



Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer

Schedule B Municipal Class Environmental Assessment

Project File: 3

January 10, 2022

Regional Municipality of Peel



Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer

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Document History and Status

Revision	Date	Description	By	Review	Approved
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1	2021-06-02	Draft Project File – Agency Approval Review (CVC and City of Mississauga)	DN	JT	PD
2	2021-09-23	Final Project File for Public Review	DN	JT	PD
3	2022-01-10	Final Project File for Filing	DN	JT	PD

Executive Summary

The Region of Peel (Region) has completed the Schedule B Municipal Class Environmental Assessment (EA) process to identify a preferred alignment for the Relocation of the 1500-millimetre Credit Valley Sanitary Trunk Sewer to permit its continued safe and efficient operation.

As a result of the widened Highway 401 right-of-way and construction of the widened Creditview Road bridge, the section of the 1500 millimetre Credit Valley Sanitary Trunk Sewer from east of the intersection of Creditview Road and Old Creditview Road to south of Highway 401 needs to be realigned. With the close proximity of the East to West Diversion Sanitary Trunk Sewer installation, an opportunity to provide additional operational flexibility for the west trunk system is also possible. An analysis of all opportunities and constraints, as summarized by the following problem/opportunity Statement, was undertaken to develop the feasible alternatives during Phase 1 of the EA.

Due to the widening of Highway 401 and the reconstruction of the Creditview Bridge, accessibility for operation and maintenance of the existing CVSTS along the highway will be very difficult. The highway works could also impact the structural integrity of the existing CVSTS.

An existing 675 mm sewer that crosses the Credit River within the study area is at risk of being exposed by stream flow. An opportunity exists to remove this sewer and reroute flows into the new realigned 1500 mm sewer.

Phase 2 of the EA consisted of developing the feasible alternative solutions to address the problem/opportunity, documenting the baseline settings, and comparatively evaluating the effects to establish the preferred solution. Five alternatives were considered, including the Do-Nothing alternative. Evaluation criteria were grouped into four main objective categories: Technical Considerations, Natural Environment, Socio-Cultural Environment, and Economic Factors. Supporting studies were completed as part of this Class EA with the ensuing findings and recommendations used to evaluate the alternative solutions. Criteria development took study-specific opportunities and constraints into consideration.

The recommended alternative, shown in **Figure i-1**, will replace the 1500 mm trunk sewer with a new sewer installed partially in the easement of the existing 675 mm Creditview Sanitary Trunk Sewer. The alignment will consist of a straight, 510 m-long open-cut trench, and a straight, 200 m-long tunnel section; the open-cut section will cross the Credit River and the tunneled section will cross Highway 401. The existing 675 mm Creditview Sanitary Trunk Sewer will be decommissioned and removed during construction of the new sewer where the two alignments are shared, including where the existing sewer currently crosses the Credit River. This recommended alternative provided the greatest benefits including:

- The most viable technical solution that also completely satisfied the problem/opportunity by removing the Credit Valley Sanitary Trunk Sewer from Highway 401's right-of-way and enabling the removal of the existing Creditview Sanitary Trunk Sewer from the Credit River.
- Facilitates safe access to infrastructure for operation and maintenance without additional effort or impact to traffic on this major highway. This also results in a comparatively lower operation and maintenance costs.
- Although it requires the open-cut of the Credit River, it avoids the potential for a frac-out that may arise if the crossing were tunneled. The open-cut crossing can be engineered to mitigate the potential impact to the natural environment.

- The ability to use the existing easement to the greatest extent possible helps avoid disturbing undisturbed lands and reduces the cost of procuring new easements.
- Partial open-cut construction further reduces the cost of implementing this alternative.

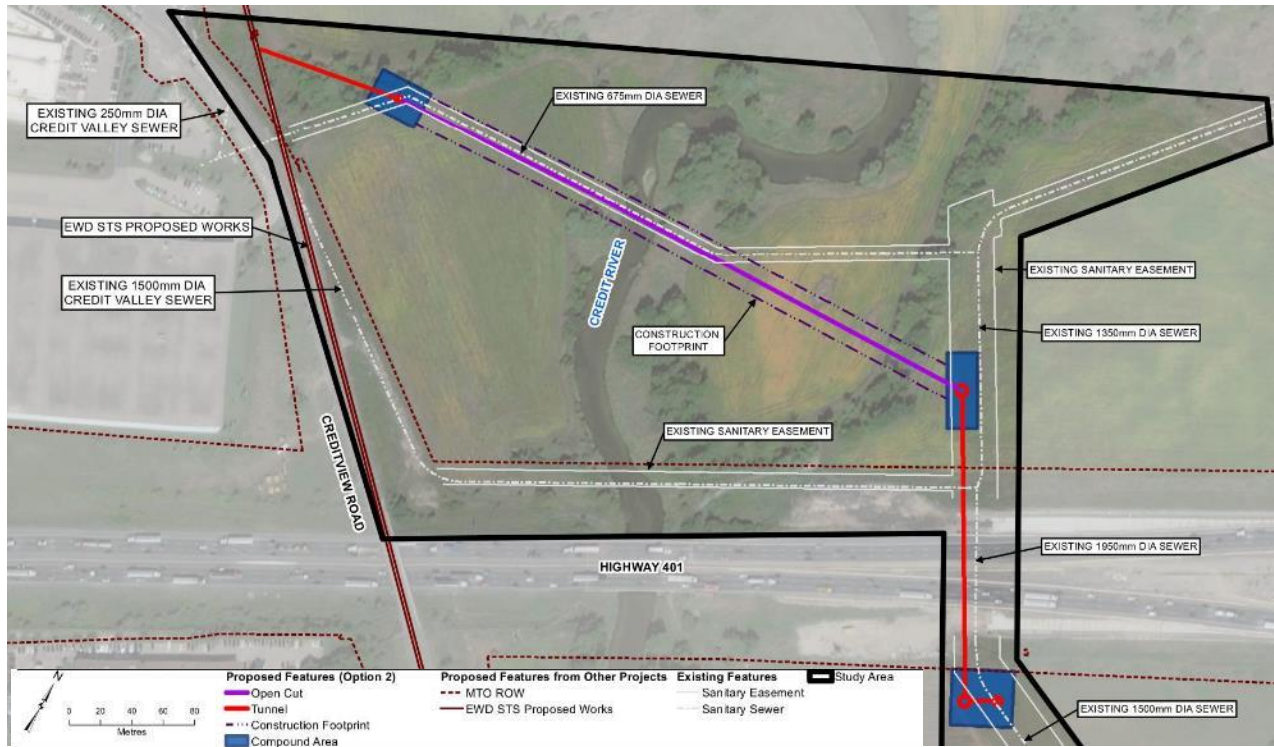


Figure i-1. Recommended Alternative

The recommended alternative was presented to public and stakeholders through a Virtual Public Information Event undertaken from February 10, 2021 to March 3, 2021. The alternatives and evaluation were presented along with the recommended alternative. Feedback provided by the public and stakeholders have been documented in this study. No significant comments were received that cannot be addressed during detailed design.

This Project File documents the project decisions to meet the requirements of the Ontario Municipal Engineers' Association's Municipal Class EA Schedule B process and the *Environmental Assessment Act*. The preferred alternative meets the problem/opportunity statement and satisfies the project-specific evaluation criteria. The potential impacts that have been identified through this study can be addressed through mitigation measures developed during detailed design.

The Project File will be made available for review by the public and stakeholders for a 40-day period. If there are no outstanding concerns or input, then the Region will proceed to detailed design, including procuring the necessary permits and approvals, and then onto construction.

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Acronyms and Abbreviations

°C	degree(s) Celsius
cm	centimetre(s)
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CSTS	Creditview Sanitary Trunk Sewer
CVC	Credit Valley Conservation Authority
CVSTS	Credit Valley Sanitary Trunk Sewer
DFO	Fisheries and Oceans Canada
DNAPL	dense, nonaqueous-phased liquids
EA Act	Environmental Assessment Act
EA	Environmental Assessment
ELC	Ecological Land Classification
ESR	Environmental Study Report
EWD STS	East to West Sanitary Trunk Sewer
FCSTS	Fletcher's Creek Sanitary Trunk Sewer
GHG	greenhouse gas
GTA	Greater Toronto Area
HIA	Heritage Impact Assessment
HVA	highly vulnerable aquifer
IO	Infrastructure Ontario
km	kilometre(s)
m	metre(s)
m/m	metre(s) per metre
m/s	metre(s) per second
m ³ /s	cubic metre(s) per second
mm	millimetre(s)
MECP	Ministry of the Environment, Conservation and Parks
MHSTCI	Ministry of Heritage, Sport, Tourism, and Culture Industries
MNRF	Ontario Ministry of Natural Resources and Forestry
MTO	Ministry of Transportation of Ontario
NHIC	Ontario Natural Heritage Information Centre
O&M	operations and maintenance
OBBA	Atlas of the Breeding Birds of Ontario
PPS	Provincial Policy Statement

Project	Credit Valley Sanitary Trunk Sewer Relocation
Region	Regional Municipality of Peel
SAR	species at risk
SARA	Species at Risk Act
SARO	Species at Risk in Ontario
SGRA	significant groundwater recharge area
SWH	significant wildlife habitat
UWSTS	Upper West Sanitary Trunk Sewer
WCC	West Corridor Constructors
WPCP	Water Pollution Control Plant

1. Introduction

The Region of Peel's (Region's) wastewater collection system is split into the west trunk system and the east trunk system. The west trunk system collects wastewater from the western side of Brampton and Mississauga and conveys it to the Clarkson Water Pollution Control Plant (WPCP), while the east trunk system collects and conveys wastewater from Bolton, Caledon East, Brampton, parts of Mississauga, and some areas of York Region and City of Toronto to the G.E. Booth WPCP. The west trunk system includes the Credit Valley Sanitary Trunk Sewer (CVSTS), Creditview Sanitary Trunk Sewer (CSTS), Fletcher's Creek Sanitary Trunk Sewer (FCSTS), and the Upper West Sanitary Trunk Sewer (UWSTS), among others (**Figure 1-1**). The CVSTS runs from north of Mayfield Road in the Town of Caledon, servicing the cities of Brampton and Mississauga, before joining the FCSTS north of Highway 401 to form the upstream end of the UWSTS's East Leg; the FCSTS at this point includes the flow from the CSTS. The UWSTS's East Leg crosses Highway 401 as a single sewer and continues downstream.

The province plans to widen Highway 401 from 6 lanes to 12 from immediately west of Regional Road 25 in the Town of Milton to west of Mavis Road in Mississauga. As a result of the expanded road right-of-way and reconstruction of the widened Creditview Road bridge, the section of the trunk sewer system from east of Creditview Road to south of Highway 401 in Mississauga needs to be relocated.

The Region has therefore initiated a Class Environmental Assessment (EA) study to identify a preferred alignment to relocate the section of trunk sewer system from east of the Creditview Road and Old Creditview Road intersection to south of Highway 401 (the Project) in order to continue safe and efficient operation. A few realignment options were developed and assessed through a comparative evaluation of the potential environmental, social/cultural, technical, and economic effects associated with construction and operation of the relocated trunk sewers. The study documented the existing baseline setting, evaluated the alternatives, and identified a preferred solution for the Project.

The Project is located east of Creditview Road, spanning Highway 401 in Mississauga, Ontario, as shown on **Figure 1-2**. The study area encompasses the area where it is reasonable to assume direct and indirect environmental and socio-economic effects of the Project's construction and operation will be experienced. This includes a construction footprint (that is, lands that will be directly disturbed during construction of the preferred alternative) as well as 500 metres (m) upstream and 500 m downstream of the Credit River and the unnamed tributary to the Credit River to account for potential Project-related activities that may affect water quality or fish habitat beyond the construction footprint.

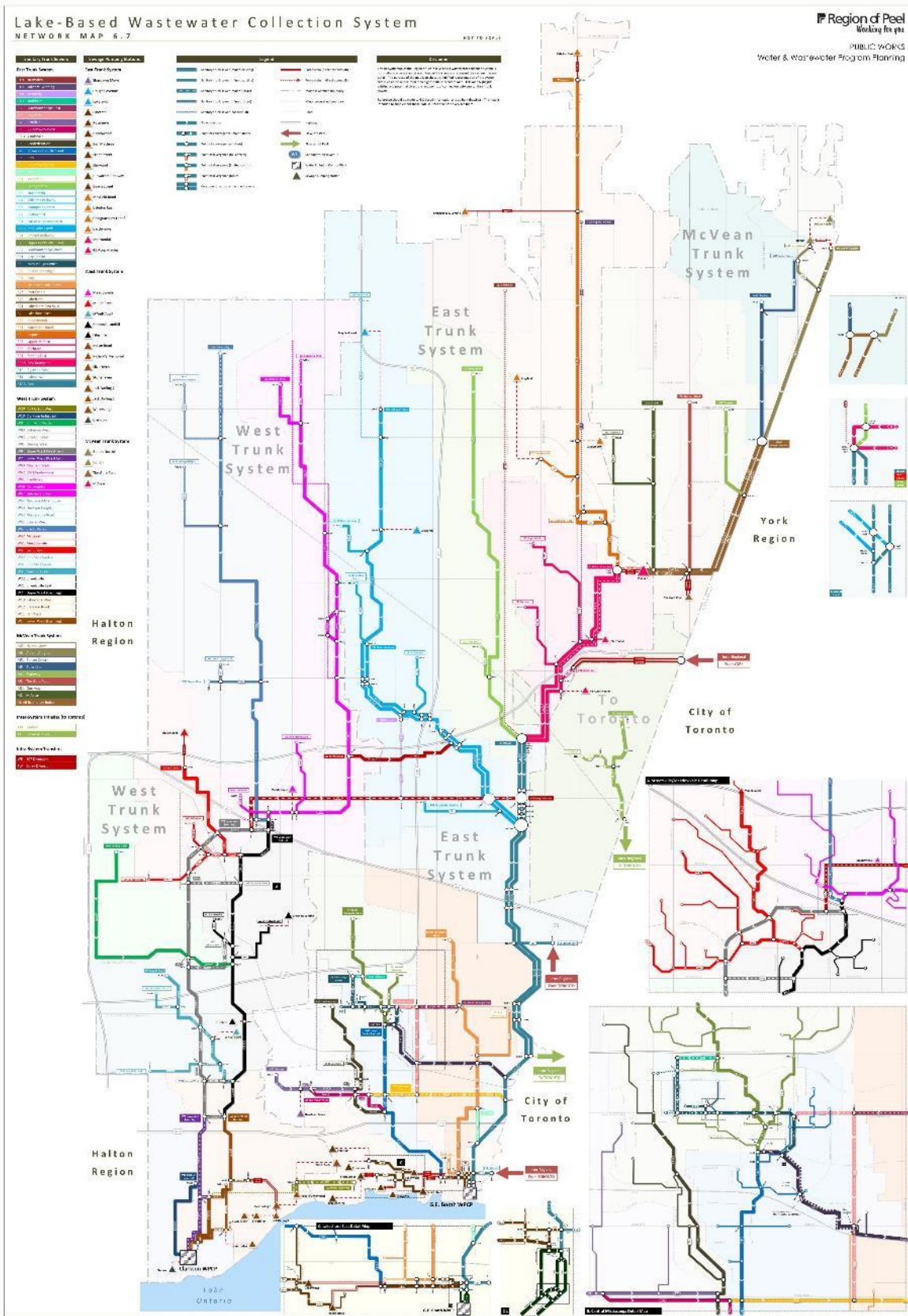


Figure 1-1. Region's Lake-Based Wastewater Collection System

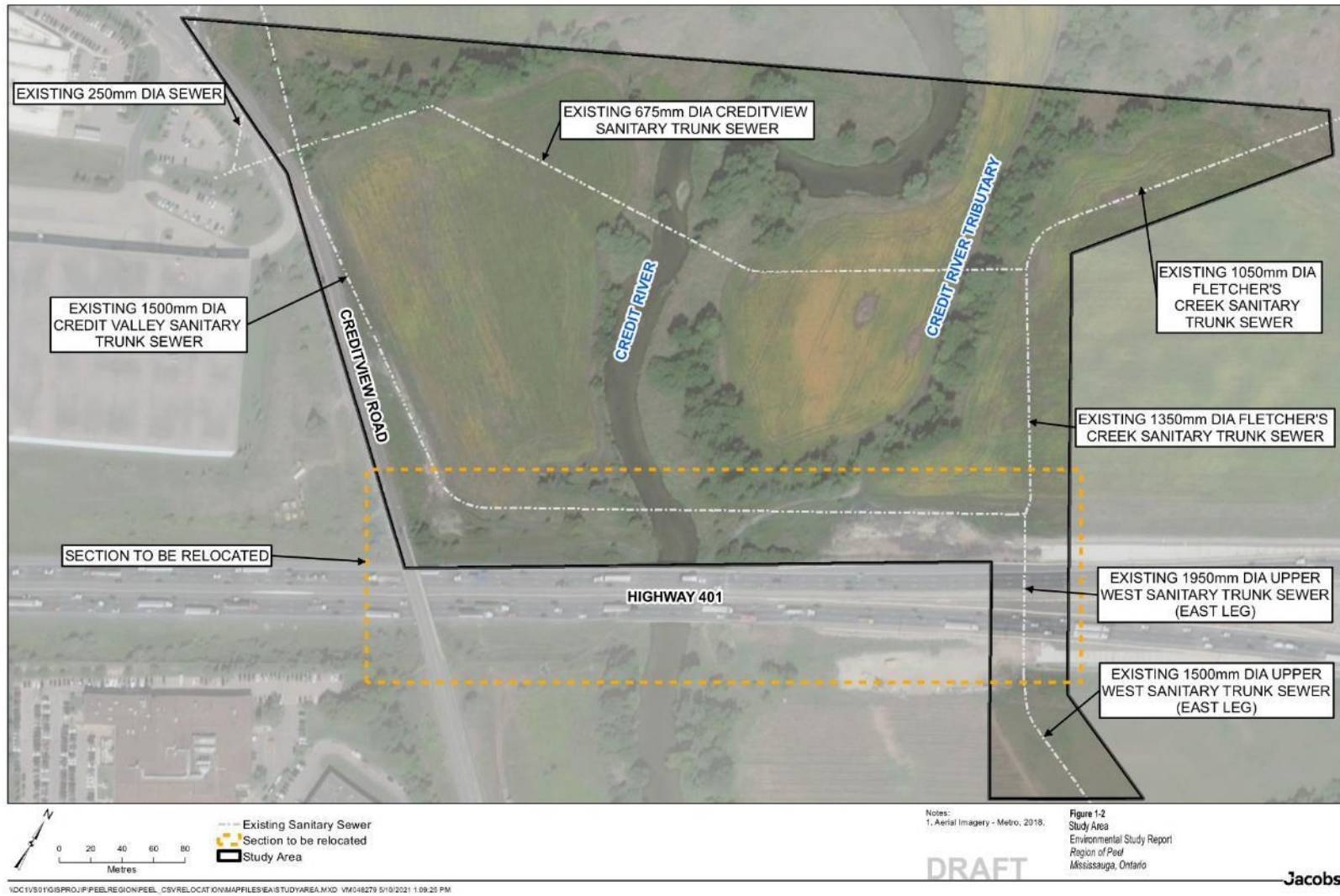


Figure 1-2. Project Overview

1.1 Background

In addition to the Highway 401 Expansion Project, the Project is affected by other projects such as the Region's implementation of the East to West Wastewater Diversion Strategy and the Creditview Road bridge reconstruction. An analysis of these other projects was undertaken to consider the resulting opportunities and constraints when developing the Problem/Opportunity Statement and the subsequent feasible alternatives.

1.1.1 Highway 401 Expansion Project

The Highway 401 Expansion Project by the Ministry of Transportation (MTO) involves reconstructing and widening approximately 18 kilometres (km) of highway within the western portions of the Greater Toronto Area (GTA), from the Credit River in Mississauga to Regional Road 25 located in Milton (Infrastructure Ontario 2019).

Under the proposed plans, the existing CVSTS would be located approximately 12 m inside of the widened highway right-of-way, running parallel to the highway, with the three existing sanitary maintenance holes on the northern side and one existing sanitary maintenance hole on the southern side located inside of the widened highway. The Region requires access to these maintenance holes to maintain and inspect the operating sanitary sewer; if left in place at their current locations, the MTO would need to restrict traffic flow along the highway to allow safe access to the maintenance holes.

Any damages to the sewer pipe that could result in leakage into the ground could also lead to embankment or retaining wall failure (potentially catastrophic if the impacts extend to the driving lanes) for both the Creditview Road bridge and embankment and Highway 401.

Through consultation with the MTO, it was determined that the East Leg of the UWSTS crossing Highway 401, approximately 400 m east of Creditview Road, would need to be replaced, and that the existing 1500 millimetre (mm) sewer alignment along Highway 401 and a portion of the alignment along Creditview Road would need to be relocated outside of the widened road allowances.

1.1.2 Coordination of Water and Wastewater Infrastructure Works with the Ontario Ministry of Transportation Highway 401 Expansion Project

As a result of MTO's planned expansion, the Region has a separate project underway to relocate 11 of its water and wastewater assets from within the expanded right-of-way. The CVSTS relocation was initially identified as part of this project's scope and was referred to as Crossing 11. However, given the need for an EA, this Project has been carried out separately and is no longer part of the Region's relocation project. The remaining conflicts will be mitigated through detailed design and construction of appropriate relocations.

1.1.3 East to West Wastewater Diversion Strategy

In 2016, the Region completed a Schedule C Municipal Class EA for the East to West Wastewater Diversion Strategy. The preferred solution identified in the Class EA includes a 2400 mm gravity sewer to be installed along Derry Road from Spring Creek east of Bramalea Road, continuing west along Old Derry Road, Old Creditview Road, and Creditview Road to Highway 401 where it would connect to the West Trunk Sewer (West Leg of the UWSTS). During construction of the UWSTS's West Leg, the northern leg was removed from the alignment, and it was decided that the East to West Sanitary Trunk Sewer (EWD STS) would be extended past Highway 401 to connect to the UWSTS at Argentia Road.

The 2400 mm EWD STS's preferred route is in close proximity to the existing 1500 mm CVSTS and 675 mm CSTS, north of the Creditview Road crossing of Highway 401. The existing 1500 mm CVSTS follows the east side of Creditview Road until it turns east to follow the northern side of Highway 401. The CSTS crosses Creditview Road, an open field, and the Credit River prior to also connecting to the East Leg of the Western Trunk that crosses Highway 401.

1.1.4 Creditview Road Bridge

In December 2019, construction to replace the Creditview Road bridge over Highway 401 began with a planned opening date in August 2021, where access over Highway 401 will be restored. The new Creditview Road bridge will be approximately 3.0 m higher than the existing bridge, resulting in a 3.0 m increase in height. This will require extensive grading to achieve a higher and wider embankment that matches the new bridge elevation, resulting in an increase of cover over the existing sanitary sewer section that runs parallel to Creditview Road, including the maintenance hole located at the bottom of the slope. This maintenance hole located adjacent to the Creditview Road bridge is 14.0 m deep, and the Region requires ongoing, reliable access to the maintenance hole for O&M.

The Region requires access to the pipe itself should there be need for repairs in the future. The proposed bridge's proximity will create access issues should localized excavation be required to access the pipe. During that excavation, there is the potential for slope failure or wall failure, which could possibly create challenges for Creditview Road and the bridge structure.

1.2 Problem/Opportunity Statement

To identify and investigate alternative solutions appropriate for the key problems and opportunities driving this Project, the following Problem/Opportunity Statement was developed:

Due to the widening of Highway 401 and the reconstruction of the Creditview Bridge, accessibility for operation and maintenance of the existing CVSTS along the highway will be very difficult. The highway works could also impact the structural integrity of the existing CVSTS.

An existing 675 mm sewer that crosses the Credit River within the study area is at risk of being exposed by stream flow. An opportunity exists to remove this sewer and reroute flows into the new realigned 1500 mm sewer.

1.3 Planning and Policy

1.3.1 Ontario's Environmental Assessment Process

Ontario's *Environmental Assessment Act* (EA Act) was passed in 1975 and was first applied to municipalities in 1981. The EA Act requires the study, documentation, and examination of the environmental effects that could result from projects or activities.

The objective of the EA Act is to consider the possible effects of these projects early in the planning process, when concerns may be most easily resolved, and to select a preferred alternative with the fewest identified impacts.

The EA Act defines "environment" very broadly as follows (Ontario 1990):

- Air, land, or water
- Plant and animal life, including human life

- Social, economic, and cultural conditions that influence the life of humans or a community
- Any building, structure machine, or other device or thing made by humans
- Any solid, liquid, gas, odour, heat, sound, vibration or radiation resulting directly or indirectly from human activities
- Any part or combination of the foregoing, and the interrelationships between any two or more of them, in or of Ontario

In applying EA Act requirements to projects, two types of EA planning and approval processes are identified:

- 1) Individual EAs (Part II of the EA Act): Projects for which Terms of Reference and an individual EA are carried out and submitted to the Minister of the Environment, Conservation and Parks (MECP) for review and approval.
- 2) Class EAs: Projects are approved subject to compliance with an approved Class EA process; provided that the appropriate Class EA approval process is followed, a proponent will comply with the requirements of the EA Act.

1.3.2 Class Environmental Assessment Process

The Class EA process is a decision-making framework that effectively meets the requirements of the EA Act, as illustrated on Figure 1-3.

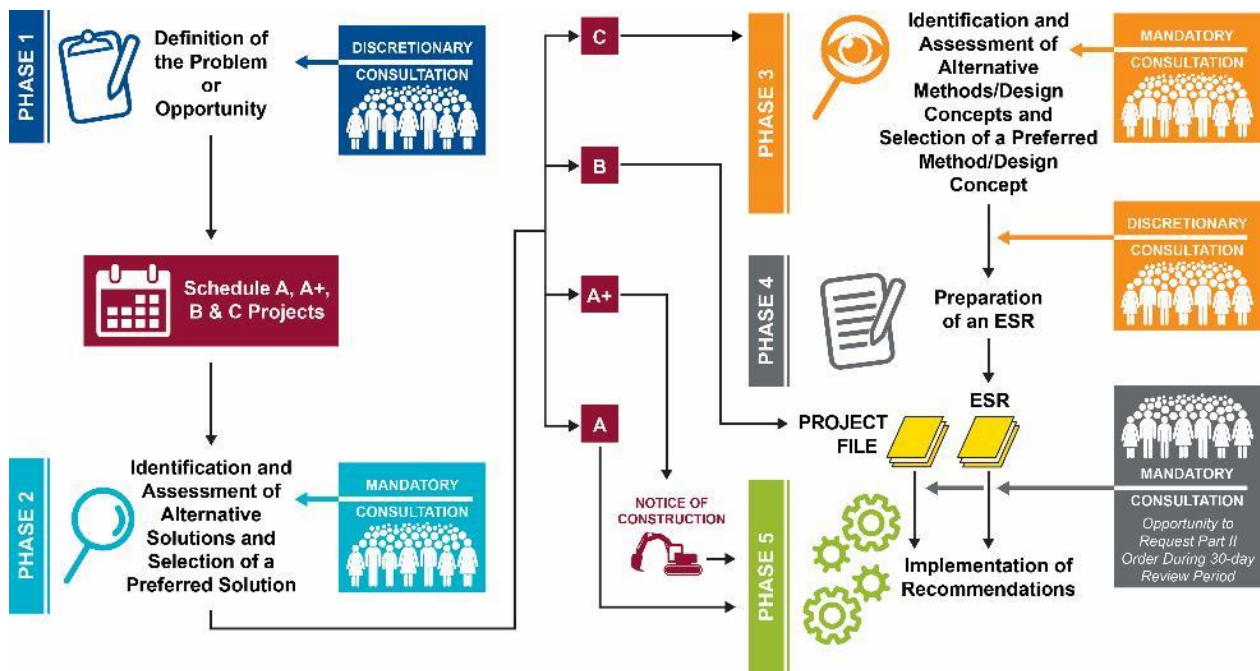


Figure 1-3. Environmental Assessment Process

The Municipal Class EA document (MEA 2015) classifies projects in terms of the following schedules, based on the anticipated environmental impact of the proposed development:

- Schedule A projects are minor operational and upgrade activities and may go ahead without further assessment once Phase One of the Class EA process is complete (that is, the problem is reviewed, and a solution is confirmed).

-
- Schedule “A+” projects are pre-approved but still require public notification prior to project implementation. Projects categorized as Schedule A+ include activities such as municipal infrastructure plans previously approved by a council member (Phase 1).
 - **Schedule B projects must proceed through the first two phases of the process. The proponent is required to undertake a screening process involving mandatory contact with directly affected public and relevant review agencies to confirm that they are aware of the project and that their concerns have been addressed. If there are no outstanding issues or concerns, then the proponent may proceed to implementation. Schedule B projects generally include improvements and minor expansions.**
 - Schedule C projects require more detailed study, public consultation, and documentation, as they may have more significant impacts. Projects categorized as Schedule C must proceed through all five phases of an assessment. An Environmental Study Report (ESR) must be completed and made available for a 30-day public review period prior to proceeding to implementation.

The Class EA process includes five phases, as defined in the Municipal Engineer Association’s Municipal Class EA document (MEA 2015).

- **Phase 1. Identify the problem of opportunity**
- **Phase 2. Identify alternative solutions and establish a preferred solution**
- Phase 3. Examine alternative methods of implementing the preferred solution that will minimize negative effect and maximize positive effects
- Phase 4. Preparation of an ESR
- Phase 5. Implementation

Replacing or relocating an existing trunk sewer, where the facilities may not be located in an existing road allowance, as contemplated in the Class EA, is considered a Schedule B project, requiring completion of Phase 1 and 2 of the Class EA process. The process requires that a Project File be prepared to document the planning and decision-making steps followed and placed on record for public and stakeholder review and comment before proceeding with Phase 5 to implement the recommendations and commitments of the completed Class EA.

1.3.3 Provincial Policy Statement

The 2020 Ontario Provincial Policy Statement (PPS) contains policies that protect Ontario’s natural heritage and water resources. The PPS requires that official plans identify provincial interests and set out appropriate land-use designations and policies (Ministry of Municipal Affairs and Housing 2020). An EA process may be required for modifications to existing infrastructure under applicable legislations. Where an EA process is required for modified infrastructure, approvals under the *Planning Act* should be integrated, provided the intent and requirements of both processes are met. By coordinating land-use planning under the Class EA process, proponents can meet the requirements of both processes in an efficient manner. Policies within the PPS that are considered relevant to the Project are described in Section 2.2.1. An official plan is the most important vehicle for implementing the policies and principles outlined in the PPS, and comprehensive, integrated, and long-term planning is best achieved through official plans (Ministry of Municipal Affairs and Housing 2020).

1.3.4 Region of Peel Official Plan

The Region provides a wide range of services in Peel, including construction and maintenance of roads, watermains, and sanitary sewers. The Project is required in order to safely relocate the existing sanitary

trunk sewers as a result of the Highway 401 expansion. Infrastructure elements such as sewers and roads serve the regional structure and require careful planning in terms of timing, location, and capital cost (Region 2018). The Project aligns with the Region's goal of having adequate, efficient, planned, and cost-effective regional service delivery consistent with public needs and financial realities.

2. Description of the Existing Environment

This section provides an overview of the environmental and socio-economic setting for the Project study area to describe the baseline information from which alternative solutions can be identified and implemented. Baseline information is presented for the natural, social, cultural, technical, and economic environment within the study area. Information collected for the setting was obtained from a desktop review and analysis of existing data as well as biophysical field surveys conducted within the study area.

2.1 Natural Environment

2.1.1 Physical Environment

The Project study area is located within the Peel Plain physiographic region (Chapman and Putnam 2007), characterized as gently rolling terrain where topography dips towards the Lake Ontario basin to the south. The Peel Plain is in an area of low relief, and bedrock at shallow depths is present. Surficial geology consists of Upper Till Plains (Halton Till), till sheets consisting of clayey silt to silty clay soils, sand to silt zones, and boulder zones. The physiographic region has been substantially altered by deforestation and wetland drainage activities to accommodate agricultural and urban land uses (Region 2011).

Underlying bedrock consists of Upper Ordovician-aged red shales of the Queenston Formation (Hewitt 1972). Bedrock was encountered from approximately 6 m to 13 m below ground surface (Golder 2020). Lacustrine deposits have formed from small glacial meltwater ponds, concentrated near river valleys. Topography within the study area is relatively flat. There are no steep slopes within the study area.

The study area's historical use includes agricultural land and existing transportation corridors. Soils within the study area include sand, gravelly sand and gravel, nearshore and beach deposits, with silty clay to silty sand and clayey gravel observed.

A Phase One Environmental Site Assessment was completed to identify potential sources of soil contamination that may be affected as a result of construction activities. A total of eight soil samples was taken. The site has been used for agricultural purposes in the past; therefore, pesticides, including herbicides, fungicides and ant-fouling agents, are anticipated to be encountered. No exceedances above the MECP Table 1 Standards were reported. There were no areas of potential environmental concern identified at the Project site or the surrounding properties. A Phase Two Environmental Site Assessment has not been recommended. There are no records of federal contaminated soils in the study area (Treasury Board of Canada Secretariat 2020). Project activities have the potential to uncover historical contamination, considering the proximity to agricultural land use and transportation corridors.

2.1.2 Terrestrial Systems

The study area is located in Ecoregion 7E, where flora and fauna are the most diverse in Canada, although most natural habitats have been drained, cut, and converted into agricultural or suburban land uses (Crins et al. 2009).

Existing environmental conditions present within the study area are documented in a Natural Heritage Assessment Report and the Breeding Bird Survey addendum completed by Matrix Solutions Inc. to support the detailed design work for the Coordination of Water and Wastewater Infrastructure Works with the Ontario Ministry of Transportation Highway 401 Expansion Project. The Project area is referred to as Sites 10 and 11 within the report included in **Appendix A** and summarized in the subsections herein.

The following background data sources were reviewed and considered as part of this existing conditions:

- Ontario Natural Heritage Information Centre (NHIC) database (MNRF 2018)
- Ministry of Natural Resources and Forestry (MNRF), Aurora District Office
- Credit Valley Conservation Authority (CVC) data (CVC 2018)
- *Natural Heritage Reference Manual for Policy 2.3 of the Provincial Policy Statement* (OMNR 2010)
- *Significant Wildlife Habitat Technical Guide* (MNR 2000)
- Committee on the Status of Endangered Wildlife in Canada (COSEWIC)
- *Species at Risk Act (SARA) Public Registry* (Government of Canada 2018)
- *Atlas of the Breeding Birds of Ontario* (OBBA) Bird Studies Canada (Cadman et al. 2007)
- *Ontario Reptile and Amphibian Atlas* (Ontario Nature 2015)
- *Ontario Butterfly Atlas* (Toronto Entomologists' Association 2019)
- *Mississauga Official Plan* (City of Mississauga 2016)
- *Peel Region Official Plan* (Region 2016b)
- *Credit River Fisheries Management Plan* (CVC and MNR 2002)

Initial background requests regarding fish and fish habitat, as well as terrestrial sensitivities and species at risk (SAR) were submitted to MNRF Aurora District on September 18, 2018, and to CVC on November 8, 2018. This information was received from the MNRF on October 2, 2018. Information regarding environmental sensitivities was received from CVC on December 4, 2018. These records of communication are included in the Natural Heritage Assessment Report (included as **Appendix A** of this EA).

Terrestrial information from the MNRF Aurora District office was supplemented with additional data from various websites and internet sources. Information regarding breeding birds in the study area was extracted from the OBBA (Cadman et al. 2007).

Background information relating to aquatic features within the study area included consultation with MNRF Aurora District as well as CVC. The Credit River Fisheries Management Plan (CVC and MNR 2002) was used to provide additional information, including fish community information, thermal regime, in-water timing windows, recommended setbacks, and drainage information for the Credit River.

In addition, the 2018 Fisheries and Oceans Canada (DFO) Aquatic Species at Risk Map (DFO 2018), the *Endangered Species Act* species status list (Government of Ontario 2008) and the SARA public registry (Government of Canada 2018) were all accessed to determine occurrence of aquatic SAR within the study area.

2.1.2.1 Vegetation

Based on an air photo interpretation, the Project area includes trees, shrubs, and potential wetland pockets within the riparian areas of the Credit River. The remaining areas are dominated by cultural meadows (that is, fields, agriculture [corn]). The study area includes seven ecological communities identified by Matrix Solutions Inc. during field investigations.

- 1) Mineral cultural meadow (CUM1) communities are open, herbaceous communities, dominated by grass-like species (for example, grass, sedge) with tree and shrub cover less than 25%.
- 2) Dry-Fresh Upland Deciduous Forest (FOD4) communities are forests (greater than 60% tree cover) with deciduous tree species representing greater than 75% of the canopy cover. They have tree species associations that are either relatively uncommon or a result of disturbance or management, and Sugar Maple (*Acer saccharum*) is absent or represents less than 10% of the canopy cover.
- 3) Fresh moist Norway maple lowland deciduous forest (FODM7-8) communities are forests (greater than 60% tree cover) consisting of a canopy cover of over 75% deciduous tree species.

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- 4) Smooth brome grass graminoid meadowland (MEGM3-5) communities consist of open, herbaceous areas with less than 25% trees and shrubs.
 - 5) Open water (OA) are defined as areas with water at a depth of 2 m or greater (e.g., Credit River).
 - 6) Open agricultural areas (OAG) are defined as fields dominated by herbaceous vegetation and grasses and include pasture and grazing areas. Weedy hay or pasture covers more than 50% of the area.
 - 7) Transportation and utilities (CVI) occupied by the laydown area for Highway 401 construction work.

The study area is located within a defined Urban System where natural heritage studies during the detailed design phase will likely be required to provide woodland protection (Region of Peel, 2018).

Woodlands associated with the study area (FOD4 and FODM7-8) would both be considered significant woodlands requiring protection in accordance with the *City of Mississauga Official Plan* (City of Mississauga 2019), as they are contiguous with larger woodlands offsite and are within 30 m of a watercourse, thus supporting a linkage function.

2.1.2.2 Wetlands

No provincially significant wetlands were identified during background review or during field investigations within the study area.

2.1.2.3 Wildlife

A Breeding Bird Survey was conducted on May 27, 2020, and July 8, 2020, using the OBBA protocol (Cadman et al 2007). Species observed within the study area include the following:

- American goldfinch (*Spinus tristis*), observed at the Credit River crossing during species breeding season
- American crow (*Corvus brachyrhynchos*), observed at the Credit River crossing during species breeding season
- American robin (*Turdus migratorius*), singing male observed at the Credit River crossing
- Barn swallow (*Hirundo rustica*), nests observed at the Credit River crossing
- Black-capped chickadee (*Poecile atricapillus*), singing male observed at the Credit River crossing
- Blue jay (*Cyanocitta cristata*), observed at the Credit River crossing during species breeding season
- Brown-headed cowbird (*Molothrus ater*), observed at the Credit River crossing during species breeding season
- Cedar waxwing (*Bombycilla cedrorum*), observed at the Credit River crossing during species breeding season
- Common grackle (*Quiscalus quiscula*), observed at the Credit River crossing during species breeding season
- European starling (*Sturnus vulgaris*), singing male observed at the Credit River crossing
- House sparrow (*Passer domesticus*), singing male observed at the Credit River crossing
- Killdeer (*Charadrius vociferus*), singing male observed at the Credit River crossing
- Red-winged blackbird (*Agelaius phoeniceus*), singing male and pair observed at the Credit River crossing, species observed during breeding season

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- Ring-billed gull (*Larus delawarensis*) observed at the Credit River crossing during species breeding season
 - Song sparrow (*Melospiza melodia*), singing male and pair observed at the Credit River crossing
 - Tree swallow (*Tachycineta bicolor*), observed at the Credit River crossing during species breeding season
 - Warbling vireo (*Vireo gilvus*), observed at the Credit River crossing during species breeding season
 - Yellow warbler (*Setophaga petechia*) singing male and pair observed at the Credit River crossing

No reptiles or amphibians were observed within the study area during field investigations in 2018 or 2020.

2.1.3 Aquatic Systems

2.1.3.1 Water Quality

The study area is located in the Credit River watershed. The headwaters for the Credit River originate in the Kame and Till Moraines and drumlinized till plains above the Niagara Escarpment near the Town of Orangeville and drains south to Lake Ontario at Port Credit in the City of Mississauga. The valleylands and riparian habitat associated with the Credit River are designated as “Natural Significant Areas” and are also considered part of the “Green System” as per the *Mississauga Official Plan*. In addition, the Credit River is a part of the Region’s designated Greenlands System’s “Core Areas” (Region 2016b). Within the study area, the Credit River is regulated by the CVC.

According to the Matrix Solutions Inc. Fluvial Geomorphic Assessment Report in 2021 (**Appendix B**), water quality and quantity in the study area has been influenced by historical and current land uses. Notably, farm fields surrounding the Credit River (1954), the large dam breach (Huttonville Dam) in 1970, recent residential development, and the construction of Highway 401.

2.1.3.2 Source Water Protection

The study area is located in the Credit Valley Source Protection Area. There is no wellhead protection zone, intake protection zone, event-based area, or issue contributing area identified within the study area (MECP 2020a). The study area encounters a significant groundwater recharge area (SGRA) with a score of six (MECP 2020a), and a highly vulnerable aquifer (HVA). Policies that apply to SGRAs and HVAs include SAL 10-12, DNAP-3, and OS-3; the policies relate to road salt, dense nonaqueous-phased liquids (DNAPLs), and organic solvents.

2.1.3.3 Groundwater

There are eight groundwater wells located within the study area: seven observation wells and one unknown well (located within the existing sanitary sewer easement and assumed to not be a drinking water well).

2.1.3.4 Aquatic Species and Habitat

The Credit River is classified as a Commercial, Recreational or Aboriginal Fishery containing warm-water sportfish habitat and a cold-water sportfish migratory corridor.

Upstream of Highway 401, the Credit River flows as a defined channel within a wide, low-lying floodplain area. The river within the survey reach flows through a combination of open agriculture areas and grassy meadow with scattered deciduous trees. Both banks contain deciduous trees and shrubs along the top of

the slope for sporadic stretches of the survey reach, which overhang the channel in places and provide shade. The outside meander bends on both banks are steep with large erosion scars, indicating that erosion is ongoing during high-flow events. A drainage channel enters the river channel from the western bank approximately 45 m upstream of the bridge. A gravel access path that connects agricultural fields north and south of the bridge is present along the eastern bank. Downstream of the Highway 401 bridge, the river continues in a general southerly direction as a defined channel constricted to the west by steep valley walls with a wider, low-lying area on the east. The adjacent land use consists of open agricultural fields with deciduous tree lines approximately 15 to 20 m wide along both bank slopes and top of bank. Partially fallen trees overhang the channel in places. The channel in the downstream reach is relatively straight and consists of a gentle bend in the river pattern to the east. The western bank shows some signs of recent erosion near the southern end of the survey reach on the outside bank of the bend. Channel morphology in the downstream reach consists of a swift run immediately downstream of the bridge, transitioning to a riffle section.

The installation of Highway 401 forms a reach break at the Credit River, and within the study area, the river divides into one reach upstream of Highway 401, extending to Old Derry Road (CR-1), and the another reach downstream, extending to Creditview Road (CR-2). A summary of watercourse channel parameters, calculated by Matrix Solutions in 2018, is provided in **Table 1**.

Table 1. Summary of Watercourse Channel Parameters (Matrix Solutions 2018)

Parameters	CR-1	CR-2
Measured average bankfull width (m)	29.4	33.7
Measured average bankfull depth (m)	0.87	0.62
Measured maximum bankfull depth (m)	1.29	1.05
Measured average bankfull width-to-depth ratio	33.8	54.0
Measured bankfull gradient (m/m)	0.0015	0.0019
Measured channel bed gradient (m/m)	0.0011	0.0019
Observed bank materials	Clay, silt, fine sand	Clay, silt, fine sand
Computed average bankfull discharge (m ³ /s)	25.9	19.0
Computed average velocity (m/s)	1.00	0.91

Notes:

m/m = metre(s) per metre

m/s = metre(s) per second

m³/s = cubic metre(s) per second

In general, bed substrates include riffle/run upstream in reach CR-1, which is typically gravel and cobble-dominated with fine sand accumulation on riffles embedding the coarse materials. Substrate measures from approximately 4 mm to 124 mm within this reach. Riffle/run substrate downstream in reach CR-2 is also gravel and cobble-dominated, with substrate measuring approximately 3 mm to 169 mm.

2.1.3.5 Fish Habitat

Overall, high-quality salmonid spawning substrate and cover habitat was observed throughout the study area. The Credit River adjacent to the study area provides spawning habitat for Pacific salmonid species; observations made during field surveys identified chinook salmon, (*Oncorhynchus tshawytscha*) spawning redds, and chinook salmon in post-spawn condition upstream and downstream of the Highway 401 bridge, as such the Credit River adjacent to the study area provides spawning habitat for Pacific salmonid species. Additionally, although they would not be spawning within the study area, this area would act as a migratory route and provide important habitat and feeding opportunities for brown trout (*Salmo trutta*), rainbow trout (*Oncorhynchus mykiss*), and Atlantic salmon (*Salmo salar*) as they move upstream to spawning areas. The Credit River within the study area also provides habitat necessary for various life cycle processes for resident warm-water sport fish and bait/forage fish, including nursery, rearing, and spawning habitat.

The following species have been observed in Credit River proximal to the study area: American eel (*Anguilla rostrata*), blacknose dace (*Rhinichthys atratulus*), bluntnose minnow (*Pimephales notatus*), brook stickleback (*Culaea inconstans*), brown bullhead (*Ameiurus nebulosus*), brown trout (*Salmo trutta*), chinook salmon (*Oncorhynchus tshawytscha*), common carp (*Cyprinus carpio*), common shiner (*Luxilus cornutus*), spottail shiner (*Notropis hudsonius*), creek chub (*Semotilus atromaculatus*), fantail darter (*Etheostoma flabellare*), fathead minnow (*Pimephales promelas*), hornyhead chub (*Nocomis biguttatus*), Johnny darter (*Etheostoma nigrum*), Iowa darter (*Etheostoma exile*), largemouth bass (*Micropterus salmoides*), longnose dace (*Rhinichthys cataractae*), northern hog sucker (*Hypentelium nigricans*), pumpkinseed (*Lepomis gibbosus*), rainbow darter (*Etheostoma caeruleum*), rainbow trout (*Oncorhynchus mykiss*), river chub (*Nocomis micropogon*), rock bass (*Ambloplites rupestris*), sea lamprey (*Petromyzon marinus*), stonecat (*Noturus flavus*), white sucker (*Catostomus commersonii*) (CVC 2018, MNR 2018). See Section 2.1.4 for information regarding aquatic SAR and related habitat.

The presence of migratory cold-water species and American eel habitat would restrict the timing window available for any in-water work or work on channel banks. The restricted timing window applied on this Project is March 31 to November 15 to protect salmonid spawning and American Eel migration. Through consultation, this restricted window has been agreed on by both the MECP and CVC. The timing window could be altered by MNR.

The *Credit River Fisheries Management Plan* (CVC and MNR 2002) identifies setbacks that protect riparian areas and provide recommended natural buffers for watercourses. For the Credit River, the minimum setback is considered the greater of the watercourse meander belt width or 15 m.

2.1.4 Species at Risk and Related Habitat

Endangered and threatened species are provided formal protection under the *Endangered Species Act*, now administered by MECP. Up-to-date SAR lists are provided by the Committee on the Status of Species at Risk in Ontario, the Species at Risk in Ontario (SARO) List, and the COSEWIC SARA List. Special Concern species are not afforded formal protection under the act; however, habitat for these species are typically afforded protection under significant wildlife habitat (SWH) criteria. Aquatic species (fish and mussels) are also afforded additional protection federally, as administered by DFO, under SARA.

Species potentially occurring within the study area were identified through a desktop review of background information and agency consultation (for example, MNR and CVC).

SWH is designated by criteria outlined within the Significant Wildlife Habitat Technical Guide (MNRF 2000) and divides habitat into four main categories:

- 1) Seasonal Concentration Areas
- 2) Rare Vegetation Communities or Specialized Habitat for Wildlife
- 3) Habitat for Species of Conservation Concern (not including Endangered or Threatened Species)
- 4) Animal Movement Corridors

A SWH assessment was undertaken during field investigations to determine additional significant features that have the potential to occur within the study area. Habitats identified as SWH receive protection under the PPS (MAH 2020), the *Region of Peel Official Plan* (Region of Peel 2016b) and the *City of Mississauga Official Plan* (The City of Mississauga 2016). Results of the SWH assessment indicate the potential for Raptor Wintering Areas, Turtle Wintering Areas, Bald Eagle and Osprey Nesting/Foraging/Perching Habitat, and Rare Wildlife Species Habitat.

Correspondence with CVC indicated that the area near Highway 401 and Creditview Road qualifies as SWH – Criteria B4: foraging area with abundant mast under the Peel Caledon Significant Woodlands and Wildlife Habitat Study. The *Significant Wildlife Technical Guide* (MNRF 2000) describes foraging areas with abundant mast as relatively large forests with numerous nut-producing trees (for example, beech or oak) and more open areas with large patches of berry-producing shrubs (for example, blueberries, raspberries, or serviceberries). According to the Peel Caledon Significant Woodlands and Significant Wildlife Habitat Study, any oak- or hickory-dominated forest block, regardless of size, would be SWH under the B4 criteria (North-South Environmental Inc. et al 2009).

A screening of SAR records was undertaken to identify reported species with the potential to occur within the study area. The screening compared species habitat preferences and spatial distributions to identify existing habitat and determine whether suitable habitat is present within the study area. **Table 2** summarizes the provincial and federal designations and protection status of those SAR with potential habitat within the study area.

In addition, the 2019 DFO Aquatic Species at Risk mapping, the *Endangered Species Act* species status list (Government of Ontario 2008), and the SARA public registry (Government of Canada 2018) were used to determine occurrence of aquatic SAR within the study area. The 2018 DFO SAR mapping indicated that no SAR or Critical Habitat have been documented within the study area.

