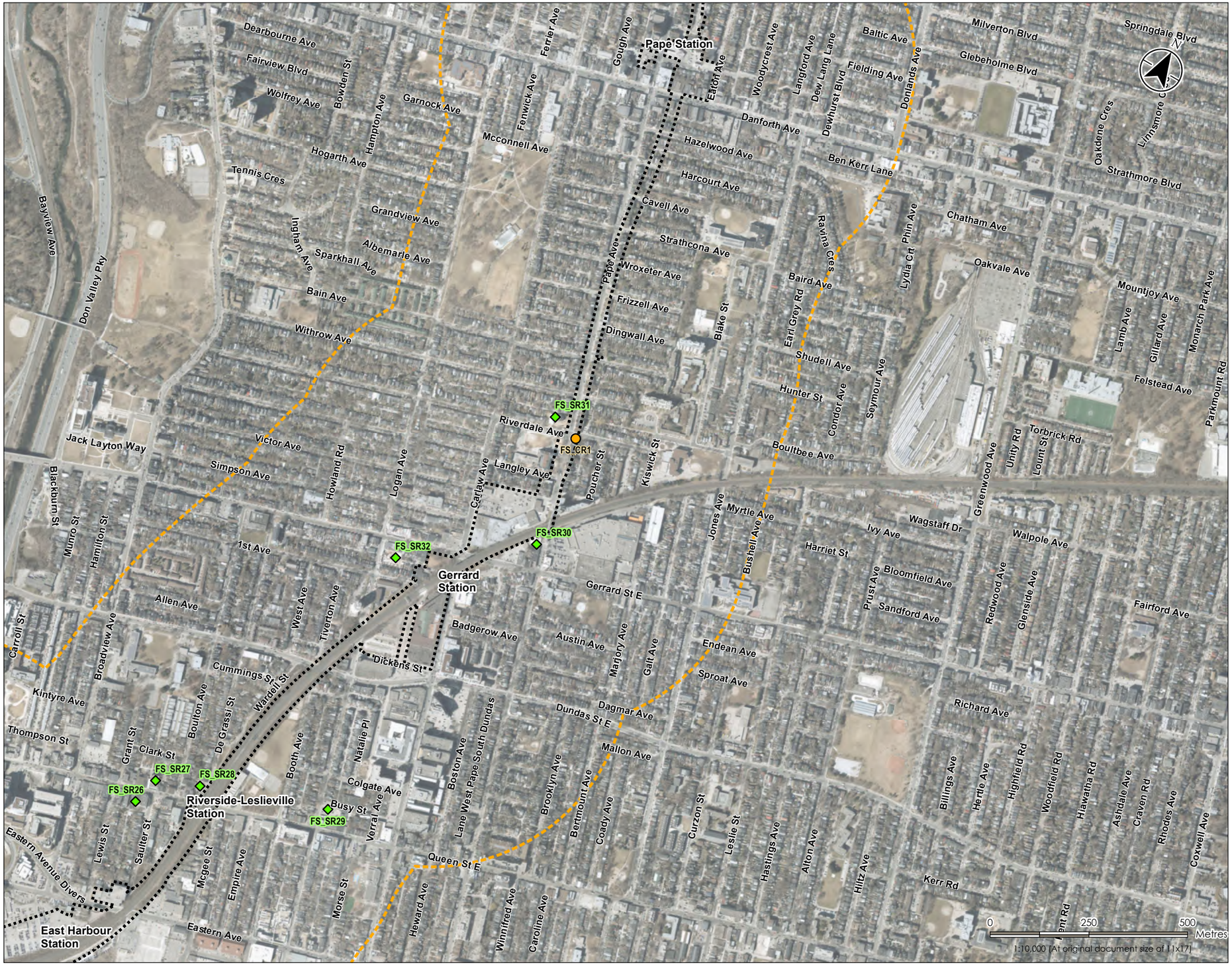
ONTARIO LINE TA

Figure No.
E-3

Title
Locations of Potential Future Critical and Sensitive Receptors



Stantec

Legend
- Project Footprint
- Study Area (500 m Buffer)
- Critical Receptor
- Sensitive Receptor

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Client/Project
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ONTARIO LINE TA

Figure No.
E-4

Title
Locations of Potential Future Critical and Sensitive Receptors

Stantec

Legend

- Project Footprint
- Study Area (500 m Buffer)

Notes

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Project Location
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ONTARIO LINE TA

Figure No.
E-5

Title
Locations of Potential Future Critical and Sensitive Receptors

Stantec

Legend

Project Footprint

Study Area (500 m Buffer)

Notes

1. Coordinate System: NAD27 MTM zone 10
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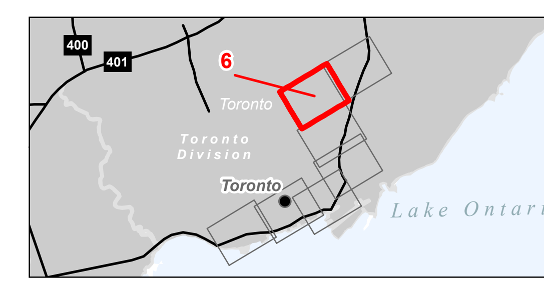

Project Location
City of Toronto, ON

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ONTARIO LINE TA

Figure No.
E-6

Title
Locations of Potential Future Critical and Sensitive Receptors

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Stantec

Legend
- Project Footprint
- Study Area (500 m Buffer)
- Critical Receptor
- Sensitive Receptor

Notes
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Project Location
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Figure No.
E-7

Title
Locations of Potential Future Critical and Sensitive Receptors

Ontario Line Subway

Table E1: List of Potential Future Sensitive and Critical Receptors - Ontario Line West Segment

Receptor ID#	Address	Critical / Sensitive	Receptor Description
FW_CR1	2 Strachan Avenue	Critical	Proposed basketball training centre
FW_CR2	126 John Street	Critical	Proposed mixed use (commercial and residential) building, potential day care
FW_SR1	1182 King Street West	Sensitive	Proposed mixed use building
FW_SR2	7 Fraser Avenue	Sensitive	Proposed live-work units
FW_SR3	10 Ordnance Street	Sensitive	Proposed residential condominium
FW_SR4	89-109 Niagara Street	Sensitive	Proposed mixed use building
FW_SR5	64 Bathurst Street	Sensitive	Proposed mixed use building
FW_SR6	663 King Street West	Sensitive	Proposed mixed use building
FW_SR7	655 Queen Street West	Sensitive	Proposed mixed use building
FW_SR8	149 Bathurst Street	Sensitive	Proposed mixed use building
FW_SR9	604 Richmond Street West	Sensitive	Proposed mixed use building
FW_SR10	543 Richmond Street West	Sensitive	Proposed mixed use building
FW_SR11	135 Portland Street	Sensitive	Proposed addition of residential units above townhouses
FW_SR12	502 Adelaide Street West	Sensitive	Proposed mixed use building
FW_SR13	445 Adelaide Street West	Sensitive	Proposed hotel
FW_SR14	497 Richmond Street West	Sensitive	Proposed mixed use building
FW_SR15	520 Richmond Street West	Sensitive	Proposed mixed use building
FW_SR16	544 King Street West	Sensitive	Proposed mixed use building
FW_SR17	462 Wellington Street West	Sensitive	Proposed mixed use building
FW_SR18	471 Richmond Street West	Sensitive	Proposed hotel
FW_SR19	457 Richmond Street West	Sensitive	Proposed mixed use building
FW_SR20	452 Richmond Street West	Sensitive	Proposed mixed use building
FW_SR21	450 Richmond Street West	Sensitive	Proposed mixed use building
FW_SR22	184 Spadina Ave	Sensitive	Propsed hotel
FW_SR23	170 Spadina Ave	Sensitive	Proposed mixed use building
FW_SR24	122 Peter Street	Sensitive	Proposed Mixed use building
FW_SR25	102 Peter Street	Sensitive	Proposed mixed use building
FW_SR26	324 Richmond Street West	Sensitive	Proposed additional condominium units
FW_SR27	219 Queen Street West	Sensitive	Propsed addition of condominiums
FW_SR28	250 University Avenue	Sensitive	Proposed mixed use building
FW_SR29	51 East Liberty Street	Sensitive	Proposed condominium
FW_SR30	90 Niagara Street	Sensitive	Proposed condominium
FW_SR31	602 King Street West	Sensitive	Proposed mixed use building
FW_SR32	49 Camden Street	Sensitive	Proposed hotel
FW_SR33	19 Duncan Street	Sensitive	Redevelopment - Mixed use building with apartment and hotel suites under construction
FW_SR34	28 Widmer Street	Sensitive	Condominium under construction