MNRF has indicated that the following species may be present within the study area: American eel (*Anguilla rostrata*), bobolink (*Dolichonyx oryzivorus*), eastern meadowlark (*Sturnella magna*), barn swallow (*Hirundo rustica*), and butternut (*Juglans cinerea*). MNRF has identified the Credit River as having potential SAR habitat for American eel, which is provincially listed as Endangered and is also under consideration for protection under SARA, and for redbreasted dace, which is listed as Endangered under SARA (**Appendix A**). During the background review, both northern myotis and little brown myotis were identified as SAR that have the potential to use the study area as habitat by the MNRF. The treed hedgerow northeast of the northern tunnel location (east of Creditview Road) has multiple large-diameter snags and connects to a 2.6-hectare woodlot farther north, providing potential roosting habitat. Because of this potential, a bat maternity roost assessment was conducted according to the *Survey Protocol for Species at Risk Bats within Treed Habitats: Little Brown Myotis, Northern Myotis, and Tri-coloured Bat* (MNRF 2017). A Phase 2 assessment was conducted for northern myotis and little brown myotis during leaf-off period. There were five snags recorded, with three being considered high-quality snag trees, located outside of, but in close proximity to, the construction footprint. According to the *Survey Protocol for Species at Risk Bats within Treed Habitats* (MNRF 2017), the MNRF defines SWH for Bat Maternity colonies as deciduous or mixed forest communities with more than 10 large-diameter snag trees per hectare. Since this threshold was not met, it is not considered SWH.

CVC provided SAR observations for the following species: butternut, bald eagle (*Haliaeetus leucocephalus*), barn swallow, peregrine falcon (*Falco peregrinus*), and monarch butterfly (*Danaus plexippus*). Barn swallow was observed on the Highway 401 bridge over the Credit River during the 2018 field surveys. Nesting habitat for this species has been confirmed within the study area; however, Project activities will not be conducted on the bridge.

Table 2. Species at Risk with Potential to Occur in the Study Area

Species	Preferred habitat ^{g,h,i,j}	S-Rank	COSEWIC	SARO	Likelihood of Occurrence
Fish					
American Eel ^b (<i>Anguilla rostrata</i>)	Muddy bottoms of lakes, ponds, rivers, and creeks with cover. Spawn in marine environments.	S1S2	THR	END	High – suitable habitat present
Herptiles					
Snapping Turtle ^{c,d} (<i>Chelydra serpentina</i>)	Prefers shallow water with mud substrate and leaf litter. Overwintering nesting occurs within sand and gravel areas of streams, but will use constructed structures, such as roads with gravel shoulders.	S4	SC	SC	High – suitable habitat present
Birds					
Bald Eagle ^f (<i>Haliaeetus leucocephalus</i>)	Bald eagles nest near major lakes or rivers where they forage for fish as their main source of food.	S2N, S4B	NAR	SC	High – suitable habitat present
Bank Swallow ^c (<i>Riparia riparia</i>)	Steep banks, lakeshore bluffs and open areas. Nesting occurs within steep features such as cliffs and stockpiles, within fine-medium sand.	S4B	THR	THR	High – suitable habitat present
Barn Swallow ^f (<i>Hirundo rustica</i>)	The barn swallow nests in small, loose colonies that usually contain no more than about 10 pairs. Nests are built largely of mud pellets. Egg laying starts in the second week of May in southern Canada.	S4B	Threatened	Threatened	High – nesting habitat observed.
Bobolink ^{b,c,f} (<i>Dolichonyx oryzivorus</i>)	Tall, grassy meadows, ditches and hayfields and croplands. Nesting occurs on the ground, typically within hayfields.	S4B	THR	THR	High – suitable habitat present
Canada Warbler ^f (<i>Cardellina canadensis</i>)	Wet low-lying areas of a mixed forest with a dense understory. Nesting occurs on mossy hummock or upturned roots or stumps.	S4B	THR	SC	Low – no suitable habitat present
Chimney Swift ^c (<i>Chaetura pelagica</i>)	Forages over cities and towns. Roost and nests within chimneys, sometimes within tree cavities.	S4B, S4N	THR	THR	Low – no suitable habitat present

Table 2. Species at Risk with Potential to Occur in the Study Area

Species	Preferred habitat ^{g,h,i,j}	S-Rank	COSEWIC	SARO	Likelihood of Occurrence
Common Nighthawk ^c (<i>Chordeiles minor</i>)	Forest openings, rock outcrops, and fields with sparse cover or bare patches. Nesting occurs on bare ground.	S4B	SC	SC	Low – marginal suitable habitat present
Eastern Meadowlark ^{b,c} (<i>Sturnella magna</i>)	Grassy meadows and pastures. Nesting occurs on a scrape or depression on the ground.	S4B	THR	THR	High – suitable habitat present
Eastern Wood-pewee ^c (<i>Contopus virens</i>)	Mid canopy forager within deciduous or mixed forests. Prefers forested areas with limited groundcover vegetation. Nesting occurs on the branches of a deciduous tree.	S4B	SC	SC	Low – marginal suitable habitat present
Golden Eagle ^f (<i>Aquila chrysaetos</i>)	Open and semi-open areas with native vegetation. Nest on cliffs and steep escarpments.	S2B	NAR	END	Low – no suitable habitat present
Golden-winged Warbler ^f (<i>Vermivora chrysoptera</i>)	Moist, shrubby fields; forest edges; and successional, new growth. Nesting occurs on the ground.	S4B	THR	SC	Low – no suitable habitat present
Olive-sided Flycatcher ^f (<i>Contopus cooperi</i>)	Clearing or edges of coniferous forests near water. Nesting occurs near water.	S4B	SC	SC	Low – no suitable habitat present
Peregrine Falcon ^f (<i>Falco peregrinus</i>)	Lakeshores, river valleys, river mouths, urban areas, and open fields. Nesting occurs on rocky cliffs or cutbanks.	S3B	NAR	SC	Low – no suitable habitat present
Rusty Blackbird ^{b,f} (<i>Euphagus carolinus</i>)	Breeds in wet forests, including areas with fens, bogs, muskeg, and beaver ponds. Winters in swamps, wet woodlands, and pond edges.	S4B	SC	NAR	Low – no suitable habitat present
Wood Thrush ³ (<i>Hylocichla mustelina</i>)	Large, mature deciduous and mixed forests. Nesting occurs within understory on seedlings or saplings, prefers Maple and Beech species.	S4B	THR	SC	Low – no suitable habitat present
Mammals					
Little Brown Myotis ^{b,f} (<i>Myotis lucifugus</i>)	Wooded areas especially near water. They roost within tree cavities and under loose bark. They forage over water and in open areas between water and forest.	S3	END	END	Moderate – suitable habitat present

Table 2. Species at Risk with Potential to Occur in the Study Area

Species	Preferred habitat ^{g,h,i,j}	S-Rank	COSEWIC	SARO	Likelihood of Occurrence
Northern Myotis ^{b,f} (<i>Myotis septentrionalis</i>)	Roosts in tree crevices, hollows, and under loose bark in forested areas. They hunt along forest edges.	S3	END	END	Moderate – suitable habitat present
Insects					
Monarch ^f (<i>Danaus plexippus</i>)	Fields and open areas with milkweed.	S2N, S4B	END	SC	High – suitable habitat present
Vegetation					
Butternut ^{b,f} (<i>Juglans cinerea</i>)	Butternut is shade intolerant and usually grows at forest edges and near water. Can be mistaken for Walnut species, and hybridization occurs.	S2	END	END	Low – marginal suitable habitat present
American Chestnut ^f (<i>Castanea dentata</i>)	Upland deciduous forests with sandy, acidic to neutral soils.	S1S2	END	END	Low – no suitable habitat present
Common Hop-tree ^f (<i>Ptelea trifoliata</i>)	Along shorelines in areas of nutrient poor sandy soils.	S3	SC	SC	Low – no suitable habitat present

References:

- ^a. NHIC database (MNR 2018)
- ^b. MNR (2018)
- ^c. *Ontario Breeding Bird Atlas* (17PJ02)
- ^d. *Ontario Reptile and Amphibian Atlas* (17PJ02)
- ^e. *Ontario Butterfly Atlas* (17PJ02)
- ^f. CVC
- ^g. MECP (2020). SARO. <https://www.ontario.ca/page/species-risk-ontario>
- ^h. Bezener, A. (2002)
- ⁱ. Eakins, R. (2020).
- ^j. Ontario Nature. (2015). *Ontario Reptile and Amphibian Atlas*. <https://ontarionature.org/programs/citizen-science/reptile-amphibian-atlas/>.

Notes:

- END = Endangered
- NAR = Not at risk
- SC = Special concern
- S-Rank = Subnational Rank
- S1 = Critically Imperiled (often 5 or fewer occurrences)
- S2 = Imperiled (often 20 or fewer occurrences)
- S2B = Provincial species of Special Concern, imperiled breeding status rank
- S2N = Provincial species of Special Concern, imperiled non-breeding status rank
- S3 = Vulnerable (restricted range with relatively few populations - often 80 or fewer)
- S3B = Vulnerable breeding population (restricted range with relatively few populations – often 80 or fewer)
- S4 = Uncommon but not rare; some cause for long-term concern due to declines or other factors.

Table 2. Species at Risk with Potential to Occur in the Study Area

Species	Preferred habitat ^{g,h,i,j}	S-Rank	COSEWIC	SARO	Likelihood of Occurrence
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S4B = Provincial species of Special Concern, apparently secure breeding status rank

S4N = Provincial species of Special Concern, apparently secure non-breeding status rank

S5 = Secure species, common, widespread, and abundant

S5B = Common species, secure breeding status rank

SX = Extirpated

THR =Threatened

2.1.5 Meteorological Environment

Ecoregion 7E is one of the mildest in Canada, classified in the Humid High Moderate Temperate Ecoclimatic Region (Ecoregions Working Group 1989). The average annual temperature range is 6.3 to 9.4 degrees Celsius (°C), with cool winters and long, hot and humid summers (Crins et al. 2009).

The following meteorological data were obtained from the Environment and Climate Change Canada Toronto Lester B. Pearson International Airport meteorological station between 1981 and 2010 (ECCC 2018a). The data were taken approximately 20 km east of the study area at an elevation of 173.4 m above sea level. The average annual daily temperature is 8.2°C. The warmest month is typically July, averaging 21.5°C, and the coolest month is typically January, averaging -5.5°C. On August 25, 1948, the station measured an extreme daily maximum of 38.3°C, and on January 4, 1981, it measured an extreme daily minimum of -31.3°C. The average total annual precipitation recorded at the station is 785.9 mm. The highest rainfall typically occurs in August, with a monthly average of 78.1 mm. The average total annual snowfall recorded at the station is 108.5 centimetres (cm). The highest snowfalls typically occur in January, with a monthly average of 29.5 cm.

2.1.5.1 Climate Change

Changing climate trends (for example, increased precipitation, extreme temperatures) in southern Ontario indicate hotter, drier summers and warmer, wetter winters in the future. Extreme weather events (for example, floods, snowstorms, windstorms, drought) are anticipated to become more common (CVC 2020). Therefore, ongoing development, such as stormwater sewer infrastructure, is expected to be built in a manner that can withstand relevant extreme weather and be accessible for maintenance or upgrades, as needed.

The Region's *Climate Change Master Plan (2019)* outlines actions and activities that will establish the management of assets, infrastructure, and services within the changing climate over the next decade, including reducing emissions and being prepared to mitigate and adapt to the effects of climate change. Climate change action priorities have resulted in several Term of Council Priorities that have initiated the development of climate change-related plans and strategies. Specifically, stormwater infrastructure design and construction specifications will follow the Region's *Design, Standards Specification and Procedures* manual.

According to the *Considering Climate Change in the Environmental Assessment Process* guidance document (MECP 2019), climate change mitigation and adaption considerations should be scaled to the significance of a project's potential environmental effects. Since the Project involves replacing below-ground sewer piping, greenhouse gas (GHG) emissions are only expected from the use of vehicles and equipment during physical construction activities. No long-term or operational emissions will occur.

To date, there are no outstanding issues or concerns regarding GHG emissions or climate change specific to the Project.

2.1.6 Air Quality

Throughout 2020, air quality in Mississauga generally ranges from low to low-moderate risk on the Air Quality Health Index, with intermittent spikes to moderate risk during summer months (MECP 2020b). Air quality in the study area is influenced by air traffic at and around the Toronto Lester B. Pearson International Airport, vehicle traffic along surrounding highways and local roads, ongoing development (construction vehicles), and human activity (for example, residential buildings). In 2016, within the Region, 262,200 individuals relied on a car to get to work, either as a driver or passenger, while 73,900 individuals reported using public transit, walking, bicycling, or other means as the main mode of transportation for their daily commute (Region 2016a).

The study area is generally surrounded by industrial and commercial use to the west, transportation corridor (Highway 401) to the south, open space to the north and east, with a farm and residence approximately 300 m northeast of the construction footprint. There is a pocket of residential housing located approximately 200 m west of the construction footprint across the street from Old Creditview Road. St. Julia Catholic Elementary School and Child Care Services is located approximately 700 m northwest of the study area. There are no nursing homes, hospitals, trailer parks, camping grounds, schools, or day care centres within 150 m of the Project.

2.1.7 Acoustic

The study area is influenced by noise from the Toronto Lester B. Pearson International Airport, a CN Rail distribution line, traffic along Highway 401, as well as other major roads in the area such as Creditview Road and Argentia Road.

2.2 Social

2.2.1 Land Use and Planning

The study area includes private land north of Highway 401 where the surrounding agricultural use is currently corn crops and City of Mississauga's parkland south of the highway. The Credit River is a river valley connection within the Greenbelt Plan boundary and is classified as an Urban River Valley (Region Peel 2018). The Project is located in a settlement area outside of the Greenbelt; however, the objectives outlined in the Greenbelt Plan do not apply to lands beyond the Greenbelt Area as shown within Schedule 1 provided in the Greenbelt Plan (Ministry of Municipal Affairs 2017). Nonetheless, the Project will be carried out in a manner that protects the natural heritage and hydrologic features and functions along the Credit River.

The study area is located within a defined Built-up Area (Region 2018). The study area is not located within a defined Provincial Policy Area, the Oak Ridges Moraine Landform Conservation Area, Niagara Escarpment, Wellhead Protection Area, Prime Agricultural Area, an area with aquifer vulnerability, or an area with high potential for mineral aggregate resources (Region 2018; CTC Source Protection Region 2015; MNR 2020).

Within the City of Mississauga, the study area is generally composed of Greenlands with the following land-use designations in the surrounding areas: Business Employment, Residential Low Density I and II, Residential Medium Density, and minimal Public Open Space to the west; Residential Low Density I and II

and Public Open Space to the northwest and south; and Residential Low Density I to the southeast (City of Mississauga 2019).

There are no First Nations or Métis communities, or Indian Reserves located within the study area (Government of Canada 2020; The Canadian Encyclopedia 2020). In 2016, there were 4,175 individuals within Mississauga who self-identified as Indigenous, including Métis, First Nation, and Inuk (Statistics Canada 2017a). Within the Region, 9,120 individuals self-identified as Indigenous (Statistics Canada 2017b).

2.2.1.1 Provincial Policy Statement

Policies outlined in the PPS that are considered applicable to the Project include the following:

- Building strong health communities:
 - Infrastructure and public service facilities will be provided in an efficient manner that prepares for the impacts of a changing climate while accommodating projected needs, since any new infrastructure will be designed and constructed in accordance with applicable codes and will be resilient to changing climate trends that may be experienced in the future (for example, increased precipitation leading to flooding) to reduce the risk associated with natural hazards.
 - Healthy, livable, and safe communities are sustained by confirming that necessary infrastructure and public service facilities are or will be available to meet current and projected needs, as the Project is replacing servicing infrastructure that may not otherwise be accessible for safe, ongoing maintenance that makes wastewater infrastructure available.
- Wise use and management of resources:
 - Development and site alteration will not be permitted in significant woodlands in Ecoregion 7E unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions, because the Project will avoid cutting or damaging the defined significant woodland area.
 - Development and site alteration will not be permitted in fish habitat except in accordance with provincial and federal requirements, as any instream construction work will be conducted in accordance with provincial (for example, MNRF) requirements.
 - Development and site alteration will not be permitted in habitats of endangered species and threatened species except in accordance with provincial and federal requirements, as all provincial and federal requirements will be in place prior to the beginning of construction.
 - Development and site alteration will not be permitted on lands containing archaeological resources or areas of archaeological potential unless significant archaeological resources have been conserved, as Archaeological Assessments required within the study area will be completed prior to the commencement of construction (see Section 2.3 of this report), and mitigation measures will be implemented in the event resources are encountered during construction.

2.2.1.2 A Place to Grow: Growth Plan for the Greater Golden Horseshoe

Building on the PPS, Ontario's *A Place to Grow: Growth Plan for the Greater Golden Horseshoe* (2019) outlines policies for infrastructure to support growth. Specifically, municipal wastewater systems will be planned, designed, and constructed to allow for opportunities for optimization and improved efficiency within existing systems.

2.2.2 Recreation

The study area does not encounter any local or provincial parks. Local parks are located farther outside of the Project study area.

2.2.3 Infrastructure and Services

The study area is accessible via Creditview Road. There are no existing transit corridors located within the study area.

2.2.3.1 Region of Peel Infrastructure

Sanitary Sewer Network

The Project area contains the CVSTS, CSTS, FCSTS, and UWSTS.

- The CVSTS (1500 mm pipe) comes south along the east side of Creditview Road and turns east to run parallel to Highway 401 just north of the highway. It crosses the Credit River and connects to a maintenance hole north of Highway 401 where it flows into UWSTS's East Leg.
- The FCSTS flows in from the northeast, collects flows from the CSTS, and flows south (1350 mm pipe) to connect to the UWSTS north of Highway 401.
- The CSTS crosses Creditview Road perpendicularly south of the intersection of Creditview Road and Old Creditview Road. It flows northeast for a section, then turns and flows southeast. It crosses the Credit River north of Highway 401, then just east of the river heads east parallel to Highway 401. It connects to the FCSTS north of the connection to the UWSTS.
- The UWSTS's East Leg, having collected flows from the CVSTS, FCSTS, and CSTS, flows south and crosses Highway 401 (1950 mm pipe) before heading southeast (1500 mm pipe).

Watermain Network

There is a 400 mm watermain that runs along the eastern side of Creditview Road.

2.2.3.2 City of Mississauga Infrastructure

The City of Mississauga owns a 2400 mm concrete municipal storm trunk sewer within the Project area. It comes into the Project area from the west, crossing Creditview Road perpendicularly south of the intersection of Creditview Road and Old Creditview Road. The storm sewer is immediately south of the CSTS. The pipe then turns south towards the highway, just east of where the CSTS crosses the open lands at a diagonal. Once in close proximity to Highway 401, the storm sewer turns east towards the Credit River, discharging just west of the Credit River, where the sloped ground drains the stormwater flows into the river.

2.2.3.3 Utilities

There is a 200 mm, extra-high-pressure gas main on the eastern side of Creditview Road, running parallel to Old Creditview Road and Creditview Road. The gas main runs in close horizontal proximity to the 1500 mm CVSTS along Old Creditview and Creditview Road but is vertically situated much closer to grade.

2.3 Cultural Environment

2.3.1 Archaeology

An archaeological assessment of the study area was undertaken during the Stage 2 Archaeological Assessment completed for the Highway 401 Crossings project and is included in draft form in **Appendix C**. This included pedestrian survey of ploughed lands at 5 m intervals and a test pitted survey at 5 m intervals. The study area referred to as Area 7.1 and 7.2, respectively, and the key findings are summarized as follows.

North of Highway 401, one archaeological site (P1 Site) was found consisting of a light scatter of 29 chipped-stone tools covering an area measuring approximately 75 m by 80 m. While a few of these artifacts were subsequently identified as being outside of the study area, the majority were found in the eastern section of the study area on gently sloping ground with a sharp rise to the northeast. The Credit River is located to the west, with Highway 401 to the south.

Two archaeological sites were found south of Highway 401 (P2 Site and H1 Site). The first (P2 Site) is an area measuring 40 m by 10 m where a total of 28 lithics were excavated. The second (H1 Site) area, measuring 70 m by 30 m, contained 248 historical artifacts, and 3 pre-contact chipped-stone artifacts; the historical artifacts are categorized into ceramic tableware, kitchen/household-related items, architectural remains, personal items, miscellaneous items, stable equipment, and faunal remains.

The findings indicate that a Stage 3 assessment will be required to determine the age and limits of the site as per the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI) Standards and Guidelines (2011).

2.3.2 Cultural Heritage

As part of the EWD STS project's Contract 2, discussions with the City of Mississauga's Heritage Planning department have identified that the lands north and south of Highway 401 east of Creditview Road are of cultural heritage interest. Stantec Inc. is preparing a Heritage Impact Assessment (HIA) addendum to the HIA completed during the EWD STS EA (Appendix G) that includes these properties, including the Project area.

3. Development of Alternatives

An important step in the Class EA process is identifying alternatives that will address the identified problems or opportunities. According to the Municipal Engineer Association's Municipal Class EA document (as amended in 2007, 2011, and 2015), *alternative solutions* are defined as follows:

"feasible alternative ways of solving an identified problem (deficiency) or addressing an opportunity, from which a preferred solution is selected."

A baseline condition against which alternative solutions are evaluated must be considered in the Class EA process, referred to as the Do-Nothing alternative. The remaining alternatives have been identified as a feasible way of solving the identified problem.

3.1 Description of Alternatives

This section provides descriptions of the alternative solutions identified for the study that address the problem statement while minimizing negative impacts on the economic, social, and natural environments.

The alternative solutions considered for the study are identified as follows and are detailed in subsequent sections of this report:

- 1) Alternative No. 1: 70 m open-cut and 640 m tunnel (500 m radius)
- 2) Alternative No. 2: 510 m open-cut and 200 m tunnel for Highway 401 crossing
- 3) Alternative No. 2A: 530 m open-cut or tunnel and 155 m tunnel for Highway 401 crossing
- 4) Alternative No. 3: 600 m open-cut and 155 m tunnel for Highway 401 crossing
- 5) Alternative No. 4: Do-Nothing

During the alternatives development, it was determined that the alternative alignments, excluding Alternative No. 4, would allow for the 675 mm CSTS to be decommissioned from service and the flows rerouted into the new 1500 mm sewer, which would minimize infrastructure on private property and the associated access challenges.

3.1.1 Alternative No. 1: 70 m Open-Cut and 640 m Tunnel

Alternative No. 1 (shown on **Figure 3-1**) replaces the existing 1500 mm trunk sewer with a new sewer installed within a new easement. The new alignment will include a 70 m open-cut section and a 640 m tunnelled section. The tunnelled section will have a 500 m radius curve north of Highway 401 and a straight crossing of Highway 401. Alternative No. 1 includes the following:

- Need for a new extensive permanent easement
- Tunnelled crossing of the Credit River and the unnamed tributary to the Credit River
- Tunnelled crossing of Highway 401
- Clearance of less than 0.5 m at two crossings of the existing 675 mm CSTS
- Existing 675 mm CSTS to be decommissioned and left in place

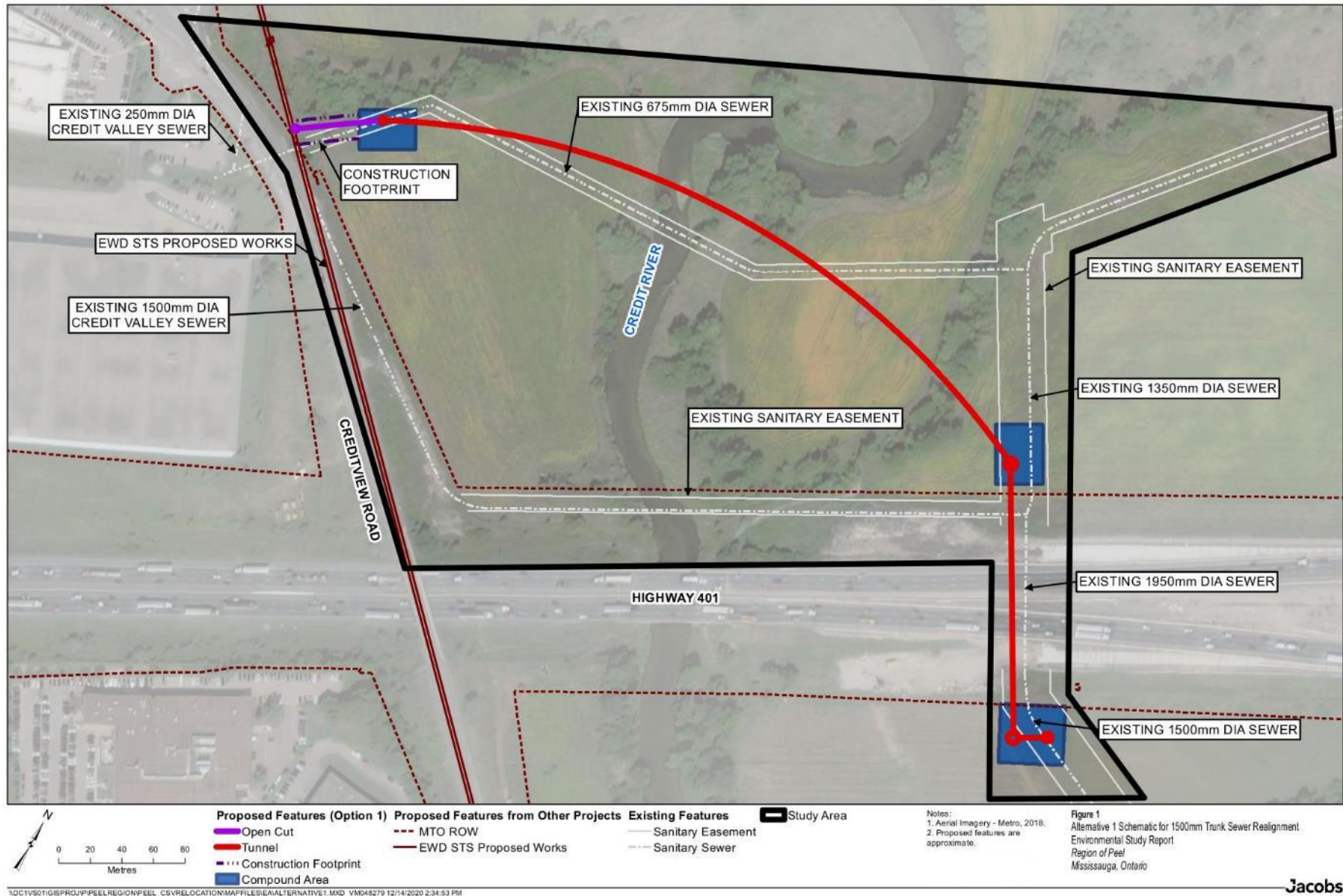


Figure 3-1. Alternative No. 1: 70 m Open-Cut and 640 m Tunnel

3.1.2 Alternative No. 2: 510 m Open-Cut and 200 m Tunnel for Highway 401 Crossing

Alternative No. 2 (**Figure 3-2**) replaces the 1500 mm trunk sewer with a new sewer installed partially in the easement of the existing 675 mm CSTS. The new sewer will be installed in a straight, 510 m-long open-cut trench, and a straight, 200 m-long tunnel section to cross Highway 401. The relocation is parallel to the existing 675 mm CSTS for approximately 230 m. Alternative No. 2 includes the following:

- Partial use of the existing easement and minimal new easement
- Open-cut crossing of the Credit River and unnamed tributary to the Credit River to avoid high potential for a frac-out during a trenchless crossing; trenchless method is not an option, because of the close proximity to the operating 675 mm CSTS if they are both to be located within the existing 10 m sewer easement (difference in inverts is approximately 2 m)
- Tunnelled crossing of Highway 401
- Existing 675 mm CSTS will be decommissioned and removed during construction of the new sewer where the two alignments are shared. Includes portion of the 675 mm CSTS that crosses the Credit River; will address potential scouring issues that may result in an exposed pipe
- Remainder of the 675 mm CSTS that will no longer be in service to be decommissioned and left in place.

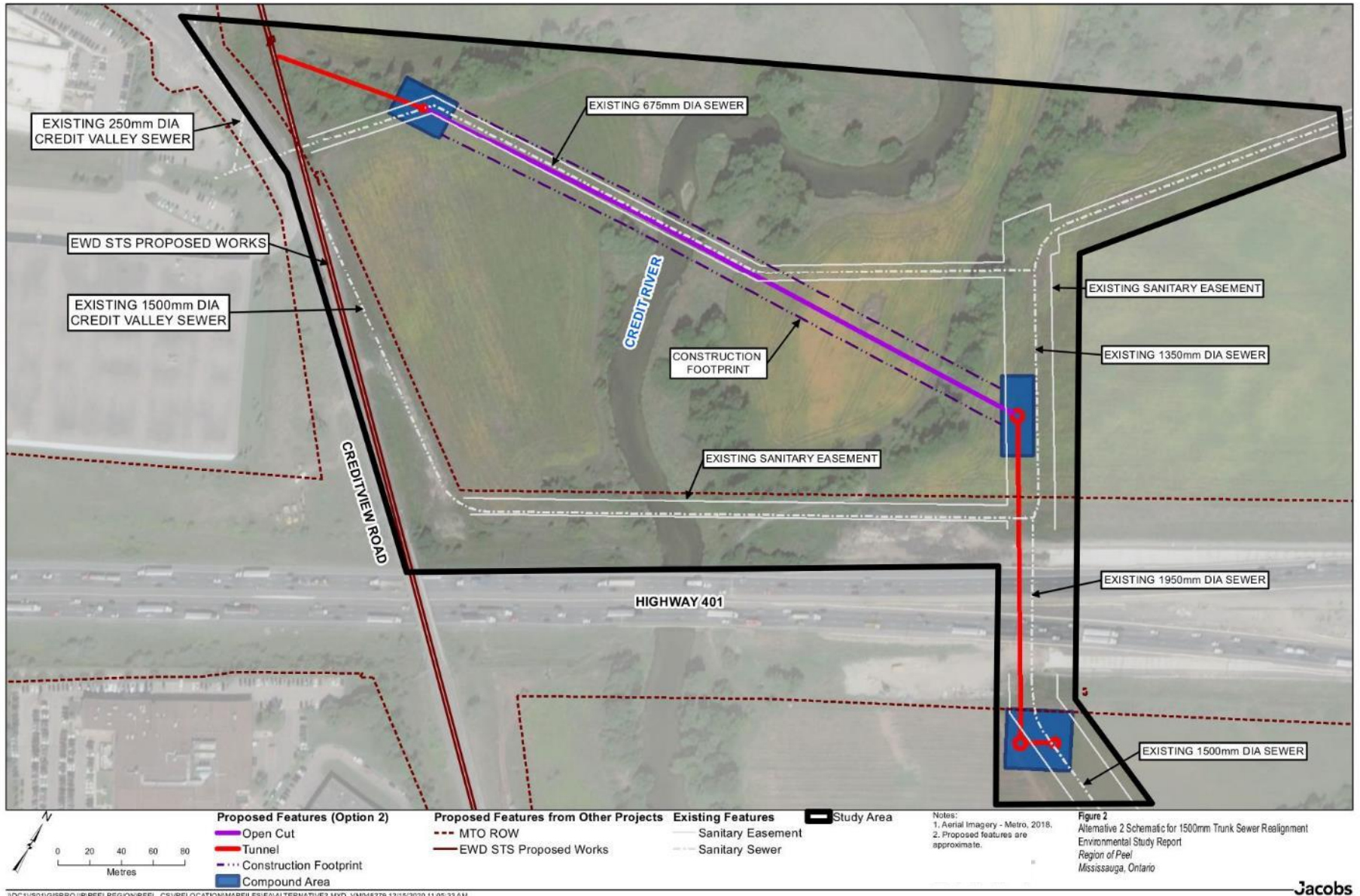


Figure 3-2. Alternative No. 2: 510 m Open-Cut and 200 m Tunnel for Highway 401 Crossings

3.1.3 Alternative No. 2A: 530 m Open-Cut and 155 m Tunnel for Highway 401 Crossing

Alternative No. 2A (**Figure 3-3**) replaces the existing 1500 mm trunk sewer with a new sewer installed in a new easement south of the existing 675 mm CSTS. This alternative includes a straight, 530 m open-cut trench across the Credit River and unnamed tributary to the Credit River, and a straight, approximately 155 m tunnel under Highway 401. Alternative No. 2A includes the following:

- Need for a new extensive permanent easement
- Open-cut construction through the Credit River and unnamed tributary to the Credit River to avoid high potential for a frac-out during a trenchless crossing
- Tunnelled crossing of Highway 401
- Existing 675 mm CSTS to be decommissioned but left in place following construction of the new sewer

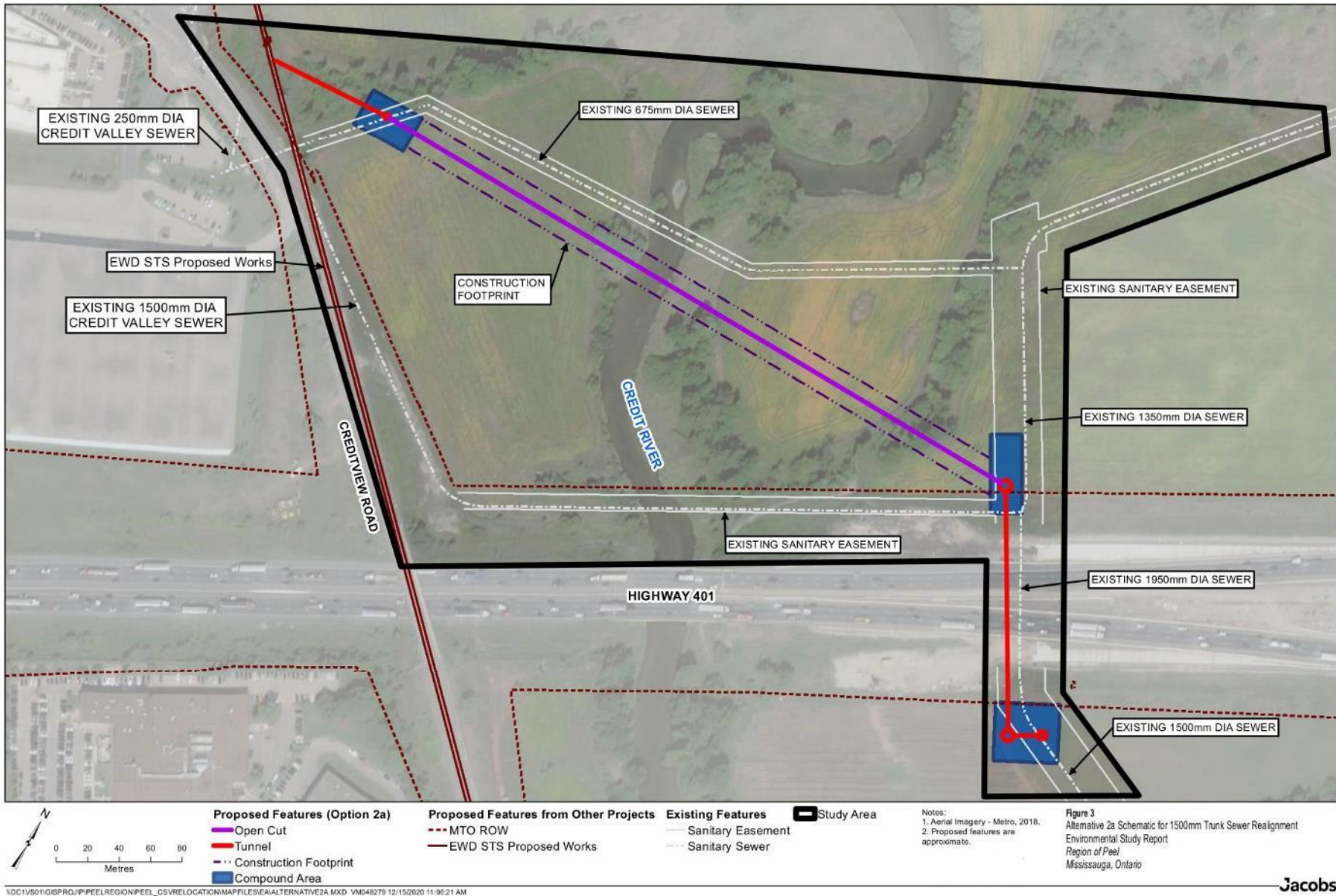


Figure 3-3. Alternative No. 2A: 530 m Open-Cut and 155 m Tunnel for Highway 401 Crossing

3.1.4 Alternative No. 3 600 m Open-Cut and 155 m Tunnel for Highway 401 Crossing

Alternative No. 3 (**Figure 3-4**) replaces the existing 1500 mm trunk sewer with a new sewer installed in a new easement adjacent to Highway 401. This alignment includes a straight, 600 m open-cut section and a 155 m tunnel section to cross Highway 401. Alternative No. 3 includes the following:

- Need for a new extensive permanent easement
- Open-cut construction through the Credit River and unnamed tributary to the Credit River to avoid high potential for a frac-out during a trenchless crossing
- Tunnelled crossing of Highway 401
- The 1500 mm trunk sewer will cross under the existing 675 mm CSTS with clearance less than 1.0 m
- Existing 675 mm CSTS to be decommissioned and left in place

3.1.5 Alternative No. 4: Do-Nothing

The Do-Nothing alternative (**Figure 3-5**) would see the existing CVSTS left in place.

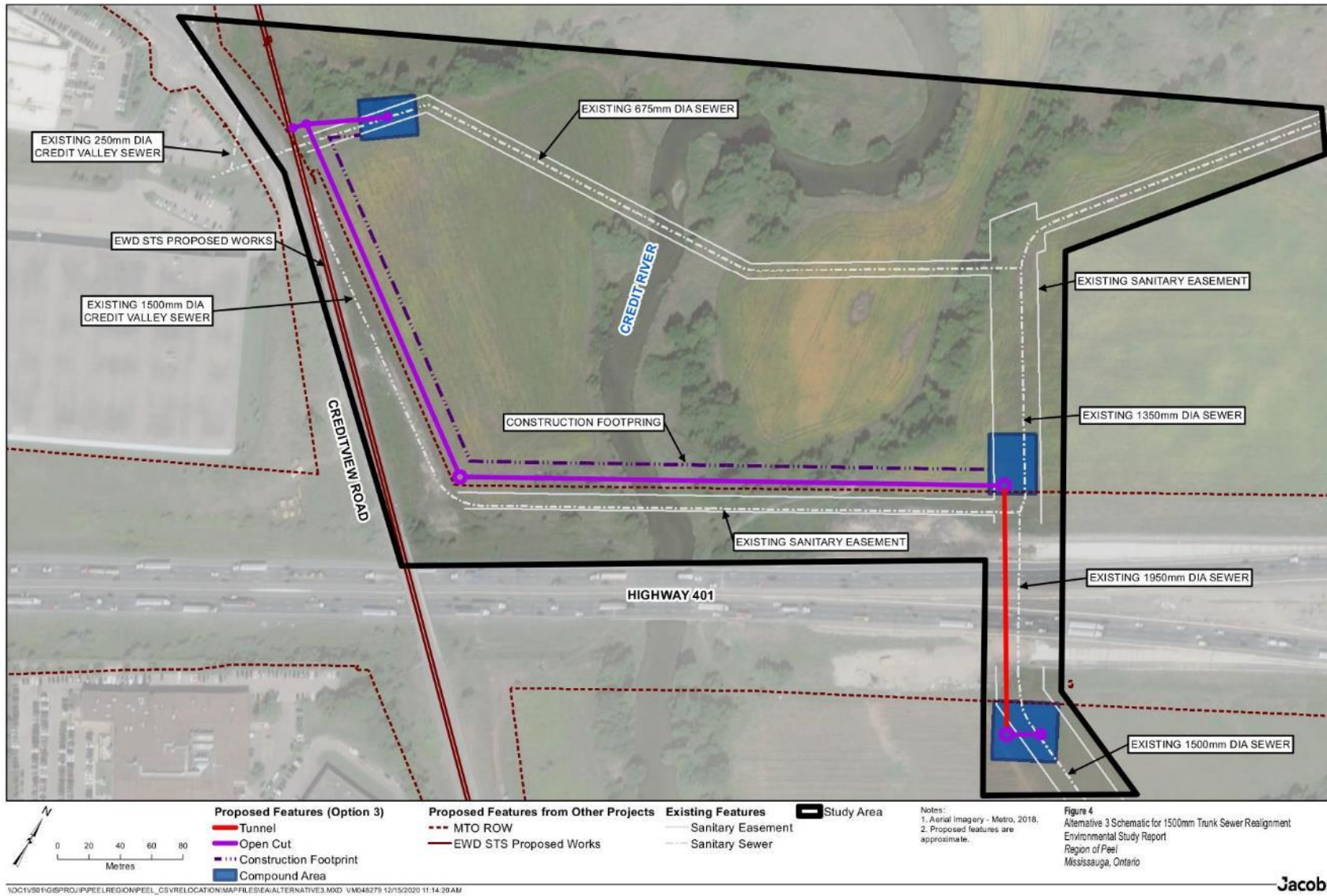


Figure 3-4. Alternative No. 3: 600 m Open-Cut and 155 m Tunnel for Highway 401 Crossing

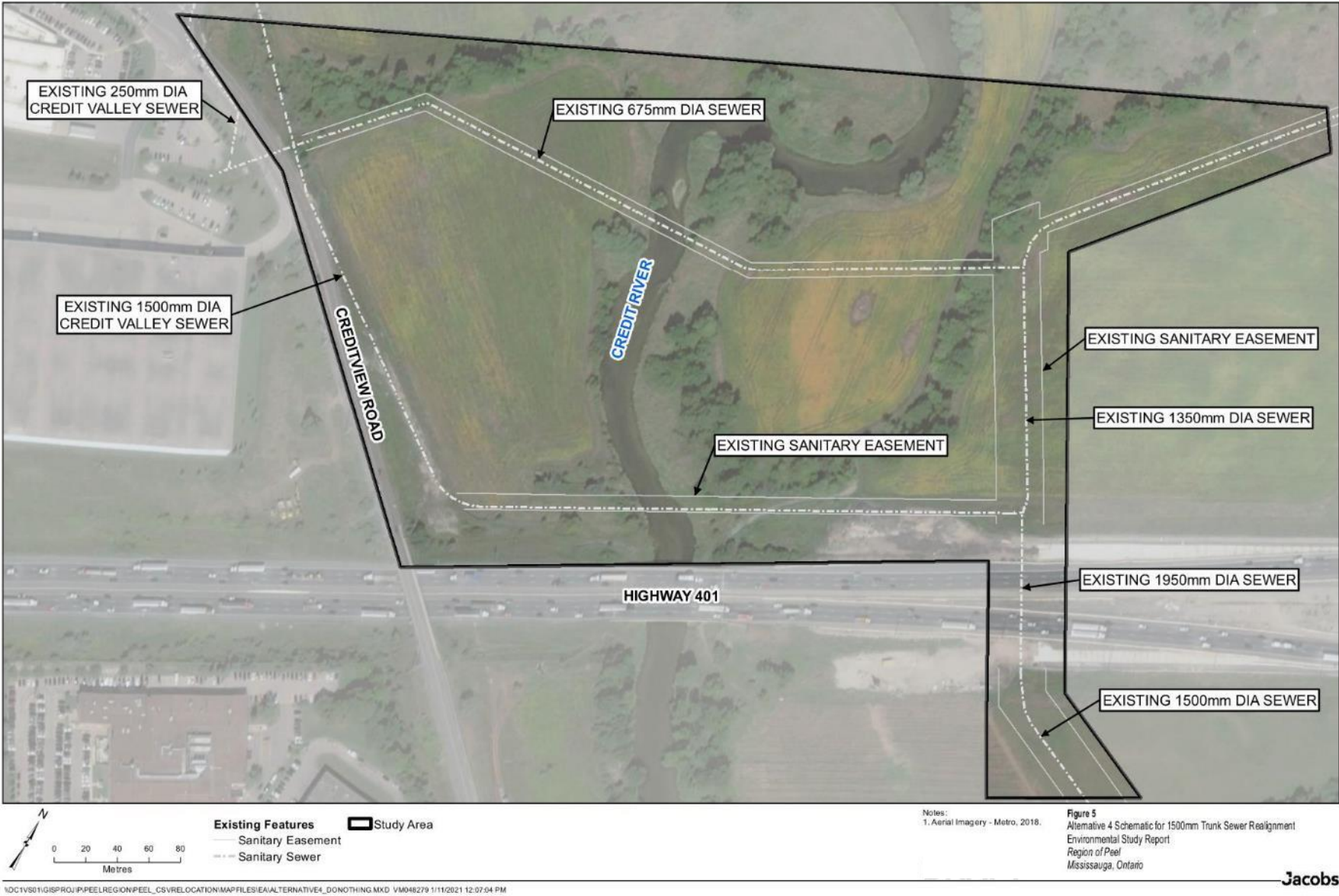


Figure 3-5. Alternative No. 4: Do-Nothing Alternative

3.2 Evaluation of Alternatives

The alternative solutions evaluation follows the standard EA approach through the development of a comprehensive set of evaluation criteria that when applied to the alternatives eliminates those that do not meet the objectives put forward in the problem statement, and identifies a preferred alternative that best satisfies the EA objectives.

Evaluation criteria are grouped in four main objective categories:

- Technical Considerations
- Natural Environment
- Socio-Cultural Environment
- Economic Factors

Each of the five alternatives was evaluated against the evaluation criteria, with each alternative assigned a score of most favourable, moderately favourable, or least favourable for each criterion. The evaluation criteria category was then assigned the average score from the scoring of its constituent evaluation criteria.

3.2.1 Criteria Development

Category-specific criteria were developed to reflect Project-specific components. A description of each criterion is presented along with the predicted measure (high, moderate, and low) that will be used to evaluate the alternatives relative to each criterion in **Table 3**.

Table 3. Evaluation Criteria




Criteria	Most Favourable 	Moderately Favourable 	Least Favourable 
Technical Environment			
Ability to address problem/opportunity statement	The alternative addresses the problem statement and introduces opportunities to enhance the solution.	The alternative addresses the problem statement.	The alternative does not address the problem statement.
Technical viability/constructability	The alternative is viable and includes preferable construction methods.	The alternative is viable but does not include preferable construction methods.	The alternative is not considered viable.
Impact on existing infrastructure and utilities	The alternative does not affect existing infrastructure or utilities during construction.	The alternative may affect existing infrastructure or utilities during construction.	The alternative will or is anticipated to affect existing infrastructure or utilities during construction.
Opportunity to coordinate other improvements	The alternative presents an opportunity to coordinate with other improvements required in the study area.	The alternative does not present an opportunity to coordinate with other improvements required in the study area.	The alternative creates additional need for improvements in the study area.

Table 3. Evaluation Criteria







Criteria	Most Favourable 	Moderately Favourable 	Least Favourable 
Future operations and maintenance	The alternative is easy to operate and will facilitate easy maintenance throughout operations.	The alternative will be operational standards; however, maintenance involves a higher level of planning throughout operations.	The alternative does not meet operational standards or may be difficult to maintain throughout operations.
Natural Environment			
Disturbance of terrestrial species and features (e.g., vegetation clearing)	The alternative does not affect terrestrial features, or site reclamation has a high probability of occurrence.	The alternative is considered to have minor, temporary impacts on terrestrial features where reclamation is possible.	The alternative has major impacts (i.e., high magnitude) to terrestrial features (e.g., tree clearing) or irreversible impacts (e.g., paving, permanent structures).
Disturbance to aquatic species and features	The alternative will not disturb aquatic features.	The alternative may introduce minor or temporary disturbances to aquatic features.	The alternative will have major impacts (i.e., high magnitude) on aquatic features.
Direct effects on terrestrial species at risk	The alternative will not have direct effects, including sensory disturbance, on terrestrial SAR.	The alternative may have minor or temporary effects on terrestrial SAR.	The alternative will have major effects (i.e., high magnitude) on SAR, or present the potential for destruction of their habitat.
Direct effects on aquatic species at risk	The alternative will not have direct effects on aquatic SAR, or effects that are routinely mitigated.	The alternative may have direct effects on aquatic habitat; however, mitigation measures and regulatory approvals are anticipated to reduce these effects.	The alternative will have major impacts (i.e., high magnitude) on aquatic SAR (e.g., death of fish, destruction of habitat), and there are no mitigation measures available to reduce these effects.
Effects on water quality or quantity (e.g., drinking water, groundwater recharge)	The alternative or its construction method are not anticipated to have effects on water quality, aside from an accident or anticipated malfunction. The alternative will not alter water quantity.	The alternative or its construction method may introduce effects to water quality or quantity.	The alternative or its construction method are known to have effects on water quality and/or quantity.
Erosion hazard	The alternative is further from actively migrating channel bends and is at lower risk from lateral erosion in the future.	The alternative is moderately far enough from actively migrating channel bends and is at moderate risk from lateral erosion in the future.	The alternative is closer to actively migrating channel bends and is at higher risk from lateral erosion in the future.

Table 3. Evaluation Criteria

Criteria	Most Favourable 	Moderately Favourable 	Least Favourable 
Scour hazard	The alternative has a larger depth of cover and is at a lower risk from vertical scour and migrating scour pools in the future.	The alternative has a moderate depth of cover and is at a moderate risk from vertical scour and migrating scour pools in the future.	The alternative has a smaller depth of cover and is at a higher risk from vertical scour and migrating scour pools in the future.
<i>Socio-Cultural Environment</i>			
Health and Safety	The alternative does not introduce health and safety issues during ongoing operations.	The alternative may introduce health and safety issues during ongoing operations.	The alternative will present health and safety issues during ongoing operations.
Noise and vibration during construction	The alternative does not generate noise during construction above existing noise sources in the area (e.g., traffic).	The alternative is moderately noisy for public receptors in the Project area.	The alternative is considered to be extremely noisy, with noise occurring 24 hours.
Air and GHG emissions during construction	The alternative does not generate or generates minimal emissions during construction.	The alternative generates air or GHG emissions within applicable standards.	The alternative generates high levels of air or GHG emissions.
Impacts on heritage or cultural resources	The alternative will avoid disturbance to heritage or cultural resources (known or potential).	The alternative may have minor impacts or disturbance to potential heritage or cultural resources.	The alternative will have impacts on existing and potential heritage or cultural resources.
Property acquisition and easement requirements	The alternative does not require the permanent acquisition of property; assets are placed into an existing, shared easement.	The alternative requires the acquisition of minimal property and has moderate easement requirements.	The alternative requires a large amount of property to acquire and will require a larger surface area.
Compliance with applicable planning policies, preferences, and legislature	The alternative complies with applicable planning policies and legislature and conforms to the requests of regulatory agencies.	The alternative complies with applicable planning policies and legislature.	The alternative does not comply with applicable planning policies and legislature.
Impacts on existing land use	The alternative will not have impacts on existing land use during construction or operation.	The alternative may have temporary or short-term impacts on existing land use.	The alternative will likely have impacts on existing land use.
Impacts on future land use or development	The alternative does not have any impacts on future land use or development opportunities (known or potential).	The alternative has minor impacts on future land use or development opportunities.	The alternative will restrict future land use or development opportunities.

Table 3. Evaluation Criteria

Criteria	Most Favourable 	Moderately Favourable 	Least Favourable 
<i>Economic Environment</i>			
Construction costs (methods and land acquisition, where applicable)	The alternative is considered economically feasible.	The alternative is more expensive compared with other feasible alternatives.	The alternative is most expensive compared with other feasible alternatives.
Operation and Maintenance Costs	The alternative is considered to have relatively low O&M costs during operations.	The alternative has moderate O&M costs during operations compared to other, feasible alternatives.	The alternative will require high costs to ensure ongoing, safe maintenance during operations.

3.2.2 Evaluation

The results of the evaluation with the criteria from **Table 3** were applied to each of the five alternatives identified for the study. The results of the evaluation process are included in **Table 4**.

Table 4. Evaluation of Alternatives
















Evaluation Criteria	Alternative No. 1: 70 m open-cut and 640 m tunnel (500 m radius)	Alternative No. 2: 510 m open-cut and 200 m tunnel for Highway 401 crossing	Alternative No. 2A: 530 m open-cut and 155 m tunnel for Highway 401 crossing	Alternative No. 3: 600 m open-cut and 155 m tunnel for Highway 401 crossing	Alternative No. 4: Do-Nothing
<i>Technical Considerations</i>					
Ability to address problem/opportunity statement	 <p>Relocates sewer from Highway 401 road allowance, allowing for safe access to maintenance holes to support ongoing, safe operation of the CVSTS. However, 675 mm CSTS will only be decommissioned and not removed.</p>	 <p>Relocates sewer from Highway 401 road allowance, allowing for safe access to maintenance holes to support ongoing, safe operation of the CVSTS. Section of 675 mm CSTS will be removed.</p>	 <p>Relocates sewer from Highway 401 road allowance, allowing for safe access to maintenance holes to support ongoing, safe operation of the CVSTS. However, 675 mm CSTS will only be decommissioned and not removed.</p>	 <p>Relocates sewer from Highway 401 road allowance, allowing for safe access to maintenance holes to support ongoing, safe operation of the CVSTS. However, 675 mm CSTS will only be decommissioned and not removed.</p>	 <p>Sewer remains within Highway 401 road allowance, increasing complexity of accessing maintenance holes. Additionally, 675 mm CSTS will not be decommissioned or removed.</p>
Technical viability/constructability	 <p>MNRF consultation indicates that the shallow, trenchless crossing of the Credit River increases the potential for frac-outs.</p>	 <p>Open-cut construction is technically viable and is considered to be the preferable construction method at this location by the MNRF.</p>	 <p>Open-cut construction is technically viable and is considered to be the preferable construction method at this location by the MNRF.</p>	 <p>Open-cut construction is technically viable and is considered to be the preferable construction method at this location by the MNRF.</p>	 <p>This alternative is not considered viable from a technical perspective, as the sewer remains within the Highway 401 road allowance, creating complex access challenges.</p>
Impact on existing infrastructure and utilities	 <p>The radial alignment presents a potential impact to the operating 675 mm CSTS during construction due to minimal available clearance.</p>	 <p>This alternative will be placed in the existing 675 mm CSTS easement, to the extent possible, and will allow that sewer to be decommissioned and removed.</p>	 <p>This alternative is anticipated to have minimal interference with the existing 675 mm operating CSTS during construction. The existing 675 mm CSTS that will be decommissioned and left in</p>	 <p>This alternative may present a potential impact to the new Creditview Road bridge embankment. It presents a direct conflict to the 2400 mm storm trunk sewer.</p>	 <p>Proximity of sewer to Highway 401 and Creditview Bridge increases potential of damage to embankment, retaining wall, or</p>

Table 4. Evaluation of Alternatives





















Evaluation Criteria	Alternative No. 1: 70 m open-cut and 640 m tunnel (500 m radius)	Alternative No. 2: 510 m open-cut and 200 m tunnel for Highway 401 crossing	Alternative No. 2A: 530 m open-cut and 155 m tunnel for Highway 401 crossing	Alternative No. 3: 600 m open-cut and 155 m tunnel for Highway 401 crossing	Alternative No. 4: Do-Nothing
			place following the CVSTS installation poses a risk.		travelled portion in the event of sewer failure.
Opportunity to coordinate other improvements	 Does not present an opportunity to address potential sewer exposure in the river.	 Supports removal of section of existing 675 mm CSTS that has the high potential for exposure.	 Does not present an opportunity to address potential sewer exposure in the river.	 Does not present an opportunity to address potential sewer exposure in the river.	 Does not present an opportunity to address potential sewer exposure in the river.
Future operations and maintenance	 Supports access to sewer through location of new maintenance hole.	 Supports access to sewer through new location of new maintenance hole.	 Supports access to sewer through location of new maintenance hole.	 Difficulty accessing the new maintenance hole near the interchange of Creditview Road and Highway 401 in the future.	 MTO will need to restrict traffic flow along the highway for safe access to the maintenance hole.
Average Score					
Natural Environment					
Disturbance of terrestrial species and features (e.g., vegetation clearing)	 This alternative will be installed by using a trenchless method and will require the least amount of temporary work space, reducing or avoiding impacts to terrestrial features such as potential Significant Woodlands.	 The new sewer will require 510 m of open-cut construction, disturbing an open agricultural, dry-fresh upland deciduous forest and mineral cultural meadow. Impacts to Significant Woodlands could occur and should be assessed at the detailed design stage.	 The new sewer will require 530 m of open-cut construction, disturbing open agricultural, dry-fresh upland deciduous forest and mineral cultural meadow. Impacts to Significant Woodlands could occur and should be assessed at the detailed design stage.	 The new sewer will require 600 m of open-cut construction, disturbing open agricultural, dry-fresh upland deciduous forest and mineral cultural meadow. Impacts to Significant Woodlands could occur and should be assessed at the detailed design stage.	 No disturbance to terrestrial species including Significant Woodlands or their habitats as there is no construction; however, because of increased complexity to access the sewer for routine maintenance and inspection, there is a risk of failure and overflow

Table 4. Evaluation of Alternatives











Evaluation Criteria	Alternative No. 1: 70 m open-cut and 640 m tunnel (500 m radius)	Alternative No. 2: 510 m open-cut and 200 m tunnel for Highway 401 crossing	Alternative No. 2A: 530 m open-cut and 155 m tunnel for Highway 401 crossing	Alternative No. 3: 600 m open-cut and 155 m tunnel for Highway 401 crossing	Alternative No. 4: Do-Nothing
Disturbance of aquatic species and features	 <p>Although this alternative employs trenchless construction, the shallow depth of the Credit River crossing increases the potential for frac-out and release of slurry/sediment into the river.</p>	 <p>Will require open-cut crossing of the Credit River and unnamed tributary; however, impact to aquatic features can be mitigated and avoids the impact of contamination from frac-out. The removal of the 675 mm CSTS avoids the potential of future exposure and resulting impact of subsequent sewer deterioration.</p>	 <p>Will require open-cut crossing of the Credit River and unnamed tributary; however, impact on aquatic features can be mitigated and avoids the impact of contamination from frac-out. Potential for exposure of the 675 mm CSTS remains with the risk of impact of subsequent sewer deterioration.</p>	 <p>Will require open-cut crossing of the Credit River and unnamed tributary; however, impact on aquatic features can be mitigated and avoids the impact of contamination from frac-out. Potential for exposure of the 675 mm CSTS remains with the risk of impact of subsequent sewer deterioration.</p>	 <p>into the natural environment.</p> <p>This alternative does not result in physical disturbance to the aquatic environment, although the potential for exposure of the 675 mm CSTS remains with the risk of impact of subsequent sewer deterioration. Further complexity to access the sewer for routine maintenance and inspection adds to the risk of failure and overflow into the natural environment.</p>
Direct effects on terrestrial species at risk	 <p>Trenchless construction will minimize impact on habitats of identified terrestrial SAR; however, Project activities may be constrained during the restricted activity period for migratory birds.</p>	 <p>Open-cut construction may affect habitats of terrestrial SAR; however, with appropriate mitigation, impacts are anticipated to be low magnitude and temporary. Project activities may be constrained during the restricted activity period for migratory birds.</p>	 <p>Open-cut construction may affect habitats of terrestrial SAR; however, with appropriate mitigation, impacts are anticipated to be low magnitude and temporary. Project activities may be constrained during the restricted activity period for migratory birds.</p>	 <p>Open-cut construction may affect habitats of terrestrial SAR; however, with appropriate mitigation, impacts are anticipated to be low magnitude and temporary. Project activities may be constrained during the</p>	 <p>No disturbance to terrestrial species or their habitats, as there is no construction; however, because of increased complexity to access the sewer for routine maintenance and inspection, there is a risk of failure and overflow</p>

Table 4. Evaluation of Alternatives






Evaluation Criteria	Alternative No. 1: 70 m open-cut and 640 m tunnel (500 m radius)	Alternative No. 2: 510 m open-cut and 200 m tunnel for Highway 401 crossing	Alternative No. 2A: 530 m open-cut and 155 m tunnel for Highway 401 crossing	Alternative No. 3: 600 m open-cut and 155 m tunnel for Highway 401 crossing	Alternative No. 4: Do-Nothing
				restricted activity period for migratory birds.	into the natural environment.
Direct effects on aquatic species at risk	 <p>Habitat for aquatic SAR may be affected because of the high probability of frac-out and release of slurry/sediment into the river.</p>	 <p>Habitat for aquatic SAR would be affected because of open-cut crossing of the Credit River.</p>	 <p>Habitat for aquatic SAR would be affected because of open-cut crossing of the Credit River.</p>	 <p>Habitat for aquatic SAR would be affected because of open-cut crossing of the Credit River.</p>	 <p>No disturbance to aquatic species or their habitat, as there is no construction; however, because of increased complexity to access the sewer for routine maintenance and inspection, there is a risk of failure and overflow into the natural environment.</p>

Table 4. Evaluation of Alternatives











Evaluation Criteria	Alternative No. 1: 70 m open-cut and 640 m tunnel (500 m radius)	Alternative No. 2: 510 m open-cut and 200 m tunnel for Highway 401 crossing	Alternative No. 2A: 530 m open-cut and 155 m tunnel for Highway 401 crossing	Alternative No. 3: 600 m open-cut and 155 m tunnel for Highway 401 crossing	Alternative No. 4: Do-Nothing
Effects on water quality or quantity (e.g., groundwater recharge)	 Minimal impacts to water quality, provided that tunnelling does not result in frac-out	 Water quality may be affected during construction activities; however, it is anticipated that water flow will be isolated during construction, and water quality will be monitored for potential sedimentation impacts.	 Water quality may be affected during construction activities; however, it is anticipated that water flow will be isolated during construction, and water quality will be monitored for potential sedimentation impacts.	 Water quality may be affected during construction activities; however, it is anticipated that water flow will be isolated during construction, and water quality will be monitored for potential sedimentation impacts.	 No disturbance to natural environment, as there is no construction; however, because of increased complexity to access the sewer for routine maintenance and inspection, there is a risk of failure and overflow into the natural environment, which is a Source Water Protection area.
Erosion hazard	 Upstream most alignment would be in closest proximity to actively migrating channel bends upstream.	 Middle alignment would be moderately close to actively migrating channel bends upstream.	 Downstream alignment would not be close to actively migrating channel bends upstream and crosses at a straight section of the channel.	 Downstream; most alignment would be adjacent to Highway 401 bridge where minimal channel migration is expected based on span and maintenance of the bridge in its current and proposed locations.	 The existing sanitary trunk sewer at a higher elevation is at greatest risk from erosion and scour hazards.

Table 4. Evaluation of Alternatives
















Evaluation Criteria	Alternative No. 1: 70 m open-cut and 640 m tunnel (500 m radius)	Alternative No. 2: 510 m open-cut and 200 m tunnel for Highway 401 crossing	Alternative No. 2A: 530 m open-cut and 155 m tunnel for Highway 401 crossing	Alternative No. 3: 600 m open-cut and 155 m tunnel for Highway 401 crossing	Alternative No. 4: Do-Nothing
Scour hazard	 Depth of cover would be less than 1.5 m over proposed STS and crossing is less than 20 m downstream of nearest migrating scour pool.	 Depth of cover would be greater than 1.5 m over proposed STS and crossing would be less than 50 m downstream of nearest migrating scour pool.	 Depth of cover would be greater than 1.5 m over proposed sanitary trunk sewer (STS) and crossing could be greater than 50 m downstream of nearest migrating scour pool.	 Depth of cover would be less than 1.5 m over proposed STS and crossing would be less than 50 m downstream of nearest migrating scour pool.	 Depth of cover is less than 0.5 m over existing STS at channel crossing and less than 50 m downstream of the nearest migrating scour pool. As such, the existing STS is at greatest risk from erosion and scour hazards.
Average Score					
Socio-Cultural Environment					
Health and Safety	 Relocation of maintenance holes reduces risk of health and safety issues during ongoing operations.	 Relocation of maintenance holes reduces risk of health and safety issues during ongoing operations.	 Relocation of maintenance holes reduces risk of health and safety issues during ongoing operations.	 Risk of health and safety issues as a result of difficulty accessing the maintenance hole near the interchange of Creditview Road and Highway 401.	 Risk of health and safety issues as a result of difficulty accessing maintenance holes for ongoing operation.

Table 4. Evaluation of Alternatives











Evaluation Criteria	Alternative No. 1: 70 m open-cut and 640 m tunnel (500 m radius)	Alternative No. 2: 510 m open-cut and 200 m tunnel for Highway 401 crossing	Alternative No. 2A: 530 m open-cut and 155 m tunnel for Highway 401 crossing	Alternative No. 3: 600 m open-cut and 155 m tunnel for Highway 401 crossing	Alternative No. 4: Do-Nothing
Noise and vibration during construction	 Trenchless construction methods (e.g., microtunnelling) will increase vibrations during construction, which may run 24 hours per day; however, there are few nearby neighbours to be affected.	 Open-cut construction will increase noise and vibrations during regular work hours; however, there are few nearby neighbours to be affected.	 Open-cut construction will increase noise and vibrations during regular work hours; however, there are few nearby neighbours to be affected.	 Open-cut construction will increase noise and vibrations during regular work hours; however, there are few nearby neighbours to be affected.	 This alternative will not create noise or vibrations during construction.
Air and GHG emissions during construction	 Trenchless construction produces few air and GHG emissions compared with open-cut construction.	 Open-cut construction produces more air and GHG emissions during construction compared with trenchless construction.	 Open-cut construction produces more air and GHG emissions during construction compared with trenchless construction.	 Open-cut construction produces more air and GHG emissions during construction compared with trenchless construction.	 There are no air or GHG emissions associated with this alternative, because there will be no construction activities.

Table 4. Evaluation of Alternatives
















Evaluation Criteria	Alternative No. 1: 70 m open-cut and 640 m tunnel (500 m radius)	Alternative No. 2: 510 m open-cut and 200 m tunnel for Highway 401 crossing	Alternative No. 2A: 530 m open-cut and 155 m tunnel for Highway 401 crossing	Alternative No. 3: 600 m open-cut and 155 m tunnel for Highway 401 crossing	Alternative No. 4: Do-Nothing
Impacts to heritage or cultural resources	 The small open-cut sections are next to identified resources; mitigation will be needed. However, trenchless construction in a majority of the alignment avoids need to further assess land or disturb any unidentified resources.	 Some open-cut sections are next to identified resources; mitigation will be needed. Partial use of the existing easement assumes any buried heritage resources would have been uncovered during original construction of that section. Remaining section outside of existing easement will need further assessment and could affect unidentified resources.	 Some open-cut sections are next to identified resources; mitigation will be needed. Remaining open-cut construction of an area previously undisturbed will require further assessment and increases the chances of uncovering buried resources.	 Some open-cut sections are next to identified resources; mitigation will be needed. Open-cut construction of an area previously undisturbed require further assessment and increases the chances of uncovering buried resources.	 This alternative does not require ground disturbance; therefore, discovering or disturbing heritage resources is unlikely.
Property acquisition and easement requirements	 A new permanent easement is required.	 This alternative will use the existing easement to the greatest extent.	 A new permanent easement is required.	 A new permanent easement is required.	 No new easement or property acquisition is required.
Compliance with applicable planning policies, preferences, and legislature	 Preferred and acceptable option for MTO. The trenchless crossing option is not as favourable to MNRF or CVC compared with other alternatives, because there is a high probability for a frac-out.	 Preferred and acceptable option for MTO. The open-cut crossing method is preferred by MNRF and CVC to avoid high probability for a frac-out during trenchless crossing under the river.	 Preferred and acceptable option for MTO. The open-cut crossing method is preferred by MNRF and CVC to avoid high probability for a frac-out during trenchless crossing under the river.	 Preferred and acceptable option for MTO; however, this alternative includes the maintenance hole located near the MTO right-of-way, which is not preferable for the MTO. The open-cut crossing method is preferred by MNRF and CVC to avoid high probability for a frac-	 Not acceptable by the MTO.

Table 4. Evaluation of Alternatives
















Evaluation Criteria	Alternative No. 1: 70 m open-cut and 640 m tunnel (500 m radius)	Alternative No. 2: 510 m open-cut and 200 m tunnel for Highway 401 crossing	Alternative No. 2A: 530 m open-cut and 155 m tunnel for Highway 401 crossing	Alternative No. 3: 600 m open-cut and 155 m tunnel for Highway 401 crossing	Alternative No. 4: Do-Nothing
				out during trenchless crossing under the river.	
Impacts to existing land use	 This alternative may have impacts to agricultural activities where the compound areas are located for the duration of construction.	 This alternative may have impacts for the duration of construction to agricultural activities where the compound areas are located and during open-cut construction.	 This alternative may have impacts for the duration of construction to agricultural activities where the compound areas are located and during open-cut construction.	 This alternative may have impacts for the duration of construction to agricultural activities where the compound areas are located and during open-cut construction.	 This alternative will not have impacts on existing land use.
Impacts to future land use or development	 The existing 675 mm CSTS will remain in place; therefore, the existing easement will not be returned to the owner, which could affect the property's future development.	 Portions of the existing easement that will not be used will be returned to the owner for potential redevelopment.	 The existing 675 mm CSTS will remain in place; therefore, the existing easement will not be returned to the owner, which could affect the property's future development.	 The existing 675 mm CSTS will remain in place; therefore, the existing easement will not be returned to the owner, which could affect the property's future development.	 The existing 675 mm CSTS will remain in place; therefore, the existing easement will not be returned to the owner, which could affect the property's future development.
Average Score					

Table 4. Evaluation of Alternatives

Evaluation Criteria	Alternative No. 1: 70 m open-cut and 640 m tunnel (500 m radius)	Alternative No. 2: 510 m open-cut and 200 m tunnel for Highway 401 crossing	Alternative No. 2A: 530 m open-cut and 155 m tunnel for Highway 401 crossing	Alternative No. 3: 600 m open-cut and 155 m tunnel for Highway 401 crossing	Alternative No. 4: Do-Nothing
<i>Economic Factors</i>					
Construction costs	○ Trenchless construction methods are generally more expensive.	● Open-cut methods are considered less expensive than trenchless methods, reducing overall construction costs.	● Open-cut methods are considered less expensive than trenchless, reducing overall construction costs.	◐ Open-cut methods are considered less expensive than trenchless methods; however, this alternative will require a longer route, which is more expensive compared with other alternatives.	● There are no construction costs associated with this alternative.
Operation and Maintenance Costs	● O&M costs are minimal, as this alternative will not require any additional measures or time to safely execute the maintenance activities.	● O&M costs are minimal, as this alternative will not require any additional measures or time to safely execute the maintenance activities.	● O&M costs are minimal, as this alternative will not require any additional measures or time to safely execute the maintenance activities.	◐ This alternative leaves the maintenance hole close to the bridge embankment, making access more difficult, resulting in higher O&M costs.	○ O&M will be significantly higher because of restricted access and the need for additional measures (e.g., safety) and time required.
Average Score	◐	●	●	◐	◐
Alternative Ranking	3	1	2	3	4

Notes:

- = Most favourable
- ◐ = Moderately favourable
- = Least favourable

3.3 Preferred Alternative

Based on the review of alternatives documented, Alternative 2 scores the highest. It provides the preferred technical solution that removes the trunk sewer from the highway's right-of-way, reducing the potential for impact on the highway and bridge and minimizing challenges of accessing maintenance holes for ongoing operation. Although it includes an open-cut crossing that will result in more disturbance to the Credit River than the tunnelled option in Alternative 1, it is considered that the impacts can be mitigated with an engineered open-cut solution and appropriate environmental safeguard measures that avoid the more significant impact from a frac-out caused by the technical challenges of a tunnelled crossing. Additionally, Alternative 2 not only provides the opportunity to decommission the 675 mm CSTS, but to also remove it from the Credit River. The removal of the existing 675 mm CSTS eliminates the potential for sewer exposure and subsequent degradation, setting it as more preferred than Alternative 2A. Use of the existing easement will also minimize property acquisition requirements.

Alternative 3 is not preferred, because it does not provide a solution for the potential of exposure of the existing 675 mm CSTS and requires the longest alignment, resulting in additional property requirements. Additionally, this alternative may have a potential impact on the new Creditview Road bridge embankment and presents a direct conflict to the 2400 mm storm trunk sewer.

Alternative 4 does not provide a viable solution to the Problem Statement.

Therefore the Region will proceed with Alternative 2 (510 m Open-Cut and 200 m Tunnel for Highway 401 Crossing) as the preferred solution, pending consultation with the public and stakeholders, including review agencies and Indigenous communities.

3.4 Consultation with Public and Stakeholders

The study followed the mandatory requirements for Schedule B projects, including consulting with public and stakeholders such as review agencies and Indigenous communities regarding the problem/opportunity and alternative solutions identified by the Project Team.

3.4.1 Notice of Commencement

The initial Project Mailing List was developed based on the recent Schedule C Municipal Class EA for the EWD STS and narrowed down to focus on Project-specific interests (**Appendix D** of this EA).

A Notice of Commencement was issued on July 18, 2019, and reissued on September 11, 2020, because of a change in project delivery schedule. The reissued Notice of Commencement was sent (mailed or e-mailed) to members of the public, directly affected landowners, and Indigenous communities on the Project Mailing List to advise them of the Project and study purpose.

3.4.2 Virtual Public Information Event

A Notice of Virtual Public Information Event was issued on January 28, 2021, for the Virtual Public Information Event undertaken from February 10, 2021, to March 3, 2021. The Notice was distributed on February 1, 2021, advertised in the local *Mississauga News* newspaper on January 28, 2021 and posted on the Region website on January 27, 2021.

The Project-specific Virtual Public Information Event was to provide the public the opportunity to review Project information, including the study purpose, alternatives identification, and alternatives evaluation. Members of the public were encouraged to review the information panels created for the Project and

email the Region to provide feedback. The Virtual Public Information Event was presented online with information relevant to each stage displayed for viewing to focus the viewers' attention on the major issues requiring public input. The Virtual Public Information Event information will remain available on the Region website. Email responses to the information presented were accepted until March 3, 2021 (**Appendix D**). No comments were received from the public during or following the event.

3.4.3 Review Agencies

A Project Information Form was submitted to MECP on September 9, 2020. A response was received on October 15, 2020. All feedback has been addressed and is included in **Appendix D**.

Review agencies with a noted interest in the Project include City of Mississauga, MECP, MHSTCI, MNRF, MTO, Infrastructure Ontario (IO), and CVC. A summary of consultation with key stakeholders is provided in **Table 5**, with all additional supporting documents provided in **Appendix A** and **Appendix D**.

In addition, review agencies were advised of the Virtual Public Information Event (provided with details) and invited to provide comment.

Table 5. Summary of Consultation with Review Agencies

Date	Method	Issue/Topic
City of Mississauga		
March 3, 2021	Email (Appendix D)	Comments provided on behalf of the Stormwater Assets department, with particular focus on storm drainage infrastructure. Feedback on the supported alternative was given.
March 16, 2021	Email (Appendix D)	Formal response was returned to the City of Mississauga, indicating the preliminary preferred alternative will have no impact on the existing infrastructure.
June 30, 2021	Email (Appendix D)	The City provided comments based on their review of the Draft Project File. Most comments are related to detailed design and ownership of storm sewer infrastructure.
September 9, 2021	Email (Appendix D)	Response was provided to the City clarifying that the storm sewer will not be City owned.
MECP		
October 15, 2020	Email (Appendix D)	MECP provided a response to the Notice of Commencement. The contents have been acknowledged and addressed in appropriate sections of the Project File as per the accompanying table in Appendix D.
February 3, 2021	Email (Appendix D)	MECP confirmed that an extended timing window for in-water work (November 15 – March 31) is acceptable.
MHSTCI		
October 7, 2020	Email (Appendix D)	MHSTCI acknowledged the EA and provided requirements for EA reporting regarding archaeological resources and cultural heritage resources/landscapes.
MNRF		

Table 5. Summary of Consultation with Review Agencies

Date	Method	Issue/Topic
September 18, 2018	Email (Appendix A)	Request for SAR records.
October 2, 2018	Email (Appendix A)	SAR records provided.
December 11, 2018	Meeting (Appendix D)	General descriptions provided. MNRF noted that open-cut crossing is preferred in this location between July 1 and September 30 when the river has the least amount of flow. Open-cut construction should be avoided November 15 to January 31 to prevent conflict with migratory salmonids and American eel.
<i>MTO/IO¹</i>		
January 15, 2019	Meeting (Appendix D)	General discussion regarding Highway 401 conflicts within the Region of Peel.
March 4, 2019	Meeting (Appendix D)	Slope analysis and possibility of a retaining wall discussed.
April 5, 2019	Meeting (Appendix D)	Crossing 11 constructability updates provided.
May 9, 2019	Meeting (Appendix D)	Crossing 11 alignment still under review. It was noted that Highway 401 expansion will impact long-term maintenance access.
July 12, 2019	Meeting (Appendix D)	Crossing 11 conflicts still under review; West Corridor Constructors will survey the north side to identify conflicts.
August 16, 2019	Meeting (Appendix D)	Crossing 11 identified as having potential conflicts with the Highway 401 work and the proposed grading (i.e., the maintenance holes will be too far above grade).
September 6, 2019	Meeting (Appendix D)	WCC to conduct a Utility Avoidance Strategy for the existing maintenance hole.
October 18, 2019	Meeting (Appendix D)	WCC to provide an avoidance plan showing all maintenance holes in the area.
December 16, 2019	Meeting (Appendix D)	Avoidance strategy was further discussed.
<i>CVC</i>		
November 8, 2018	Email (Appendix A)	Request for fisheries and natural science data request.
December 4, 2018	Email (Appendix A)	Fisheries and natural science data provided.
March 27, 2019	Meeting (Appendix D)	The geomorphology identified that the Credit River could be open-cut, MNR pre-consultation noted they would permit an open-cut crossing. The design intent would be to remove the existing 675 mm and replace it with a 1500 mm

¹ Credit Valley Sanitary Trunk Sewer relocation referred to as Crossing 11 during regular meetings with MTO regarding coordination with East West Diversion Trunk Sewer.

Table 5. Summary of Consultation with Review Agencies

Date	Method	Issue/Topic
		CVC preference for the 1500 mm to be installed trenchless and the 675 mm to remain. A memo would be required to support open-cut design and provide justification.
January 6, 2020	Technical Memo (Appendix D)	A TM was submitted to support the need for open-cutting the Credit River
November 26, 2020	Email (Appendix D)	CVC reviewed the draft NHR for the East to West Project; comments were provided, including those pertinent to the EA
December 10, 2020	Meeting (Appendix D)	General discussion on mitigation measures that the Project will take regarding source water protection areas and highly vulnerable aquifers. Source water protection policies were sent to Jacobs for Project compliance.
December 10, 2020	Email (Appendix D)	CVC provided additional information on Source Water Protection, including identification of areas of concern.
February 11, 2021	Table (Appendix D)	Most of the comments from November 26, 2020, on the draft NHR were responded to in a submission package for the EWD STS's Contract 2. Remaining comments will be addressed in a future submission for the detailed design of EWD STS's Contract 2.
July 12, 2021	Email (Appendix D)	CVC provided comments on the evaluation of alternatives as well on impact to natural heritage features within the study area. Additional information and further evaluation was requested.
August 26, 2021	Email (Appendix D)	Additional evaluation and supporting documentation in the form of a TM were provided to CVC.
September 7, 2021	Email (Appendix D)	CVC accepted the additional material and do not have any further comments.
<i>Department of Fisheries and Oceans</i>		
February 18, 2021	Email (Appendix D)	DFO was provided the Request for Review, including drawings, site photos, geomorphology report, hydraulics TM, and consultation with MECP and CVC.
April 15, 2021	Email (Appendix D)	DFO has confirmed that a fisheries protection biologist will reach out to the Project Team with additional questions on the Project.

Note:

NHR = Natural Heritage Report

WCC = West Corridor Constructors

3.4.4 Indigenous Communities

Seven Indigenous communities listed below were contacted as part of this Project, including those identified by the MECP:

- Mississaugas of the Credit First Nation

- Six Nations of the Grand River
- Houdenosaunee Confederacy
- Huron-Wendat Nation
- Mississaugas of Scugog Island First Nation
- The Métis Nation of Ontario
- Credit River Metis Council

They were contacted three times throughout the project: by the Notice of Commencement, Notice of Virtual Public Information Event, and finally by the Notice of Completion. Response was received from the Mississaugas of the Credit First Nation (MCFN) for the Virtual Public Information Event. MCFN indicated their acknowledgement of the Project but did not have any direct concerns or questions regarding the Project information. They expressed interest in participating in field work and provided their terms of involvement; as documented in **Table 6**, agreements on field work participation were signed between the Region and MCFN. Following the Notice of Completion, the Huron-Wendat Nation expressed interest in participating in archaeological fieldwork, and in reviewing and providing comments on draft reports. However, as the Stage 3 Archaeological Assessment fieldwork has ended, the Region offered to set up an agreement for the Huron-Wendat Nation to review the draft report.

Table 6. Summary of Consultation with Indigenous Communities

Date	Method	Issue/Topic
<i>MCFN</i>		
February 17, 2021	Email (Appendix D)	MCFN indicated their acknowledgement of the Project and specified the terms of their involvement.
February 23, 2021	Email (Appendix D)	MCFN provided the standards and guidelines required for their involvement.
March 8, 2021	Email (Appendix D)	Region had mailed the agreement for MCFN to sign. MCFN has signed and returned the field agreements provided by the Region
<i>Huron-Wendat Nation</i>		
October 5, 2021	Email (Appendix D)	Huron-Wendat Nation requested to be informed of the next steps of the project, specifically those pertaining to archaeological studies/fieldwork. They informed the Region that they are interested in participating in archaeological fieldwork and in providing review/comments of draft reports.
October 18, 2021	Email (Appendix D)	The Region noted that the project is wrapping up Stage 3 archaeological assessment fieldwork, including area that would be of interest to the Huron-Wendat Nation. The Region offered to provide the reports to the Huron-Wendat Nation for review and asked for the name/contact information of those members of the community who will be involved in the review. This information will be used to prepare an agreement.

3.4.5 Notice of Completion

The Project-specific Notice of Completion was distributed to notify public and stakeholders of Project completion (**Appendix D**). The Notice of Completion serves as the final point of public contact and is intended to do the following:

- Notify the public and stakeholders that the study has been completed

- Invite the public and stakeholders to review the Project File posted to the Region's website

The Notice of Completion was issued providing a 40-calendar day period (starting on September 23, 2021 and ending on November 1, 2021) during which comments and inputs were received by the Project Team.

All questions or comments regarding the Class EA were to be submitted to the Region's project manager listed below:

Ajay Puri, P.Eng.

Project Manager, Engineering Services Division
 Wastewater Collection & Conveyance
 The Regional Municipality of Peel
 Suite B, 4th Floor, 10 Peel Centre Drive
 Brampton, ON L6T 4B9
 Email: Ajay.Puri@peelregion.ca
 Phone: 1-905-791-7800 ext. 5073

In addition, a request may be made to the Ministry of the Environment, Conservation and Parks for an order requiring a higher level of study (i.e., requiring an individual/ comprehensive EA approval before being able to proceed), or that conditions be imposed (e.g., require further studies), only on the grounds that the requested order may prevent, mitigate or remedy adverse impacts on constitutionally protected Aboriginal and treaty rights. Requests on other grounds will not be considered. Requests should include the requested contact information and full name.

Requests should specify what kind of order is being requested (request for conditions or a request for an individual/comprehensive environmental assessment), how an order may prevent, mitigate, or remedy potential adverse impacts on Aboriginal and treaty rights, and any information in support of the statements in the request. This will ensure that the ministry is able to efficiently begin reviewing the request.

The request should be sent in writing or by email to:

<p>Minister of the Environment, Conservation and Parks Ministry of Environment, Conservation and Parks 777 Bay Street, 5th Floor Toronto ON M7A 2J3 minister.mecp@ontario.ca</p>	<p>Director, Environmental Assessment Branch Ministry of Environment, Conservation and Parks 135 St. Clair Ave. W, 1st Floor Toronto ON, M4V 1P5 EABDirector@ontario.ca</p>
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Requests should also be copied to the Region by mail or by e-mail. Please visit the ministry's website for more information on requests for orders under section 16 of the Environmental Assessment Act at: ontario.ca/page/class-environmental-assessments-part-ii-order.

All personal information included in your request – such as name, address, telephone number and property location – is collected, under the authority of section 30 of the Environmental Assessment Act and is collected and maintained for the purpose of creating a record that is available to the general public. As this information is collected for the purpose of a public record, the protection of personal information provided in the Freedom of Information and Protection of Privacy Act (FIPPA) does not apply (s.37). Personal information you submit will become part of a public record that is available to the general public unless you request that your personal information remain confidential.

4. Implementation Plan

4.1 Project Description

Based on the alternatives evaluation and consultation with the public and stakeholders, Alternative No. 2: 510 m Open-Cut and 200 m Tunnel for Highway 401 Crossing is confirmed as the preferred alternative for relocation of the CVSTS. The Region can now proceed with detailed design activities required to construct the preferred alternative. The implementation of the preferred alternative will include the following mitigation, monitoring and follow-up commitments, as outlined, to provide an appropriate technical solution, while minimizing the impact on the natural and social environment.

4.2 Implementation

The following mitigation measures and commitments will be implemented during construction of the preferred solution.

4.2.1 Natural Environment

- Project activities have the potential to affect sources of drinking water when occurring within designated vulnerable areas. In accordance with Section 1.1 of O.Reg 287/17, made under the *Clean Water Act*, the Project involves the following prescribed drinking water threats:
 - The establishment, operation or maintenance of a system that collects, stores, transmits, treats, or disposes of sewage, as the Project involves the relocation and operation of a sewer trunk that will carry wastewater
 - The handling and storage of fuel, as Project vehicles and equipment will be required onsite for the duration of construction activities

Because of concerns of personnel safety onsite, road salt will be replaced with sand. The Project is not anticipated to introduce road salt that will affect HVAs and SGRAs, according to CTC SPP's *SAL 10-12*.

In order to mitigate the impact of DNAPLs or organic solvents (*DNAP-3* and *OS-3*) that may be used onsite, the use of best management practices during handling and storage of DNAPLs and organic solvents will be required.

- Correspondence from MNRF has indicated that the Credit River is considered a warm-water system with a cold-water migratory corridor. Correspondence with MECP confirmed that an extended timing window (November 15 and March 31) for in-water works is acceptable
- At the detailed design stage, provide mapping of Significant Woodlands or potential Significant Woodlands. Construction should avoid these areas if possible. If not, habitat compensation and mitigation will be required.
- Minimum setback distance at Credit River is the watercourse meander belt width or 15 m, whichever is greater, according to the Credit River Fisheries Management Plan.
- An arborist assessment and Landscape Restoration Plan will be developed to meet the requirements set forth in the *Peel Region Official Plan* (Region 2016b) and the *Mississauga Official Plan* (City of Mississauga 2016) for any required tree removal and restoration.
- Construction activities will include proper dewatering (for example, pump, well point) of the construction footprint, as required, to reduce impacts to water quality. Dewatering activities will be suspended if signs of erosion, flooding, or sediment loading occur.

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- Previously disturbed vegetation (for example, agricultural land) may contain weeds. Construction activities will be conducted in a manner that does not introduce or spread weeds to adjacent lands (for example, by confirming equipment is clean and confining construction equipment to the approved footprint).
 - The Region's *Climate Change Master Plan (2019)* states that the reduction of emissions and being prepared to mitigate and adapt to the effects of climate change are priorities.
 - Detailed design will include engineering principles that reduce environmental stressors and consider changing climate trends for public safety and efficiency during the Project's operational phase, such as the following:
 - Consider energy conservation and efficiency to reduce the Project's GHG emissions and contribution to climate change (that is, measures to reduce maintenance activities for an underground sewer system).
 - Design Project components according to applicable codes and standards, and to withstand extreme weather events (for example, floods, high winds, heavy or persistent precipitation, extreme temperatures).
 - Construction activities may create sensory disturbance (noise, vibrations) for wildlife present within the surrounding environment. In the event construction activities are scheduled to occur within the migratory bird nesting window, the Contractor will be required to implement mitigation measures to comply with the *Migratory Birds Convention Act* for all migratory birds and with the *Endangered Species Act* as follows:
 - Training should be provided to onsite personnel, with respect to appropriate actions to be taken whenever SAR are encountered and what species-specific guidelines should be followed. The Contractor will confirm that all persons are provided with information and awareness training prior to entering the Project Site.
 - Vegetation and tree removal operations or clearing should be avoided between April 15 and August 31 of any year, to prevent impacts to nesting SAR or migratory birds. If vegetation and tree removals or clearing must occur within the breeding bird timing window, the Contractor will retain a qualified avian specialist prior to clearing, to screen for breeding birds, using methods outlined by Environment and Climate Change Canada.
 - Vegetation removal will be avoided where possible.
 - An avian specialist should be consulted if breeding birds or nests are encountered incidentally. If the Contractor is not able to get recommendations from an avian specialist, works will not continue in the nest location until after August 31 or as soon as it has been determined that the young have left the nest.
 - Because the Project area is identified as having suitable habitat for Snapping Turtles, mitigation measures will be specified, in accordance with *Fish and Wildlife Conservation Act* to mitigate impact should they be encountered onsite:
 - Training should be provided to onsite personnel, with respect to appropriate actions to be taken whenever protected species are encountered and what species guidelines should be followed. The Contractor will confirm that all persons are provided with information and awareness training prior to entering the Project site.
 - Workers will be advised to perform a visual survey of machinery and the work area prior to commencing work, as wildlife may be found hiding or basking around equipment, rocks, and debris piles, for example. If any trenches or holes are left overnight, they should be inspected before being filled, and any trapped wildlife should be released.

- Where a reptile or amphibian SAR is sighted during construction, nearby work will stop immediately, and the animal should be allowed to move out of the work area on its own. The MECP should be notified by the contract administrator.
- A protected reptile or amphibian may be moved only with MECP approval. The methods used will be according to the protocols within the document called *Ontario Species at Risk Handling Manual: For Endangered Species Act Authorization Holders*, which can be found at http://files.ontario.ca/environment-and-energy/species-at-risk/mnr_sar_tx_sar_hnd_mnl_en.pdf.
- Mitigation measures to protect fish habitat and water quality within the Credit River area includes the following:
 - The Contractor's operations will be controlled to prevent the entry and re-suspension of deleterious materials while carrying out construction works. Activities to be conducted in water and along the banks of all fish-bearing watercourses within the Highway 401 study area will be minimized where possible.
 - Any in-water works or work on channel banks should be conducted between November 15 and January 31, according to consultation with MNR (Appendix A). This has been superseded by consultation with MECP where timing of in-water works from November 15 to March 31 was deemed acceptable.
 - In-water activities must not interfere with fish passage or reduce flows.
 - In-water works for Credit River must be contained with use of a coffer according to relevant Contract Specifications (that is, coffer dams).
 - At no time can the channel of Credit River be constricted fully during construction. Flow shall be maintained downstream at all times when coffer dams are in place, in order to maintain fish passage and habitats downstream.
 - A qualified environmental professional will be retained to obtain the applicable permits for relocating fish from within the contained work area (coffer dams) and to capture any fish trapped within an isolated/enclosed area at the work Site and safely relocate them to an appropriate location in the same waters. Fish may need to be relocated again, should flooding occur on the site.
 - Work will be scheduled to avoid wet and rainy periods that may increase erosion and sedimentation and to avoid the input of contaminated runoff from entering the watercourses.
 - Regular inspection, removal, and disposal of waste materials, and sediment will occur.
 - No stockpiles of construction materials will be permitted within 30 m of Credit River. Any construction or waste materials stored at the site will be situated in a manner that will prevent the erosion or deposition of this material into Credit River or associated drainage ditches that outlet to these watercourses.
 - Watercourse banks will be restored to pre-existing or better condition and seeded to establish vegetative cover.
 - Properly installed silt fence or erosion control measures are to be used to prevent contaminated/sediment laden runoff water from entering the watercourse.
 - Removal of vegetation will be minimized where possible, and proper clearing and grubbing techniques will be used. All retained vegetation will be delineated and protected. Removal or clearing of vegetation will be completed in accordance with appropriate operational standards.

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- Disturbed banks will be covered in topsoil and seeded with native seed mixture or exposed areas will be covered with erosion control measures until seeding can occur.
 - Riparian planting plan will be developed and implemented so that cleared areas are restored to preconstruction conditions or better through planting of native trees and vegetation.
 - Heavy equipment/machinery access will be limited to pre-defined areas within the defined study area and along the banks of the Credit River above the normal high-water mark. The watercourse will not be crossed (that is, forded) or treated as equipment/machinery staging at any time.
 - Whenever possible, equipment/machinery will be operated on land above the high-water mark in a manner that minimizes disturbance to the banks and bed of the water body.
 - Whenever possible, the Project will avoid crossing watercourses within the study area. If crossings area required, temporary crossing structures or other practices to cross Credit River will be used.
 - Equipment/machinery will be washed, refuelled, and serviced, and fuel and other materials for the equipment/machinery will be stored a minimum of 30 m from Credit River to prevent any deleterious substances from entering the water.
 - The removal of natural woody debris, rocks, sand, or other materials from the banks or the bed of the Credit River will be minimized below the normal high-water mark. If material is removed from the watercourse or its banks, it is to be set aside and returned to its original location once construction activities are completed.
 - Banks disturbed by any activity associated with the Project immediately be stabilized to prevent erosion and sedimentation through revegetation with native species (seed) suitable for the site.
 - If replacement rock reinforcement/armouring is required to stabilize eroding or exposed areas, appropriately sized, clean rock will be used, and the rock will be installed at a similar slope to maintain a uniform bank and natural stream alignment.
- **Waste Management**
 - Any excess soil resulting from excavation activities during construction that is not used for backfilling will be moved off site and managed in a sustainable manner as per O. Reg 406/19 *Onsite and Excess Soil Management*.
 - Project-related waste generated during construction will be disposed of in accordance with provincial requirements (for example, Regulation 347 [as amended] General Waste Management, O. Reg 102/94 Waste Audits and Waste Reduction Work Plans).
 - If known or suspected contaminated soil is encountered during construction, the removal or movement of soil may be required. Appropriate testing to determine contaminant levels from previous land uses or activities will be undertaken. Contaminated soil will be disposed of in accordance with Regulation 247 (as amended).

4.2.2 Emergency Spill Response

- Develop a spill response plan that is to be implemented immediately in the event of a sediment release or spill of a deleterious substance.
- Emergency spill kits will be kept onsite (and in heavy machinery) in case of emergency. The emergency spill kit should contain, at the very least, absorbent materials to initially contain a spill, protective gear to handle hazardous materials, and the number (1-800-268-6060) for the MECP Spills Action Centre.
- The Contractor must also confirm that materials such as paint, primers, rust solvents, degreasers, grout, poured concrete, or other chemicals do not enter the watercourse.

- Verify that building material used in a watercourse has been handled and treated in a manner to prevent the release or leaching of substances into the water that may be deleterious to fish.
- All spills will be reported to the MECP Spills Action Centre (1-800-268-6060). DFO and MNRF Aurora District will be contacted if impacts will occur to fisheries or wildlife resources.

4.2.3 Social/Cultural

There are no residents located within the immediate vicinity of the study area. Project activities will occur on privately owned land currently used for agricultural purposes (for example, crops).

It is unlikely that construction activities would affect users of the identified local parks and recreational areas, because of the distance from the Project area and the presence of much more significant impacts from Highway 401 crossing the Project area. Regardless, construction activities will adhere to the Corporation of the City of Mississauga Noise Control Bylaw No. 360-79 and will be scheduled to occur during normal working hours of Monday to Saturday between 7 a.m. and 7 p.m., where possible. If construction is required outside this period or on Sundays or statutory holidays, then an application for a noise by-law exemption will be required.

- Property access issues will be negligible, considering construction activities will be conducted on private land and City of Mississauga’s land where access is already granted. Construction activities may create a temporary increase in traffic along Creditview Road and where access roads are required for the Project because of worker and supply transport. Construction methods to reduce traffic during construction will be evaluated. Traffic management measures may include using multi-passenger vehicles to and from the construction footprint and posting signs stating speed limits along the gravel road.
- It is expected that construction activities required to implement a solution will increase criteria air contaminants as a result of vehicle and equipment use, and dust generated. Equipment and vehicle travel along gravel roads may create dust if construction activities are conducted under dry conditions. The construction workforce will adhere to local speed limits, and dust suppression measures (for example, watering down the road) will be implemented, as warranted.
- Stage 3 Archaeological Assessment will be undertaken, and acceptance from the MHSTCI will be obtained prior to commencing construction activities.
- An HIA addendum will be completed as part of the EWD STS’s Contract 2 detailed design; it will be used to inform on impacts to cultural heritage features on the 1200 Old Derry Road property and the parklands to the south of Highway 401 prior to implementing this work.

4.3 Permits and Approvals

Permits and approvals needed for the Project are summarized in **Table 7**. They will be confirmed during detailed design with the advancement of design.

Table 7. Permits and Approvals

Agency	Permit or Approval	Description
DFO	Project Authorization	Open-cut construction work needed to cross Credit River.
MECP	Environmental Compliance Approval – Transfer of Review	Certain sewage works in designated municipalities.
MECP	Permit to Take Water – Category 3	Groundwater takings during construction if the cumulative water taking is over 400 cubic metres per day.

Table 7. Permits and Approvals

Agency	Permit or Approval	Description
MECP	Compliance with Endangered Species Act	In cases where species are at risk or their habitats will be affected, permits may be required and approved only in certain circumstances.
MTO	Encroachment Permit	Installation of infrastructure or construction activities within MTO-owned lands.
MHSTCI	Archaeological Assessment Clearance	Acceptance of the Stage 2 Archaeological Assessment work, as well as once Stage 3 Archaeological Assessment is undertaken.
CVC	Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Permit	Proposed work, including the open-cut crossing of Credit River, within CVC-regulated Credit River floodplain.
City of Mississauga	Cultural Heritage Permit	Work in proximity to cultural heritage features and landscapes.

4.4 Conceptual Design

Because of the required timeline for implementing this work, development of the design drawing package has been advanced beyond the conceptual design phase simultaneously with development of this EA. Detailed design drawings can be found in **Appendix E**. Details and considerations that have driven the creation of this drawing package can be found as follows.

4.4.1 Upstream Connection Point and Interface with the Proposed East to West Diversion Sanitary Trunk Sewer

The upstream extent of the realignment is a connection point to the existing 1500 mm CVSTS near Old Creditview Road and Creditview Road. As noted in the background section of this report, the Region is in the process of designing and constructing the 2400 mm EWD STS. The preferred route of the EWD STS is near the alignment of the existing 1500 mm CVSTS along Old Creditview Road and Creditview Road. The realignment of the 1500 mm CVSTS provides an opportunity to make a connection between the 1500 mm pipe and the proposed 2400 mm EWD STS. The connection point will include a buried diversion chamber, which will provide the Region the operational flexibility to divert flows from the existing 1500 mm CVSTS into the new proposed EWD STS or continue into the realigned 1500 mm CVSTS. The existing 675 mm CSTS will also be diverted into the diversion chamber. At this location, the proposed EWD STS will be installed with an invert elevation of approximately 144.00 m, which is approximately 14 m below the invert of the existing 1500 mm CVSTS at the connection point. Therefore, a drop structure will be required between the diversion chamber accepting flows from the 1500 mm CVSTS and existing 675 mm CSTS and the connection point into the EWD STS to dissipate energy from the falling flow and minimize the amount of air that is entrained and transported into the main tunnel. A construction compound has been proposed at Old Creditview Road and Creditview Road that will serve as the location of the upstream connection point of the preferred alternative as well as the location of the proposed diversion chamber and drop structure for connection into the EWD STS.