Ontario Line Subway

Table E2: List of Potential Future Sensitive and Critical Receptors - Ontario Line South Segment

Receptor ID#	Address	Critical / Sensitive	Receptor Description
FS_CR1	433 Pape Avenue	Critical	Proposed day care
FS_CR2	West Don Lands	Critical	Proposed West Don Lands Development including residential, school, child care centre
FS_SR1	483 Bay Street	Sensitive	Proposed addition of residential units
FS_SR2	207 Yonge Street	Sensitive	Proposed residential development
FS_SR3	193 Church Street	Sensitive	Proposed mixed use (commercial and residential) building
FS_SR4	139 Church Street	Sensitive	Proposed mixed use building
FS_SR5	60 Queen Street East	Sensitive	Proposed mixed use building
FS_SR6	89 Church Street	Sensitive	Proposed mixed use building
FS_SR7	90 Queen Street East	Sensitive	Proposed mixed use building
FS_SR8	110 Adelaide Street East	Sensitive	Proposed mixed use building
FS_SR9	231 Richmond St East	Sensitive	Proposed mixed use building
FS_SR10	33 Sherbourne Street	Sensitive	Proposed mixed use building
FS_SR11	245 Queen Street East	Sensitive	Proposed mixed use building
FS_SR12	12 Bonnycastle Street	Sensitive	Proposed residential condominium
FS_SR13	254 King Street East	Sensitive	Proposed mixed use building
FS_SR14	284 King Street East	Sensitive	Proposed mixed use building
FS_SR15	301 Queen Street East	Sensitive	Proposed mixed use building
FS_SR16	75 Ontario Street	Sensitive	Proposed mixed use building
FS_SR17	49 Ontario Street	Sensitive	Proposed mixed use building
FS_SR18	261 Queens Quay East	Sensitive	Proposed mixed use building
FS_SR19	250 Front Street East	Sensitive	Proposed mixed use building
FS_SR20	161 Parliament Street	Sensitive	Proposed mixed use building
FS_SR21	390 Cherry Street	Sensitive	Proposed mixed use building
FS_SR22	31 Parliament Street	Sensitive	Proposed mixed use building
FS_SR23	33 Parliament Street	Sensitive	Proposed mixed use building
FS_SR24	125R Mill Street	Sensitive	Proposed mixed use building
FS_SR25	475 Front Street East	Sensitive	Proposed residential condominium
FS_SR26	763 Queen Street East	Sensitive	Proposed mixed use building
FS_SR27	772 Queen Street East	Sensitive	Proposed residential condominium
FS_SR28	8 De Grassi Street	Sensitive	Proposed residential apartment
FS_SR29	263 Logan Avenue	Sensitive	Proposed residential townhouses
FS_SR30	354-358 Pape Avenue	Sensitive	Proposed mixed use building
FS_SR31	450 Pape Avenue	Sensitive	Proposed residential
FS_SR32	485 Logan Avenue	Sensitive	Proposed residential
FS_SR33	60 Mill Street	Sensitive	Proposed hotel
FS_SR34	109 George Street	Sensitive	Proposed mixed use building
FS_SR35	244 Church Street	Sensitive	Proposed mixed use building
FS_SR36	238 Berkeley Street	Sensitive	Proposed townhouses

Ontario Line Subway

Table E3: List of Potential Future Sensitive and Critical Receptors - Ontario Line North Segment

Receptor ID#	Address	Critical / Sensitive	Receptor Description
FN_CR1	770 Don Mills Road 805 Don Mills Road	Critical	Proposed residential towers with potential day care
FN_CR2	905 Don Mills Road	Critical	Proposed retirement residence
FN_SR1	844 Don Mills Road & 1150 Eglinton Avenue East	Sensitive	Proposed mixed use (commercial and residential) buildings
FN_SR2	25 St. Dennis Drive	Sensitive	Proposed residential apartment
FN_SR3	1185 Eglinton Avenue East	Sensitive	Proposed residential apartment