The detailed design drawings included in **Appendix E** show the layout of the construction compound, including the location of the proposed drop structure and diversion chamber. The location of the diversion chamber necessitates that the first portion of the realigned 1500 mm trunk sewer be installed through a densely forested area until it reaches the existing easement of the 675 mm CSTS. To avoid tree removal, this initial portion of the realigned 1500 mm trunk sewer is proposed to be installed through trenchless methods. sanitary maintenance hole 12 has been proposed at the location of the required downstream shaft. This maintenance hole will provide the Region with the ability to maintain the realigned 1500 mm trunk sewer.

The realigned 1500 mm trunk sewer will be installed via open cut from proposed maintenance hole 12 to the proposed maintenance hole 13, which is located on the eastern side of Credit River. This segment of the realigned 1500 mm runs entirely within the alignment and existing easement of the 675 mm CSTS. The CSTS will be removed during construction of the realigned 1500 mm trunk sewer.

4.4.2 Work through the Floodplain and Crossing of Credit River

The segment of open-cut installation between proposed maintenance hole 12 and maintenance hole 13 includes work within the flood plain as well as an open-cut crossing of Credit River.

For work within the floodplain, heavy duty silt fencing will be installed, the site cleared, and the topsoil stripped and stockpiled. Sediment traps will be provided to capture sediments from the working areas and from any surface runoff. The sediment traps will be maintained after each rainfall event. Dewatering during construction will also be controlled so there is no discharge off the working areas. Treated flows will be discharged into the sanitary sewer system. Because the works are located within the Credit River floodplain, the retained Contractor will need to provide an emergency plan for vacating the site during any significant rainfall event.

The in-water work to cross Credit River will be carried out in two stages. Each stage will isolate a portion of the river crossing with a cofferdam and deflection barriers. The cofferdam and deflection barriers will route the river flow around the construction activities within the river. The Contractor is to construct or use a cofferdam made of sheet piling/sandbags, which will be erected equal to water levels pertaining to the existing 2-year storm event. Work will be planned during low-flow conditions. If the water levels exceed the existing 2-year levels, the Contractor will be required to stop all work and evacuate from the site. This is to permit the cofferdam to be over topped during high flows. Construction within the cofferdam may take place in drained/undrained conditions, depending on the Contractor's construction methodology. Water removed from within the cofferdam will be pumped into sediment basins as shown on the drawings. The outlet from the basins will be monitored to confirm that no sediments are released back into the river. The pipe, when placed, will be encased with concrete and backfilled. During the isolation, the riverbanks will be protected from erosion with 300 mm river stone. The riverbed will be restored with stone, and the riverbanks stabilized with geotextiles until planting has been established, prior to the removal of the perimeter sediment control measures. Any buildup of ice or flooding will be managed by the Contractor.

Details regarding work within the floodplain, including the Credit River crossing, will need to be discussed and approved by the appropriate regulatory bodies, including, but not limited to, CVC and DFO.

Downstream of maintenance hole 13, the 1500 mm trunk sewer will be installed via open cut within a new permanent easement up to proposed maintenance hole 14, located just north of Highway 401, where its sanitary flow will be combined with the sanitary flows from the existing UWSTS. Maintenance hole 15 has been proposed to intercept flows in the existing 1350 mm FCSTS and carry them to maintenance hole 14.

4.4.3 Crossing of Highway 401

The realigned CVSTS will cross Highway 401 via trenchless methods, which necessitates the need for launching/receiving shafts and construction compounds on either side of Highway 401. The proposed compounds are shown in **Appendix E**. The tunnelled sewer crossing is proposed to be a larger 1950 mm-diameter sanitary sewer to prevent the need for another tunnelled crossing of Highway 401 because of increases in flow from the upstream sewers. Maintenance hole 10 has been proposed on the southern side of Highway 401 to allow for the downstream connection point of the realigned trunks sewers into the East Leg of the UWSTS. Upon completion and commissioning of the new realigned 1500 CVSTS, the existing Highway 401 crossing and associated maintenance holes will be decommissioned. The top 2 m of existing maintenance holes will be removed, and the existing pipe grouted and abandoned.

4.4.4 Construction Access

Construction access to the work proposed to the western side of the Credit River will be from Creditview Road. Access to the work proposed east of Credit River and north of Highway 401 will be from Lamplight Way along the Region's existing easement for the FCSTS. On the southern side of Highway 401, access will be provided from the Harris Farms access road from Creditview Road south of Argentia.

4.5 Construction Sequencing

The Region requires continuous operation of the existing sanitary sewer network during construction such that it can continue to serve its constituents. The proposed work therefore requires that flows in existing sewer systems be maintained through construction. The Contractor will be required to bypass pump existing flows and make live connections to sewers. To minimize the Contractor's requirements to setup a bypass system to manage existing flows during the work, the following sequence is suggested:

- 1) Tunnel crossing of Highway 401 Shaft 8 to Shaft 9 (Crossing 11)
- 2) Construction of maintenance hole 14
- 3) Construction of maintenance hole 10
- 4) Construction of maintenance hole 15
- 5) Diversion of flows from 1350 mm-diameter existing sanitary sewer from Lamplight Way
- 6) Open-cut sanitary sewer from maintenance hole 14 to eastern side of Credit River crossing
- 7) Open-cut sanitary sewer from Site 6/Diversion Chamber 6 to maintenance hole 6B
- 8) Construction of maintenance hole 6B
- 9) Diversion of flow from maintenance hole 6B to existing 1500 mm-diameter sanitary sewer at Site 6
- 10) Credit River crossing (both in water and near water works)
- 11) Setup at Site 6 bypass system to manage flows in existing 1500 mm-diameter and existing 675 mm-diameter CSTS at Site 6 (by pumping or syphon)
- 12) Tunnelling from Diversion Chamber 6 to Shaft 12 and open-cut sanitary sewer from Credit River crossing to maintenance hole 12
- 13) Pressure test of 1500 mm-diameter sanitary sewer from Diversion Chamber 6 to maintenance hole 14
- 14) Completion of eastern part of Diversion Chamber 6 to permit flows from 1500 mm-diameter and 750 mm-diameter sewers to be diverted towards maintenance hole 14
- 15) Construction of Drop Shaft 6A

16) Completion of Diversion Chamber 6 and Drop Shaft 6A

4.6 Schedule of Work

The construction of the realigned CVSTS will be included as part of Contract 2 of the EWD STS because of the overlapping nature of the two works. Construction of the EWD STS Contract 2 is anticipated to occur from 2021 to 2025. The suggested construction sequencing would allow for construction of the realigned CVSTS from spring 2022 to summer 2023. The construction may take longer because of the Contractor's own schedule determination and requirement to perform certain activities, like the Credit River crossing, with the provided working windows.

4.7 Cost Estimate

A high-level cost estimate of the preferred alignment is provided in **Table 8**. The cost estimate does not include costs associated with connecting the 1500 mm CVSTS into the new proposed EWD STS, because it is not related to the scope of this ESR.

Table 8. High-Level Cost Estimate

Item	Cost (\$)	Notes
Site preparation, including construction accesses	1,200,000	
Open-cut installation, including crossing of Credit River	500,000	
1500 mm trenchless installation	1,000,000	
1950 mm trenchless Highway 401 crossing	1,700,000	
Construction of required maintenance holes	1,500,000	
Site Restoration	1,000,000	
Sub-total	6,900,000	
Additional Construction Costs (10%)	690,000	Includes mob/demob, connections, inspection, hydrants, signage, traffic management, bonding, insurance
Provisional and Allowance (10%)	690,000	Provisional labour and materials in addition to base construction cost
Sub-Total Construction Base Costs	8,280,000	
Geotechnical/Hydrogeological/Materials (0.5%)	41,400	
Property Requirements (1%)	82,800	
Consultant Engineering/Design (12%)	993,600	Includes planning, pre-design, detailed design, training, contract administration, commissioning
Project Contingency (10%)	828,000	Construction Contingency is dependent on Cost Estimate Class and Project Complexity
Total (2021 CAD)	10,225,800	

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Appendix A. Natural Heritage Assessment Report and Breeding Bird Survey Addendum



NATURAL HERITAGE ASSESSMENT REPORT
HIGHWAY 401 WATERMAIN AND SANITARY TRUNK SEWER PROJECT
REGION OF PEEL

Report Prepared for:
JACOBS

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Version 1.0
November 2019
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NATURAL HERITAGE ASSESSMENT REPORT
HIGHWAY 401 WATERMAIN AND SANITARY TRUNK SEWER PROJECT
REGION OF PEEL

Prepared for Jacobs, November 2019



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DISCLAIMER

Matrix Solutions Inc. certifies that this report is accurate and complete and accords with the information available during the project. Information obtained during the project or provided by third parties is believed to be accurate but is not guaranteed. Matrix Solutions Inc. has exercised reasonable skill, care, and diligence in assessing the information obtained during the preparation of this report.

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1 INTRODUCTION

The Region of Peel retained Jacobs to design multiple new watermain and sanitary sewer access shaft crossings in the City of Mississauga (the City) ahead of the planned expansion of the Highway 401 footprint. The requirements for this project also include the construction of a new watermain and trunk sanitary sewers. The proposed watermain and sanitary sewer will extend along Highway 401, from Winston Churchill Boulevard to east of the Credit River near the Creditview Road overpass over Highway 401 (Figure 1). The construction phase of the proposed Highway 401 Watermain and Sanitary Trunk Sewer alignment will require tunnelling by Tunnel Boring Machine (TBM) and an open cut crossing of the Credit River. The tunneling will be facilitated through surface works associated with the construction of ten paired tunnelling shafts and associated laydown areas, and work compounds (staging areas). All tunneling work will be undertaken within the road right-of-way (RoW), adjacent vacant lands, and existing open spaces where the predominant constraints are the existing trees and vegetation. In some cases, the lands, which have the potential to be affected by this work, are within valley areas associated with watercourses which serve as wildlife habitat. The open cut crossing for the Credit River will occur within the natural valley corridor for the Credit River with associated laydown and staging areas located along the river banks.

1.1 Project Background

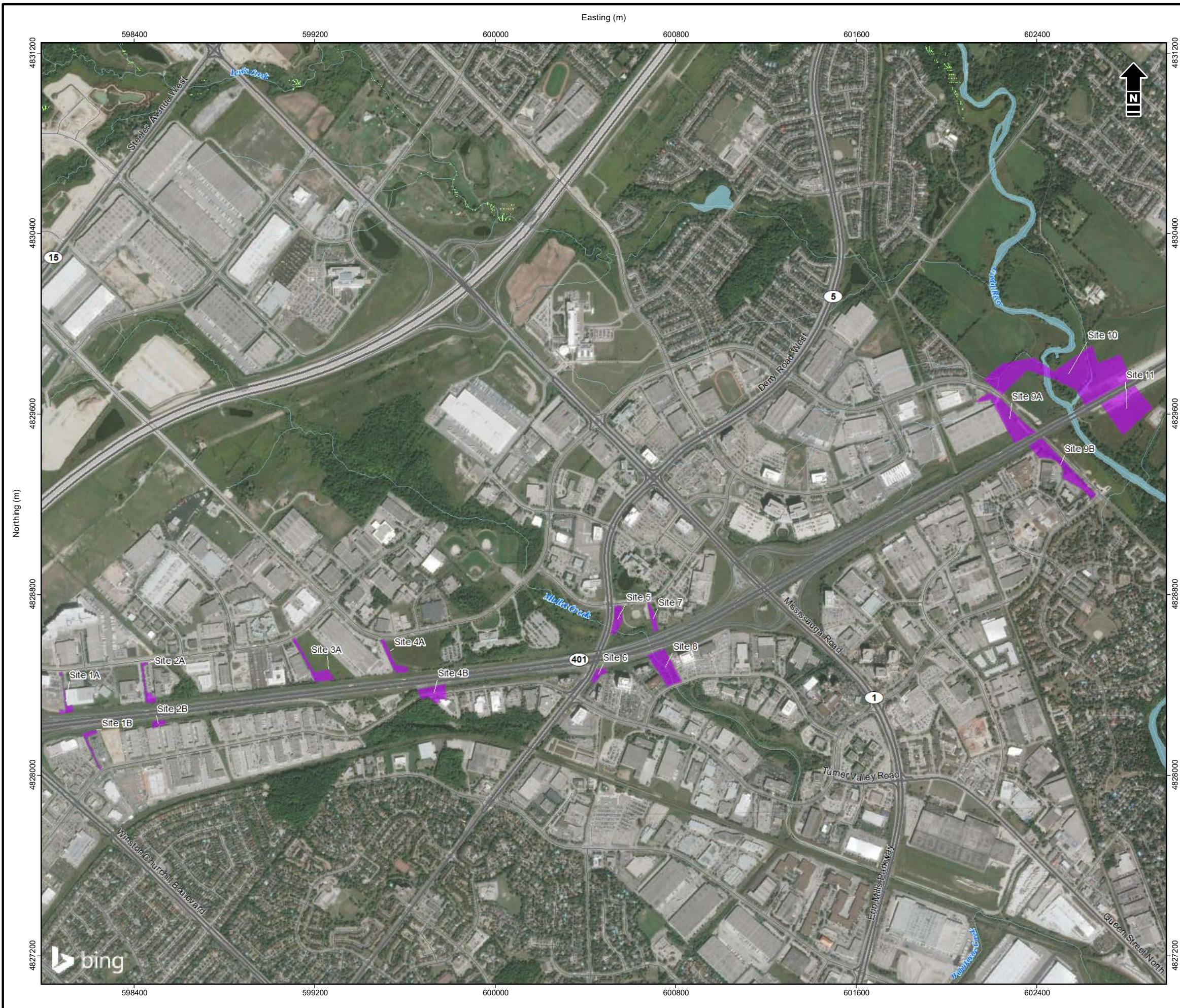
Jacobs retained Matrix Solutions Inc. to complete a natural heritage evaluation for the ten paired shaft locations and the Credit River open cut crossing to support the detailed design of the Highway 401 Watermain and Sanitary Trunk Sewer Project for the Region.

1.2 Study Objectives

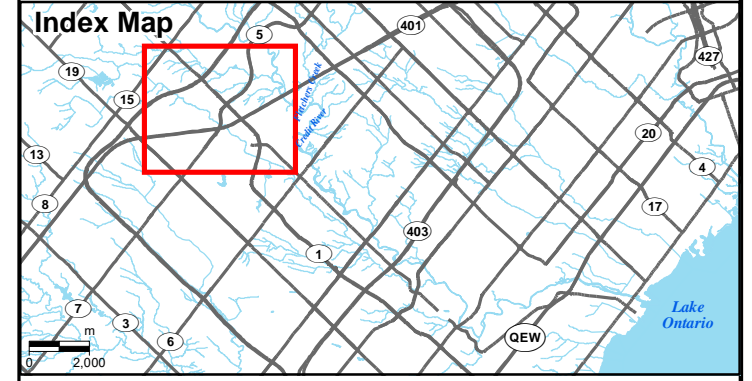
The Natural Heritage Assessment provides a summary of the study area and outlines the environmental assessment methodology and information regarding the existing environmental conditions present within the study area. The following environmental inventories were completed:

- vegetation assessment and Ecological Land Classification (ELC)
- terrestrial habitat assessment
- species at risk (SAR) assessment
- incidental wildlife observations
- aquatic habitat characterization

The results of the environmental inventories will be used to complete an assessment of potential impacts, which may result from proposed works, develop recommended measures to mitigate potential environmental impacts, and determine specific regulatory permits that might be required before construction.



- Shaft Location Site
- Wetland
- Water Body
- Watercourse
- Highway
- Road



Reference: Contains information licensed under the Open Government Licence - Ontario
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 (2019) Distribution Airbus DS

Scale: 1:17,000
 0 180 0 180 360 metres
 NAD 1983 UTM Zone 17N



Region of Peel
 Highway 401 Watermain and Sanitary Trunk Sewer Project

Study Area

Date:	November, 2019	Project:	27896	Submitter:	E. Wilkinson	Reviewer:	A. Fausto
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I:\arcgis\27896\FiguresandTables\ECL\2019\Report\Figure 1 Study Area.mxd - Tab01_L_05-Nov-19_11:29 AM - eholinger - TD005

1.3 Environmental Setting

The Highway 401 Watermain and Sanitary Trunk Sewer access shafts will be constructed primarily within a highly urbanized portion of Mississauga with natural environment corridors occurring along Mullet Creek (Derry Road and Highway 401 crossings west of Mississauga Road) and the Credit River (Highway 401 crossing east of Creditview Road). Mullet Creek originates in the Peel Plain physiographic region with its headwaters north of Highway 407 and flows south through South Slope physiographic region within the study area to its confluence with the Credit River, south of Burnhamthorpe Road. The headwaters for the Credit River originate in the Kame and Till Moraines and Drumlinized Till Plains above the Niagara Escarpment near the Town of Orangeville and flows south to Lake Ontario in the City of Mississauga. The valleylands and riparian habitat associated with Mullet Creek and the Credit River are designated as “Natural Significant Areas” as per the *Mississauga Official Plan* (The City 2016) and are also considered part of the “Green System” as per the *Mississauga Official Plan*. In addition, the Credit River is a part of the Region of Peel’s designated Greenlands System’s “Core Areas” (Region of Peel 2016). Both Mullet Creek and the Credit River are areas regulated by the by Credit Valley Conservation (CVC) Authority. The remaining upland areas along the Highway 401 Watermain and Sanitary Truck Sewer alignment are urban with environmental constraints being limited to manicured lawns, fallow lands, and the vegetated RoW.

Natural heritage evaluations were completed for all ten shaft locations with aquatic habitat mapping completed for watercourses present within 30 meters of any shaft location within the study area, including Mullet Creek and the Credit River.

2 BACKGROUND REVIEW

The following background data sources were reviewed and considered as part of this existing conditions report:

- Ontario Natural Heritage Information Centre (NHIC) database (MNRF 2018a)
- Ministry of Natural Resources and Forestry (MNRF), Aurora District Office
- CVC data (CVC 2018)
- Natural Heritage Reference Manual for Policy 2.3 of the Provincial Policy Statement (OMNR 2010)
- Significant Wildlife Habitat Technical Guide (MNR 2000)
- Committee on the Status of Endangered Wildlife in Canada (COSEWIC)
- Species at Risk (SARA) Public Registry (Government of Canada 2018a)
- Atlas of the Breeding Birds of Ontario (OBBA) Bird Studies Canada (Cadman et al. 2007)
- Ontario Reptile and Amphibian Atlas (ORAA; Ontario Nature 2015)
- Ontario Butterfly Atlas (OBA; Toronto Entomologists’ Association 2019)
- Mississauga Official Plan (The City 2016)
- Region of Peel Official Plan (Region of Peel 2016)
- Credit River Fisheries Management Plan (CVC and MNR 2002)

Initial background requests regarding fish and fish habitat, as well as terrestrial sensitivities and species at risk (SAR) were submitted to MNRF Aurora District on September 18, 2018 and to CVC on November 08, 2018. This information was received from the MNRF on October 02, 2018. Information regarding environmental sensitivities was received from CVC on December 04, 2018. All communications with MNRF and CVC have been included in Appendix A.

Terrestrial information from the MNRF Aurora District office was supplemented with additional data from various websites and internet sources, including the NHIC, OBA and ORAA. Information regarding breeding birds in the study area was extracted from the Ontario Breeding Bird Atlas (OBBA; Cadman et al. 2007).

Background information relating to aquatic features within the study area included consultation with MNRF Aurora District as well as CVC. The *Credit River Fisheries Management Plan* (CVC and MNR 2002) was utilized to provide additional information including fish community information, thermal regime, in-water timing windows, recommended setbacks and drainage information for Mullet Creek and the Credit River.

In addition, the 2018 Fisheries and Oceans Canada (DFO) Aquatic Species at Risk Mapping (DFO 2018a), the *Endangered Species Act* species status list (Government of Ontario 2008) and the *Species at Risk Act* public registry (Government of Canada 2018a) were all accessed to determine occurrence of aquatic species at risk within the study area.

2.1 Species at Risk Screening

During background review and agency consultation, several SAR were identified as potentially occurring within the study area. MNRF has indicated that the following SAR may be present within the study area, American Eel (*Anguilla rostrata*), Bobolink (*Dolichonyx oryzivorus*), Eastern Meadowlark (*Sturnella magna*), Barn Swallow (*Hirundo rustica*), and Butternut (*Juglans cinerea*). CVC provided SAR observations for the following species: Butternut, Bald Eagle (*Haliaeetus leucocephalus*), Barn Swallow, Peregrine Falcon (*Falco peregrinus*), and Monarch (*Danaus plexippus*).

2.1.1 Aquatic Species at Risk

Aquatic SAR mapping is made available by DFO through Conservation Ontario. As this area falls within the boundaries of CVC, SAR mapping was available for the project area. The 2018 DFO SAR mapping indicated that no SAR have been documented within the study area.

Correspondence with MNRF indicated the presence of one aquatic SAR within the study area: American Eel, a species designated as “Endangered” under the provincial *Endangered Species Act* and under consideration for listing federally under the *Species at Risk Act* (SARA; Government of Canada 2018b).

A NHIC search of the two 1 × 1 km squares encompassing the study area provided a record for Redside Dace (*Clinostomus elongatus*) for the Credit River from 1999.

2.1.2 Terrestrial Species at Risk

Information from the MNRF Aurora District office was supplemented with additional data from various websites and internet sources, including:

- A NHIC search of two 1 × 1 km squares encompassing the study area provided records for Henslow's Sparrow (*Centronyx henslowii*) from 1932.
- A search of the OBBA for the period of 2001 to 2005 for the species recorded in one 10 × 10 km square encompassing the study area: 17PJ02. The OBBA provided records for eight SAR within the study area including Bank Swallow (*Riparia riparia*), Barn Swallow, Bobolink, Chimney Swift (*Chaetura pelagica*), Eastern Meadowlark, Common Nighthawk (*Chordeiles minor*), Eastern Wood-Pewee (*Contopus virens*), and Wood Thrush (*Hylocichla mustelina*).
- A search of the ORAA for the period of 2017 and earlier for the species recorded in one 10 × 10 km square encompassing the study area: 17PJ02. The ORAA provided records for two SAR within the study area: Jefferson Salamander (*Ambystoma jeffersonianum*) and Snapping Turtle (*Chelydra serpentina*).
- A search of the OBA for the period of 2017 and earlier for the species recorded in one 10 × 10 km square encompassing the study area: 17PJ02. The OBA provided records for one SAR within the study area: Monarch.

A summary of all SAR with potential to be found near the Highway 401 Watermain and Sanitary Trunk Sewer study area are provided in Table 1. Detailed habitat information for each species is found in Section 4.7.

TABLE 1 Species at Risk Potentially Present within the Study Area

Species Common Name	Species Scientific Name	Species At Risk Act Status	Endangered Species Act Status	S-Rank
Fish				
American Eel ²	<i>Anguilla rostrata</i>	Endangered	Under consideration	S1?
Redside Dace ¹	<i>Clintostomus elongatus</i>	Endangered	Endangered	S2
Reptile				
Jefferson Salamander ⁴	<i>Ambystoma jeffersonianum</i>	Endangered	Endangered	S2
Snapping Turtle ^{4,6}	<i>Chelydra serpentina</i>	Special Concern	Special Concern	S3
Bird				
Bald Eagle ⁶	<i>Haliaeetus leucocephalus</i>	-	Special Concern	S2N,S4B
Bank Swallow ³	<i>Riparia riparia</i>	Threatened	Threatened	S4B
Barn Swallow ^{2,3,6}	<i>Hirundo rustica</i>	Threatened	Threatened	S4B
Bobolink ^{2,3}	<i>Dolichonyx oryzivorus</i>	Threatened	Threatened	S4B
Chimney Swift ³	<i>Chaetura pelagica</i>	Threatened	Threatened	S4B
Common Nighthawk ³	<i>Chordeiles minor</i>	Threatened	Special Concern	S4B
Eastern Meadowlark ^{2,3}	<i>Sturnella magna</i>	Threatened	Threatened	S4B
Eastern Wood Pewee ³	<i>Contopus virens</i>	Special Concern	Special Concern	S4B
Henslow Sparrow ¹	<i>Ammodramus henslowii</i>	Endangered	Endangered	SHB
Peregrine Falcon ⁶	<i>Falco peregrinus</i>	Special Concern	Special Concern	S3B
Wood Thrush ³	<i>Hylocichla mustelina</i>	Threatened	Special Concern	S4B
Insects				
Monarch ^{5,6}	<i>Danaus plexippus</i>	Special Concern	Special Concern	S2N,S4B
Vegetation				
Butternut ^{2,6}	<i>Juglans cinerea</i>	Endangered	Endangered	S2

References:

¹ NHIC database (MNR 2018a)² MNR (2018)³ Ontario Breeding Bird Atlas (Cadman et al. 2007)⁴ Ontario Reptile and Amphibian Atlas (Ontario Nature 2015)⁵ Ontario Butterfly Atlas (Toronto Entomologists' Association 2019)⁶ Credit Valley Conservation (CVC 2018)

A screening of SAR records was undertaken to identify which of the reported species have the potential to occur within the study area. The screening compared species habitat preferences and spatial distributions collected through agency consultation and literature review to determine if suitable habitat was present. Species with suitable habitat present are discussed in greater detail in Section 4.7.

2.2 Significant Habitat Wildlife Screening

Significant Wildlife habitat is generally designated by criteria identified within the Significant Wildlife Habitat Technical Guide (MNR 2000) and the Significant Wildlife Habitat Eco-Regional Criterion Schedule (MNR 2015), which divides habitat into four broad categories:

- Seasonal Concentration Areas
- Rare Vegetation Communities or Specialized Habitat for Wildlife
- Habitat for Species of Conservation Concern (not including Endangered or Threatened species)
- Animal Movement Corridors

Correspondence with CVC indicated that the area near Highway 401 and Creditview Road in the vicinity of Sites 9 and 10 qualifies as Significant Wildlife Habitat (SWH) – Criteria B4: foraging area with abundant mast under the *Peel - Caledon Significant Woodlands and Wildlife Habitat Study* (North-South Environmental Inc, et al 2009). The Significant Wildlife Technical Guide (OMNR 2000) describes foraging areas with abundant mast as relatively large forests with numerous nut producing trees (e.g., Beech, Oak) and more open areas with large patches of berry-producing shrubs (e.g., blueberries, raspberries, serviceberries). Under the *Peel Caledon Significant Woodlands and Wildlife Habitat Study*, any oak or hickory dominated forest block, regardless of size would be considered SWH under the B4 criteria. A SWH assessment was undertaken during field investigations to determine additional significant features that have the potential to occur within the study area. Habitats identified as SWH receive protection under the Provincial Policy Statement (PPS; MAH 2014), the Region of Peel Official Plan (Region of Peel 2016) and the City of Mississauga Official Plan (The City 2016).

A review of the Region of Peel Official Plan (Region of Peel 2016) and the City of Mississauga Official Plan (The City 2016) indicated that the Credit River and its natural corridor are considered a Core Area of the Greenlands System under the Region of Peel Official Plan and the valley corridors associated with Mullet Creek at Sites 5, 7, and 8, the Credit River at Sites 10 and 11, as well as the forested area associated with a tributary of Mullet Creek near Site 4b, are considered Significant Natural Areas and Natural Green Space under the City of Mississauga Official Plan (The City 2016).

A review of the NHIC database did not identify any Designated Natural Areas, Provincially Significant Wetlands (PSW), Areas of Natural and Scientific Interest (ANSI) or Environmentally Sensitive Areas (ESAs) located within 120 m of the shaft location the study areas.

3 METHODOLOGY

3.1 Terrestrial Field Surveys

Field surveys of terrestrial communities and SAR habitat were completed by Matrix in October 2018. Data on existing terrestrial communities were obtained from the MNRF and confirmed during field investigations.

3.1.1 Ecological Land Classification

Vegetation communities were generally characterized following the Ecological Land Classification (ELC) System for southern Ontario (Lee et al. 1998). The second approximation of ELC (Lee 2008) was also used, but only when there was no code available for a specific community type in the first approximation. ELC was completed by Matrix for the shaft locations and laydown areas only, including dominant species associations to ecosite level and characterized to determine if rare vegetation communities were present. The laydown areas were Sited in disturbed or culturally influenced locations along the shoulder of various roads. No rare vegetation communities were noted.

3.1.2 Incidental Wildlife Observations

All incidental wildlife observations were recorded throughout field surveys. Observations included visual and auditory identification of species, as well as evidence of presence (i.e., herbivory, scat, tracks, and trails). Particular attention was paid to presence of SAR and rare wildlife.

3.1.3 Tree Inventory

The tree inventory and assessment was conducted by an International Society of Arboriculture (ISA)-certified Arborist between October 10 and October 30, 2018. ISA standards were followed during the field investigation. The inventory and assessment included all trees greater than 10 cm diameter above breast height (dbh) at each Site. The purpose of the tree inventory was to document tree resources where watermain and sanitary trunk sewers will be extended, which have the potential to be impacted by construction activities. Data collected as part of the tree inventory will be used to inform project planning.

The following information was collected for each tree:

- genus and/or species based on physical characteristics of each tree
- measurement of dbh

- radial dripline estimation based on spread of canopy from trunk to limit of overhead branches
 - ✦ radial dripline often extends beyond the limit of branches or can be limited by infrastructure such as curbs and sidewalks. Radial dripline is used as a starting point to determine the minimum limits of a Tree Protection Zone (TPZ) for a particular tree as part of tree protection planning
- general rating (Good, Fair, Poor) of trunk integrity, crown structure, and crown vigour based on observations of overall physical appearance of tree, such as existing defects or injuries, leaf colour and quantity, as well as general health. No detailed structural assessments of roots, trunk, or branches were conducted.
- condition observations including presence of multiple or codominant stems, percentage of crown dieback, lean direction, presence or absence of pathogens (fungus or rot), insect pests, epicormics growth, cavities or wounds, and other physical anomalies (i.e. Emerald Ash Borer)
- other general comments relating to unique conditions or surrounding growing conditions

Each tree included in the inventory received a metal tag with an identifying number that was affixed to the tree with a small nail. If the tree was designated as a street or parking lot tree, the tag was affixed out of direct sight to avoid generating attention from the public. At the time of the assessment, access to some areas was restricted, specifically trees located within the fenceline of Highway 401. For safety reasons, these trees were not tagged; however, an estimated coordinate and identification was determined for these trees if they were easily distinguishable through aerial photography.

Dead trees were not included in the inventory; however, their presence within the Site was noted and used to assess wildlife habitat.

Trees were surveyed using a TopCon Hiper SR receiver through real time network (RTN) technology. This model is able to collect data with sub-centimetre accuracy under ideal conditions. Due to the density of tree cover, the accuracy tolerance of the RTN was increased from 1 cm to 1 m, with the majority of shots falling into the range of 1 cm to 30 cm.

A terrestrial photograph record of field surveys can be found in Appendix B.

3.2 Aquatic Field Surveys

Detailed aquatic habitat assessments were completed during the environmental assessment (EA) phase for all watercourses along the RoW. Additional surveys were completed by Matrix in October and November 2018 to document existing conditions, identify the presence of fish habitat (direct or indirect) and complete aquatic habitat mapping for Mullet Creek and the Credit River.

3.2.1 Aquatic Habitat Survey

Aquatic habitat characterization surveys documented watercourses adjacent to proposed shaft locations, to characterize the following fish habitat potential:

- general watercourse characteristics (i.e., stream pattern, confinement, and gradient)
- channel characteristics (i.e., bank slope, channel dimensions, wetted width, depth of pools/riffles/runs)
- streamflow and discharge, where flow exists
- substrate and bank materials
- aquatic vegetation and riparian habitat
- obstructions/barriers to fish passage and major disturbances
- “critical” or important habitat areas including potential spawning areas, nursery cover, and feeding areas
- photographic documentation of the crossing locations and surrounding areas

Photographs were taken of the instream habitat and bank characteristics upstream and downstream of each watercourse crossing (Appendix B).

Habitat mapping was created for each Site, which provides a visual to show the location of important fish habitat features including, but not limited to, instream vegetation, undercut banks, boulders, and woody debris. Appendix C contains the habitat field assessment and mapping for each watercourse crossing that received an aquatic habitat assessment.

Fish community surveys were not completed as sufficient data were provided by MNRF, and CVC. Fish community information is provided in Section 6.2.

4 EXISTING TERRESTRIAL HABITAT

4.1 Bedrock and Soils

The study area is generally located within the Lake Erie – Lake Ontario Ecoregion. This ecoregion is underlain predominantly by Silurian and Devonian limestone bedrock, with the exception of the Niagara Escarpment from Burlington to Queenston and some deposits of moraine material and drumlin fields in the north-central portion of the ecoregion. The surficial geology of the ecoregion reflects its bedrock control, and other surficial materials and landforms are highly variable. The topography is generally flat with much of the bedrock covered by deep undulating deposits of ground moraine and substantial glaciolacustrine deposits from historical lakes. Substrates in the ecoregion are composed of mainly calcareous mineral material with organic material as a minor component of the landscape. Soils in this ecoregion include Gray Brown Luvisols (60%) and Gleysols (37%). Substrates in the ecoregion demonstrate a high to moderate capacity to buffer the impacts of acidic atmospheric depositions (Crins et al. 2009).

4.2 Vegetation Communities

The study area contained 9 ELC communities which are described in detail below. MNRF and CVC noted the potential presence of Butternut within the study area within the Credit River valley corridor; however, no Butternut were observed within the study area during the field investigations.

Dry Fresh Upland Deciduous Forest (FOD4)

FOD4 communities are forests (greater than 60% tree cover) with deciduous tree species representing greater than 75% of the canopy cover. They have tree species associations that are either relatively uncommon or a result of disturbance or management and Sugar Maple (*Acer saccharum*) is absent or represents less than 10% of the canopy cover. The FOD4 communities within the study area contained the following species:

- Norway Maple (*Acer platanoides*), Sugar Maple, Bitternut Hickory (*Carya cordiformis*), Manitoba Maple (*Acer negundo*), American Basswood (*Tilia Americana*), White Oak (*Quercus alba*), Ash sp. (*Fraxinus sp.*), Mulberry sp. (*Morus sp.*), Honeysuckle sp. (*Lonicera sp.*), Common buckthorn (*Rhamnus cathartica*), Hawthorn sp. (*Crataegus sp.*), Willow sp. (*Salix sp.*), and Red Osier Dogwood (*Cornus stolonifera*) in the canopy and subcanopy, and Smooth Brome (*Bromus inermis*), Thistle sp. (*Cirsium sp.*), Cow Vetch (*Vicia cracca*), Dog-strangling Vine (*Vincetoxicum rossicum*), Aster sp. (*Aster sp.*), Wild Cucumber (*Cucumis anguria*), Wild Red Raspberry (*Rubus idaeus*), Wild Carrot (*Daucus carota*), Wild Grape Vine (*Vitis riparia*), Goldenrod sp. (*Solidago sp.*), and Garlic Mustard (*Alliaria petiolata*) for ground cover.

Dry Fresh Sumac Deciduous Shrub Thicket (CUT1-1)

Deciduous Thickets are defined as having shrub cover greater than 25% and tree cover less than 25%, where greater than 75% of shrub species are deciduous. Shrub cover varies from scattered and patchy to continuous. These natural areas typically have unique flora, areas with a cultural legacy, and are typically dominated by more invasive shrub species. The CUT1-1 communities within the study area contained Staghorn Sumac (*Rhus typhina*), Wild Red Raspberry, Garlic Mustard, Burdock sp. (*Arctium sp.*), Goldenrod sp., Virginia Creeper, and grasses.

Mineral Cultural Thicket (CUT1)

Cultural thickets are defined as having shrub cover greater than 25% and tree cover less than 25%, where greater than 75% of shrub species are deciduous. Shrub cover varies from scattered and patchy to continuous. These natural areas typically have unique floras, areas with a cultural legacy, and are typically dominated by more invasive shrub species. The CUT1 communities within the study area contained the following species:

- Red Oak (*Quercus rubra*), Common Buckthorn, American Fly Honeysuckle (*Lonicera canadensis*), Willow sp., Cherry sp. (*Prunus sp.*), Hawthorn sp., Silver Maple (*Acer saccharinum*), Red Pine, Red Osier Dogwood, Trembling Aspen (*Populus tremuloides*), Common Hackberry (*Celtis occidentalis*) and

Balsam Poplar (*Populus balsamifera*) in the canopy and subcanopy and Goldenrod sp., Cow Vetch, Wild Grape Vine, Thistle sp., Teasel (*Dipsacus sylvestris*), Garlic Mustard, and Dog-strangling Vine for ground cover.

Mineral Cultural Meadow (CUM1)

Cultural meadow communities are open herbaceous communities, dominated by grass-like species (e.g. grass, sedge) with tree and shrub cover less than 25%. The CUM1 communities within the study area contained the following species Red Oak, Sugar Maple, Silver Maple, Blue Spruce (*Picea pungens*), Red Osier Dogwood, Hawthorn sp., Slippery Elm (*Ulmus rubra*), Willow sp., Buckthorn, and Staghorn Sumac, and ground cover species including Goldenrod sp, Garlic Mustard, Thistle sp, Milkweed, Bittersweet Nightshade (*Solanum dulcamara*), Wild Red Raspberry, Wild Grape Vine, Tansy (*Tanacetum vulgare*), Wild Carrot, Birdsfoot Trefoil (*Lotus corniculatus*), Smooth Brome, Purple stemmed Aster (*Symphotrichum puniceum*), Enchanters Nightshade, Cow Vetch, Teasel, Dandelion (*Taraxacum officinalis*), Clover sp. (*Trifolium sp.*), Butter and Eggs (*Linaria vulgaris*), Aster sp., Rose sp. (*Rosa sp.*), and Common Mullein (*Verbascum thapsus*).

Constructed Green Lands (CGL)

Green lands are parks, picnic areas, playing fields, common gardens, golf courses, cemeteries, arboreta and playgrounds. Green lands within the study area contained Norway Maple, Red Pine, Blue Spruce, White Spruce, Scots Pine (*Pinus sylvestris*), ash, White Oak, Silver Maple, Black Locust, and mowed grass.

Transportation and Utilities (CVI)

CVI areas consist of roads, highways, RoWs, towers, pipelines, airports, railways, marinas, etc.

Open Agriculture (OAG)

Open agricultural areas are defined as fields dominated by herbaceous vegetation and grasses and includes pasture and grazing areas. Weedy hay or pasture covers more than 50% of the area.

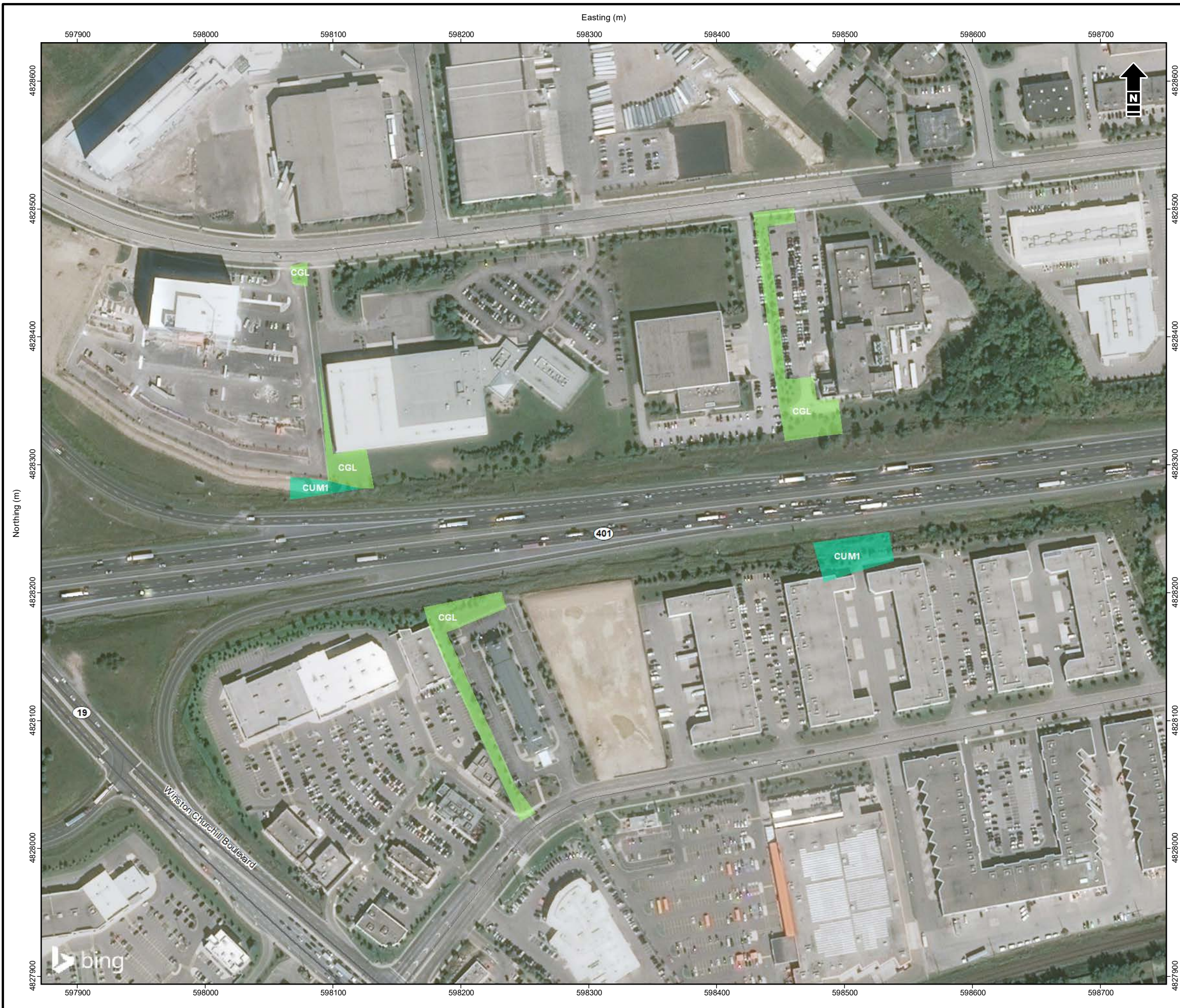
Open Agriculture Annual Row Crops (OAGM1)

Open agriculture annual row crops are cultivated fields, which produce crops in varying degree (corn, wheat, etc.) and includes specialty agriculture that consists of orchards, market gardens, Christmas tree plantations, and nurseries.

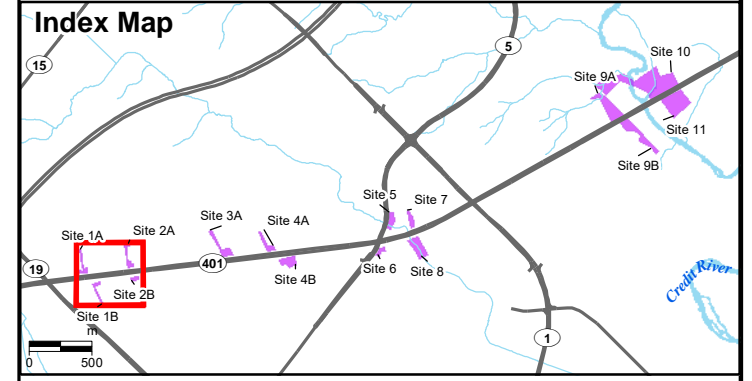
Open Water (OA)

Open water areas are defined as communities with greater than 2 m depth of water. Open water areas within the study area represented by the Credit River and Mullet Creek.

Maps showing ELC communities present within the study area are provided in Figures 2a to 2d.



- Shaft Location Site
- Water Body
- Highway
- Road
- ELC Code**
- CGL (Constructed Green Lands)
- CUM1 – Mineral Cultural Meadow



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 (2019) Distribution Airbus DS

1:3,000 metres
 0 30 60
 NAD 1983 UTM Zone 17N



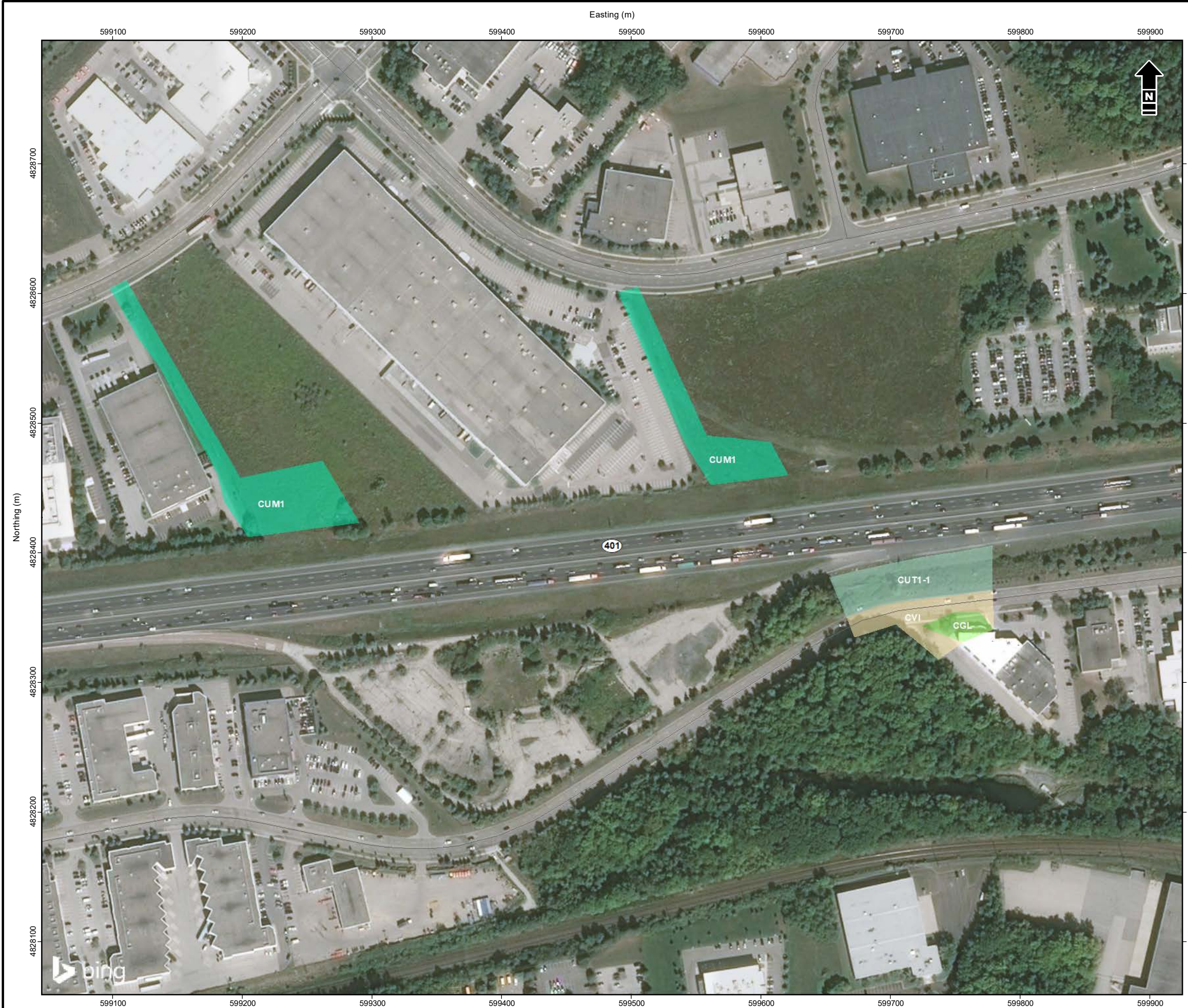
Region of Peel
 Highway 401 Watermain and Sanitary Trunk Sewer Project

Ecological Land Classification Communities

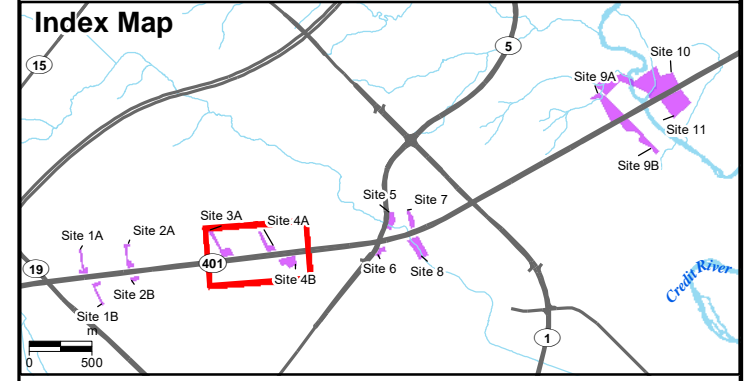
Date: November, 2019 Project: 27896 Submitter: E. Wilkinson Reviewer: A. Fausto

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- Shaft Location Site
- Water Body
- Highway
- Road
- ELC Code**
- CGL (Constructed Green Lands)
- CUM1 – Mineral Cultural Meadow
- CUT1-1 – Dry-Fresh Sumac Deciduous Shrub Thicket
- CVI (Transportation and Utilities)



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 (2019) Distribution Airbus DS



Region of Peel
 Highway 401 Watermain and Sanitary Trunk Sewer Project

Ecological Land Classification Communities

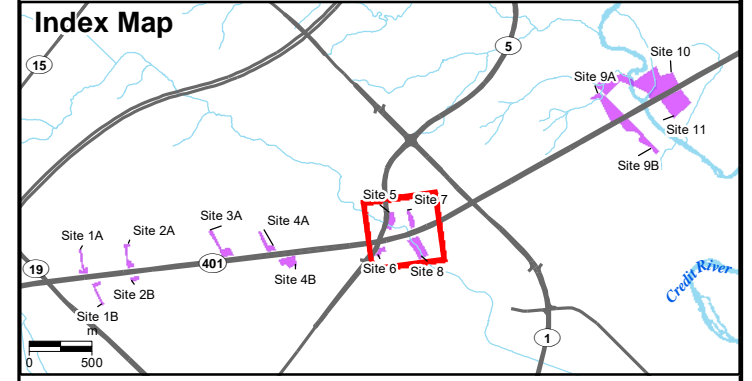
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- Shaft Location Site
 - Water Body
 - Watercourse
 - Highway
 - Road
- ELC Code**
- CGL (Constructed Green Lands)
 - CUM1 – Mineral Cultural Meadow
 - CUT1 – Mineral Cultural Thicket
 - FOD4 - Dry-Fresh Upland Deciduous Forest



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Region of Peel
 Highway 401 Watermain and Sanitary Trunk Sewer Project

Ecological Land Classification Communities

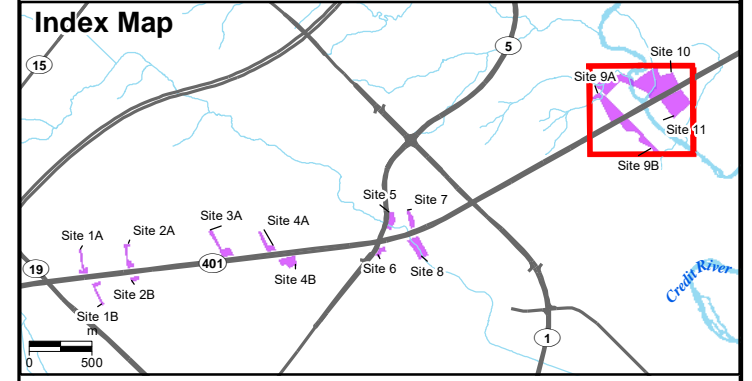
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- Shaft Location Site
- Water Body
- Watercourse
- Highway
- Road
- ELC Code**
- CGL (Constructed Green Lands)
- CUM1 – Mineral Cultural Meadow
- CVI (Transportation and Utilities)
- FOD4 - Dry-Fresh Upland Deciduous Forest
- OA (Open Water)
- OAG (Open Agriculture)
- OAGM1 (Open Agriculture Annual Row Crops)



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Region of Peel
 Highway 401 Watermain and Sanitary Trunk Sewer Project

Ecological Land Classification Communities

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4.2.1 Tree Inventory

The tree inventory conducted in the fall of 2018 included 572 trees from 36 different species. These trees were tallied from each Site within the study area and included a size, structure, and health assessment of each tree observed. No SAR or species of conservation concern were observed in the study area.

The complete list of trees observed, and their associated health assessments are presented in Appendix D.

4.3 Wetlands

The PPS prohibits development and Site alteration in significant wetlands, also referred to as PSWs. Significant wetlands are identified and evaluated by the MNRF to determine the significance of the wetland. After being identified, wetlands must then be designated as such in municipal official plans for the PPS protection provisions to apply.

No PSWs were identified during background review or field investigations and no wetlands (evaluated or unevaluated) were observed within 120 m of the proposed shaft locations.

4.4 Woodlands

Significant woodlands are areas that are ecologically important in terms of features such as species composition, age of trees, and stand history; functionally important due to its contribution to the broader landscape because of its location, size, or due to the amount of forest cover in the planning area; or economically important due to Site quality, species composition, or past management history.

The City of Mississauga Official Plan (The City 2016) identifies significant woodlands as:

- Those woodlands which are greater than or equal to 4 hectares (ha).
- Any woodland greater than 0.5 ha that either supports old growth trees, supports a significant linkage function, is located within 100 m of another Significant Natural Area, is located within 30 m of a watercourse or significant wetland, or supports significant species or communities.

The woodland directly adjacent to Site 4B near Argentina Road meets the definition of a significant woodland. This woodland is outside of the limits of construction, but it located within the study area.

4.5 Wildlife Habitat

4.5.1 Birds

During field investigations, the following bird species were observed within the study area:

- American Goldfinch (*Spinus tristis*), Northern Cardinal (*Cardinalis cardinalis*), American Robin (*Turdus migratorius*), Gray Catbird (*Dumetella carolinensis*), Red-tailed Hawk (*Buteo jamaicensis*), European Starling (*Sturnus vulgaris*), Downy Woodpecker (*Dryobates pubescens*), Black-capped Chickadee (*Poecile atricapillus*), Blue Jay (*Cyanocitta cristata*), White-breasted Nuthatch (*Sitta carolinensis*), Song Sparrow (*Melospiza melodia*), Hairy Woodpecker (*Dryobates villosus*), and Northern Flicker (*Colaptes auratus*)

According to the OBBA of 2001-2005, 90 species were recorded within the 10 × 10 km square encompassing the study area, eight of which are SAR, including: Bank Swallow, Barn Swallow, Bobolink, Chimney Swift, Common Nighthawk, Eastern Meadowlark, Eastern Wood-Pewee, and Wood Thrush. Additionally, the MNRF identified two SAR birds as potentially present within the study area including Henslow's Sparrow and Eastern Meadowlark. Information from CVC identified recent observations of Bald Eagle and Peregrine Falcon within the Credit River valley corridor.

No SAR birds were observed within the study areas during field investigations; however, a Barn Swallow nest was observed under the Highway 401 Bridge over the Credit River. The Dry Fresh Graminoid Meadow (MEGM3) habitat upstream and downstream of the Highway 401 Bridge over the Credit River (Sites 10 and 11) was identified as potential habitat for Bobolink and Eastern Meadowlark. The Deciduous Forest communities at (Sites 8 and 10) were identified as potential Eastern Wood-Pewee habitat. Section 7.1 presents a detailed discussion of SAR birds with potential habitat present within the study area. A breeding bird survey is recommended to be completed in 2019 to provide further confidence as to actual habitat usage, if any, by SAR birds within the study area.

4.5.2 Herpetofauna

According to the ORAA, Jefferson Salamander and Snapping Turtle were the two SAR recorded within a 10 × 10 km encompassing the study area. Due to the late fall timing of the Site investigations, no reptiles or amphibians were incidentally observed within study area during field investigations.

4.5.3 Insects

During the 2018 field investigations, Monarchs were observed at Site 3a. A search of the OBA returned records for the Monarch, which was the only SAR insect found within a 10 × 10 km encompassing the study area. Additionally, CVC provided recent observations for Monarch within the Credit Valley corridor in 2011 and 2012. The MNRF did not identify the potential for any SAR insects within the study area.

4.5.4 Mammals

Several Grey Squirrels (*Sciurus carolinensis*) and White-tailed Deer (*Odocoileus virginianus*) were observed in forested areas of the natural valley corridors associated with watercourses in the study area and an Eastern Cottontail (*Sylvilagus floridanus*) was observed in the vicinity of Site 7b. No other evidence of mammals was observed within the study area during field investigations. MNRF did not identify the potential for SAR mammal within the study area.

4.6 Significant Wildlife Habitat

The study area is located within Ecoregion 7E. There are four categories of significant wildlife habitat within Ecoregion 7E, according to the *Significant Wildlife Habitat Technical Guide* (MNR 2000) and the *Significant Wildlife Habitat Eco-Regional Criterion Schedule* (MNRF 2015). The wildlife habitat assessment was based on vegetation communities and incidental wildlife observations documented during the Site investigations, as well as data collected from the background review.

A screening-level assessment of candidate SWH was completed based on the results of the background data collection. The wildlife habitats screened are summarized in Table 2 and are based on those identified by the MNRF for Ecoregion 7E (MNRF, 2015) as well as the Peel Caledon Significant Woodlands and Significant Wildlife Habitat Study (North-South Environmental et al. 2009). Wildlife habitats confirmed to meet the criteria as significant based on the existing data are denoted by a ‘Y’ while potential candidate SWH are denoted by a ‘P’. Those wildlife habitats determined as not present or do not meet the criteria for candidate significance are denoted by an ‘N’.

TABLE 2 Screening Assessment Summary of Significant Wildlife Habitat

Seasonal Concentrations of Animals							
N	Waterfowl Stopover and Staging Areas (Aquatic)	N	Waterfowl Stopover and Staging Areas (Terrestrial)	N	Shorebird Migratory Stopover Area	N	Raptor Wintering Area
N	Bat Hibernacula	P	Bat Maternity Colonies	P	Turtle Wintering Areas	N	Reptile Hibernaculum
N	Colonially - Nesting Bird Breeding Habitat (Bank/Cliff)	N	Colonially - Nesting Bird Breeding Habitat (Tree/Shrubs)	N	Colonially - Nesting Bird Breeding Habitat (Ground)	N	Migratory Butterfly Stopover Area
N	Landbird Migratory Stopover Areas	N	Deer Winter Congregation Areas				
Rare Vegetation Community							
N	Cliff and Talus Slopes	N	Sand Barren	N	Alvar	N	Old Growth Forest
N	Savannah	N	Tallgrass Prairie	N	Foraging areas with abundant masts ¹	N	Highly diverse areas ¹

Specialized Habitat for Wildlife							
N	Waterfowl Nesting Area	N	Bald Eagle and Osprey Nesting / Foraging / Perching	N	Woodland Raptor Nesting Habitat	N	Turtle Nesting Areas
N	Seeps and Springs	N	Amphibian Breeding Habitat (Woodland)	N	Amphibian Breeding Habitat (Wetland)	N	Woodland Area-Sensitive Bird Breeding Habitat
P	Mink, Fisher, Martin, or River Otter dens ¹						
Habitat for Species of Conservation Concern							
N	Marsh Bird Breeding Habitat	N	Open Country Bird Breeding Habitat	N	Shrub/Early Successional Bird Breeding Habitat	N	Terrestrial Crayfish
N	Rare Plant Species	P	Rare Wildlife Species				
Animal Movement Corridor							
N	Amphibian Movement Corridor	N	Migratory Bat Stopover Areas				

Note: ¹ subcategory which was included within the North-South Environmental et al. 2009 document but were not present within the MNRF 2015 document.

4.6.1 Seasonal Concentration Areas

At certain times of the year, some species of animals gather together from geographically wide areas to hibernate or to bask (e.g., some reptiles and bats), over-winter (e.g., deer yards), or to breed (e.g., Bullfrog breeding and nursery areas, bird breeding colonies). Maintenance of the habitat features that result in these concentrations can be critical in sustaining local or even regional populations of wildlife (MNRF 2015).

Based on the screening level assessment, there is potential for Bat maternity habitat particularly surrounding Sites 4B, 8, and 10. These Sites all contained large diameter snag trees adjacent to watercourses. There is also potential for turtle overwintering within the Credit River as there were a number of deep pools noted.

4.6.2 Rare Vegetation Communities and Specialized Habitat for Wildlife

Rare vegetation communities often contain rare species, particularly plants and small invertebrates, which depend on such habitats for their survival and cannot readily move to or find alternative habitats. Specialized habitat for wildlife is a diversity-based category, which means the more wildlife species a habitat contains, the more significant the habitat becomes. The largest and least fragmented habitats within an area will support the most significant populations of wildlife (MNRF 2015).

There were no rare vegetation communities observed at any of the proposed shaft locations within the study area. The habitats observed did not meet the criteria of specialized habitat for wildlife.

4.6.3 Habitat for Species of Conservation Concern (not Including Endangered or Threatened Species)

Rare wildlife status is based on species listed as Special Concern under the ESA or SARA, Global Rank (G-rank) or Provincial Rank (S-rank) status, identified through the NHIC. According to the *Significant Wildlife Habitat Technical Guide* (MNR 2000), the highest priority for protection should be provided to habitats of the rarest species (on a scale of global through to local municipality); it also states that habitats that support large populations of a species of concern should be considered significant (MNRF 2015).

There are several Species of Conservation Concern that were identified to potentially have habitat present within the study area including Bald Eagle, Eastern Wood-Pewee, Monarch, and Snapping Turtle. The preferred habitats of these species were observed at Sites 4a, 4b, 8, 10, and 11.

4.6.4 Animal Movement Corridors

Animal movement corridors are elongated areas used by wildlife as they move from one habitat to another. They are important to ensure genetic diversity in populations, to allow seasonal migration of animals and to allow animals to move throughout their home range from feeding areas to cover areas (MNRF 2015).

According to the guidelines for Ecoregion 7E and to the *Significant Wildlife Habitat Technical Guidelines*, significance may potentially occur if the following example habitats are present:

- Amphibian Movement Corridors: Movement corridors for amphibians moving from their terrestrial habitat to breeding habitat can be extremely important for local populations. The areas observed did not contain amphibian breeding habitat and therefore a movement corridor is not present.
- Bat Migratory Stopover Area: Stopover areas for long distance migrant bats are important during fall migration. Currently the only known significant stop over area is located in Long Point Ontario.

4.7 Species at Risk and Species of Conservation Concern

Species which are listed as Threatened or Endangered, and are protected by the provincial *Endangered Species Act*, 2007 or the federal SARA are discussed in this section. SAR listed as Special Concern are classified as Species of Conservation Concern. Several SAR including Butternut, Bald Eagle, Bank Swallow, Barn Swallow, Bobolink, Chimney Swift, Common Nighthawk, Eastern Meadowlark, Eastern Wood-Pewee, Henslow's Sparrow, Peregrine Falcon, Wood Thrush, Jefferson Salamander, and Snapping Turtle were identified during background review. All potential SAR, their habitat preferences, and their potential within the study area are discussed below.

Butternut was identified by MNRF and CVC as having the potential to occur within the study area. Butternut is listed as 'Endangered' under the ESA and SARA. Butternut is a shade intolerant tree that is often found as a minor component of deciduous stands, or as large populations in certain floodplains.

They grow in rich, moist, and well-drained soil often found along streams. They may also be found on well-drained gravel Sites, especially those made up of limestone (MNRF 2018b). Although Butternut was historically found near the study area, this tree species was not inventoried during the 2018 field investigation and there is low potential for the species to occur within the study area.

Bald Eagle are listed as 'Special Concern' under the ESA and are not listed on SARA. Bald Eagles prefer a variety of habitats and forest types. They usually nest in large trees such as poplar and pine and favour habitat close to water bodies such as lakes and large rivers where they do most of their hunting. In winter they sometimes congregate near open water or in places with a high deer population where carcasses can be easily found (MNRF 2018b). CVC provided Bald Eagle observations within the Credit River valley corridor from 2015 and 2018. There is potential habitat for Bald Eagle within the FODM4 communities near the Credit River within the study area at Site 10.

Bank Swallow are listed as 'Threatened' under the ESA and SARA. They nest in burrows in natural and human-made settings where there are vertical faces in silt and sand deposits. Many nests are on banks of rivers and lakes, but they are also found in active sand and gravel pits or former ones where the banks remain suitable. They breed in colonies ranging from several to a few thousand pairs (MNRF 2018b). There is limited potential for Bank Swallow habitat within the study area.

Barn Swallows are listed as 'Threatened' under the ESA and SARA. They prefer farmlands or rural areas but are also found in open forests or near water for feeding. They prefer buildings or other human-made structures to construct their nests (MNRF 2018b). There is high potential for Barn Swallow within the study area as a Barn Swallow nest was observed on the Highway 401 Bridge over the Credit River.

Bobolink area listed as 'Threatened' under the ESA and SARA. Bobolinks historically lived in North American tallgrass prairie and other open meadows. Since the clearing of native prairies in Ontario, Bobolinks have started residing in hayfields. They live in large, open expansive grasslands with dense ground cover, hayfields, meadows or fallow fields or marshes and often build their nests on the ground in dense grasses (MNRF 2018b). There is potential habitat for Bobolink habitat within the study area in the Dry Fresh Graminoid Meadow (MEGM3) communities at Sites 10 and 11.

Chimney Swift is listed as 'Threatened' under the ESA and SARA. Prior to European settlement, Chimney Swift nested on cave walls and in hollow trees and cavities in old growth forests. More recently, they have been found to prefer areas near urban settlement and nest or roost in chimneys and other human-made structures with a preference for areas near water (MNRF 2018b). There is limited potential for Chimney Swift habitat within the study area.

Common Nighthawk is listed as 'Threatened' under SARA and as 'Special Concern' under the ESA. Common Nighthawk is commonly found on open ground, clearings in dense forests, or ploughed fields. They are also found on gravel beaches or barren areas with rocky soils, open woodlands, and flat gravel roofs (MNRF 2018b). There is limited potential for Common Nighthawk habitat within the study area.

Eastern Meadowlark is listed as 'Threatened' under the ESA and SARA. They prefer open, grassy meadows, farmland, pastures, hayfield or grasslands with elevated singing perches. They are also found on cultivated land, in weedy areas, or in old orchards with nearby open grassy areas greater than 10 ha in size (MNRF 2018b). There is potential habitat for Eastern Meadowlark within the study area in the Dry Fresh Graminoid Meadow (MEGM3) communities at Sites 10 and 11.

Eastern Wood-Pewee is listed as 'Special Concern' by SARA and by the ESA, and it is considered a Species of Conservation Concern. This species prefers open deciduous, mixed or coniferous forests with little understory. It can also be found in forest clearings and edges, farm woodlots, or parks (MNRF 2018b). There is potential habitat for Eastern Wood-Pewee within the study area provided by the forested communities (FODM4 and FODM4-6) near Sites 8, and 10.

Henslow's Sparrow is listed as 'Endangered' under the ESA and SARA. They have been found in abandoned farm fields, pastures, and wet meadows. Henslow's Sparrow tend to avoid fields that have been grazed or are crowded with trees and shrubs. It prefers large, dense, tall grasslands where it can more easily conceal its small ground nest (MNRF 2018b). There is no potential for Henslow's Sparrow habitat within the study area.

Peregrine Falcon are listed as 'Special Concern' under ESA and SARA. They usually nest on tall, steep cliff ledges close to large bodies of water however some birds have adapted to urban environments and will nest on ledges of tall buildings. Urban areas offer good feeding opportunities provided by pigeons and starlings (MNRF 2018b). Suitable habitat is not present for Peregrine Falcon within the study area.

Wood Thrush area listed as 'Threatened' under the ESA and SARA. They prefer mature deciduous and mixed (conifer-deciduous) forests with moist stands of trees, well-developed undergrowth, and tall trees for singing perches. These birds prefer large forests, but they will also use smaller stands of trees. They build their nests in living saplings, trees or shrubs, usually Sugar Maple or American Beech (MNRF 2018b). There is limited potential for Wood Thrush within the study area.

Monarch butterfly is listed as 'Special Concern' under the ESA and SARA, and it is considered a Species of Conservation Concern. Monarchs use three different types of habitat throughout their life cycle. Only the caterpillars feed on milkweed plants and are confined to meadows and open areas where milkweed grow. Adult butterflies can be found in more diverse habitats where they feed on nectar from a variety of wildflowers (MNRF 2018b). There is high potential for Monarch habitat within the study area, such as Site 4a.

Jefferson Salamander is listed as 'Endangered' under the ESA and SARA. Jefferson Salamanders are found in deciduous or mixed forests with undisturbed forest floors. Adults live in moist, loose soil, under logs, or in leaf litter. Breeding ponds are generally vernal pools that are fed by groundwater, snowmelt, or surface water. They spend the winter underground in mammal burrows, rock crevices, or other underground

cavities where they can get below the frost line and avoid freezing temperatures (MNRF 2018b). There is limited potential for Jefferson Salamander within the study area.

Snapping Turtles are listed as 'Special Concern' under the ESA and SARA, and they are considered a Species of Conservation Concern. Snapping Turtles are found in permanent, semi-permanent fresh water or in marshes, swamps or bogs. They prefer rivers and streams with soft muddy banks or bottoms and often use soft soil or clean dry sand on south-facing slopes for nest Sites. They may nest at some distance from water and often hibernate together in groups in mud under water (MNRF 2018b). There is potential for Snapping Turtle habitat within the study area, specifically at Site 10.

5 EXISTING AQUATIC HABITAT

5.1 Aquatic Habitat Characterization

The study area has two watercourses within 30 m of proposed work locations: Mullet Creek and the Credit River. Detailed aquatic habitat assessments were completed to document existing conditions and identify the presence of fish habitat for both watercourses within the vicinity of shaft location study areas.

Mullet Creek

Upstream Reach

The upstream survey reach consisted of the section of Mullet Creek between Derry Road West and the Highway 401 Bridge. Within the reach, the channel flowed in a general southeast direction and then turned to flow south under the Highway 401 Bridge. The channel flowed through a vegetated shallow valley area with a steep bank (Highway 401 embankment) on the south side and a wide floodplain area on the north bank.

The south bank had been stabilized with gabion baskets along the edge of the creek for most of the survey reach. The channel was relatively straight with only a slight meander pattern observed. The floodplain area and nearshore margins of the creek contained dense emergent vegetation throughout the entire reach. Most substrates within the reach were covered with submergent algae. Clumps of Watercress (*Nasturtium officinale*), a groundwater indicator species, were observed scattered throughout the watercourse channel.

A storm sewer outlet culvert and small side channel entered the watercourse channel from the north approximately 5 m downstream of the Derry Road West culvert. The valley slopes were vegetated with deciduous trees and shrubs which overhung the channel from the south bank in places. Channel morphology within the reach consisted primarily of run habitats with slow to moderate flow, riffles, and pools.

Two pools were observed, one on the slight bend as the channel turned toward the Highway 401 culvert near the downstream end of the reach and the second pool was midway through the reach with a large overhanging willow. Pools had a mean wetted width of 4.0 m with a maximum depth of 0.27 m. Bankfull width was 10.1 m with an associated bankfull depth of 0.62 m. Substrates in pools consisted of cobble, gravel, and sand.

Mean wetted width within run areas was 3.2 m with a maximum depth of 0.20 m. Bankfull width was measured at 13.5 m with an associated bankfull depth of 0.45 m. Substrates within runs were dominated by cobble with pockets of gravel and sand, and silt along the margins.

Riffles had a mean wetted width of 3.7 m with a maximum depth of 0.14 m. Bankfull width was 10.2 m with an associated depth of 0.4 m. Substrates in riffles were dominated by algae covered cobble, with pockets of gravel and small amounts of sand. Aquatic macrophyte growth within the reach was dominated by emergent vegetation which consisted of cattails, grasses, and Watercress with submergent algae present on substrates and a few scattered clumps of submergent grasses.

The riparian zone was well vegetated with grasses and herbaceous plants for ground cover and woody shrubs and deciduous trees which shaded the channel in some areas. Instream habitat was limited to instream and overhanging vegetation, small amounts of instream and overhanging woody debris, and cover opportunities provided by cobble substrates. Habitat present likely provides sufficient opportunities to support various life cycle requirements of a bait/forage fish community.

Downstream Reach

Within the downstream survey reach, the creek flowed south from Highway 401 for approximately 160 m to the Century Avenue Bridge which was considered the end point for the survey area. Within the downstream survey reach, Mullet Creek consisted of a defined fairly straight channel with limited sinuosity. The creek flowed through a highly urban environment within a narrowly entrenched V-shaped river valley with a constricted floodplain area flanked by steep valley walls. The valley was well vegetated with deciduous thicket and deciduous forest both east and west of the creek.

Both creek banks were lined with gabion baskets which had failed and slumped in some areas. Dense growth of Common Reed within the channel was present immediately downstream of the Highway 401 Bridge which had created a backwater effect under the bridge. The nearshore margins of both banks were lined with emergent vegetation throughout the survey reach with Watercress present along the toe of the creek banks which indicated that groundwater inputs may be present.

A natural knick point in the channel had created a small cascade approximately 0.3 m high with a deep scour pool immediate downstream approximately 55 m downstream of the Highway 401 Bridge. An exposed cobble/gravel bar existed mid-channel approximately 70 m downstream of the Highway 401 Bridge. Channel morphology within the reach was varied and consisted of riffles, runs, and pools.

Mean wetted depth within riffles was 2.2 m with a maximum wetted depth of 0.14 m. Bankfull width was determined to be 5.0 m with an associated bankfull depth of 0.45 m. Substrates within riffles consisted of cobble and gravel.

Run areas had a mean wetted width of 4.1 m with a maximum wetted depth of 0.21 m. Bankfull width was measured at 5.6 m with an associated bankfull depth of 0.55 m. Substrates in runs consisted primarily of cobble and gravel with some sand present.

Pool areas had a mean wetted width of 2.2 m with a maximum depth of 0.51 m. Bankfull width and depth were 6.0 m and 1.0 m, respectively. Substrates in pools consisted of cobble, gravel, and sand. Aquatic macrophyte growth within the channel consisted of emergent vegetation composed of Common Reed, cattails, rushes, sedges, Watercress, and submergent algae.

The riparian zone was well vegetated with grasses and herbaceous plants for ground cover and shrubs and deciduous trees along both banks which provided some overhead shade and cover. Instream habitat consisted of instream and overhanging vegetation and small amounts of instream and overhanging woody debris with additional cover opportunities provided by undercut banks and failed gabion basket which had slumped into the creek in places.

Fish Habitat Assessment

Within the survey area, the creek provides habitat for various life cycle processes for a bait/forage fish community including nursery, rearing, and spawning habitat. Aquatic habitat characterization mapping for Mullet Creek is provided in Figure 3.

Credit River

Upstream Reach

Upstream of Highway 401, the Credit River flowed as a defined channel within a wide low-lying floodplain area. The river within the survey reach flowed through a combination of open agriculture areas and grassy meadow with scattered deciduous trees. Both banks contained deciduous trees and shrubs along the top of the slope for sporadic stretches of the survey reach which overhung the channel in places providing shade. The outside meander bends on both banks were steep with large erosion scars an indication that erosion is ongoing during high flow events. A drainage channel entered the river channel from the west bank approximately 45 m upstream of the bridge. A gravel access path which connected agricultural fields north and south of the bridge was present along the east bank.

An exposed cobble/gravel bar which had resulted in a small side channel refuge area was present along the west bank approximately 250 m upstream of the Highway 401 Bridge. Morphological channel features within the reach were diverse and consisted of runs, riffles, and pools but were dominated by run habitats.

Mean wetted width within runs was approximately 20 m with a maximum wetted depth of 0.75 m. Bankfull depth was estimated to be 1.5 m. Substrates within runs were dominated by cobble and gravel with sand and silt present in slower velocity areas.

Riffles had a mean wetted width of approximately 30 m and a maximum depth of 0.45 m. Bankfull depth was estimated to be 1.5 m. Substrates observed within riffles were dominated by cobble and boulder with some gravel present.

Pool areas had a mean wetted width of approximately 25 m with a maximum depth of greater than 2 m. Bankfull depth was also greater than 2 m. Substrates within pools were dominated by sand and silt with lesser amounts of gravel and cobble.

Bankfull width for all morphological features was not clearly identified but was determined to be approximately 30 to 40 m. Aquatic macrophyte growth within the reach was sparse and limited to emergent grasses and cattails with a clump of Watercress along the east bank. Vegetation growth within the riparian zone was dominated by ground cover which consisted of grasses and herbaceous plants with scattered woody shrubs and deciduous trees.

Diverse and high-quality fish habitat and cover was observed within the upstream reach and comprised primarily of overhanging vegetation (grasses, shrubs, and trees) and overhanging woody debris from fallen trees and branches particularly when associated with undercut banks and pools. Additional cover was provided by instream boulders and cobble throughout the channel and small amounts of instream vegetation. The large boulders present within the channel act as velocity breaks and likely provide refuge areas during high flows and for fish migrating upstream to spawn.

Downstream Reach

Downstream of the Highway 401 Bridge, the river continued in a general south direction as a defined channel constricted to the west by steep valley walls with a wider low-lying area on the east. The adjacent land use consisted of open agricultural fields with deciduous tree lines approximately 15 to 20 m wide along both bank slopes and top of bank. Partially fallen trees overhung the channel in places. The channel in the downstream reach was relatively straight and consisted of a gentle bend in the river pattern to the east. The west bank showed some signs of recent erosion near the south end of the survey reach on the outside bank of the bend. Channel morphology in the downstream reach consisted of a swift run immediately downstream of the bridge, which transitioned to a riffle section.

Mean wetted width within the run was approximately 25 m with a maximum depth of 0.42 m. Bankfull width was approximately 30 to 35 m with an associated bankfull depth in the run of approximately 1.5 m. Substrates within the run consisted of cobble and gravel with sand and silt along the margins.

Mean wetted width within the riffle was approximately 25 m with a maximum depth of 0.25 m. Bankfull depth in the riffle area was 1.5 m. Substrates within the riffle were cobble and boulder with pockets of

gravel and sand along the margins. Instream vegetation was sparse and consisted entirely of submergent algae along the west bank immediately downstream of the bridge.

The riparian zone was well vegetated with grasses and tall herbaceous plants (goldenrod, aster etc.) along the edge of the river with woody shrubs and deciduous trees which provided some shade for the channel. Instream habitat within the downstream reach was composed of overhanging vegetation (grasses, shrubs, and partially fallen trees), instream and overhanging woody debris (large fallen branches), with small amounts of cover provided by instream vegetation and instream boulders throughout the section. Aquatic habitat characterization mapping for the Credit River is provided in Figure 4.

Fish Habitat Assessment

Overall, high quality salmonid spawning substrate and cover habitat was observed throughout the study area and observations made by Matrix during the Site investigations identified Chinook Salmon (*Oncorhynchus tshawytscha*) spawning redds and Chinook Salmon in post-spawn condition upstream and downstream of the Highway 401 Bridge, as such the Credit River adjacent to the study area provides spawning habitat for Pacific salmonid species. Additionally, although they would not be spawning within the study area, this area would act as a migratory route and provide important habitat and feeding opportunities for Brown Trout (*Salmo trutta*), Rainbow Trout (*Oncorhynchus mykiss*), and Atlantic Salmon (*Salmo salar*) as they move upstream to spawning areas. The Credit River within the study area also provides habitat necessary for various life cycle processes for resident warmwater sport fish and bait/forage fish including nursery, rearing and spawning habitat.

A summary of each aquatic habitat characterization for Mullet Creek and the Credit River is provided in Table 3.



- Shaft Location Site
- ~ Pool
- ~ Watercourse
- Highway
- Riffle
- Run
- # Field Note
- 0.35 Water Depth (m)

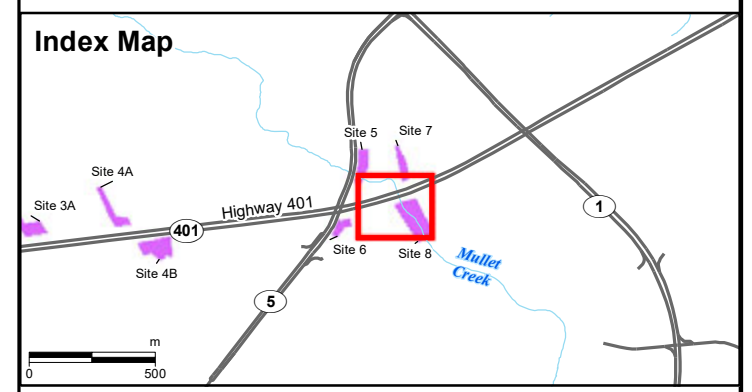
Field Note

- 1 Dense emergent and submergent vegetation within channel
- 2 Watercress present along toe of bank slope
- 3 Dense emergent vegetation growth along nearshore margin and bank
- 4 Exposed cobble/gravel bar
- 5 Failing gabion basket collapsed in creek channel
- 6 Small cascade resulting in deep scour pool downstream
- 7 Dense cluster of Phragmites growth has created backwater area under bridge
- 8 Exposed mid-channel cobble bar upstream of culvert inlet
- 9 Clumps of Watercress along banks
- 10 Red Oiser Dogwood overhanging pool
- 11 Dead fallen tree overhanging creek channel
- 12 Large willow overhanging pool
- 13 Clumps of Watercress scattered along bank toes throughout run area
- 14 Storm sewer outlet and small side channel

General Notes:

- Emergent vegetation present along toe of both banks throughout reach
- Wide floodplain area on north bank upstream of Highway 401 contains dense emergent vegetation
- Submergent algae present on substrates throughout reach
- Both banks stabilized with gabion baskets downstream of highway 401 and on south bank upstream of Highway 401

Index Map



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 Imagery Service Layer Credits: © 2019 Microsoft Corporation © 2019 DigitalGlobe © CNES (2019) Distribution Airbus DS
 1:1,000 metres
 0 10 20
 NAD 1983 UTM Zone 17N



Region of Peel
 Highway 401 Watermain and Sanitary Trunk Sewer Project

**Aquatic Habitat Characterization
 Mullet Creek**

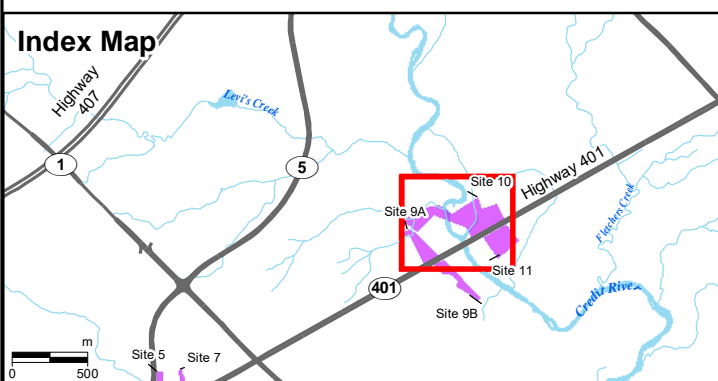
Date: January 2019 Project: 27896 Submitter: E. Wilkinson Reviewer: A. Fausto

Disclaimer: The information contained herein may be compiled from numerous third party materials that are subject to periodic change without prior notification. While every effort has been made by Matrix Solutions Inc. to ensure the accuracy of the information presented at the time of publication, Matrix Solutions Inc. assumes no liability for any errors, omissions, or inaccuracies in the third party material.



- Shaft Location Site
- Coldwater Sportfish Migratory Corridor
- Pool
- Water Body
- Watercourse
- Bank Erosion Site
- Riffle
- Run
- Field Note
- Chinook Salmon Spawning Location
- 0.35** Water Depth (m)

- Field Note**
- 1 Steep bank slope vegetated with trees and shrubs with signs on ongoing erosion
 - 2 Partially fallen trees in floodplain overhanging river channel
 - 3 Submergent vegetation/algae along west bank in the nearshore area
 - 4 Storm sewer outlet channel
 - 5 Clumps of Watercress scattered along toe of bank slope
 - 6 Large exposed mid-channel cobble/gravel bar with small side channel refuge area
 - 7 Large overhanging trees
 - 8 Overhanging trees and large woody debris overhanging and submerged in channel
 - 9 Large overhanging willows and large woody debris protruding from bank, overhanging channel and submerged in channel
 - 10 Gravel access path connecting agricultural fields



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 (2019) Distribution Airbus DS

1:2,500 metres
 0 25 50
 NAD 1983 UTM Zone 17N



Region of Peel
 Highway 401 Watermain and Sanitary Trunk Sewer Project

Aquatic Habitat Characterization Credit River

Date: January 2019 Project: 27896 Submitter: E. Wilkinson Reviewer: A. Fausto

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TABLE 3 Summary of fish habitat within the study area

Watercourse ID	Location	Flow	Thermal Regime	Fish Habitat	Fish Species Present	Substrate	Vegetation	Features/Characteristics	Important/Key Fish Habitat	Species at Risk Habitat
Credit River	Highway 401 crossing, 160 m east of Creditview Road UTM (17T 602558 4829596)	Permanent	Resident warmwater with a migratory coldwater corridor	Sport fish: Direct Forage Fish: Direct	MNRF: American Eel Credit Valley Conservation: Blacknose Dace, Bluntnose Minnows, Brook Stickleback, Brown Bullhead, Brown Trout, Chinook Salmon, Common Carp, Common Shiner, Creek Chub, Fantail Darter, Fathead Minnow, Hornyhead, Johnny Darter, Largemouth Bass, Longnose Dace, Northern Hog Sucker, Pumpkinseed, Rainbow Darter, Rainbow Trout, River Chub, Rock Bass, Sea Lamprey, Stonecat, White Sucker	Dominant – Boulder, cobble, gravel Margins – sand and silt	Emergent: cattails, grasses, Watercress Submergent: algae Floating: none Riparian: grasses, herbaceous plants, shrubs, deciduous trees	<ul style="list-style-type: none"> Defined channel which meandered through wide floodplain Riffle dominated channel morphology with deep meander bend pools and short run sections Substrates dominated by cobble, gravel and boulder Moderate flow 	<ul style="list-style-type: none"> Species at Risk Habitat for American Eel Recreational warmwater sport fish habitat and coldwater sport fish migration corridor Confirmed Chinook Salmon spawning habitat Potential spawning habitat for warmwater sport fish Spawning habitat for bait/forage fish 	<ul style="list-style-type: none"> American Eel Habitat
Mullet Creek	Upstream and Downstream of Highway 401 between Derry Road West and Century Avenue UTM (17T 600686 4828582)	Permanent	Warmwater	Sport fish: Indirect Forage Fish: Direct	MNRF: None Credit Valley Conservation: Common Shiner, Blacknose Dace, Creek Chub, Rock Bass, Fantail Darter, Rainbow Darter, Longnose Dace	Dominant – cobble, gravel, sand Margins – silt	Emergent: cattails, grasses, Watercress Submergent: algae, grasses Floating: none Riparian: grasses, herbaceous plants, shrubs, deciduous trees	<ul style="list-style-type: none"> Defined channel with slight meander pattern within shallow confined valley Gabion basket bank stabilization along both banks throughout study area Upstream of Highway 401 wide floodplain area densely vegetated with cattails Channel morphology alternating riffles and runs with small pools 	<ul style="list-style-type: none"> Cyprinid spawning habitat 	None

5.2 Fish Community

Fish community sampling was not conducted during field investigations due to the substantial fish community information currently available. Fish community information for watercourses within the study area compiled during background review is provided below.

Mullet Creek

The Credit River Fisheries Management Plan indicates that Mullet Creek within the vicinity of Highway 401 is a small warmwater community dominated by cyprinids. The plan indicates that species typical of this habitat classification include Creek Chub (*Semotilus atromaculatus*), Blacknose Dace (*Rhinichthys atratulus*), Brook Stickleback (*Culaea inconstans*), Bluntnose Minnow (*Pimephales notatus*), and Fathead Minnow (*Pimephales promelas*).

Fish records for Mullet Creek exist from 1954 to the present. CVC sampling at a long-term monitoring station approximately 450 m upstream of the study area upstream of Meadowvale Boulevard resulted in the capture of Blacknose Dace and Creek Chub. Based on information received from CVC (Pers. Comm; 2018), historical fish sampling within the study area downstream of Derry Road found the following species present: Blacknose Dace, Creek Chub, Common Shiner (*Luxilus cornutus*), Fantail Darter (*Etheostoma flabellare*), Rainbow Darter (*Etheostoma caeruleum*), and Rock Bass (*Ambloplites rupestris*). A sampling event in 2000 within the study area between Highway 401 and Derry Road resulted in the capture of Longnose Dace (*Rhinichthys cataractae*).

Credit River

According to the Credit River Fisheries Management Plan (CVC and MNR 2002) the Credit River within the study area is coolwater/warmwater community and is managed as a large warmwater community. Fish species records for the Credit River are available from 1954 to 2018.

Fish sampling conducted downstream of the shaft location study area at the Highway 401 in 2000 collected the following species:

- Rainbow Trout, Brassy Minnow (*Hybognathus hankinsoni*), Common Shiner, Spottail Shiner (*Notropis hudsonius*), Blacknose Dace, Creek Chub, Brown Bullhead (*Ameiurus nebulosus*), Rock Bass, Rainbow Darter, Iowa Darter (*Etheostoma exile*), and Johnny Darter (*Etheostoma nigrum*). CVC conducts semi-annual fish community monitoring approximately 2 km upstream of the study area within Meadowvale Conservation Area. According to information provided by CVC, species collected at this station which may be present within the study area include: Blacknose Dace, Bluntnose Minnows, Brook Stickleback, Brown Bullhead, Brown Trout, Chinook Salmon, Common Carp (*Cyprinus carpio*), Common Shiner, Creek Chub, Fantail Darter, Fathead Minnow, Hornyhead Chub (*Nocomis biguttatus*), Johnny Darter, Largemouth Bass (*Micropterus salmoides*), Longnose Dace, Northern Hog Sucker (*Hypentelium nigricans*), Pumpkinseed (*Lepomis gibbosus*), Rainbow Darter, Rainbow Trout, River Chub (*Nocomis micropogon*), Rock Bass, Sea Lamprey (*Petromyzon marinus*), Stonecat (*Noturus flavus*), and White Sucker (*Catostomus commersoni*; CVC 2018).

6 SUMMARY OF ENVIRONMENTAL CONSTRAINTS

6.1 Terrestrial Habitat Constraints

Several biological constraints, as they relate to the terrestrial ecosystem, exist within the Highway 401 study area. The construction of the new shaft locations will occur within mainly a high-density urbanized area of Mississauga. The main areas that will be affected by construction are the tunnelling shaft locations. The ten paired tunnelling shaft footprints will be located in primarily urbanized areas: either on roads, sidewalks, or public lands and valley corridors adjacent to infrastructure. However, some trees within valley corridors or ornamental trees found within or immediately adjacent to construction areas may need to be removed and replaced in accordance with the Landscape Restoration Plan that will be developed to meet the requirements set forth in the *Region of Peel Official Plan* (Region of Peel 2016) and the *Mississauga Official Plan* (The City 2016).

No wetlands (evaluated or unevaluated), rare vegetation communities or ANSIs were identified within the study area during field investigations or background review from MNRF, OBBA, ORAA, OBA, and historic records from NHIC. The woodland adjacent to Site 4B and south of Argentina Road meets the Significant Woodland Criteria within the Region of Peel and City of Mississauga Official Plans. Candidate SWH is also present within several Sites throughout the project area and includes Sites 4A, 4B, 8, 10, and 11. These Sites contain a mixture of riparian woodland, as well as meadow habitats that could be utilized as Bat maternity habitat, or SWH for rare species such as those identified in Table 4. Table 4 provides a summary of the provincial and federal designations and protection status of those SAR/SCC with potential habitat within the study area.

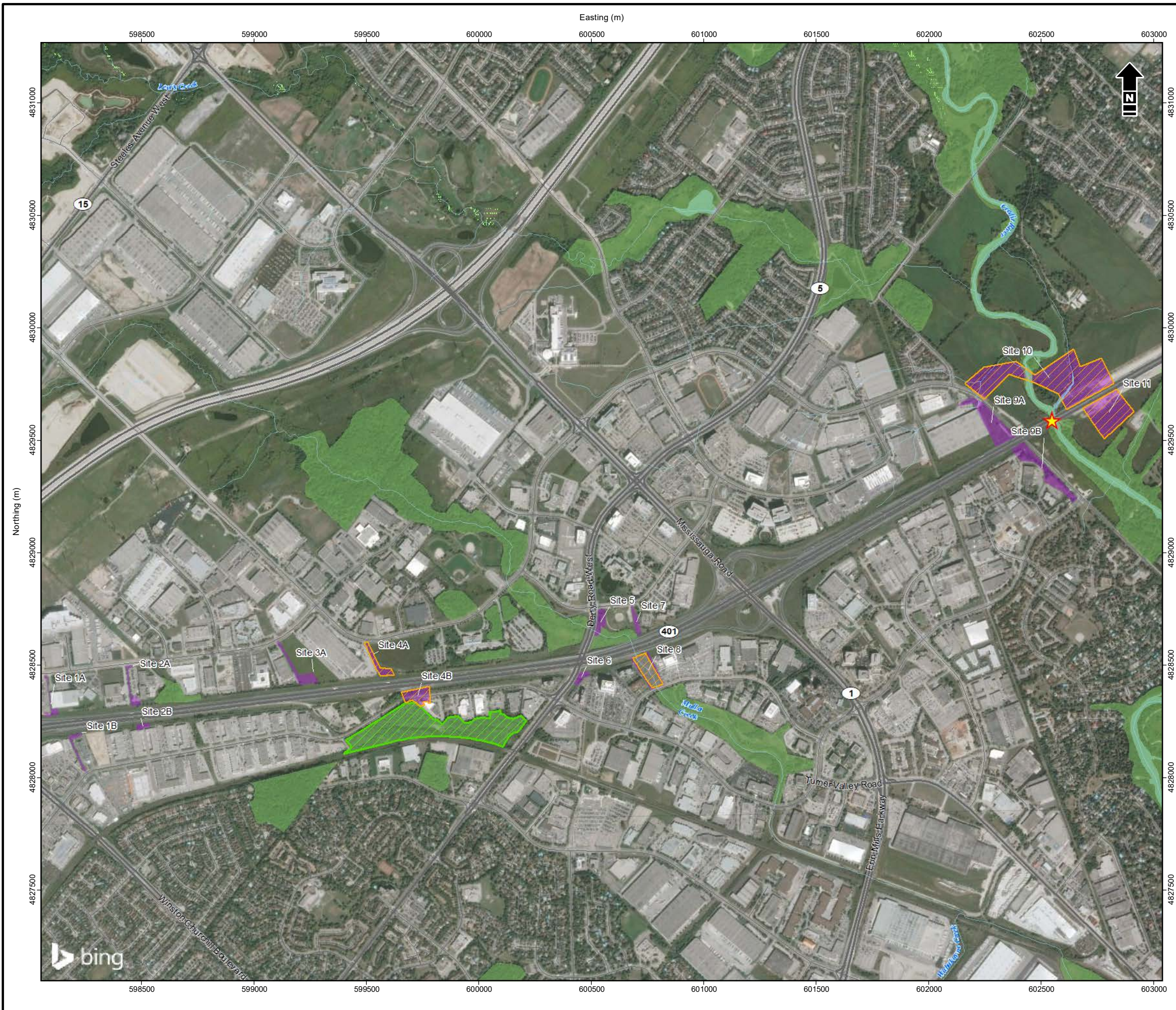
One confirmed SAR was observed during the 2018 field program A Barn Swallow nest was observed on the Highway 401 Bridge over the Credit River; as such nesting habitat for the species is confirmed in the study area. This species is designated as Threatened under the ESA. Several additional SAR and SCC have suitable habitat within the study area. Avoidance and mitigation techniques outlined below should be implemented to avoid impacts on these species. Terrestrial constraints identified within the study area are shown in Figure 5.

TABLE 4 Potential SAR and Species of Conservation Concern with habitat within the Study Area

Species		Designations			Protections	Suitable Habitat in Environmental Study Area
Common Name	Scientific Name	Federal (COSEWIC)	Federal (SARA)	Provincial (SARO)		
Bald Eagle	<i>Haliaeetus leucocephalus</i>	-	-	Special Concern	MBCA, FWCA, PPS	Potential - FODM4 communities within the Credit River valley corridor at Site 10
Barn Swallow	<i>Hirundo rustica</i>	Threatened	Threatened	Threatened	ESA, MBCA	Confirmed - Nest observed on Highway 401 Bridge in vicinity of Sites 10 and 11
Bobolink	<i>Dolichonyx oryzivorus</i>	Threatened	Threatened	Threatened	SARA, ESA, MBCA	Potential - Graminoid meadow communities at Sites 10 and 11
Eastern Meadowlark	<i>Sturnella magna</i>	Threatened	Threatened	Threatened	SARA, ESA, MBCA	Potential - Graminoid meadow communities at Sites 10 and 11
Eastern Wood-Pewee	<i>Contopus virens</i>	Special Concern	Special Concern	Special Concern	MBCA, FWCA, PPS	Potential - FODM4 and FODM4-6 communities associated with the Mullet Creek and Credit River valley corridors at Sites 8, and 10
Monarch	<i>Danaus plexippus</i>	Endangered	Special Concern	Special Concern	FWCA, PPS	Potential - Mixed meadow communities at Site 4a, and the graminoid meadow communities at Sites 10 and 11, which contained Milkweed
Snapping Turtle	<i>Chelydra serpentina</i>	Special Concern	Special Concern	Special Concern	FWCA, PPS	Potential - Credit River in the vicinity at Site 10

Notes:

- SARA- Species at Risk Act
- MBCA- Migratory Birds Convention Act
- FWCA- Fish and Wildlife Conservation Act
- ESA- Endangered Species Act
- FA- Fisheries Act
- PPS- Provincial Policy Statement



- Shaft Location Site
- Significant Natural Areas and Natural Green Spaces
- Candidate Habitat for Species at Risk and Significant Wildlife Habitat
- Significant Woodland
- Wetland
- Water Body
- Watercourse
- Highway
- Road
- Barn Swallow Nesting Site

Index Map

1:17,000
metres

180 0 180 360
NAD 1983 UTM Zone 17N

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ENVIRONMENT & ENGINEERING

Region of Peel
Highway 401 Watermain and Sanitary Trunk Sewer Project

Terrestrial Ecosystem Constraints

Date: November, 2019	Project: 27896	Submitter: E. Wilkinson	Reviewer: A. Fausto
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6.2 Aquatic Habitat Constraints

A few biological constraints, as they relate to fish and fish habitat exist within the 401 study area. All locations within the study area have been previously disturbed and no new watercourse crossings, watercourse realignments or major alterations within channels or riparian areas are proposed. Background research and field studies, coupled with agency consultation, were used in the determination of habitat function and significance, including significant fish and fish habitat and critical features, aquatic resources, hydrology and groundwater recharge discharge areas, and high water table areas.

MNRF has identified the Credit River near Site 10 as potential SAR habitat for American Eel, listed as 'Endangered' provincially and protected under the ESA, and 'under consideration' for listing federally under SARA. Since American Eel are protected provincially, ESA permitting requirements may apply for the proposed undertaking should any in-water works be deemed necessary.

Redside Dace, listed as 'Endangered' under the ESA and SARA was identified during background review as historically present within the Credit River. Redside Dace was last observed within the study area in 1999; however, MNRF did not provide information regarding designated habitat for Redside Dace for the Credit River within the study area.

The Credit River is also considered Candidate SWH for overwintering turtles, such as Snapping Turtles, which was identified as potentially occurring within the Study Area.

According to the Credit River Fisheries Management Plan, the Credit River is a warmwater thermal regime with an associated in-water timing window (where works are permitted) of July 1 to March 31. However, correspondence from MNRF has indicated that the Credit River is considered a warmwater system with a coldwater migratory corridor. Due to the presence of migratory coldwater species and American Eel habitat, a more restrictive timing window will likely apply, and will likely only be permitted between November 15 and January 31. Within the study area, various coldwater salmonid species migrate upstream in the Credit River to access spawning habitats in the upper reaches. Field observations by Matrix biologists identified salmonid species spawning immediately upstream of the Highway 401 Bridge. Additionally, recreational sport fish including Smallmouth Bass (*Micropterus dolomieu*) are considered present within the study area as well as a diverse variety of warmwater and coolwater bait/forage fish species. When considering the background and field investigation data collected, there is ample evidence to indicate that various sport fish species depend on the Credit River within the vicinity of the Highway 401 Bridge for important life processes, including migration to upstream spawning locations during the spring (trout) and fall (salmon), as well as spawning and nursery habitat for young-of-the-year warmwater sport fish.

Mullet Creek has been identified as a warmwater thermal regime, which supports a warmwater bait/forage fish community. Consequently, it is likely that any required in-water works or work on channel banks will only be permitted between July 1 and March 31 for Mullet Creek.

For both the Credit River and Mullet Creek, the minimum setback is considered whichever is greater of the watercourse meander belt width or 15 m. Figure 6 indicates the areas of constraints with respect to fish and fish habitat within the Credit River and Mullet Creek in the Highway 401 study area.

7 PRELIMINARY ASSESSMENT OF POTENTIAL IMPACTS

7.1 Potential Terrestrial Impacts

Activities undertaken in relation to this project will be in compliance with SARA and the ESA. The existing Site conditions of the study area were evaluated against the proposed tunneling, open cut and shaft location disruptions in order to assess any resulting potential impacts to the terrestrial ecosystem and SAR. It is anticipated that all impacts associated with these works can be avoided or properly mitigated; however, a breeding bird is recommended prior to construction to assess potential SAR habitat use in the vicinity of study areas.

There is potential to temporarily disturb the meadows, thickets, watercourses, and forests from nearby works in a small area in the vicinity of shaft locations and laydown areas to facilitate the use of heavy equipment and materials required for shaft construction. The work is not expected to significantly obstruct the natural functions of these features; however, some minor disruption during construction activities may occur. There is also potential to temporarily disturb vegetated areas and wildlife during construction through minor removal/damage to vegetation and noise during construction. All disturbances are expected to be temporary, and wildlife movement will remain as status quo. No SAR or SAR habitat is anticipated to be permanently impacted by construction works.

With appropriate mitigation measures, impacts to environmentally sensitive areas and SAR will be kept to a minimal level. The recommended mitigations intended to avoid permanent impacts and contraventions under the ESA, *Migratory Birds Convention Act* (MBCA; Government of Canada 2017), or FWCA are provided below in Section 9.1.

7.2 Potential Aquatic Impacts

As part of the proposed tunneling, open cut and shaft construction works within the RoW, construction works which could potentially impact fish and fish habitat have been proposed within 30 m of two fish bearing watercourses, including the Credit River and Mullet Creek. This assessment of potential impacts has been completed using the DFO Pathways of Effects (POE) diagrams for Projects near water (DFO 2018b) based on the following project works:

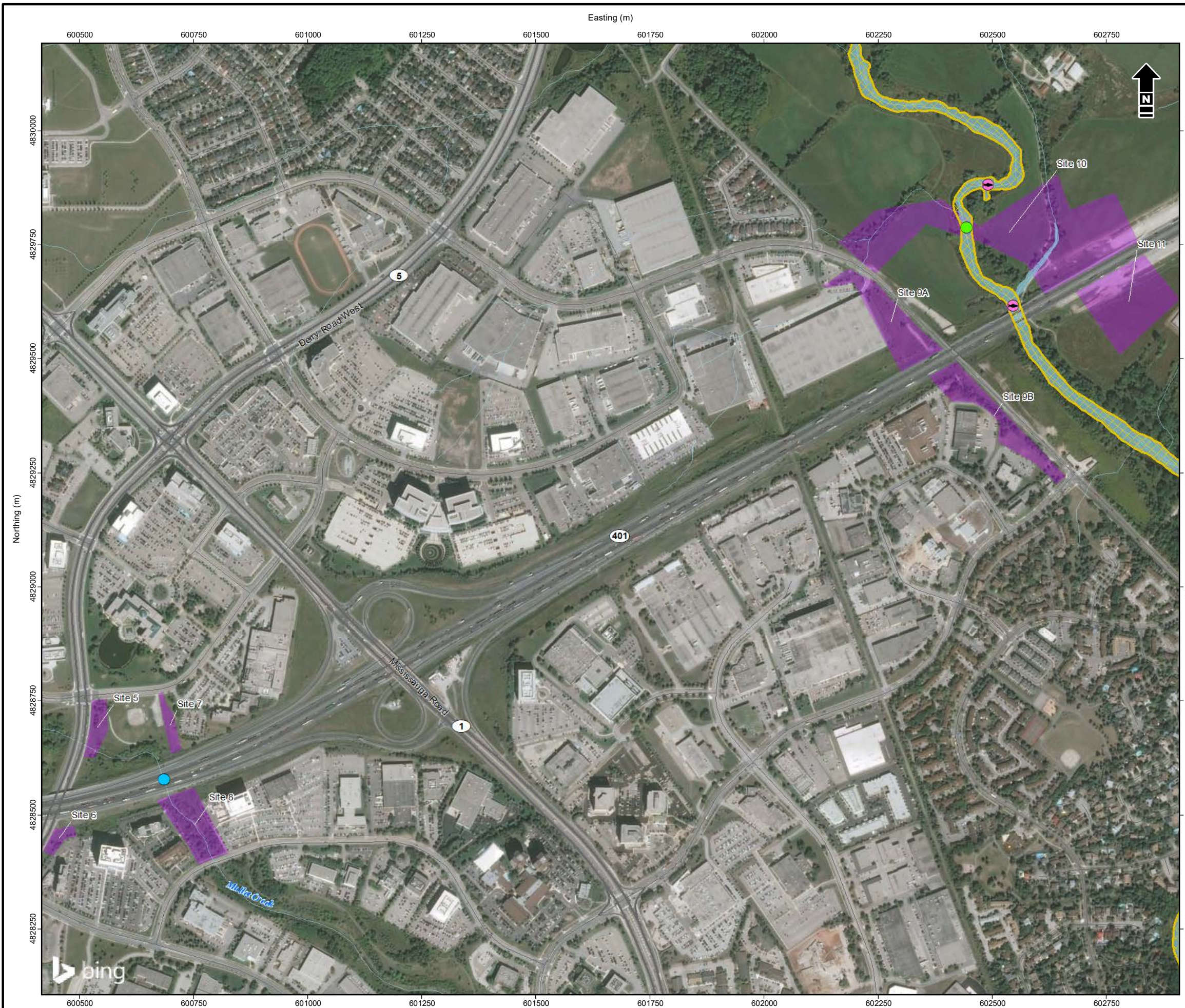
- isolated 'open cut' crossing for the Credit River
- access shaft construction near Mullet Creek
- tunneling using TBM under Mullet Creek

The Credit River has been defined as a permanent warmwater system with a coldwater migratory corridor which provides SAR habitat and supports fish, as defined under the *Fisheries Act* (Government of Canada 2016). Mullet Creek has been identified as a permanent warmwater tributary, which provides habitat for bait/forage fish species which support fish. This general assessment of potential impacts has been completed based on the current 50% design details provided by Jacobs.

Since both Mullet Creek and the Credit River have been documented to support fish, appropriate fisheries mitigations must be implemented prior to and during construction. Proposed tunneling and shaft construction activities have the potential to result in disturbances to the natural environment, including fish and fish habitat.

As indicated by the proposed works, only land-based activities are anticipated to occur for Mullet Creek. Land-based activities include: vegetation clearing, excavation, grading, and use of industrial equipment. Using PoE diagrams for each of these land-based activities, potential impacts include, but are not limited to, alteration to native vegetation, change in sediment and contaminant concentrations, lubricant and fuel leaks from equipment and re-suspension, and entrainment of sediment. The PoE model was used to perform a general assessment of potential impacts which may result from the proposed tunneling and shaft construction works and form the basis for mitigation in order to protect and maintain the natural environment, including fish and fish habitat within Mullet Creek.

Proposed works for the Credit River indicate that both land-based and in-water activities have the potential to occur. Land-based activities identified as potential sources of impacts on the fish and fish habitat include: vegetation clearing, excavation, grading, and use of industrial equipment. In-water activities include: addition or removal of aquatic vegetation, changing in timing, duration or frequency of flow, placement of materials or structures in water, organic debris management, water extraction, and fish passage. Potential impacts include, but are not limited to, alteration to native vegetation, change in habitat structure and cover, change in sediment and contaminant concentrations, incidental entrainment or mortality of fish, lubricant and fuel leaks from equipment, bank instability and exposed soils, and re-suspension and entrainment of sediment. The PoE model was used to perform a general assessment of potential impacts which may result from the proposed open cut crossing and form the basis for mitigation in order to protect and maintain the natural environment, including fish and fish habitat within the Credit River.



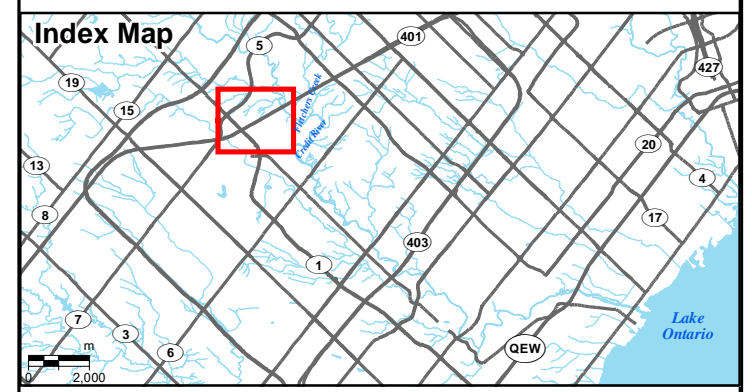
- Shaft Location Site
- ⬭ Candidate Significant Wildlife Habitat
- Water Body
- Watercourse
- Highway
- Road
- DFO Fishery – Permanent watercourse, resident warmwater thermal regime with migratory coldwater corridor
- Supports DFO Fishery- Permanent watercourse, warmwater thermal regime
- Chinook Salmon Spawning Location

Notes:

Credit River - In-water timing window (works permitted) is likely from November 15th - January 31st

Mullet Creek - In-water timing window (works permitted) from July 1st - March 31st

DFO* - Department of Fisheries and Oceans



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1:8,500 metres
 90 0 90 180
 NAD 1983 UTM Zone 17N



Region of Peel
 Highway 401 Watermain and Sanitary Trunk Sewer Project

Aquatic Ecosystem Constraints

Date: November, 2019 Project: 27896 Submitter: E. Wilkinson Reviewer: A. Fausto

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Through a preliminary review of these potential stressors on the fish and fish habitat within Mullet Creek, each activity associated with tunneling and shaft construction can be properly mitigated through implementation of the appropriate mitigation measures outlined below in Section 8.2. Based on the review of potential impacts at Mullet Creek, the proposed works are not anticipated to result in serious harm to fish and fish habitat and works at these locations should not require review by DFO under the Fisheries Protection Provisions of the *Fisheries Act*.

However, through review of potential stressors on fish and fish habitat within the Credit River, not all construction activities can be properly mitigated, and some residual effects may persist following open cut works proposed for the Credit River crossing. Residual effects are mainly a result of the increase in the ecological footprint and subsequent alteration of fish habitat associated with the placement of materials below the high-water mark in the form of scour protection and bank protection after completion of trenching activities. As a result, these works have the potential to result in serious harm to fish and fish habitat, and as such it is likely that these works will require project review by DFO. If DFO determines that the project will not result in serious harm to fish the project may proceed without a *Fisheries Act* Authorization through a Letter of Advice. Alternatively, if DFO determines that the project will result in serious harm to fish, a *Fisheries Act* Authorization will be required which will require the development of an offsetting plan. Further assessment of the potential impacts associated with proposed works will be required and an updated impact assessment should be completed once in-water footprints and extent of disruption areas have been identified based on the final design details.

8 MITIGATION MEASURES

8.1 Terrestrial Measures

Mitigations should be followed to ensure compliance with the MBCA for all migratory birds and with the ESA for Bobolink, Eastern Meadowlark, and Barn Swallow. The following avoidance and mitigation recommendations should be implemented:

- Training should be provided to all on-site personnel, with respect to appropriate actions to be taken whenever SAR species are encountered and what species-specific guidelines should be followed. The Contractor shall ensure that all persons are provided with information and awareness training, prior to entering the project Site.
- Wildlife will not be harassed or harmed, including birds and nests or eggs of protected migratory birds shall not be destroyed.
- Vegetation and tree removal operations or clearing should be avoided between April 15 and August 31 of any year, to prevent impacts to nesting SAR or migratory birds. In the event that vegetation and tree removals or clearing must occur within the breeding bird timing window, the

Contractor will retain a qualified avian specialist prior to clearing, to screen for breeding birds using methods outlined by Environment and Climate Change Canada.

- Vegetation removals will be avoided where possible.
- An avian specialist should be consulted if breeding birds and/or nests are encountered incidentally. If the Contractor is not able to get recommendations from an avian specialist, work will not continue in the location of the nest until after August 31 or as soon as it has been determined that the young have left the nest.

Snapping Turtle may be encountered incidentally throughout the study area as they move in search of suitable nesting or over-wintering Sites. To avoid a contravention to the ESA, the following avoidance and mitigation recommendations shall be implemented:

- Training should be provided to all onsite personnel, with respect to appropriate actions to be taken whenever protected species are encountered and what species guidelines should be followed. The Contractor shall ensure that all persons are provided with information and awareness training, prior to entering the project Site.
- Advise workers to perform a visual survey of machinery and work area prior to commencing work, as wildlife may be found hiding or basking around equipment, rocks, debris piles, etc. If any trenches or holes are left overnight, they should be inspected before being filled, and any trapped wildlife should be released.
- Where a SAR reptile or amphibian is sighted during construction, work will immediately stop in the vicinity and the animal should be allowed to move out of the work area on its own. The Ministry of Environment, Conservation, and Parks (MECP) should be notified by the contract administrator.
- A protected reptile or amphibian may be moved only with MECP approval. The methods used will be according to the protocols within the document called "*Ontario Species at Risk Handling Manual: For Endangered Species Act Authorization Holders*" found at http://files.ontario.ca/environment-and-energy/species-at-risk/mnr_sar_tx_sar_hnd_mnl_en.pdf

8.2 Aquatic Measures

In order to protect the fish and fish habitat within the study area, the Contractor's operations shall be controlled to prevent the entry and re-suspension of deleterious materials while carrying out the tunneling, open cut and shaft construction works. Works in-water and along the banks of all fish bearing watercourses within the Highway 401 study area will be minimized where possible.

In addition to the timing windows (where in-water construction is permitted) noted in Section 7.2 above, protection measures to protect fish and fish habitat within study area watercourses shall include the following:

- Due to the presence of resident warmwater fish species, a coldwater migration corridor and SAR habitat within the Credit River, **any required in-water works or work on channel banks will only be permitted between November 15 to January 31** (Pers. Comm, MNRF 2018).
- Due to the presence of a warmwater fish community within Mullet Creek, **any required in-water works or work on channel banks will only be permitted between July 1 to March 31** (CVC and MNR 2002).
- Ensure that all in-water activities do not interfere with fish passage or reduce flows.
- Contain all in-water works for the Credit River with use of a coffer dam designed and installed according to relevant Contract Specifications (i.e., SP Cofferdams).
- At no time can the channel of the Credit River be constricted fully during construction. Flow shall be maintained downstream at all times when coffer dams are in place, in order to maintain fish passage and habitats downstream.
- Retain a qualified environmental professional to ensure applicable permits for relocating fish from within the contained work area (i.e., coffer dams) are obtained and to capture any fish trapped within an isolated/enclosed area at the work Site and safely relocate them to an appropriate location in the same waters. Fish may need to be relocated again, should flooding occur on the Site.
- For tunneling works near Mullet Creek, develop a frac-out response plan that includes measures to stop work, contain the drilling mud, prevent further sediment migration to Mullet Creek, and identify materials and equipment needed to contain and clean up release on-site as a result of a frac-out.
- Schedule work to avoid wet and rainy periods that may increase erosion and sedimentation and to avoid the input of contaminated runoff from entering the watercourses.
- Regular inspection, removal, and disposal of waste materials and sediment.
- No stockpiles of construction materials shall be permitted within 30 m of the Credit River or Mullet Creek. Any construction or waste materials stored at the Site shall be situated in a manner that will prevent the erosion and/or deposition of this material into the Credit River, Mullet Creek and/or associated drainage ditches that outlet to these watercourses.
- Restore watercourse banks to pre-existing or better condition, and seed to establish vegetative cover.

- Use of properly installed silt fence or erosion control measures to prevent contaminated/sediment laden runoff water from entering the watercourses.
- Minimize vegetation removal where possible and proper clearing and grubbing techniques will be utilized. All retained vegetation will be delineated and protected. Removal or clearing of vegetation shall be completed in accordance with appropriate operational standards.
- Top soil and seed disturbed banks with native seed mixture and/or cover exposed areas with erosion control measures until seeding can occur.
- Develop and implement a riparian planting plan to ensure that cleared areas are restored to pre-construction conditions or better through planting of native trees and vegetation.

8.2.1 Dewatering

- All dewatering shall be conducted in accordance with Permit-to-take-water conditions.
- When using a pump, the intake shall be controlled to prevent entry of fish and other aquatic wildlife (screen any water intakes or outlet pipes to prevent entrainment or impingement of fish).
- Dewatering operations shall be directed to a sediment control device or natural attenuation area prior to discharge to watercourses, if a natural attenuation area is used, a minimum 15 m setback shall be maintained from the receiving watercourse.
- When water is discharged to a watercourse, the water discharged shall be done in a manner that does not cause erosion or other damage to adjacent lands.

8.2.2 Erosion and Sediment

The disturbance and release of sediments may have direct negative effects such as respiratory stress, reduced feeding efficiency and loss of nursery/rearing habitat in downstream areas. Erosion and sediment impacts, which are not properly contained, may affect local fish populations as well as habitats downstream within the Credit River and Mullet Creek. Thus, every effort shall be made to contain sediments within the work area to avoid potential downstream impacts during shaft construction activities.

- Use of effective erosion control measures including topsoil and seed, silt fence barriers, and erosion control blankets.
- Design and implement erosion and sediment controls to contain/isolate the construction zone, manage Site drainage/runoff, and prevent erosion of exposed soils and migration of sediment into water body. Erosion and sediment control measures shall be maintained until all disturbed ground has been permanently stabilized.

- Installation of effective erosion and sediment control measures before starting work to prevent sediment from entering the water body.
- Site isolation/containment measures for the Credit River (i.e., coffer dams) shall be implemented to isolate areas where in-water work is required. Cofferdams shall be implemented and designed according to relevant Contract Specifications (i.e., Cofferdams).
- Measures for containing and stabilizing waste material (e.g., construction waste and materials, accumulated debris, etc.) above the high water mark of the water body shall be implemented to prevent re-entry.
- Regular inspection and maintenance of erosion and sediment control measures and structures during the course of construction and timely repairs shall be made to erosion and sediment control measures and structures, if damage occurs.
- Removal of non-biodegradable erosion and sediment control materials once the shaft location Site is stabilized.

8.2.3 Bank Revegetation and Stabilization

Within the shaft location construction areas, clearing of riparian vegetation shall be kept to a minimum whenever possible and use of existing trails, roads, or cut lines to avoid disturbance to the riparian vegetation and prevent soil compaction is recommended. Additional measures to avoid impacts to bank vegetation and stability include:

- When practical, prune or top the vegetation instead of grubbing/uprooting.
- Minimize the removal of natural woody debris, rocks, sand, or other materials from the banks or the bed of the Credit River below the normal high water mark. If material is removed from the watercourse or its banks, it is to be set aside and returned to its original location once construction activities are completed.
- Immediately stabilize banks disturbed by any activity associated with the project to prevent erosion and/or sedimentation through revegetation with native species (seed) suitable for the Site.
- If replacement rock reinforcement/armouring is required to stabilize eroding or exposed areas, ensure that appropriately-sized, clean rock is used and that rock is installed at a similar slope to maintain a uniform bank and natural stream alignment.
- Banks disturbed by construction access and staging shall be re-graded to re-establish low banks to increase bank stability and make less susceptible to erosion.

8.2.4 Operation of Machinery

The Contractor must ensure that equipment/machinery arrives on-site in a clean condition and is maintained free of fluid leaks, invasive species, and noxious weeds for the duration of construction. Contractor must also ensure that:

- Heavy equipment/machinery access will be limited to pre-defined areas within the defined study area and along the banks of the Credit River and Mullet Creek above the normal high water mark. The watercourse will not be crossed (i.e., forded) or treated as equipment/machinery staging at any time.
- Whenever possible, operate equipment/machinery on land above the high water mark in a manner that minimizes disturbance to the banks and bed of the water body.
- Whenever possible avoid crossing watercourses within the study area. If crossings area required, use temporary crossing structures or other practices to cross the Credit River and Mullet Creek.
- Wash, refuel, and service equipment/machinery and store fuel and other materials for the equipment/machinery a minimum of 30 m from the Credit River and Mullet Creek to prevent any deleterious substances from entering the water.
- Have spill kits on-site and drip pans under all non-mobile machinery.

8.2.5 Contaminant and Emergency Spill Response

For each of the shaft location construction areas within the study area, a response plan must be developed that is to be implemented immediately in the event of a sediment release or spill of a deleterious substance. Emergency spill kits shall be kept on-site (and in heavy machinery) in case of emergency. The emergency spill kit should contain, at the very least, absorbent materials to initially contain a spill, protective gear for the handling of hazardous materials, and the number (1-800-268-6060) for the Ministry of the Environment and Climate Change (MOECC) Spills Action Centre.

The Contractor must also ensure that:

- Materials such as paint, primers, rust solvents, degreasers, grout, poured concrete, or other chemicals do not enter the watercourse.
- Ensure that building material used in a watercourse has been handled and treated in a manner to prevent the release or leaching of substances into the water that may be deleterious to fish.

All spills shall be reported to the MOECC Spills Action Centre (1-800-268-6060). DFO and MNRF Aurora District will be contacted if impacts will occur to fisheries or wildlife resources.

9 CONCLUSIONS

A preliminary review of potential impacts, which could affect the terrestrial and aquatic environment and SAR as a result of the proposed tunneling, open cut, and shaft construction works were assessed. No PSWs or unevaluated wetlands, rare vegetation communities, or ANSIs were identified within the study area during field investigations or background review. The woodland south of Site 4B has been identified as a significant woodland. No works are currently anticipated within this woodland. Due to the presence of a Barn Swallow nest on the Highway 401 Bridge over the Credit River and the identification of potential habitat for Bobolink and Eastern Meadowlark as well as several Species of Conservation Concern within the study area (Eastern Wood-Pewee, and Bald Eagle,), an in-season breeding bird survey is recommended to confirm SAR habitat within the study area. Should SAR habitat be confirmed during breeding bird surveys, approvals by MECP under the ESA may be required.

Through the Fisheries Habitat Assessment completed for proposed tunneling works in the vicinity of Mullet Creek, it was determined that construction works are not anticipated to result in serious harm to fish as long as proper environmental protection and sediment/erosion controls are used effectively during construction and therefore these works are in compliance with the *Fisheries Act* and may proceed without further review. Through the Fisheries Habitat Assessment completed for the open cut crossing of the Credit River it was determined that the proposed works have the potential to result in serious harm to fish, therefore a project review will likely be required. Once the extent of in-water works and the footprint area of impacts below the high water mark are determined, it is recommended that a DFO Request for Review be prepared and submitted to DFO to determine if the project may proceed or if a *Fisheries Act* Authorization and associated offsetting plan will be required.

Due to MECP classification of the Credit River as SAR habitat for American Eel and the proposed in-water works associated with the open cut crossing, project approval under the *Endangered Species Act* for American Eel will likely be required. Submission of an Information Gathering Form to MECP for American Eel is recommended to determine next steps and identify specific approvals which may be required.

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APPENDIX A
Agency Correspondence

From: ESA Aurora (MNRF) <ESA.Aurora@ontario.ca>
Sent: Tuesday, October 2, 2018 2:38 PM
To: Erica Wilkinson
Subject: RE: SAR Information Request for Highway 401 Watermain and Sanitary Sewer Crossings

Hello Erica

No SAR records until you get to the Credit River valley.

Here's the SAR in the area:

- American Eel
- Bobolink
- Meadowlark
- Barn Swallow
- Butternut

Regards

Mark Heaton
OMNRF Aurora

From: Erica Wilkinson [<mailto:ewilkinson@matrix-solutions.com>]
Sent: September 18, 2018 1:38 PM
To: ESA Aurora (MNRF) <ESA.Aurora@ontario.ca>
Subject: SAR Information Request for Highway 401 Watermain and Sanitary Sewer Crossings

Hello,

I am helping complete a natural heritage evaluation for the Region of Peel Highway 401 Watermain and Sanitary Sewer Crossings project. I am hoping to receive some information on species at risk information that will supplement the NHIC data I have looked at already (Henslow's Sparrow and Redside dace). I have attached maps (in the word document) that show the locations of the shaft staging areas. I am mostly concerned with these locations, however I understand that the habitat of SAR would not be fully contained within just these polygons and adjacent habitat is also important to incorporate into the assessment. If you have any additional questions please let me know.

Thanks and look forward to hearing from you,

Erica Wilkinson, B.A., ERPG
Ecologist
ISA Certified Arborist

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7B-650 Woodlawn Rd W, Guelph ON N1K 1B8

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T 519.772.3777 **F** 519.648.3168

www.matrix-solutions.com



From: Vir, Aanchal <Aanchal.Vir@cvc.ca>
Sent: Tuesday, December 4, 2018 1:50 PM
To: Brydon MacVeigh
Subject: RE: [EXTERNAL] RE: Fisheries and Natural Science data request Hwy 401 Watermain

Hi Brydon,

Please see the notes I forgot to include in the previous email.

- The consultant should be directed to MNRF for additional SAR records and details
- The area by HWY 401 and Creditview Rd. qualifies as SWH - criteria B4: foraging area with abundant mast under the *Peel Caledon Significant Woodlands and Wildlife Habitat Study*. CVC has not assessed all SWH criteria and the proponent is responsible for assessing the area for the presence of SWH.

Regards,

Aanchal Vir

Technician, Planning | Credit Valley Conservation
905.670.1615 ext 304 | 1-800-668-5557
aanchal.vir@cvc.ca | <http://cvc.ca>

From: Brydon MacVeigh [<mailto:BMacVeigh@matrix-solutions.com>]
Sent: December 4, 2018 12:26 PM
To: Vir, Aanchal
Subject: RE: [EXTERNAL] RE: Fisheries and Natural Science data request Hwy 401 Watermain

Hi Aanchal,

Attached is the signed data sharing agreement for DR 18 064.

Thanks,
Brydon

From: Vir, Aanchal [<mailto:Aanchal.Vir@cvc.ca>]
Sent: Friday, November 23, 2018 10:59 AM
To: Brydon MacVeigh
Subject: RE: [EXTERNAL] RE: Fisheries and Natural Science data request Hwy 401 Watermain

Hi Brydon,

Attached is the Data Sharing Agreement (DSA). Please complete Schedule 2 with user information, provide a signature from the proponent, sign and return the DSA at your earliest convenience.

Regards,

Aanchal Vir

Technician, Planning | Credit Valley Conservation
905.670.1615 ext 304 | 1-800-668-5557
aanchal.vir@cvc.ca | <http://cvc.ca>

From: Brydon MacVeigh [<mailto:BMacVeigh@matrix-solutions.com>]
Sent: November 8, 2018 3:49 PM
To: Vir, Aanchal
Subject: RE: [EXTERNAL] RE: Fisheries and Natural Science data request Hwy 401 Watermain

Hi Aanchal,

Sorry about that, I didn't realize when I reduce the file size to email that the labels became illegible. I've added some street names to the maps and re-attached them.

Thanks,
Brydon

From: Vir, Aanchal [<mailto:aanchal.vir@cvc.ca>]
Sent: Thursday, November 8, 2018 3:34 PM
To: Brydon MacVeigh
Subject: [EXTERNAL] RE: Fisheries and Natural Science data request Hwy 401 Watermain

Hi Brydon,

Can you please indicate some street names on the maps to help indicate the study areas.

Regards,

Aanchal Vir

Technician, Planning | Credit Valley Conservation
905.670.1615 ext 304 | 1-800-668-5557
aanchal.vir@cvc.ca | <http://cvc.ca>

From: Brydon MacVeigh [<mailto:BMacVeigh@matrix-solutions.com>]
Sent: November 8, 2018 10:30 AM
To: Vir, Aanchal
Subject: Fisheries and Natural Science data request Hwy 401 Watermain

Good morning,

Matrix Solutions Inc. has been retained by Jacobs Engineering Group to complete natural heritage evaluations for the Region of Peel Highway 401 Watermain and Sanitary Trunk Sewer project in the City of Mississauga which falls within the jurisdiction of Credit Valley Conservation. Please note we have already been in contact with Aurora District MNRF, they have provided us the data/information they have available.

As this project falls within your jurisdiction we would kindly like to request any background information you may have on file pertaining to environmental resources for the study area. Site maps have been attached with this correspondence and a list of watercourse crossings within the study area is provided below.

Fisheries – fish community data, SAR and important habitat features (critical or regulated habitat) for the following watercourse crossings:

- Mullet Creek, Highway 401 (UTM 17T 600690 4828581)
- Credit River, Highway 401 Crossing (UTM 17T 602558 4829593)

Terrestrial – Environmentally Significant Areas, significant wildlife, wetlands, woodlots etc.

Species at Risk - Any information from previously recorded observations of SAR within the project areas would be greatly appreciated.

If you do not have any information available, please let us know so we can document it accordingly. Should you have any questions or concerns regarding our request, please do not hesitate to contact me.

Kind Regards,

Brydon

Brydon McVeigh
Aquatic Ecologist

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APPENDIX B
Photographic Record



*Matrix Solutions Inc.
October 10, 2018*

1. View of Dry-Fresh Graminoid Meadow community (MEMM3) at Site 3a.



*Matrix Solutions Inc.
October 10, 2018*

2. View of the Dry-Fresh Graminoid Meadow community (MEMM3) at Site 4a looking north.



*Matrix Solutions Inc.
October 10, 2018*

3. View of the Constructed Green Lands (CGL) area at Site 6 looking east from Derry Road.



*Matrix Solutions Inc.
October 10, 2018*

4. View of the Dry-Fresh Graminoid Meadow community (MEMM3) adjacent to Mullet Creek at Site 5.



*Matrix Solutions Inc.
October 10, 2018*

5. View of the Mixed Thicket community (THM) along the west bank of Mullet Creek at Site 8.



*Matrix Solutions Inc.
October 10, 2018*

6. View of Dry fresh Upland Deciduous Forest community (FODM4) on east bank of Mullet Creek at Site 8.



*Matrix Solutions Inc.
October 10, 2018*

7. View of Mullet Creek downstream of Highway 401 at Site 8.



*Matrix Solutions Inc.
October 10, 2018*

8. View of gabion baskets along bank of Mullet Creek downstream of Highway 401 at Site 8.



*Matrix Solutions Inc.
October 10, 2018*

9. View of natural 'nick' point in channel, which has resulted in a small cascade downstream of Highway 401 at Site 8.



*Matrix Solutions Inc.
October 10, 2018*

10. View of Watercress within Mullet Creek channel downstream of Highway 401 at Site 8.



*Matrix Solutions Inc.
October 10, 2018*

11. View of dense instream emergent vegetation immediately downstream of Mullet Creek outlet under Highway 401.



*Matrix Solutions Inc.
November 13, 2018*

12. View of Mullet Creek immediately upstream of Highway 401, adjacent to Site 7



*Matrix Solutions Inc.
November 13, 2018*

13. View of riffle and overhanging vegetation along Mullet Creek upstream of Highway 401 adjacent to Site 7



*Matrix Solutions Inc.
November 13, 2018*

14. View of dense emergent vegetation within Mullet Creek floodplain upstream of Highway 401 adjacent to Site 7



*Matrix Solutions Inc.
November 13, 2018*

15. View of storm sewer outlet and small side channel entering Mullet Creek immediately downstream of Old Derry Road at Site 5.



*Matrix Solutions Inc.
October 10, 2018*

16. View of Open Agricultural field (OAG) at Site 9a on east side of Creditview Road



*Matrix Solutions Inc.
October 10, 2018*

17. View of the Dry-Fresh Graminoid Meadow community (MEGM3) at Site 10 on the east bank of the Credit River



*Matrix Solutions Inc.
October 10, 2018*

18. View of the Dry-Fresh Graminoid Meadow community (MEGM3) on the east side of the Credit River at Site 11, which provides potential Bobolink and Eastern Meadowlark habitat



*Matrix Solutions Inc.
October 10, 2018*

19. View of the Credit River immediately upstream of the Highway 401 bridge looking downstream



*Matrix Solutions Inc.
October 10, 2018*

20. View of the Credit River downstream of Highway 401 looking downstream from under the Highway 401 bridge



*Matrix Solutions Inc.
October 10, 2018*

21. View of Credit River immediately upstream of proposed crossing location



*Matrix Solutions Inc.
October 10, 2018*

22. View of potential salmonid spawning red upstream of proposed crossing location



*Matrix Solutions Inc.
October 10, 2018*

23. View of Credit River at proposed crossing location looking downstream

APPENDIX C
Field Habitat Mapping Forms

Table 4.0 Fish Habitat Map

Project Number:

Date: Oct 30, 2018

Project Name: ADVU01

Site Name: Credit River

WaterBody ID:

Field Staff: KR

Waterbody Name: Credit River

Habitat Inventory Type:

LEGEND

- Ba BARE GROUND
- Bd BEDROCK
- Bs BOULDER
- L.Bs LARGE BOULDER
- Co COBBLE
- S.Co SMALL COBBLE
- L.Co LARGE COBBLE
- Gr GRAVEL
- S.Gr SMALL GRAVEL
- L.Gr LARGE GRAVEL
- TT ESCARPMENT
- FI FINES
- Sa SAND
- Si SILT
- Or ORGANIC MATERIAL
- DP DEBRIS PILE
- BL BEAVER LODGE
- BD BEAVER DAM
- EM EMERGENT MACROPHYTES
- SM SUBMERGENT MACROPHYTES
- FM FLOATING MACROPHYTES
- IV INSTREAM VEGETATION
- TV TERRESTIAL VEGETATION
- DF DEADFALL
- RW ROOTWAD
- SH SHRUB
- MF MIXEDWOOD FOREST
- CF CONIFEROUS FOREST
- DF DECIDUOUS FOREST
- SE SEDGES
- GF GRASS/FORBES
- MO MOSS
- BMT MINNOW TRAP
- UCB UNDERCUT BANK
- OHC OVERHEAD COVER
- OHV OVERHANGING VEGETATION
- ISC INSTREAM COVER
- INV INUNDATED VEGETATION
- USB UNSTABLE BANK
- BW BACKWATER
- IP IMPOUNDMENT POND
- SN SNYE
- CH CHUTE
- CA CASCADE
- SHALLOW SLOPE
- MODERATE SLOPE
- MODERATELY STEEP SLOPE
- STEEP SLOPE
- FLOW DIRECTION
- RA RAPIDS
- RF RIFFLE
- R1 CLASS 1 RUN
- R2 CLASS 2 RUN
- R3 CLASS 3 RUN
- P1 CLASS 1 POOL
- P2 CLASS 2 POOL
- P3 CLASS 3 POOL
- FL FLAT
- FA FALLS
- WATER DEPTH
- T1 TRANSECT

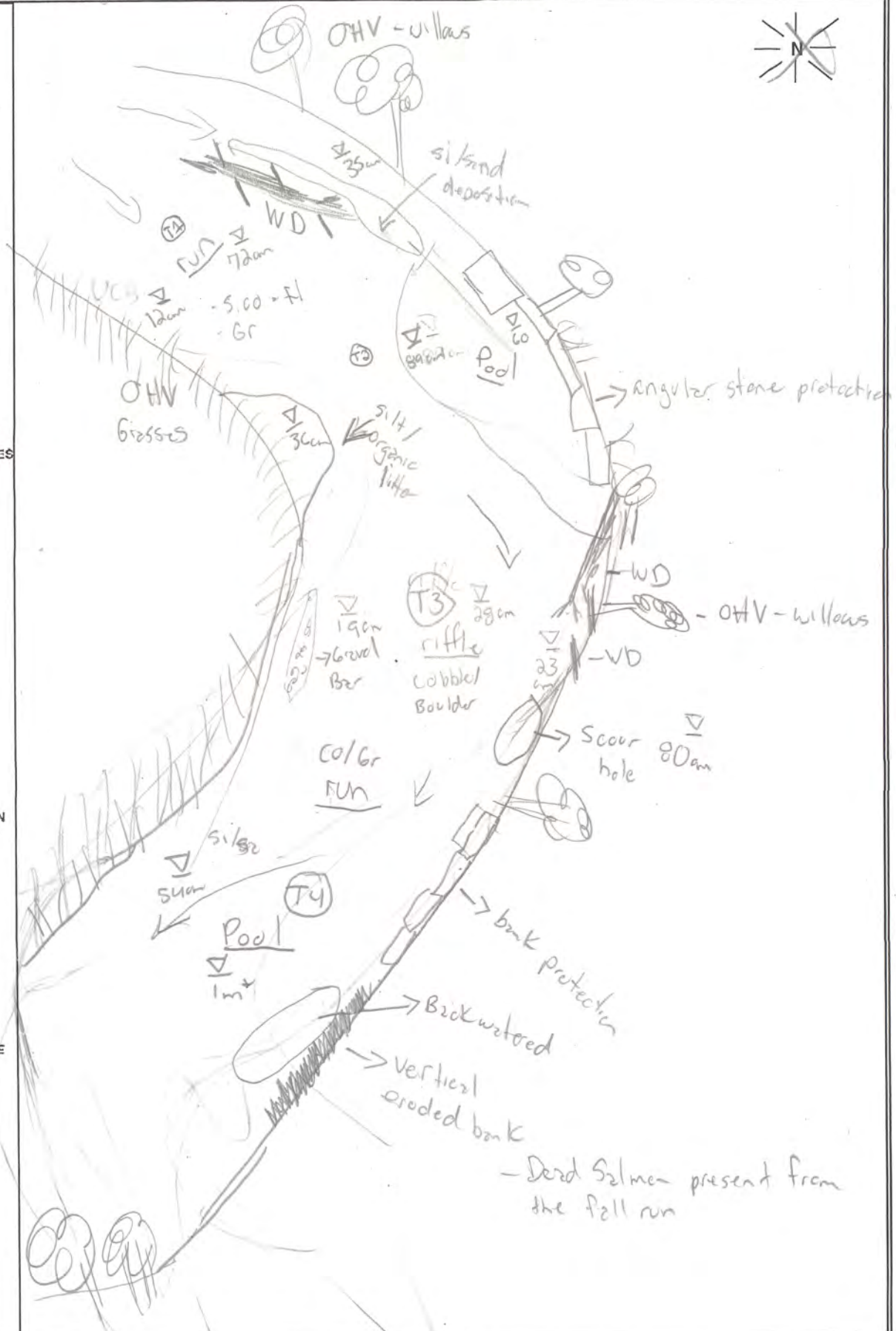


Table 4.0 Fish Habitat Map

Project Number: 27896	Date: Oct 30/18
Project Name: Hwy 401	Site Name:
WaterBody ID: Credit River	Field Staff: KR
Waterbody Name:	Habitat Inventory Type:

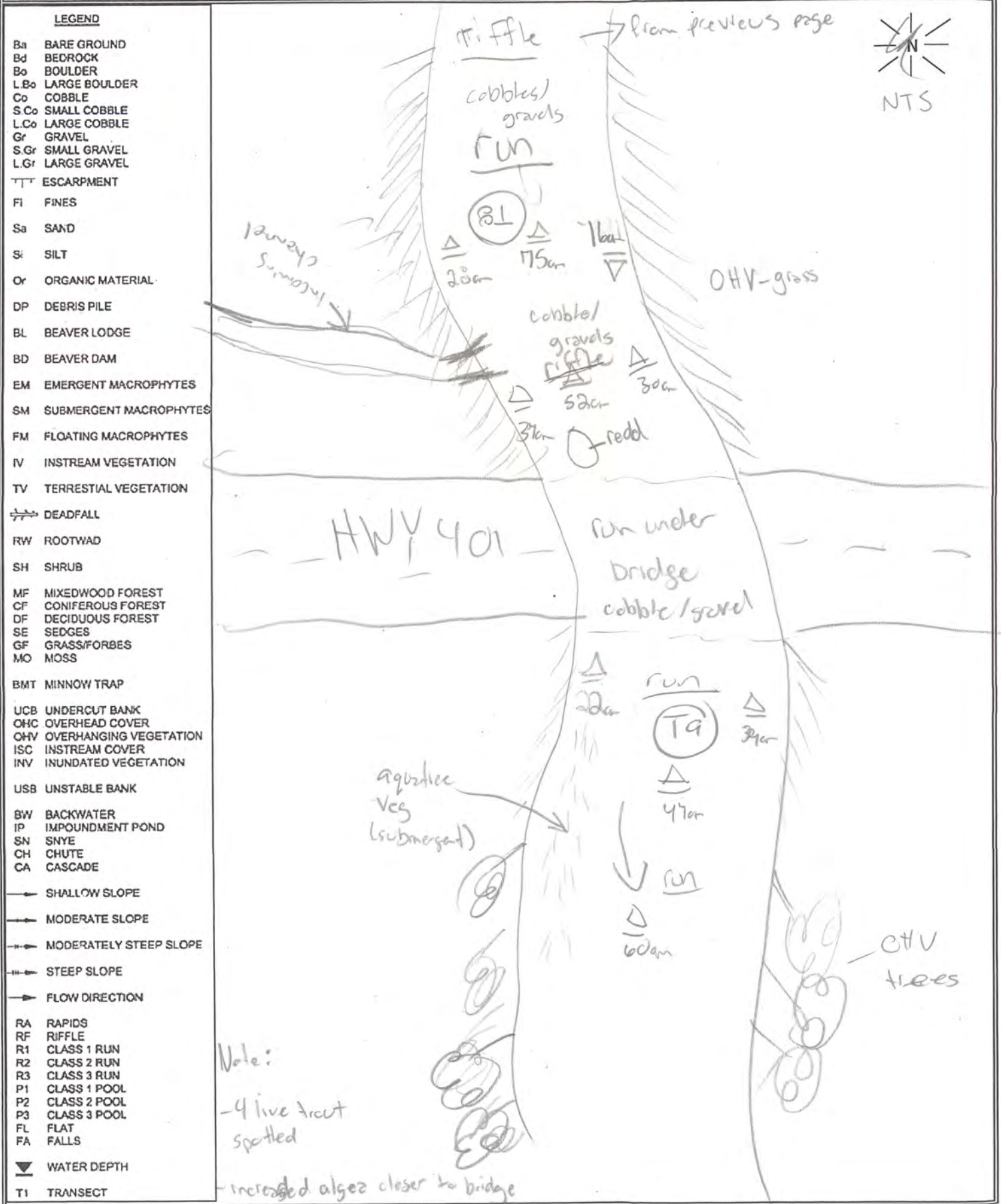


Table 1.0 Watercourse Assessment Form		0.12		Date:						
Project Number:		Site Name:		Field Staff:						
Project Name:		Assessment Start Time:		End Time:						
Watercourse Name:										
General Terrain Setting:	Mountain	Rolling Hills	Boreal Forest	Parkland	Prairie	Other: urban				
Land Use:	Natural	Agricultural	Recreational	Oil & Gas	Forestry	Mining Urban				
Confinement:	Entrenched	Confined	Frequently Confined	Occasionally Confined	Un-Confined	N/A				
Channel Pattern:	Straight	Winding	Regular	Irregular	Torturous	Braided				
Channel Profile:	Deeply Incised	Incised	Irregular	Neutral	Open	Broad				
Barriers to Fish Migration	Yes	No	Type/Location:	drop structure/weir	# Obstructions / 200 m:	approx 6				
Transect Location Information:	T1	T2	T3	T4	T5					
Description / Location:										
NAD: 27 or 83										
Easting:										
Zone: 17N										
Northing:										
Waypoint No:										
Channel Characteristics	T1	T2	T3	T4	T5					
Channel Unit at Transect (Riffle/Pool/Run)	run	Pool	riffle	Pool	riffle					
Groundwater seeps (Yes, No, Unknown)	Unknown	Unknown	Unknown	Unknown	Unknown					
Surface (smooth, irregular, broken)	irregular	Smooth	broken	Smooth	broken					
*High Water Level (Bankfull) Width (m)	30m+	30m+	30m+	30m+	30m+					
*High Water Level (Bankfull) Depth (m)	1.2m	2.0m	1m	2.5m	1m					
Wetted Width (m)	50m	30m	30m+	30m+	30m+					
Wetted Depths (25 50 75%) (m)	35 17 12	60 30 36	25 13 19	? 100 54	36 12 34					
Point Velocities (m/s)										
*Channel Slope (between Transects)										
Streambank Characteristics	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Slope (0 to 90 Degrees)	80	90	80	80	80	80	90	75	75	90
Undercut Measurement (m)										
Stable, Low, Mod or Highly Unstable:	Stable	Mod stable	Mod stable	Low stable	Stable					
Riparian Veg.: (GF, SH, CF, DF, BA, Mixed)	Aspen	Grass	Grass	Grass	Better Grass	Grass	Grass	Grass	Aspen	Grass
Bank Texture (%)	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Fines (<2mm), Small Gravel (3-16mm), Gravel (17-64mm), Cobble (65-256mm), Boulder (>256mm), Bedrock (>4000mm)	Fines	Fines	Fines	Fines	Fines	Fines	Fines	Fines	Fines	Fines
Substrate Composition (%)	T1 to T2	T2 to T3	T3 to T4	T4 to T5	T5 & downstream					
Fines (<2mm), Small Gravel (3-16mm), Gravel (17-64mm), Cobble (65-256mm), Boulder (>256mm), Bedrock (>4000mm)	Gravel - 40% Fines - 40% Cobble - 20%	Fines - 50% Cobble - 10% Gravel - 40%	Cobble - 50% Boulder - 10% Gravel - 40%	Fines - 80% Gravel - 20%	Cobble - 60% Gravel - 30% Fines - 10%					
Cover (%)	T1 to T2	T2 to T3	T3 to T4	T4 to T5	T5 & downstream					
Canopy Cover	10%	0%	5%	0%	10%					
Overhanging Vegetation	5%	5%	10%	10%	10%					
Woody Debris	5%	0	10%	0	0					
Undercut Banks	0%	0	0	0	0					
Surface Turbulence	0%	0	0	0	0					
Depth of Water	20%	30%	5%	50%	0					
Instream Vegetation	0%	0%	5%	5%	0					
Boulder Cover	0%	0%	5%	0	0					
Pool/Riffle/Run Ratio	T1 to T2	T2 to T3	T3 to T4	T4 to T5	T5 & downstream					
(Count between Transects)										
Water Quality (Taken at US extent)	T1	T2	T3	T4	T5					
pH										
Temp (°C)										
EC (µS/cm)										
D.O. (mg/L)										
Turb 1 (NTU)										
Turb 2 (NTU)										
Site Photo Numbers	T1	T2	T3	T4	T5					
Looking upstream										
Looking downstream										
Looking at left bank										
Looking at right bank										
Description: productive capacity for fish spp; unique habitat features, seeps/springs, beaver activity/dams/lodges, extra photos, fish/wildlife observations, etc.										
Species list from FWMIS:	eg. MNWH				Forage					
Spawning:	Salmon / trout - observed - riffles with gravel/cobble									
Rearing:	All species									
Feeding:	All species									
Overwintering:	deep pools									

Table 1.0 Watercourse Assessment Form		0.12		Date:		
Project Number:				Site Name:		
Project Name:				Field Staff:		
Watercourse Name:				Assessment Start Time:		
				End Time:		
General Terrain Setting:	Mountain	Rolling Hills	Boreal Forest	Parkland	Prairie	Other: urban
Land Use:	Natural	Agricultural	Recreational	Oil & Gas	Forestry	Mining Urban
Confinement:	Entrenched	Confined	Frequently Confined	Occasionally Confined	Un-Confined	N/A
Channel Pattern:	Straight	Winding	Regular	Irregular	Torturous	Braided
Channel Profile:	Deeply Incised	Incised	Irregular	Neutral	Open	Broad
Barriers to Fish Migration	Yes	No	Type/Location: drop structure/weir		# Obstructions / 200 m: approx 6	
Transect Location Information:	T1 T6		T2 T7		T3 T8	
Description / Location:					T4 T9	
NAD: 27 or 83					T5	
Easting:						
Zone: 17N						
Northing:						
Waypoint No:						
Channel Characteristics	T1 T6		T2 T7		T3 T8	
Channel Unit at Transect (Riffle/Pool/Run)	Pool		Riffle		Run	
Groundwater seeps (Yes, No, Unknown)	Unknown		Unknown		Unknown	
Surface (smooth, irregular, broken)	Smooth		Irregular		Irregular	
*High Water Level (Bankfull) Width (m)	30m+		30m+		30m+	
*High Water Level (Bankfull) Depth (m)	3m		1.5m		2.0m	
Wetted Width (m)	30m+		30m+		30m+	
Wetted Depths (25 50 75%)	56 11 3		45 21 13		16 18 28	
Point Velocities (m/s)						
*Channel Slope (between Transects)						
Streambank Characteristics	Left	Right	Left	Right	Left	Right
Slope (0 to 90 Degrees)	60	90	90	60	60	90
Undercut Measurement (m)						
Stable, Low, Mod or Highly Unstable:	Med Stable		Med Stable		Med Stable	
Riparian Veg.: (GF, SH, CF, DF, BA, Mixed)	Grass		Grass		Grass	
Bank Texture (%)	Left	Right	Left	Right	Left	Right
Fines (<2mm), Small Gravel (3-16mm), Gravel (17-64mm), Cobble (65-256mm), Boulder (>256mm), Bedrock (>4000mm)	Fines Fines		Fines Fines		Fines Fines	
Substrate Composition (%)	T1 to T2		T2 to T3		T3 to T4	
Fines (<2mm), Small Gravel (3-16mm), Gravel (17-64mm), Cobble (65-256mm), Boulder (>256mm), Bedrock (>4000mm)	Fines - 100%		Cobble - 60% Fines - 10% Boulder - 10% Gravel - 20%		Cobble - 60% Gravel - 30% Fines - 10%	
Cover (%)	T1 to T2		T2 to T3		T3 to T4	
Canopy Cover	0		0		0	
Overhanging Vegetation	10%		10%		10%	
Woody Debris	0		10%		0	
Undercut Banks	0		0		0	
Surface Turbulence	0		0		0	
Depth of Water	40%		5%		10%	
Instream Vegetation	0		0		0	
Boulder Cover	0		5%		0	
Pool/Riffle/Run Ratio	T1 to T2		T2 to T3		T3 to T4	
(Count between Transects)						
Water Quality (Taken at US extent)	T1		T2		T3	
pH						
Temp (°C)						
EC (µS/cm)						
D.O. (mg/L)						
Turb 1 (NTU)						
Turb 2 (NTU)						
Site Photo Numbers	T1		T2		T3	
Looking upstream						
Looking downstream						
Looking at left bank						
Looking at right bank						
Description: productive capacity for fish spp; unique habitat features, seeps/springs, beaver activity/dams/lodges, extra photos, fish/wildlife observations, etc.						
Species list from FWMIIS:		eg. MNWH				Forage
Spawning:						
Rearing:						
Feeding:						
Overwintering:						

Table 1.0 Watercourse Assessment Form		0.12		Date: 12-15, 2018	
Project Number: 22596		Site Name:		Field Staff: KR + BM	
Project Name: Hwy 101 Watermain		Assessment Start Time:		End Time:	
Watercourse Name: Mullet Creek					
General Terrain Setting:		Mountain Rolling Hills Boreal Forest Parkland Prairie		Other: urban	
Land Use:		Natural Agricultural Recreational Oil & Gas Forestry Mining Urban			
Confinement:		Entrenched Confined Frequently Confined Occasionally Confined Un-Confined N/A			
Channel Pattern:		Straight Winding Regular Irregular Torturous Braided			
Channel Profile:		Deeply Incised Incised Irregular Neutral Open Broad			
Barriers to Fish Migration		Yes No Type/Location: drop structure/weir		#Obstructions / 200 m: approx 6	
Transect Location Information:		T1 T2 T3 T4 T5			
Description / Location:		X			
NAD: 27 or 83 Easting:					
Zone: 17N Northing:					
Waypoint No.:					
Channel Characteristics		T1 T2 T3 T4 T5			
Channel Unit at Transect (Riffle/Pool/Run)		Rifle Run Pool			
Groundwater seeps (Yes, No, Unknown)		Unknown Unknown			
Surface (smooth, irregular, broken)		broken smooth			
*High Water Level (Bankfull) Width (m)		10.2 13.5 10.1			
*High Water Level (Bankfull) Depth (m)		4.0 0.45 0.62			
Wetted Width (m)		3.7 3.2 4.0			
Wetted Depths (25 50 75%) (m)		14.0 20 27			
Point Velocities (m/s)					
*Channel Slope (between Transects)					
Streambank Characteristics		Left Right Left Right Left Right Left Right Left Right			
Slope (0 to 90 Degrees)					
Undercut Measurement (m)					
Stable, Low, Mod or Highly Unstable:					
Riparian Veg.: (GF, SH, CF, DF, BA, Mixed)					
Bank Texture (%)		Left Right Left Right Left Right Left Right Left Right			
Fines (<2mm), Small Gravel (3-16mm), Gravel (17-64mm), Cobble (65-256mm), Boulder (>256mm), Bedrock (>4000mm)					
Substrate Composition (%)		T1 to T2 T2 to T3 T3 to T4 T4 to T5 T5 & downstream			
Fines (<2mm), Small Gravel (3-16mm), Gravel (17-64mm), Cobble (65-256mm), Boulder (>256mm), Bedrock (>4000mm)		Cobble 70 silt 10 gravel 20 gravel 20		Cobble 60 silt 5 gravel 20 sand 15	
Cover (%)		T1 to T2 T2 to T3 T3 to T4 T4 to T5 T5 & downstream			
Canopy Cover		40 0 20			
Overhanging Vegetation		20 20 10			
Woody Debris		0 0 0			
Undercut Banks		0 0 0			
-Surface Turbulance		0 0 0			
Depth of Water		0 0 0			
Instream Vegetation		10 10 0			
Boulder Cover		0 0 0			
Pool/Riffle/Run Ratio		T1 to T2 T2 to T3 T3 to T4 T4 to T5 T5 & downstream			
(Count between Transects)					
Water Quality (Taken at US extent)		T1 T2 T3 T4 T5			
pH		X		X	
Temp (°C)					
EC (µS/cm)					
D.O. (mg/L)					
Turb 1 (NTU)					
Turb 2 (NTU)					
Site Photo Numbers		T1 T2 T3 T4 T5			
Looking upstream					
Looking downstream					
Looking at left bank					
Looking at right bank					
Description: productive capacity for fish spp; unique habitat features, seeps/springs, beaver activity/dams/lodges, extra photos, fish/wildlife observations, etc.					
Species list from FWMISS: eg. MNWH				Forage	
Spawning:					
Rearing:					
Feeding:					
Overwintering:					

MULLET CREEK

4/5 Hwy 401, d/s Derry Rd

- > Fairly straight channel = slight meander pattern
- > Steep embankment on south bank and wide floodplain on north bank
- > Gabion baskets along south bank
- > Floodplain and nearshore = dense emergent vegetation (cattails)
- > clumps of WC throughout channel
- > storm sewer culvert + small side channel enter ~ 5m d/s of Syntax RR
- > algae covered cobble substrate dominates throughout
- > ~ 10m d/s of Derry Rd to culvert sand/gravel substrates dominate
- > valley slopes ~~are~~ = deciduous trees + shrubs overhanging channel in areas
- > mostly run + riffle habitat, 2 pool areas (1 pool area = OH red osier dogwood from south bank, 2nd pool overhung by large willow)
- > sparse amounts of instream woody debris + OUH woody debris
- > overhanging vegetation lining banks (grasses + herbaceous plants)

PROFILE



Table 4.0 Fish Habitat Map

Project Number: 27896
 Project Name: Hwy 401 Watermain
 WaterBody ID:
 Waterbody Name: MULLET CREEK

Date: Nov 15/18
 Site Name:
 Field Staff: R/M, K/R
 Habitat Inventory Type: Aquatic Habitat Characterization

LEGEND	
Ba	BARE GROUND
Bd	BEDROCK
Bo	BOULDER
L.Bo	LARGE BOULDER
Co	COBBLE
S.Co	SMALL COBBLE
L.Co	LARGE COBBLE
Gr	GRAVEL
S.Gr	SMALL GRAVEL
L.Gr	LARGE GRAVEL
Esc	ESCARPMENT
Fj	FINES
Sa	SAND
Sl	SILT
Or	ORGANIC MATERIAL
DP	DEBRIS PILE
BL	BEAVER LODGE
BD	BEAVER DAM
EM	EMERGENT MACROPHYTES
SM	SUBMERGENT MACROPHYTES
FM	FLOATING MACROPHYTES
IV	INSTREAM VEGETATION
TV	TERRESTRIAL VEGETATION
DF	DEADFALL
RW	ROOTWAD
SH	SHRUB
MF	MIXEDWOOD FOREST
CF	CONIFEROUS FOREST
DF	DECIDUOUS FOREST
SE	SEDGES
GF	GRASS/FORBES
MO	MOSS
BMT	MINNOW TRAP
UCB	UNDERCUT BANK
OHC	OVERHEAD COVER
OHV	OVERHANGING VEGETATION
ISC	INSTREAM COVER
INV	INUNDATED VEGETATION
USB	UNSTABLE BANK
BW	BACKWATER
IP	IMPOUNDMENT POND
SN	SNYE
CH	CHUTE
CA	CASCADE
↘	SHALLOW SLOPE
↘↘	MODERATE SLOPE
↘↘↘	MODERATELY STEEP SLOPE
↘↘↘↘	STEEP SLOPE
→	FLOW DIRECTION
RA	RAPIDS
RF	RIFFLE
R1	CLASS 1 RUN
R2	CLASS 2 RUN
R3	CLASS 3 RUN
P1	CLASS 1 POOL
P2	CLASS 2 POOL
P3	CLASS 3 POOL
FL	FLAT
FA	FALLS
▽	WATER DEPTH
T1	TRANSECT

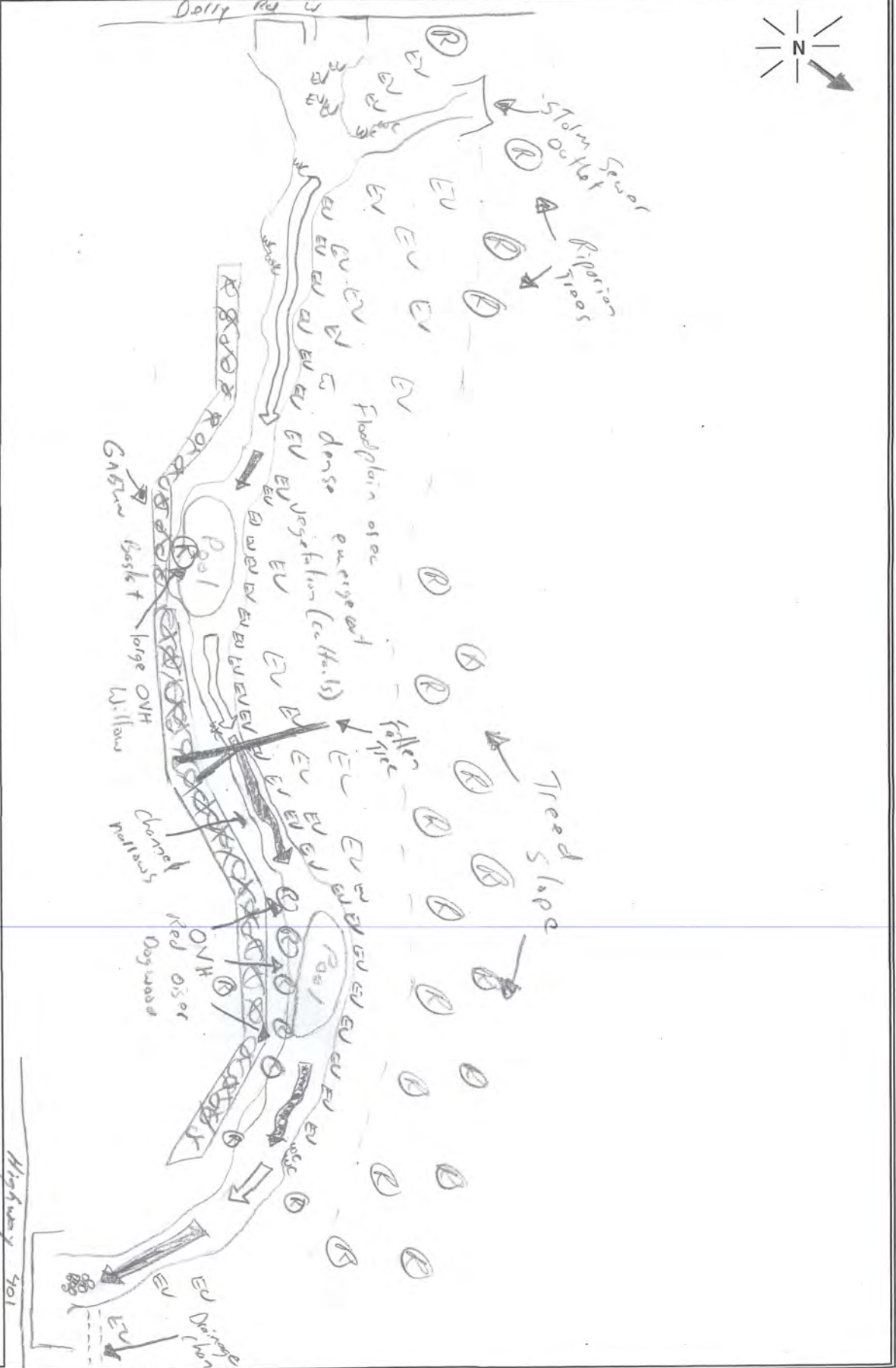
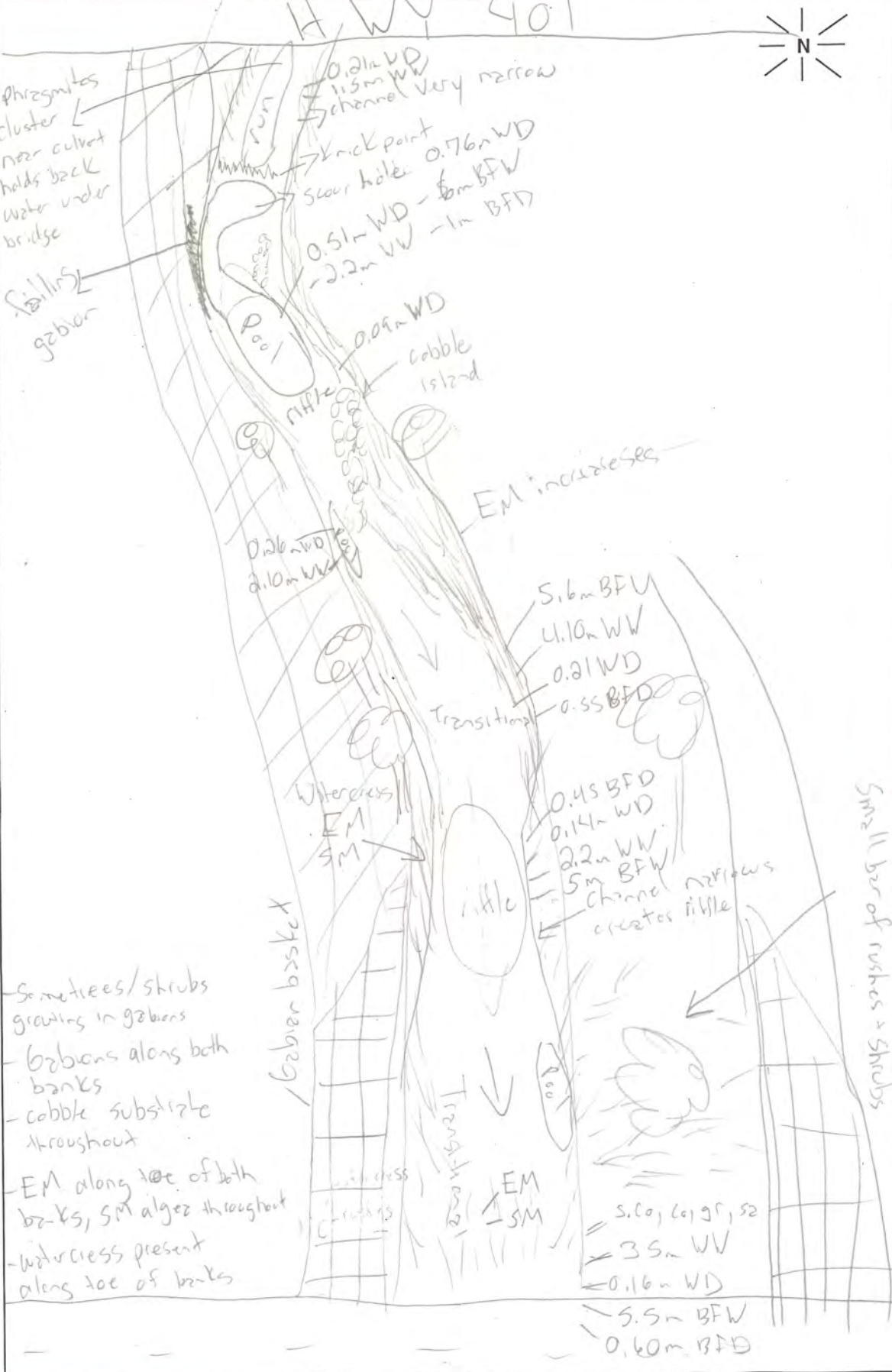


Table 4.0 Fish Habitat Map

Project Number: _____ Date: Oct 19, 2018
 Project Name: Ste 11b Site Name: Muller Creek #1b
 WaterBody ID: _____ Field Staff: _____
 Waterbody Name: Muller Creek Habitat Inventory Type: _____

LEGEND	
Ba	BARE GROUND
Bd	BEDROCK
Bo	BOULDER
L.Bo	LARGE BOULDER
Co	COBBLE
S.Co	SMALL COBBLE
L.Co	LARGE COBBLE
Gr	GRAVEL
S.Gr	SMALL GRAVEL
L.Gr	LARGE GRAVEL
TT	ESCARPMENT
FI	FINES
Sa	SAND
S	SILT
Or	ORGANIC MATERIAL
DP	DEBRIS PILE
BL	BEAVER LODGE
BD	BEAVER DAM
EM	EMERGENT MACROPHYTES
SM	SUBMERGENT MACROPHYTES
FM	FLOATING MACROPHYTES
IV	INSTREAM VEGETATION
TV	TERRESTRIAL VEGETATION
DF	DEADFALL
RW	ROOTWAD
SH	SHRUB
MF	MIXEDWOOD FOREST
CF	CONIFEROUS FOREST
DF	DECIDUOUS FOREST
SE	SEDGES
GF	GRASS/FORBES
MO	MOSS
BMT	MINNOW TRAP
UCB	UNDERCUT BANK
OHC	OVERHEAD COVER
OHV	OVERHANGING VEGETATION
ISC	INSTREAM COVER
INV	INUNDATED VEGETATION
USB	UNSTABLE BANK
BW	BACKWATER
IP	IMPOUNDMENT POND
SN	SNYE
CH	CHUTE
CA	CASCADE
→	SHALLOW SLOPE
→	MODERATE SLOPE
→	MODERATELY STEEP SLOPE
→	STEEP SLOPE
→	FLOW DIRECTION
RA	RAPIDS
RF	RIFFLE
R1	CLASS 1 RUN
R2	CLASS 2 RUN
R3	CLASS 3 RUN
P1	CLASS 1 POOL
P2	CLASS 2 POOL
P3	CLASS 3 POOL
FL	FLAT
FA	FALLS
▽	WATER DEPTH
T1	TRANSECT



APPENDIX D
Tree Inventory

Final_Code	Species_Scientific	Species_Common	Y_UTM	X_UTM	Site	DBH(cm)	Dripline(m)	TPZ(m)	Type	Additional st	TI	CS	CV	CoD_Stem	CDB (%)	Inc_Bark	Lean Dir.	Fungus	Insects	Cavity	Rot	Wound	Frost Crack	Epicormic	EAB	Canker	Suppressed		
1132	Acer negundo	Manitoba maple	4829804.658	602631.389	10	12	3	1.44	Tree		G	F	?		?		W												
1133	Acer negundo	Manitoba maple	4829785.274	602633.9507	10	45	5	5.4	Tree		G	G	?		?														
1134	Salix sp.	Willow sp	4829773.246	602635.1524	10	38	7	4.56	Tree		G	G	?		?														
1135	Acer negundo	Manitoba maple	4829749.829	602626.8117	10	78	9	9.36	Tree	2	G	P	G		10									X					
1136	Salix sp.	Willow sp	4829713.252	602599.4179	10	90	8	10.8	Tree		F	F	F		20							X							
1137	Acer negundo	Manitoba maple	4829706.836	602590.8658	10	31	4	3.72	Tree	1	P	P	?		?							X		X					
1138	Acer negundo	Manitoba maple	4829706.443	602590.6891	10	20	4	2.4	Tree		G	G	?		?														
1139	Acer negundo	Manitoba maple	4829704.758	602591.1877	10	38	6	4.56	Tree		G	G	?		?														
1140	Acer negundo	Manitoba maple	4829703.119	602591.9689	10	20	5	2.4	Tree		G	G	?		?														
1141	Acer negundo	Manitoba maple	4829701.459	602588.3649	10	33	8	3.96	Tree		G	F	?		?		SE												
1142	Quercus rubra	Red oak	4829697.993	602575.2793	10	12	2	1.44	Tree		G	F	F	X	20		W					X							
1143	Salix sp.	Willow sp	4829751.311	602487.2062	10	80	10	9.6	Tree		P	G	G		5								X						
1144	Acer negundo	Manitoba maple	4829747.741	602490.1077	10	50	7	6	Tree	2	P	G	F		20														
1145	Salix sp.	Willow sp	4829829.357	602453.4158	10	110	9	13.2	Tree		G	G	?		?		E												
1146	Acer negundo	Manitoba maple	4829823.841	602452.2494	10	41	9	4.92	Tree	1	G	G	G	X	10					X				X					
1147	Acer negundo	Manitoba maple	4829803.794	602458.5869	10	14	3	1.68	Tree		G	G	F		20														
1148	Acer negundo	Manitoba maple	4829801.189	602457.001	10	15	3	1.8	Tree	2	G	G	?		?							X							
1149	Acer negundo	Manitoba maple	4829793.235	602456.7445	10	11	2	1.32	Tree		F	G	?		?							X							
1150	Acer negundo	Manitoba maple	4829802.496	602420.4319	10	25	4	3	Tree		G	G	?		?														
1151	Tilia americana	Basswood	4829829.696	602298.2725	10	53	7	6.36	Tree	1	G	F	?		?														
1152	Acer negundo	Manitoba maple	4829828.302	602297.6748	10	14	4	1.68	Tree	1	G	G	G		10														
1153	Tilia americana	Basswood	4829824.553	602299.1966	10	20	4	2.4	Tree		G	F	?		?		E												
1154	Carya cordiformis	Bitternut hickory	4829823.52	602299.4597	10	60	7	7.2	Tree		F	G	F		20							X							
1155	Tilia americana	Basswood	4829823.39	602293.4557	10	14	3	1.68	Tree		G	G	G		5							X							
1156	Unknown species	Unknown	4829823.509	602292.8046	10	18	3	2.16	Tree		G	G	P		50														
1157	Tilia americana	Basswood	4829822.361	602290.0097	10	49	6	5.88	Tree		G	G	?		?														
1158	Unknown species	Unknown	4829821.38	602296.3647	10	17	4	2.04	Tree	2	G	G	G		10														
1159	Unknown species	Unknown	4829818.586	602295.7739	10	24	4	2.88	Tree	1	P	F	?		?														
1160	Acer negundo	Manitoba maple	4829817.104	602289.7631	10	20	6	2.4	Tree		F	G	?		?														
1161	Tilia americana	Basswood	4829813.618	602287.7206	10	24	4	2.88	Tree		G	F	G		10		N							X					
1162	Carya cordiformis	Bitternut hickory	4829815.59	602284.589	10	30	5	3.6	Tree	2	G	G	?		?														
1163	Quercus alba	White oak	4829809.813	602287.8572	10	70	8	8.4	Tree		G	G	?		?														
1164	Carya cordiformis	Bitternut hickory	4829812.179	602283.3531	10	22	4	2.64	Tree		G	G	?		?														
1165	Unknown species	Unknown	4829814.043	602277.0419	10	40	8	4.8	Tree		G	G	G		10														
1166	Carya cordiformis	Bitternut hickory	4829804.159	602282.2727	10	21	4	2.52	Tree		F	F	?		?						X		X						
1167	Carya cordiformis	Bitternut hickory	4829803.081	602283.5483	10	18	4	2.16	Tree	1	G	G	?		?														
1168	Tilia americana	Basswood	4829803.971	602280.24	10	41	6	4.92	Tree		G	G	?		?							X							
1169	Quercus alba	White oak	4829790.169	602272.1698	10	80	6	9.6	Tree		G	G	F		20							X							
1170	Acer negundo	Manitoba maple	4829797.496	602269.3811	10	37	7	4.44	Tree		F	P	?		?							X							
1171	Unknown species	Unknown	4829794.571	602268.9913	10	38	6	4.56	Tree		G	G	F		20														
1172	Tilia americana	Basswood	4829801.136	602259.3729	10	54	6	6.48	Tree	1	G	G	?		?														
1173	Acer negundo	Manitoba maple	4829789.515	602264.1107	10	18	5	2.16	Tree		P	P	?		?							X							
1174	Acer negundo	Manitoba maple	4829792.461	602260.3463	10	41	6	4.92	Tree		G	G	?		?														
1175	Acer negundo	Manitoba maple	4829786.188	602261.3608	10	16	4	1.92	Tree		G	F	?		?		S												
1176	Acer negundo	Manitoba maple	4829780.239	602251.3631	10	21	5	2.52	Tree		F	F	?		?							X		X					
1177	Acer negundo	Manitoba maple	4829780.045	602249.403	10	24	5	2.88	Tree		F	F	?		?									X					
1178	Acer saccharum ssp. saccharum	Sugar maple	4829779.333	602244.9997	10	26	5	3.12	Tree		F	F	?		?							X		X					
1179	Quercus alba	White oak	4829788.194	602246.3946	10	78	7	9.36	Tree		G	G	?		?														
1180	Fraxinus sp.	Ash sp	4829780.732	602235.9263	10	26	5	3.12	Tree		F	G	?		?							X							
1181	Fraxinus sp.	Ash sp	4829777.166	602237.567	10	17	4	2.04	Tree		P	P	?		?										X				
1182	Picea glauca	White spruce	4829784.388	602232.1033	10	40	4	4.8	Tree		P	P	?		?										X				
1183	Acer negundo	Manitoba maple	4829775.154	602216.4647	10	29	6	3.48	Tree		G	G	G		5														
1184	Acer saccharum ssp. saccharum	Sugar maple	4829765.189	602232.6864	10	28	5	3.36	Tree		F	F	?		?						X								
1185	Acer negundo	Manitoba maple	4829763.274	602238.3192	10	15	4	1.8	Tree		G	G	?		?														
1186	Acer negundo	Manitoba maple	4829766.999	602243.5545	10	16	3	1.92	Tree		G	G	?		?										X				
1187	Acer negundo	Manitoba maple	4829764.691	602242.1814	10	12	3	1.44	Tree		G	G	?		?										X				
1188	Acer saccharum ssp. saccharum	Sugar maple	4829759.923	602241.0038	10	29	5	3.48	Tree		G	G	?		?														
1189	Acer negundo	Manitoba maple	4829759.039	602237.7341	10	15	4	1.8	Tree		G	G	?		?														
1190	Acer negundo	Manitoba maple	4829758.665	602236.8248	10	14	4	1.68	Tree	1	G	G	?		?														
1191	Acer negundo	Manitoba maple	4829755.827	602236.0942	10	14	5	1.68	Tree	2	G	G	?		?														
1192	Acer negundo	Manitoba maple	4829758.647	602224.5231	10	23	6	2.76	Tree	2	G	G	?		?									X					
1193	Salix sp.	Willow sp	4829762.172	602215.8074	10	50	7	6	Tree	2	G	G	?		?														
1194	Acer negundo	Manitoba maple	4829760.476	602215.4877	10	12	3	1.44	Tree	1	G	G	?		?														
1195	Acer negundo	Manitoba maple	4829760.986	602206.6675	10	34	8	4.08	Tree		G	G	?		?														
1196	Picea glauca	White spruce	4829767.499	602209.5467	10	21	3	2.52	Tree	1	F	G	?		?						X		X						
1197	Acer negundo	Manitoba maple	4829769.417	602207.2057	10	19	4	2.28	Tree		G	G	G		5														
1198	Acer negundo	Manitoba maple	4829769.211	602206.2754	10	15																							

Final_Code	Species_Scientific	Species_Common	Y_UTM	X_UTM	Site	DBH(cm)	Dripline(m)	TPZ(m)	Type	Additional st	TI	CS	CV	CoD_Stem	CDB (%)	Inc_Bark	Lean Dir.	Fungus	Insects	Cavity	Rot	Wound	Frost Crack	Epicormic	EAB	Canker	Suppressed
1204	Acer negundo	Manitoba maple	4829775.546	602411.607	10	50	6	6	Tree		G	G	?		?												
1076	Tilia americana	Basswood	4829737.49	602632.32	10	72	8	1.68	Tree		G	G	?		?												
378	Picea pungens	Blue spruce	4828280.854	598100.8716	1A	14	1.5	1.2	Tree		G	G	P		60												
379	Fraxinus sp.	Ash sp	4828191.475	598216.4833	1B	22	4	1.32	Tree		F	G		3	?				X			X					
380	Quercus alba	White oak	4828191.414	598213.6092	1B	24	2.5	2.52	Tree		G	G	F		15												
381	Quercus alba	White oak	4828188.294	598212.5805	1B	20	2.5	1.2	Tree		G	G	G		10												
382	Quercus alba	White oak	4828190.188	598206.9935	1B	21	2	1.32	Tree		G	F	G		10							X					
383	Quercus alba	White oak	4828185.265	598206.7181	1B	25	2	1.2	Tree		G	F	G		10												
384	Quercus alba	White oak	4828186.307	598204.2789	1B	22	2	3.6	Tree		G	F	G		10												
385	Fraxinus sp.	Ash sp	4828184.148	598199.8291	1B	18	3	2.76	Tree		P	F	P		95				X			X		X			
386	Fraxinus sp.	Ash sp	4828182.669	598195.772	1B	21	4	1.92	Tree		P	G	P		70				X	X		X		X			
387	Fraxinus sp.	Ash sp	4828186.781	598192.0641	1B	20	4	1.44	Tree		P	G	P		40				X								
388	Fraxinus sp.	Ash sp	4828185.647	598186.4186	1B	15	3	1.8	Tree		P	F	P		95				X			X		X			
389	Acer saccharinum	Silver maple	4828171.19	598177.0518	1B	13	2	1.56	Tree		G	G	G		5												
390	Acer saccharinum	Silver maple	4828166.823	598180.0614	1B	12	2	1.44	Tree		G	G	G		5												
391	Acer saccharinum	Silver maple	4828139.199	598191.7956	1B	11	2	1.32	Tree		G	G	G		5												
392	Acer saccharinum	Silver maple	4828132.743	598194.4678	1B	14	2	1.68	Tree		G	G	G		5												
393	Picea pungens	Blue spruce	4828156.177	598190.7263	1B	25	2	3	Tree		G	G	G		0												
394	Picea pungens	Blue spruce	4828147.212	598194.8401	1B	16	2	1.92	Tree		G	G	G		0												
395	Picea pungens	Blue spruce	4828137.819	598198.7831	1B	18	2.5	2.16	Tree		G	G	G		10												
396	Picea pungens	Blue spruce	4828116.979	598210.7498	1B	20	3	2.4	Tree		G	G	G		5												
397	Fraxinus sp.	Ash sp	4828111.286	598211.0118	1B	18	3	2.16	Tree		F	G	G		5						X	X					
398	Picea pungens	Blue spruce	4828113.929	598218.0767	1B	20	2.5	2.4	Tree		G	G	G		5												
399	Picea pungens	Blue spruce	4828108.089	598213.9138	1B	19	2.5	2.28	Tree		G	G	G		5												
400	Picea pungens	Blue spruce	4828107.573	598218.8189	1B	20	2.5	2.4	Tree		G	G	G		5												
401	Picea pungens	Blue spruce	4828103.074	598217.9716	1B	16	1.5	1.92	Tree		G	F	F		15												
402	Picea pungens	Blue spruce	4828074.217	598226.2487	1B	19	2	2.28	Tree		G	G	G		0												
403	Picea pungens	Blue spruce	4828066.218	598230.5277	1B	20	2	2.4	Tree		G	G	G		5												
404	Picea pungens	Blue spruce	4828056.519	598234.4424	1B	20	2	2.4	Tree		G	G	G		10												
405	Picea pungens	Blue spruce	4828048.16	598238.0933	1B	19	2	2.28	Tree		G	G	G		10												
406	Picea pungens	Blue spruce	4828043.326	598241.7121	1B	14	2	1.68	Tree		G	G	F		15												
407	Picea pungens	Blue spruce	4828043.726	598246.26	1B	18	2	2.4	Tree	1	G	G	G		5												
408	Picea pungens	Blue spruce	4828039.49	598243.4774	1B	20	2	2.16	Tree		G	G	G		5												
1501	Acer saccharinum	Silver maple	4828146.7	598187.9	1B	8	2	1.2	Tree		G	G	?		?												
1502	Acer saccharinum	Silver maple	4828155.128	598184.276	1B	8	2	1.2	Tree		G	G	?		?												
1503	Acer saccharinum	Silver maple	4828161.451	598181.687	1B	7	2	1.2	Tree		G	G	?		?												
340	Picea pungens	Blue spruce	4828490.93	598428.6397	2A	22	1.5	2.64	Tree		G	G	G		10												
341	Picea pungens	Blue spruce	4828484.283	598430.9776	2A	20	2	2.4	Tree		G	G	G		5												
342	Picea pungens	Blue spruce	4828471.95	598438.2939	2A	13	1	1.56	Tree		G	G	G		10												
343	Picea pungens	Blue spruce	4828468.484	598440.1508	2A	15	2	1.8	Tree		G	F	F		10												
344	Picea pungens	Blue spruce	4828465.305	598439.6809	2A	13	1	1.56	Tree		G	G	B		10												
345	Picea pungens	Blue spruce	4828462.474	598441.902	2A	14	1.5	1.68	Tree		G	G	G		5												
346	Picea pungens	Blue spruce	4828446.508	598442.6574	2A	17	2	2.04	Tree		G	G	G		5												
347	Picea pungens	Blue spruce	4828443.363	598441.5735	2A	16	2	1.92	Tree		G	G	G		5												
348	Picea pungens	Blue spruce	4828439.361	598443.0527	2A	20	2	2.4	Tree		G	G	G		5												
349	Picea pungens	Blue spruce	4828435.986	598442.5415	2A	12	1	1.44	Tree		G	G	G		10												
350	Picea pungens	Blue spruce	4828432.914	598444.2506	2A	13	1.5	1.56	Tree		G	G	B		10												
352	Quercus alba	White oak	4828410.033	598448.2767	2A	14	2	2.16	Tree		G	G	B		0												
351	Picea pungens	Blue spruce	4828417.035	598441.043	2A	18	2	1.68	Tree	10	G	G	G		10												
353	Picea pungens	Blue spruce	4828406.866	598446.2587	2A	15	2	1.8	Tree		G	G	G		5												
354	Picea pungens	Blue spruce	4828403.247	598447.5465	2A	14	2	1.68	Tree		G	G	G		5												
355	Picea pungens	Blue spruce	4828399.931	598445.6803	2A	19	2.5	2.28	Tree		G	G	G		5												
356	Picea pungens	Blue spruce	4828396.421	598449.8557	2A	17	2	2.04	Tree		G	G	G		5												
357	Picea glauca	White spruce	4828369.404	598454.0112	2A	21	3	2.52	Tree		G	G	G		10												
360	Picea pungens	Blue spruce	4828365.65	598456.746	2A	16	1.5	2.76	Tree		G	G	G		10												
358	Picea glauca	White spruce	4828366.753	598447.9139	2A	23	2	2.52	Tree		G	G	G		5												
359	Picea glauca	White spruce	4828362.709	598452.5051	2A	21	3	1.92	Tree		G	G	G		10												
362	Picea glauca	White spruce	4828360.592	598456.6557	2A	14	2.5	1.2	Tree		G	G	G		5												
361	Picea glauca	White spruce	4828361.254	598461.4659	2A	10	1.5	1.68	Tree		G	G	G		5												
363	Picea glauca	White spruce	4828357.33	598460.1558	2A	14	2.5	1.68	Tree		G	G	G		5												
364	Picea glauca	White spruce	4828353.662	598456.8742	2A	12	2	1.44	Tree		G	G	G		10												
366	Pinus resinosa	Red pine	4828346.212	598458.9773	2A	28	3	2.04	Tree		G	G	G		10												
365	Pinus resinosa	Red pine	4828347.221	598451.3242	2A	17	3	3.36	Tree		G	G	G		10												
367	Pinus resinosa	Red pine	4828336.579	598454.829	2A	28	4	3.36	Tree		G	G	G		10												
368	Pinus resinosa	Red pine	4828332.284	598457.0886	2A	24	3	2.88	Tree		F	G	G		10												
371	Picea pungens	Blue spruce	4828326.231	598458.1704	2A	27	3	3	Tree		G	G	G		0												
369	Picea pungens	Blue spruce	4828327.15	598452.3817	2A	25	2.5	3.48	Tree		G	G	G		10												
370	Pinus sylvestris	Scots pine	4828321.246	598450.7956	2A	29	2	3.24	Tree		G	G	F		15												
372	Pinus sylvestris	Scots pine	4828331.22	598464.609	2A	25	3	3	Tree		G	F	F		15												
373	Pinus sylvestris	Scots pine	4828333.491	598476.1337	2A	31	3	3.72																			

Final_Code	Species_Scientific	Species_Common	Y_UTM	X_UTM	Site	DBH(cm)	Dripline(m)	TPZ(m)	Type	Additional st	TI	CS	CV	CoD_Stem	CDB (%)	Inc_Bark	Lean Dir.	Fungus	Insects	Cavity	Rot	Wound	Frost Crack	Epicormic	EAB	Canker	Suppressed
376	Picea pungens	Blue spruce	4828337.34	598494.628	2A	20	2.5	2.4	Tree		G	G	G		5												
377	Acer saccharinum	silver maple	4828338.25	598500.9074	2A	11	3	1.32	Tree	4	F	F	G		5								X				
PP1	Robinia pseudoacacia	Black locust	4828353.515	598477.39	2A	11	2	1.32	Tree		G	G	?		?												
PP2	Robinia pseudoacacia	Black locust	4828355.922	598478.2399	2A	10	2	1.2	Tree		G	G	?		?												
PP3	Robinia pseudoacacia	Black locust	4828358.557	598475.9775	2A	14	2	1.68	Tree		G	G	?		?												
1528		unknown species	4828498.752	598447.897	2A	4	2	1.2	Tree		G	G	?		?												
1529		unknown species	4828497.468	598437.966	2A	4	2	1.2	Tree		F	G	?		?							X					
shrub5		unknown species	4828479.482	598436.816	2A	0	0	0	Shrub						0												
shrub6		unknown species	4828490.964	598452.588	2A	0	0	0	Shrub						0												
409	Fraxinus sp.	Ash sp.	4828228.068	598521.7234	2B	20	4	2.4	Tree		P	P	P		50									X			
410	Picea pungens	Blue spruce	4828230.587	598516.3771	2B	24	3	2.88	Tree		G	G	G		0												
411	Picea pungens	Blue spruce	4828226.662	598513.2056	2B	24	3	2.88	Tree		G	G	G		0												
412	Picea pungens	Blue spruce	4828224.005	598507.6351	2B	22	3	2.64	Tree		G	G	G		0												
413	Picea pungens	Blue spruce	4828221.323	598503.5405	2B	14	2	1.68	Tree		G	G	G		0												
414	Picea pungens	Blue spruce	4828221.667	598497.4083	2B	26	3	3.12	Tree		G	G	G		0												
415	Pinus resinosa	Red pine	4828215.054	598492.6407	2B	26	3	3.12	Tree		G	G	G		0												
416	Acer platanoides	Norway maple	4828220.344	598492.5365	2B	21	4	2.52	Tree		F	G	G	1	0								X				
417	Acer platanoides	Norway maple	4828215.035	598484.8492	2B	19	4	2.28	Tree		G	G	G		0												
418	Pinus resinosa	Red pine	4828211.787	598478.9579	2B	18	3	2.16	Tree		G	G	G		0		E										
419	Acer platanoides	Norway maple	4828216.302	598467.9306	2B	19	4	2.28	Tree		G	G	G		5												
dead1		unknown species	4828229.86	598535.265	2B	0	0	0	Tree						0												
shrub3		unknown species	4828219.64	598487.446	2B	0	0	0	Shrub						0												
shrub4		unknown species	4828231.111	598528.574	2B	0	0	0	Shrub						0												
195	Quercus rubra	Red oak	4828421.582	599205.4076	3A	21	5	2.52	Tree		G	G	G		5												
196	Crataegus sp.	Hawthorn sp	4828432.588	599276.6589	3A	25	4	3	Tree	3	G	G		3	?												
197	Salix sp.	Willow sp	4828578.825	599116.042	3A	17	3	2.04	Tree		P	G	G		10					X	X	X					
198	Salix sp.	Willow sp	4828578.977	599114.78	3A	15	3	1.8	Tree		F	G	G		10							X					
199	Salix sp.	Willow sp	4828581.319	599113.6157	3A	15	2	1.8	Tree		F	F	F		20							X		X			
200	Salix sp.	Willow sp	4828584.206	599113.8081	3A	14	2	1.68	Tree		F	G	F		15							X					
201	Salix sp.	Willow sp	4828585.251	599111.6449	3A	30	4	3.6	Tree	2	G	G	F		15												
1525	Abies sp.	Fir sp	4828440.219	599194.914	3A	10	2	1.2	Tree		G	G	G	0	5												
1526	Abies sp.	Fir sp	4828443.33	599193.95	3A	12	3	1.44	Tree		G	G	G		10								X				
1527	Salix sp.	Willow sp	4828580.867	599115.985	3A	9	2	1.2	Tree	2	F	G	?		?							X					
420	Gleditsia triacanthos var. inermis	Shademaster honey locust	4828340.461	599742.3368	4B	23	3	2.76	Tree		G	G	G		0												
422	Gleditsia triacanthos var. inermis	Shademaster honey locust	4828343.102	599745.379	4B	23	3	2.76	Tree		G	G	G		0												
423	Gleditsia triacanthos var. inermis	Shademaster honey locust	4828342.96	599748.4881	4B	18	2	2.76	Tree		G	G	G		0												
424	Gleditsia triacanthos var. inermis	Shademaster honey locust	4828346.227	599748.1779	4B	35	4	2.16	Tree		G	G	G		0												
421	Gleditsia triacanthos var. inermis	Shademaster honey locust	4828343.626	599742.7498	4B	23	3	4.2	Tree		G	G	G		0												
425	Quercus rubra	Red oak	4828369.595	599702.5648	4B	12	2	1.44	Tree		G	G	G		0												
426	Acer platanoides	Norway maple	4828369.962	599702.2505	4B	41	6	4.92	Tree	2	G	F	G		0												
427	Acer saccharum ssp. saccharum	Sugar maple	4828354.605	599663.0559	4B	23	5	2.76	Tree		F	G	F		15							X					
428	Acer saccharum ssp. saccharum	Sugar maple	4828352.798	599657.9678	4B	23	5	2.76	Tree		G	G	G		0												
1504		unknown species	4828352.225	599740.922	4B	2	1	1.2	Tree		G	G	?		?												
1505		unknown species	4828350.997	599730.37	4B	3	1	1.2	Tree		G	P	?		?												
1506		unknown species	4828349.927	599721.366	4B	4	1	1.2	Tree		G	G	?		?												
1507	Picea glauca	white spruce	4828368.322	599713.373	4B	4	1	1.2	Tree		G	G	G		10												
1508	Pinus resinosa	Red pine	4828368.389	599716.848	4B	5	1	1.2	Tree		G	G	G		0												
1509	Pinus resinosa	Red pine	4828368.828	599720.076	4B	5	1	1.2	Tree		G	G	G		0												
1510	Celtis occidentalis	Common hackberry	4828369.502	599732.198	4B	3	1	1.2	Tree		F	G	?		?									X			
1511	Celtis occidentalis	Common hackberry	4828370.425	599736.915	4B	3	1	1.2	Tree		F	G	?		?									X			
1512	Celtis occidentalis	Common hackberry	4828371.489	599741.998	4B	3	1	1.2	Tree		G	G	G		?												
1513		Shrub species	4828371.029	599747.023	4B	4	2	1.2	Tree	2	G	G	?		?												
1514	Celtis occidentalis	Common hackberry	4828372.626	599752.263	4B	3	1	1.2	Tree		G	G	?		?												
1515	Celtis occidentalis	Common hackberry	4828373.043	599757.169	4B	3	1	1.2	Tree		G	G	?		?												
1516	Celtis occidentalis	Common hackberry	4828373.436	599762.07	4B	2	1	1.2	Tree		G	G	?		?												
1517	Celtis occidentalis	Common hackberry	4828373.657	599767.426	4B	3	1	1.2	Tree		G	G	?		?												
1518	Celtis occidentalis	Common hackberry	4828374.543	599772.067	4B	3	1	1.2	Tree		G	G	?		?												
1519	Picea pungens	Blue spruce	4828375.78	599776.804	4B	4	1	1.2	Tree		G	G	G		10												
dead2		Ash sp	4828337.702	599730.171	4B	0	0	0	Tree						0												
dead3		Ash sp	4828341.342	599726.933	4B	0	0	0	Tree						0												
dead4		Ash sp	4828356.641	599667.386	4B	0	0	0	Tree						0												
shrub1		Staghorn Sumac	4828362.614	599672	4B	0	0	0	Shrub						0												
shrub2		Staghorn Sumac	4828370.639	599687.892	4B	0	0	0	Shrub						0												
155	Acer rubrum	Red maple	4828733.841	600560.0661	5A	20	4	2.4	Tree	3	G	F	G		5												
156	Pinus resinosa	Red pine	4828741.324	600556.6709	5A	26	4	3.12	Tree		G	G	G		10												
157	Pinus resinosa	Red pine	4828741.46	600551.136	5A	30	4	3.6	Tree		G	G	G		10												
158	Pinus resinosa	Red pine	4828747.852	600549.103	5A	25	3	3	Tree		G	G	G		10												
159	Pinus resinosa	Red pine	4828746.859	600543.8002	5A	30	5	3.6	Tree		G	G	G		10												
160	Pinus resinosa	Red pine	4828740.866	600542.6253	5A	27	4	3.24	Tree		G	G	G		10												
161	Pinus resinosa	Red pine	4828741.396	600546.675	5A	25	4	3	Tree		G	F	P		95												
163	Pinus resinosa	Red pine	4828740.484	600538.3611	5A	27	4	3.72	Tree																		

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164	Pinus resinosa	Red pine	4828733.424	600532.877	5A	32	5	3.84	Tree		G	G	G		5												
165	Pinus resinosa	Red pine	4828727.539	600536.9887	5A	35	4	4.2	Tree		G	G	G		10												
167	Pinus resinosa	Red pine	4828727.59	600550.1729	5A	30	4	3.6	Tree		G	G	F		15												
168	Pinus resinosa	Red pine	4828724.71	600546.8251	5A	26	3	3.12	Tree		G	G	F		20												
169	Pinus resinosa	Red pine	4828715.309	600539.7804	5A	27	3	3.24	Tree		G	G	F		15												
170	Pinus resinosa	Red pine	4828713.326	600534.936	5A	27	4	3.24	Tree		G	G	G		5												
171	Pinus resinosa	Red pine	4828708.609	600540.5918	5A	26	3	3.12	Tree		G	G	F		20												
172	Pinus resinosa	Red pine	4828704.854	600539.9308	5A	28	3	3.36	Tree		G	G	P		45												
173	Pinus resinosa	Red pine	4828705.194	600533.9859	5A	32	4	3.84	Tree		G	G	F		15												
174	Pinus resinosa	Red pine	4828701.465	600538.5393	5A	28	4	3.36	Tree		G	G	F		15												
175	Pinus resinosa	Red pine	4828698.078	600533.1157	5A	31	5	3.72	Tree		G	G	F		15												
176	Pinus resinosa	Red pine	4828690.163	600536.1077	5A	31	5	3.72	Tree		G	G	G		5												
177	Salix sp.	Willow sp	4828651.86	600546.8869	5A	15	5	1.8	Tree		G	G	G		10												
182	Robinia pseudoacacia	Black locust	4828628.581	600521.8633	5A	11	3	1.32	Tree	2	G	F	G		10									X			
183	Salix sp.	Willow sp	4828626.817	600526.9123	5A	13	2	1.56	Tree	1	G	G	F		15												
184	Acer saccharinum	Silver maple	4828621.899	600525.5554	5A	29	5	3.48	Tree	1	G	G	G		10												
178	Salix sp.	Willow sp	4828656.58	600541.9971	5A	17	4	2.04	Tree	1	F	P	P		50												
179	Salix sp.	Willow sp	4828650.824	600541.9971	5A	16	4	1.92	Tree	2	G	G	G		10												
180	Salix sp.	Willow sp	4828653.526	600539.0603	5A	15	3	1.8	Tree	2	G	F	G		5												
181	Salix sp.	Willow sp	4828655.17	600540.4699	5A	16	3	1.92	Tree	6	G	F	G		5									X			
166	Pinus resinosa	Red pine	4828727.651	600544.1116	5A	32	4	3.84	Tree		G	F	P		80												
185	Acer platanoides	Norway maple	4828455.685	600490.5551	5B	20	4	2.4	Tree		F	F	F		15							X					
186	Acer platanoides	Norway maple	4828452.51	600482.6654	5B	19	4	2.28	Tree		G	G	G		5												
187	Acer platanoides	Norway maple	4828450.499	600476.1111	5B	20	4	2.4	Tree		F	G	F		25							X					
188	Pinus resinosa	Red pine	4828435.262	600458.7801	5B	21	3	2.52	Tree	1	G	G	G		5												
189	Pinus resinosa	Red pine	4828432.338	600454.8373	5B	20	3	2.4	Tree		G	G	G		5												
190	Pinus resinosa	Red pine	4828428.524	600452.7314	5B	20	3	2.4	Tree		G	G	F		30				X								
191	Pinus resinosa	Red pine	4828425.51	600450.2086	5B	18	3	2.16	Tree		G	G	F		30												
192	Picea pungens	Blue spruce	4828424.597	600446.1689	5B	19	2	2.28	Tree		G	G	F		20												
193	Picea pungens	Blue spruce	4828421.694	600442.4015	5B	20	3	2.4	Tree		G	G	G		5												
194	Acer platanoides	Norway maple	4828434.46	600441.2951	5B	13	4	1.56	Tree	8	G	F	G		0									X			
101	Salix sp.	Willow sp	4828699.564	600705.0104	7A	22	5	2.64	Tree	1	F	F	F		20							X					
102	Quercus rubra	Red oak	4828689.847	600712.9848	7A	10	2.5	1.2	Tree		G	G	F		20												
103	Quercus rubra	Red oak	4828683.215	600713.3923	7A	10	2	1.2	Tree		G	G	G		10												
104	Fraxinus sp.	Ash sp	4828672.65	600718.7069	7A	15	1	1.8	Tree		P	P	P		90									X			
105	Malus sp.	Apple sp	4828669.141	600721.9716	7A	14	3	1.68	Tree	4	F	G	G		5							X					
106	Salix sp.	Willow sp	4828697.564	600705.0104	7A	18	4	2.16	Tree		G	G	F		15												
1520	Salix sp.	Willow sp	4828709.377	600705.707	7A	10	3	1.2	Tree		P	P	P		1 ?								X				
1521	Salix sp.	Willow sp	4828707.371	600705.34	7A	12	4	1.44	Tree		P	P	?		1 ?								X				
1522	Salix sp.	Willow sp	4828705.789	600705.896	7A	10	3	1.2	Tree		P	P	?		2 ?							X					
1523	Salix sp.	Willow sp	4828687.408	600711.182	7A	15	4	1.8	Tree		P	P	?		3 ?												
1524	Salix sp.	Willow sp	4828688.233	600705.412	7A	10	3	1.2	Tree		F	F	?		0 ?												
107	Acer platanoides	Norway maple	4828404.962	600770.04	7B	24	6	2.88	Tree		G	G	G		5							X					
108	Acer platanoides	Norway maple	4828412.384	600770.9481	7B	31	6	3.72	Tree		G	G	G		5												
109	Acer platanoides	Norway maple	4828419.831	600770.1087	7B	27	5	3.24	Tree		G	G	G		5							X					
110	Acer platanoides	Norway maple	4828420.087	600764.0444	7B	25	5	3	Tree		G	G	F		15							X					
111	Acer platanoides	Norway maple	4828425.825	600767.0618	7B	23	5	2.76	Tree		G	G	G		5							X					
112	Acer platanoides	Norway maple	4828427.875	600771.5065	7B	38	6	4.56	Tree		G	G	G		10												
113	Acer platanoides	Norway maple	4828429.391	600762.3923	7B	26	5	3.12	Tree		G	G	G		10												
114	Acer platanoides	Norway maple	4828434.98	600765.4424	7B	26	4	3.12	Tree		F	G	F		15							X	X				
115	Pinus sylvestris	Scots pine	4828441.75	600762.3649	7B	26	4	3.12	Tree		G	G	G		5												
117	Pinus sylvestris	Scots pine	4828443.693	600769.2417	7B	14	4	3.6	Tree		G	G	P		50												
118	Acer sp.	Maple sp.	4828444.766	600770.4663	7B	13	4	1.68	Tree		G	G	?		?												
119	Fraxinus sp.	Ash sp	4828443.908	600771.0144	7B	11	3	1.56	Tree	1	G	G	P		80							X			X		
120	Fraxinus sp.	Ash sp	4828446.826	600769.3925	7B	10	2	1.32	Tree		F	G	P		90										X		
121	Fraxinus sp.	Ash sp	4828447.021	600769.9299	7B	15	3	1.2	Tree		F	G	P		90										X		
122	Fraxinus sp.	Ash sp	4828446.599	600751.1634	7B	40	5	1.8	Tree		F	G	P		85										X		
123	Pinus sylvestris	Scots pine	4828446.348	600759.0982	7B	33	3.5	4.8	Tree		G	G	F		15												
124	Pinus sylvestris	Scots pine	4828447.413	600748.4093	7B	24	3	3.96	Tree		G	G	G		10												
125	Pinus sylvestris	Scots pine	4828448.343	600751.0685	7B	23	3	2.88	Tree		G	G	F		15												
126	Pinus sylvestris	Scots pine	4828448.119	600742.0374	7B	38	3	2.76	Tree		G	G	F		15												
127	Pinus sylvestris	Scots pine	4828461.663	600755.1773	7B	14	3	4.56	Tree		G	G	G		10												
128	Salix sp.	Willow sp	4828464.067	600742.1922	7B	29	5	1.68	Tree	3	G	G	F		20												
129	Fraxinus sp.	Ash sp	4828460.694	600740.8135	7B	30	5	3.48	Tree	1	F	G	P		90												
130	Fraxinus sp.	Ash sp	4828463.707	600735.671	7B	40	5	3.6	Tree		F	G	P		90										X		
131	Fraxinus sp.	Ash sp	4828470.361	600740.9487	7B	29	3	4.8	Tree		F	G	P		90										X		
132	Pinus resinosa	Red pine	4828471.993	600742.1958	7B	30	3	3.48	Tree		G	G	F		30												
133	Pinus resinosa	Red pine	4828491.859	600710.3352	7B	25	3	3.6	Tree		G	G	G		5												
134	Salix sp.	Willow sp	4828502.642	600714.078	7B	16	3	3	Tree		G	G	G		10												
135	Fraxinus sp.	Ash sp	4828501.814	600703.6847	7B	10</																					

Final_Code	Species_Scientific	Species_Common	Y_UTM	X_UTM	Site	DBH(cm)	Dripline(m)	TPZ(m)	Type	Additional st	TI	CS	CV	CoD_Stem	CDB (%)	Inc_Bark	Lean Dir.	Fungus	Insects	Cavity	Rot	Wound	Frost Crack	Epicormic	EAB	Canker	Suppressed
137	Salix sp.	Willow sp	4828508.702	600700.3255	7B	13	2	1.56	Tree		G	G	G		5												
138	Morus alba	White mulberry	4828413.326	600805.2964	7B	26	4	3.12	Tree	1	F	G	G		5						X						
139	Morus alba	White mulberry	4828436.4	600790.4256	7B	38	4	4.56	Tree		P	G	G		10						X	X					
140	Morus alba	White mulberry	4828444.307	600793.2417	7B	35	4	4.2	Tree		F	G	G		10							X					
141	Morus alba	White mulberry	4828449.621	600787.0635	7B	38	5	4.56	Tree		F	G	G		10							X					
142	Salix sp.	Willow sp	4828455.353	600787.2551	7B	18	3	2.16	Tree		G	G	F		15												
143	Morus alba	White mulberry	4828459.709	600792.8702	7B	50	5	6	Tree		F	G	G		10						X						
144	Salix sp.	Willow sp	4828456.92	600779.6588	7B	24	5	2.88	Tree	1	F	G	G		10							X					
145	Salix sp.	Willow sp	4828458.953	600778.6109	7B	12	3	1.44	Tree	1	F	P	F		15												
146	Morus alba	White mulberry	4828467.574	600779.03	7B	20	5	2.4	Tree	1	P	F	G		10						X	X	X				
147	Morus alba	White mulberry	4828468.153	600787.7103	7B	38	5	4.56	Tree		F	G	G		10						X	X					
148	Morus alba	White mulberry	4828476.511	600773.0046	7B	22	3	2.64	Tree		F	G	G		5						X	X					
149	Pinus resinosa	Red pine	4828483.935	600772.7766	7B	25	3	3	Tree		G	G	G		10												
150	Pinus resinosa	Red pine	4828492.399	600764.4949	7B	24	3	2.88	Tree		G	G	G		5												
151	Pinus resinosa	Red pine	4828504.802	600752.4925	7B	27	4	3.24	Tree		G	G	G		5												
152	Pinus resinosa	Red pine	4828509.341	600753.6963	7B	23	3	2.76	Tree		G	G	G		10												
153	Pinus resinosa	Red pine	4828502.884	600746.9711	7B	24	3	2.88	Tree		G	G	G		5												
154	Pinus resinosa	Red pine	4828515.239	600747.7151	7B	25	3	3	Tree		G	G	G		5												
300	Ulmus pumila	Siberian elm	4829664.728	602128.1303	9A	15	3	1.8	Tree	2	G	G	G		5												
301	Acer platanoides 'Crimson King'	Crimson King Norway Maple	4829659.65	602151.6088	9A	13	2	1.56	Tree		F	G	G		0												
302	Picea pungens	Blue spruce	4829665.043	602161.9856	9A	22	2	2.64	Tree		G	G	G		0												
303	Picea pungens	Blue spruce	4829668.59	602167.9828	9A	22	2	2.64	Tree		G	G	G		5												
304	Picea pungens	Blue spruce	4829669.299	602171.7475	9A	20	2	2.4	Tree		G	G	G		5												
305	Picea pungens	Blue spruce	4829669.584	602180.6351	9A	25	2	3	Tree		G	G	G		10												
306	Picea pungens	Blue spruce	4829672.284	602184.5066	9A	22	2	2.64	Tree		G	G	G		5												
307	Picea pungens	Blue spruce	4829673.921	602187.455	9A	20	2	2.4	Tree		G	G	G		5												
308	Picea pungens	Blue spruce	4829682.003	602202.3134	9A	19	2	2.28	Tree		G	G	G		5												
309	Picea pungens	Blue spruce	4829682.134	602205.7967	9A	17	2	2.04	Tree		G	G	G		5												
310	Salix sp.	Willow sp	4829663.616	602241.3664	9A	14	3	1.68	Tree	1	G	G	G		5												
311	Salix sp.	Willow sp	4829659.905	602242.773	9A	11	3	1.32	Tree	2	G	G	G		10												
313	Salix sp.	Willow sp	4829644.251	602247.8576	9A	24	2	1.32	Tree	1	G	G	G		10												
312	Tilia cordata	Little leaf linden	4829658.954	602243.34	9A	11	3	2.88	Tree	4	G	G	G		5								X				
316	Acer platanoides 'Crimson King'	Crimson King Norway Maple	4829643.664	602224.8517	9A	20	3	2.28	Tree		G	G	G		0								X				
315	Acer platanoides 'Crimson King'	Crimson King Norway Maple	4829642.985	602230.8464	9A	15	2	1.8	Tree		G	G	G		5							X					
314	Acer platanoides 'Crimson King'	Crimson King Norway Maple	4829637.886	602229.9702	9A	19	2	2.4	Tree		G	G	G		0												
317	Picea pungens	Blue spruce	4829629.167	602226.9658	9A	17	2	2.04	Tree		G	G	G		5												
318	Picea pungens	Blue spruce	4829628.786	602233.0446	9A	19	2	2.28	Tree		G	G	G		0												
319	Picea pungens	Blue spruce	4829625.92	602233.1287	9A	18	1.5	2.16	Tree		G	G	G		5												
320	Picea pungens	Blue spruce	4829621.561	602231.4354	9A	18	2	2.16	Tree		G	G	G		5												
323	Tilia cordata	Little leaf linden	4829564.433	602265.2283	9A	12	1.5	1.8	Tree	2	G	G	G		10												
324	Tilia cordata	Little leaf linden	4829560.539	602271.0279	9A	16	1	1.8	Tree	3	G	G	G		10												
325	Picea pungens	Blue spruce	4829556.706	602271.4369	9A	14	1	1.44	Tree		G	P	G		10												
326	Picea pungens	Blue spruce	4829555.34	602275.4549	9A	14	1	1.92	Tree		G	F	G		10												
327	Picea pungens	Blue spruce	4829539.307	602276.5374	9A	13	1	1.68	Tree		G	G	G		5												
328	Picea pungens	Blue spruce	4829535.703	602273.9632	9A	16	1	1.68	Tree		G	G	G		0												
329	Picea pungens	Blue spruce	4829531.519	602275.4098	9A	18	1.5	1.56	Tree		G	G	F		15												
330	Picea pungens	Blue spruce	4829530.489	602272.0913	9A	18	1.5	1.92	Tree		G	G	G		5												
331	Picea pungens	Blue spruce	4829522.773	602283.2989	9A	20	3	2.16	Tree		G	G	G		10												
332	Picea pungens	Blue spruce	4829510.912	602330.7785	9A	16	3	2.16	Tree		G	G	G		5												
321	Fraxinus sp.	Ash sp	4829617.019	602267.9078	9A	15	3	2.4	Tree		F	F	P		50								X	X			
322	Fraxinus sp.	Ash sp	4829619.416	602271.072	9A	15	3	1.92	Tree		G	G	F		20												
333	Picea pungens	Blue spruce	4829524.96	602376.72	9A	31	3	3.72	Tree		G	G	G		5												
334	Picea pungens	Blue spruce	4829531.93	602375.32	9A	31	3	3.72	Tree		G	G	G		10												
335	Picea pungens	Blue spruce	4829529.23	602373.57	9A	37	3	4.44	Tree		G	G	G		10												
336	Tilia cordata	Little leaf linden	4829573.71	602300.33	9A	15	4	1.8	Tree	1	G	G	G	X	10												
337	Tilia cordata	Little leaf linden	4829571.58	602303.02	9A	36	5	4.32	Tree	5	F	P	G		10												
338	Tilia cordata	Little leaf linden	4829573.79	602307.01	9A	14	3	1.68	Tree		G	G	G		10												
339	Tilia cordata	Little leaf linden	4829575.6	602305.2	9A	14	3	1.68	Tree	3	G	G	G		10												
1530	Picea pungens	Blue spruce	4829661.3	602197.301	9A	32	4	3.84	Tree		G	G	G		0												
1531	Picea pungens	Blue spruce	4829660.05	602200.284	9A	28	4	3.36	Tree		G	G	G		0												
1532	Picea pungens	Blue spruce	4829656.275	602199.384	9A	15	3	1.8	Tree		G	G	G		0												
1533	Picea pungens	Blue spruce	4829654.27	602200.228	9A	34	4	4.08	Tree		G	G	G		0												
1534	Crataegus sp.	Hawthorn sp.	4829649.951	602244.375	9A	15	4	1.8	Tree	4	G	G	?		?												
1535	Salix sp.	Willow sp	4829653.08	602252.159	9A	9	2	1.2	Tree	1	G	G	?		?												
1536	Salix sp.	Willow sp	4829652.119	602253.153	9A	10	2	1.2	Tree	0	G	G	?		?												
1537	Salix sp.	Willow sp	4829639.708	602267.747	9A	8	2	1.2	Tree		G	G	?		?												
1538	Juniperus virginiana	Eastern red cedar	4829629.376	602275.852	9A	5	2	1.2	Tree		G	G	G		0												
1539	Salix sp.	Willow sp	4829627.94	602278.228	9A	12	3	1.44	Tree		G	G	?		?												
1540	Salix sp.	Willow sp	4829619.846	602287.361	9A	15	4	1.8	Tree	1	G	G	?		?												
1541	Crataegus sp.	Hawthorn sp.	4829610.445	602274.312	9A	12	5	1																			

October 2, 2020

Version 1.0
Matrix 27896-504

Ms. Dorin Newton
JACOBS CANADA INC.
Suite 400, 245 Consumers Rd.
Toronto, ON M2H 1R3

Subject: Highway 401 Watermain and Sanitary Sewer Scoped Breeding Bird Survey

Dear Ms. Newton:

1 INTRODUCTION

The Region of Peel retained Jacobs Canada Inc. to design multiple new watermain and sanitary sewer access shaft crossings in the City of Mississauga, ahead of the planned expansion of the Highway 401 footprint. The proposed watermain and sanitary sewer will extend along Highway 401 from Winston Churchill Boulevard to east of the Credit River near the Creditview Road overpass over Highway 401.

In 2018, Matrix Solutions Inc. conducted a natural heritage assessment report (Matrix 2019), which included information on bird species that was collected from the *Atlas of the Breeding Birds of Ontario, 2001-2005* (Cadman et al. 2007) during the desktop review and incidental observations during field investigations. During the analysis phase of the natural heritage assessment, Matrix concluded that there was potential for both species at risk (SAR) and species of conservation concern (SCC) to utilize Site 4 (north and south), Site 7/8, and Site 11 as breeding habitat. A breeding bird survey was recommended in the natural heritage assessment report (Matrix 2019) to gain a full understanding of bird species using the study area. Jacobs approved the completion of a breeding bird survey on March 20, 2020. This letter will act as an addendum to the 2019 natural heritage assessment report.

The following sections discuss the methodology and results of the 2020 breeding bird survey.

2 METHODOLOGY

A breeding bird survey was completed at Site 4 (north and south), Site 7/8, and Site 11 using the *Atlas of the Breeding Birds of Ontario, 2001-2005* (Cadman et al. 2007) protocol. The protocol states that two rounds of surveys should be completed between May 24 and July 10, between 5:00 a.m. and 10:00 a.m., and under reasonable weather conditions. Breeding bird surveys took place on May 27, 2020, between 6:00 a.m. and 8:00 a.m. and July 8, 2020, between 5:00 a.m. and 8:00 a.m. Weather conditions during the survey on May 27 consisted of temperatures ranging from 19°C to 23°C, 10% cloud coverage, and no wind. Weather conditions on July 8 consisted of a temperature range from 24°C to 26°C, 0% to 50% cloud coverage, and a light breeze. Due to the small area of each site, only one station was set up at each site (Figures 1, 2, and 3).



FIGURE 1 Breeding Bird Station at Site 4 (north and south)



FIGURE 2 Breeding Bird Station at Site 7/8

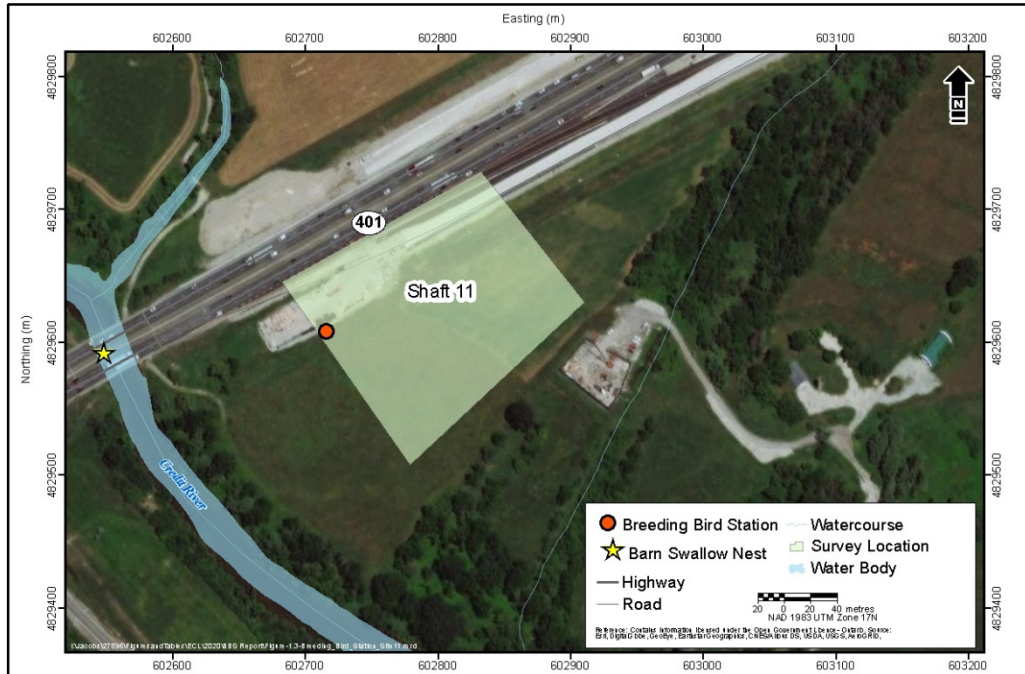


FIGURE 3 Breeding Bird Station at Site 11

Observations of breeding evidence for each species were recorded based on the following definitions provided by the *Ontario Breeding Bird Atlas Guide for Participants* (OBBA 2001):

- **Observed (O):** species observed in its breeding season (no evidence of breeding).
- **Possible Breeding (PO):** presence of species in its breeding season in suitable habitat or presence of a singing male in suitable habitat.
- **Probable Breeding (PR):** observation of any of the following: (1) a pair in their breeding season in suitable nesting habitat; (2) permanent territory presumed through registration of territorial song on at least 2 days, a week, or more apart, at the same time; (3) courtship or display between a male and a female or two males, including courtship feeding or copulation; (4) visiting probable nest sites; (5) agitated behaviour or anxiety calls of an adult; (6) brood patch on adult female or cloacal protuberance on adult male; and (7) nest building or excavation of nest hole.
- **Confirmed Breeding (C):** observation of any of the following: (1) a distraction display or injury feigning; (2) used nest or eggshell found (occupied or laid within the period of study); (3) recently fledged young or downy young, including young incapable of sustained flight; (4) adults leaving or entering nest site in circumstances indicating an occupied nest; (5) adults carrying a faecal sac or food for young; and (6) nest containing eggs or young that are seen or heard.

3 RESULTS

A total of 19 bird species were recorded at all sites during both visits. Table 1 summarizes the survey results and the resulting highest breeding evidence.

TABLE 1 Breeding Bird Survey Results

Species (Common Name)	Species (Scientific Name)	ESA Listing	SARA Listing	Visit 1 May 27, 2020				Visit 2 July 8, 2020				Highest Breeding Evidence			
				Site 4 (north)	Site 4 (south)	Site 7/8	Site 11	Site 4 (north)	Site 4 (south)	Site 7/8	Site 11	Site 4 (north)	Site 4 (south)	Site 7/8	Site 11
American Goldfinch	<i>Spinus tristis</i>	-	-		X	X ⁽¹⁾		X				O	O	PO	-
American Robin	<i>Turdus migratorius</i>	-	-		X ⁽¹⁾	X	X		X	X		-	PO	O	O
Barn Swallow*	<i>Hirundo rustica</i>	END	END				X					-	-	-	O
Black-capped Chickadee	<i>Poecile atricapillus</i>	-	-							X		-	-	O	-
Blue Jay	<i>Cyanocitta cristata</i>	-	-			X ⁽¹⁾						-	-	PO	-
Brown Headed Cowbird	<i>Molothrus ater</i>	-	-				X ⁽²⁾					-	-	-	PR
Cedar Waxwing	<i>Bombycilla cedrorum</i>	-	-				X					-	-	-	O
Eastern Kingbird	<i>Tyrannus tyrannus</i>	-	-				X			X		-	-	O	O
European Starling	<i>Sturnus vulgaris</i>	-	-	X	X ⁽¹⁾	X ⁽¹⁾						O	PO	PO	-
Gray Catbird	<i>Dumetella carolinensis</i>	-	-			X ⁽¹⁾				X		-	-	PO	-
Great Blue Heron	<i>Ardea herodias</i>	-	-			X						-	-	O	-
House Sparrow	<i>Passer domesticus</i>	-	-	X ⁽¹⁾		X						PO	-	O	-
Mallard	<i>Anas platyrhynchos</i>	-	-	X			X				X	O	-	-	O
Northern Cardinal	<i>Cardinalis cardinalis</i>	-	-		X ⁽¹⁾					X ⁽¹⁾		-	PO	PO	-
Northern Flicker	<i>Colaptes auratus</i>	-	-		X ⁽¹⁾							-	PO	-	-
Red Winged Blackbird	<i>Agelaius phoeniceus</i>	-	-	X ⁽¹⁾	X ⁽¹⁾	X ^(1,2)	X ^(1,2)	X ⁽¹⁾		X ⁽¹⁾	X	PR	PO	PR	PR
Ring-Billed Gull	<i>Larus delawarensis</i>	-	-	X	X	X				X	X	All observations were fly overs.			
Song Sparrow	<i>Melospiza melodia</i>	-	-				X ¹	X ⁽¹⁾	X ⁽¹⁾	X	X ⁽¹⁾	PO	PO	O	PR
Yellow Warbler	<i>Setophaga petechia</i>	-	-				X ¹					-	-	-	PO

Notes:

1 Male singing/calling

2 Pair observed

ESA - *Endangered Species Act*

SARA - *Species at Risk Act*

Site 4 (north) had possible breeding of House Sparrow and Song Sparrow and had probable breeding of Red Winged Blackbird. This site is directly adjacent to active construction; therefore, these birds, if breeding, would be utilizing trees planted within the parking lot or trees within the highway right-of-way.

Site 4 (south) had possible breeding of American Robin, European Starling, Northern Cardinal, Northern Flicker, Red Winged Blackbird, and Song Sparrow. This site is directly adjacent to a significant woodland, which likely accounts for the higher number of birds heard singing/calling.

Site 7/8 had possible breeding of American Goldfinch, Blue Jay, European Starling, Gray Catbird, and Northern Cardinal and had probable breeding of Red Winged Blackbird. This site is part of the Mullet Creek valley that acts as a wooded linkage for birds and other wildlife.

Site 11 had possible breeding of Yellow Warbler and probable breeding of Brown Headed Cowbird, Red Winged Blackbird, and Song Sparrow. Site 11 is small and is located within a field that has been previously disturbed. The breeding bird survey extends 100 m from the station point; therefore, some bird results will be outside of the site boundary. Due to nesting requirements it is likely that the Brown Headed Cowbird is not probable within the Site 11 boundary; however, the other resultant birds should still be considered.

3.1 SAR Assessment

Of the birds recorded, Barn Swallow is the only SAR that was recorded. Barn Swallow was recorded at Site 11, which is located just south of Highway 401. In previous field investigations conducted on October 30, 2018 (Matrix 2019), as well as during the breeding bird survey, Barn Swallow nests were observed under the Highway 401 and Credit River bridge approximately 170 m west of Site 11; therefore, confirmed breeding is located outside of the Site 11 study and access areas. No construction or alteration will be occurring to the bridge; therefore, Category 1 (the nest) and Category 2 (5 m from the nest) general habitat will remain unimpacted by the construction. Site 11 is located within Category 3 general habitat (5 to 200 m from nest), which is the area of highest tolerance to alteration and can be used by Barn Swallow for foraging (MECP 2019a). Foraging is done over waterbodies, pastures with livestock, and woodland edge land uses; none of which are located within the Site 11 boundary. The construction activities will be temporary and the area will be returned to existing conditions (i.e., agriculture); therefore, no significant modifications or fragmentation will be occurring that will permanently impair the function of the Category 3 habitat. As per the *Categorizing and Protecting Habitat under the Endangered Species Act* document (MECP 2019b), “in general almost all small-impact activities that alter these [Category 3] areas are not likely to damage or destroy the habitat and are not likely to require authorization.”

It is our professional opinion that the project activities will not damage or destroy the Category 3 habitat as the Shaft 11 location is within an agricultural field, and additionally will not kill, harm, or harass Barn Swallow. Therefore, the activities within the Shaft 11 location will not contravene the Endangered Species Act and as a result, a permit will not be required.

To avoid contravention of the *Migratory Bird Convention Act*, all required tree removals should be conducted outside of the active nesting period of April 15 to August 31 in any given year to prevent impacts to nesting SAR and migratory birds.

4 CONCLUSIONS

Due to the potential for both SAR and SCC to be present within the study area, a breeding bird survey was recommended in the 2019 natural heritage assessment report (Matrix 2019). The assessment was conducted on May 27 and July 8, 2020 with 19 bird species being recorded. The highest breeding evidence ranged from Observed to Probable breeding and one SAR bird was recorded. The Barn Swallow was recorded in the Site 11 survey; however, there is no appropriate nesting habitat within the Site 11 boundary and nesting for this species has been confirmed to be located under the Highway 401 bridge over the Credit River approximately 115 m west of the Site 11. In order to avoid contravention with the *Migratory Bird Convention Act*, all vegetation clearing and removal should be conducted outside of the active nesting season (April 15 to August 31).

5 CLOSURE

We trust that this letter report suits your present requirements. If you have any questions or comments, please call either of the undersigned at 519.772.3777.

Yours truly,

MATRIX SOLUTIONS INC.



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EW/vc
Attachments

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Appendix B. Geomorphology Report



FLUVIAL GEOMORPHIC ASSESSMENT
HIGHWAY 401 WATERMAIN AND SANITARY TRUNK SEWER PROJECT
REGION OF PEEL

Prepared for:
JACOBS

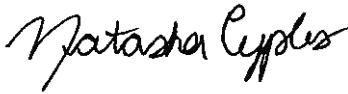
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FLUVIAL GEOMORPHIC ASSESSMENT
HIGHWAY 401 WATERMAIN AND SANITARY TRUNK SEWER PROJECT
REGION OF PEEL

Prepared for Jacobs, January 2021



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DISCLAIMER

Matrix Solutions Inc. certifies that this report is accurate and complete and accords with the information available during the project. Information obtained during the project or provided by third parties is believed to be accurate but is not guaranteed. Matrix Solutions Inc. has exercised reasonable skill, care, and diligence in assessing the information obtained during the preparation of this report.

This report was prepared for Jacobs on behalf of the Regional Municipality of Peel. The report may not be relied upon by any other person or entity without the written consent of Matrix Solutions Inc. and of Jacobs and the Regional Municipality of Peel. Any uses of this report by a third party, or any reliance on decisions made based on it, are the responsibility of that party. Matrix Solutions Inc. is not responsible for damages or injuries incurred by any third party, as a result of decisions made or actions taken based on this report.

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1 INTRODUCTION

Jacobs, on behalf of the Regional Municipality of Peel, retained Matrix Solutions Inc. to provide fluvial geomorphological input in support of the Highway 401 Watermain and Sanitary Trunk Sewer (STS) project. Ahead of the planned expansion of Highway 401 in Mississauga, Ontario, multiple new watermain and sanitary sewer crossings are being designed by Jacobs between 0.5 km east of Trafalgar Road to immediately east of the Credit River. In May 2013, URS Canada Inc. conducted a Class Environmental Assessment (EA) and in September 2014 URS provided a Preliminary Design Report (PDR) for the proposed widening of Highway 401 from east of the Credit River to Trafalgar Road.

A 1,500 mm diameter sanitary trunk sewer (STS) is proposed for installation under the Credit River to convey wastewater to an existing 2,400 mm STS that runs underneath Creditview Road west of the Credit River crossing. The sewer is to cross underneath the Credit River approximately 200 m upstream of Highway 401. At another location, a 750 mm watermain and a 750 mm sanitary sewer are proposed for installation under Mullet Creek north of Highway 401.

Matrix has completed a fluvial geomorphic and scour assessment to ensure that the proposed sanitary sewers and watermain are not put at risk due to fluvial processes at the crossings of the Credit River and Mullet Creek. The following tasks were completed:

- Collection and review of background information, including reports, mapping, and aerial imagery.
- Desktop analysis to assess lateral channel migration and establish a meander belt width (MBW).
- Field investigations to document existing fluvial geomorphic conditions and channel stability.
- Assessment of the scour depth below riffle grade using field reconnaissance and scour calculations.
- Development of design recommendations to limit risk to the proposed utilities from fluvial processes.

2 BACKGROUND REVIEW

2.1 Study Area

Both study sites are located in Mississauga, Ontario, where the Credit River and Mullet Creek intersect Highway 401. The study area for the Credit River crossing extends approximately 500 m upstream and 500 m downstream of Highway 401 (Figure 1). South of the study area, the river continues on to flow south through Mississauga before flowing into Lake Ontario at Port Credit. Mullet Creek is a tributary to the Credit River. The study area for Mullet Creek extends approximately 200 m upstream and 200 m downstream of Highway 401 (Figure 2). Both watercourses are under the jurisdiction of Credit Valley Conservation (CVC).

The watercourses are situated within the Peel Plain physiographic region (Chapman and Putnam 2007). This region is characterized as gently rolling terrain and topography dips toward the Lake Ontario basin to the south. The Peel Plain is an area of low relief with the presence of bedrock at shallow depths. Surficial geology consists of Upper Till Plains (Halton Till) and till sheets consist of clayey silt to silty clay soils, although there are sand to silt zones and boulder zones (Chapman and Putnam 2007). Underlying bedrock consists of Upper Ordovician aged red shales of the Queenston Formation (Hewitt 1972). The overburden deposits represent recent lacustrine deposits formed from small glacial meltwater ponds and are concentrated near river valleys. This physiographic region has been greatly altered by deforestation and wetland drainage to accommodate agricultural and urban land uses (Regional Municipality of Peel 2011). Land use is further discussed as a part of the historical assessment (Section 3).

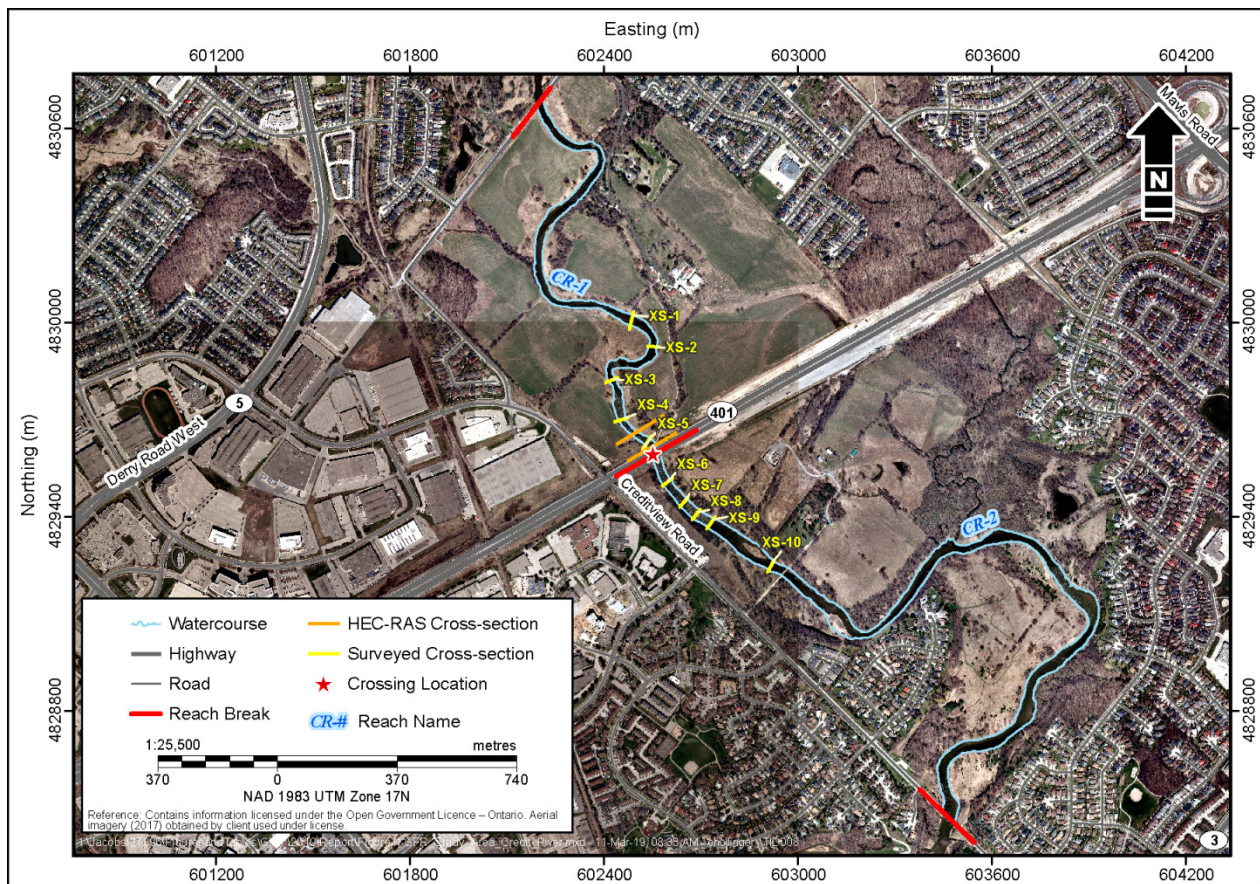


FIGURE 1 Study Area Overview, Reach Delineation, and Cross-section Locations for the Credit River Crossing with Highway 401

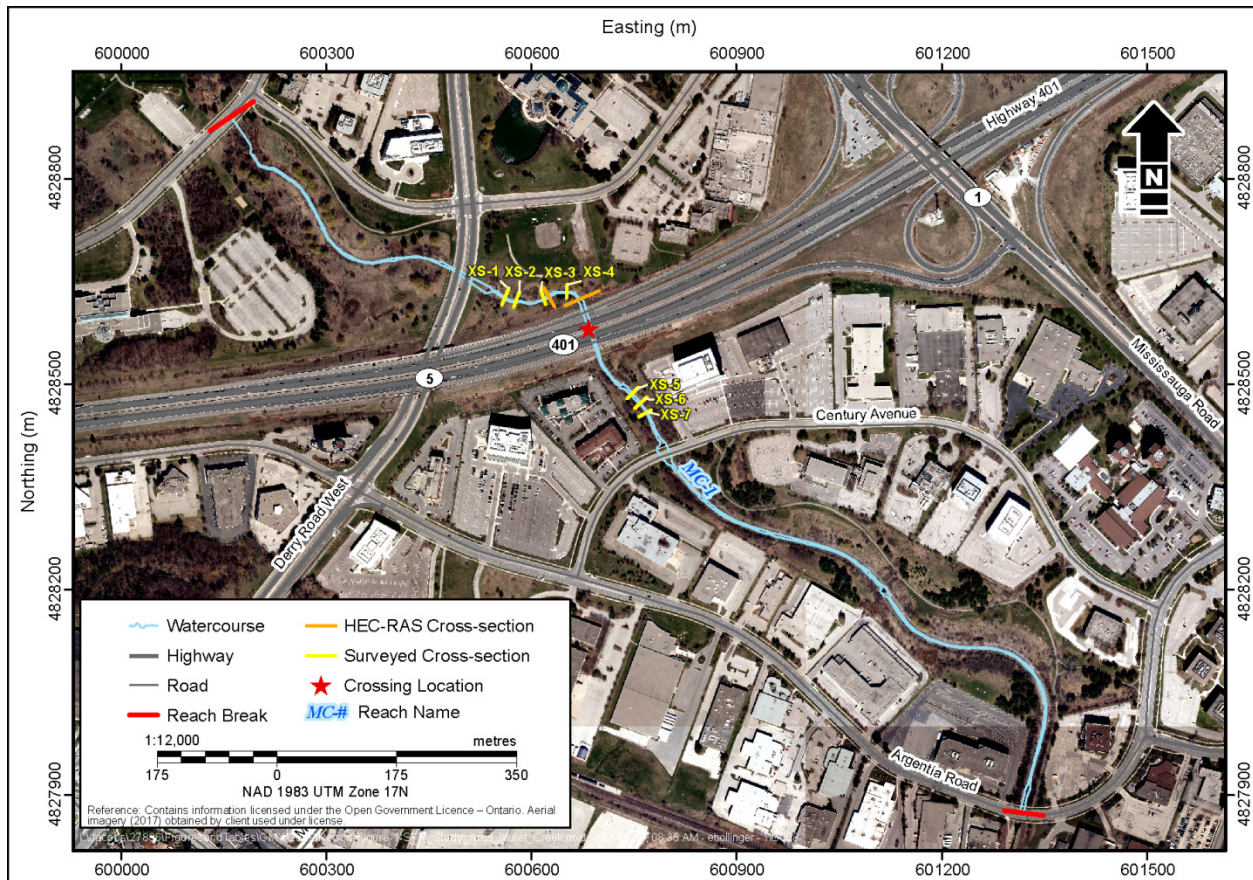


FIGURE 2 Study Area Overview, Reach Delineation, and Cross-section Locations for the Mullet Creek Crossing with Highway 401

2.2 Previous Studies

Previous studies and reports examining and assessing channel morphology and erosion within the respective reaches were reviewed and summarized as follows.

Credit Valley Trunk Sewer – Phase I Geomorphic and Erosion Assessment – Revised Report (PARISH 2006)

In 2006, PARISH Geomorphic Ltd. (PARISH) conducted a geomorphic investigation in support of the installation of a 1,500 mm STS proposed to cross the Credit River immediately upstream of Highway 401 and at Churchville Road. Rapid assessments and detailed geomorphic surveys were conducted along 600 m of the Credit River extending both upstream and downstream of the crossing at Highway 401. A scour analysis was completed within the vicinity of Highway 401 and considered regime equations and existing deep pools. A pool with a bankfull depth of 2.02 m was identified as the deepest pool during field reconnaissance (interpreted as general scour value of 0.89 m below average riffle grade). This number was calculated by subtracting the bankfull depth of 1.13 from 2.02 m. Given the proximity to the bridge crossing at Highway 401 and the propensity for ice and debris jams to occur along the Credit River,

constricted flow conditions at the sewer crossing was identified to potentially locally increase scour depths. As a result, PARISH recommended the predicted scour depth be doubled to yield to the predicted constricted scour range, resulting in a working scour range of 2 to 4 m. Given the potential maximum constricted scour depth is 4.0 m, the scour processes have the potential to lower the existing bed at the crossing by 2.87 m (4.0 to 1.13 m) and as such, PARISH recommended a burial depth of 2.87 m below the existing channel invert (riffle grade) at the crossing; however, it was noted that this was not achievable and burial depth was limited to 1.17 m below the channel invert. As a result, additional engineering countermeasures were proposed to protect the sewer.

Ontario Ministry of Transportation – W.O.07-20021 – Highway 401 Improvements from East of the Credit River to Trafalgar Road – Class EA and Preliminary Design Credit River Meander Belt Width and Fluvial Assessment (Water’s Edge 2012)

Water’s Edge completed a MBW assessment in 2012 for the Credit River at the bridge crossing with Highway 401. The geomorphic assessment was undertaken as part of the proposed Highway 401 bridge replacement. The average local bankfull width of the channel was 34 m and minimal bank erosion was observed immediately upstream and downstream of the crossing. Based on a historical analysis spanning a time period of 63 years (1946-2009), 100-year erosion rates were measured approximately 620 m upstream of the highway crossing and 820 m downstream of the crossing. 100-year erosion rates between 1 and 40 m were measured; however, it was noted by Water’s Edge that there was effectively no erosion associated with the channel immediately upstream and downstream of the Highway 401 bridge over the examined 63-year time period. A preliminary MBW of 57 m was measured, and due to the lack of erosion near the crossing by Water’s Edge, a factor of safety (FOS) of 1.10 was applied to the belt width and a final MBW of 62.7 m was recommended. Water’s Edge provided recommendations including that the new bridge should be a minimum of 40 m wide to accommodate the natural bankfull channel and that the bridge be centered on the existing meander axis of the channel. It is noted by Matrix that application of local MBW erosion hazards by Water’s Edge is not consistent with the reach-scale meander belt theoretical concept or with the TRCA (2004) procedures.

Preliminary Design Report – Highway 401 Improvements East of the Credit River to Trafalgar Road (URS 2014)

A PDR was developed by URS for the widening of Highway 401 from six lanes to a 12-lane express-collector system from Trafalgar Road to the 407 Express Toll Route (ETR) interchange and from Winston Churchill to east of the Credit River. The report described associated proposed infrastructure works including construction of a new sewer system along the eastbound and westbound outer separators and 8 km of new storm sewer. At the Credit River crossing with Highway 401, the bridge was proposed to be replaced with three span structures with a 40 m interior span and two 25 m outer spans. At the Mullet Creek crossing with Highway 401, a culvert extension was recommended to accommodate the proposed widening of the highway, with either a precast box culvert or an open footing culvert. Detailed hydraulic and fluvial geomorphic assessments were recommended for the detailed design stage.

Credit River/Levi Creek Scour Assessment – Old Derry Road Sewer Crossing (PARISH 2014)

PARISH completed a geomorphic scour assessment in May 2014 on the Credit River at the crossing with Old Derry Road in Mississauga. The scour assessment was completed in support of the installation of a sanitary sewer crossing at this location. Field observations included a large scour pool at a CP rail crossing upstream of Old Derry Road that was measured to have a scour depth (measured from the channel invert) of 4.3 m. The field-observed scour depth of 4.3 m was recommended as the design scour depth at the proposed crossing location. This value is greater than the one recommended in the PARISH (2006) study, however the local deep point was noted to be directly attributable to infrastructure in the creek that causes flow constriction and general and local scour.

3 HISTORICAL ASSESSMENT

Changes in the watershed such as urbanization and/or deforestation typically alter the sediment and water contributions to the watercourse, which in turn trigger a response of channel adjustment that can be documented through historical aerial photographs. A historic assessment was undertaken based on available aerial photographs for the years 1954, 1999, and 2017, spanning a time period of 63 years. The images were georeferenced and reviewed for changes in land use and planform in ESRI™ ArcMap. Historical imagery was obtained from Jacobs.

Since 1954, the land surrounding both Mullet Creek and the Credit River has been developed substantially. In 1954, farm fields surrounded the watercourses outside of the floodplain. As reported in PARISH (2006), approximately 7 km northwest of the study area, a large dam, the Huttonville Dam, was breached in 1970, releasing a significant amount of water and sediment into the Credit River; however the morphological changes that resulted were not reported. By 2017, land use was predominately residential around the downstream reach of the Credit River and continues to be open meadow upstream. Around Mullet Creek, nearly all of the area has been developed into industrial/commercial land.

The most notable change throughout the examined time period in the current study area is the construction of Highway 401 after 1954. In 1954, Mullet Creek had a much more sinuous and natural planform consisting of smaller amplitude (20 to 35 m) and wavelength (20 to 40 m) meanders. Following the construction of the highway, Mullet Creek was altered and lined with gabion baskets. The channel now consists of larger, longer wavelength bends and is overall less sinuous. Between 1999 and present the planform of Mullet Creek has not changed and there is no evidence of lateral migration.

Refer to Appendix A for historical planform traces for the Credit River. Historical traces were not drawn for Mullet Creek due to the realignment of the creek between 1954 and 1999. The channel morphology of Mullet Creek is no longer considered “natural” due to artificial hardening (i.e., gabion baskets), and therefore no channel migration has occurred and a rate is not available via measurement of historical traces.

4 EXISTING CONDITIONS

4.1 Reach Delineation

A reach is a length of channel that displays similar physical characteristics. The controlling and modifying influences within a reach are similar and are reflected in similar geomorphic form, function, and processes. Reach delineation considers external parameters such as local geology, topography, valley setting, hydrology, riparian vegetation, and land use. Consideration is also given to characteristics that reflect these external influences such as sinuosity, gradient, and channel dimensions (PARISH 2001).

Road crossings often serve as reach breaks due to impacts from the crossing structure or changes in land use on either side of the road that impact channel morphology. Highway 401 formed such a break for the Credit River. The Credit River within the study area was divided into two reaches, one upstream of Highway 401 (CR-1) extending to Old Derry Road and one downstream (CR-2) extending to Creditview Road. The reaches were divided at the bridge crossing as the gradient near a road crossing is often altered, resulting in a locally steeper gradient. Mullet Creek in the study area is considered one reach that extends from upstream to downstream of Highway 401 (MC-1). The upstream extent of reach MC-1 is at Meadowvale Boulevard, while the downstream extent is at Argentia Road. Reach breaks are shown for the Credit River in Figure 1 and for Mullet Creek in Figure 2.

Field assessments were completed in October and November 2018 which included rapid assessments and a detailed survey consisting of cross-sections and a channel profile. Fieldwork limits for the Credit River site were approximately 500 m upstream (CR-1) and 500 m downstream of Highway 401 (CR-2) for fluvial geomorphic rapid assessments. Field work limits for the Mullet Creek site were approximately 200 m upstream and 200 m downstream of Highway 401 (MC-1).

4.2 Rapid Geomorphic Assessments

Rapid assessments including the Rapid Geomorphic Assessment (RGA; MOE 2003) and the Rapid Stream Assessment Technique (RSAT; Galli 1996) were completed to gain insight into existing geomorphic conditions and document evidence of active geomorphic processes (e.g., erosion and deposition). For the RGA, based on channel conditions, each reach is assessed a score to indicate whether the channel is stable/in regime (score ≤ 0.20), stressed/transitional (score 0.21 to 0.40), or adjusting (score ≥ 0.40). Refer to Appendix B for further information regarding rapid assessment protocols and scoring methodology.

During the assessment, bankfull channel dimensions are identified. In natural, stable streams, the “bankfull” channel area often represents the maximum capacity of the channel before flow spills into the floodplain and is associated with the channel-forming discharge (bankfull discharge). Field indicators of bankfull flow elevation include obvious breaks or inflections in the cross-section profile, the top elevation of point bars, and changes in vegetation.

The study reaches are described below in order from most-upstream to most-downstream, with all references to left or right banks when looking in the downstream direction. Refer to Appendix C for site photographs.

4.2.1 Credit River at Highway 401

CR-1

Field work for reach CR-1 was conducted over a distance of approximately 500 m upstream of the bridge at Highway 401. The reach is characterized as a single thread, sinuous channel. Bankfull dimensions at riffles are approximately 26 to 35 m in width and 1.1 to 1.3 m in depth. At the time of the survey, wetted widths ranged between 25 and 33 m, while wetted depths ranged between 0.5 and 0.6 m. The bed material is generally finer within the upstream extent of the reach, consisting of more sand, pebbles, and minor cobbles. The substrate at cross-sections measured closer to Highway 401 consists of coarser substrate dominated by pebbles, large cobbles, and occasional boulders. The substrate of riffles is approximately 50% embedded due to the deposition of finer material, commonly observed where there is woody debris in the channel. A small woodlot borders much of the left bank of the channel and there is abundant woody debris lining the banks and occasionally within the channel. Approximately 400 m upstream of the bridge, large slabs of concrete are present along the left bank. These slabs were possibly placed as a protective measure against bank erosion and lateral channel migration. Exposed tree roots and leaning trees are abundant along the left bank, with evidence of minor bank erosion where the channel has widened along the outer bank. The right bank is bordered by a large open grassy meadow. The channel widens approximately 250 m upstream of the Highway 401 bridge, where a large pool 1.5 m in water depth (1.8 m to top of bank) is present. There is a steep drop-off along the outer meander bend on the right bank into the pool. Downstream of this deep pool, channel banks remain near-vertical and bank slumping along the outer meander bend has occurred. In addition, small chute channels have developed, isolating the slumped bank material. There is a large stormwater outfall on the right bank 50 m upstream from the highway bridge with no signs of active erosion downstream of the outfall. A scour pool approximately 1.2 m deep (water depth at time of survey) is present near the upstream left abutment of the bridge.

Overall, CR-1 was assessed an RGA score of 0.29, indicating that it is in a Transitional or Stressed condition. Based on the indicators observed, the dominant geomorphic processes/modes of adjustment are widening, aggradation, and planimetric form adjustment. The reach was scored 33 using the RSAT protocol, indicating moderate stream health.

CR-2

Reach CR-2 begins downstream of the Highway 401 bridge and extends to the downstream limit of the study area at a pedestrian bridge crossing the Credit River. Downstream of the bridge the channel is much less sinuous, and the channel is substantially wider. Bankfull dimensions of riffles are 29 to 36 m in width and 0.8 to 1.1 m in depth. At the time of the survey, wetted dimensions of riffles were approximately

28 to 34 m in width and 0.3 to 0.4 m in depth. There is a general absence of pools in this reach with morphology limited to riffles and runs. In addition, there is minimal fine material and the channel substrate is dominated by pebbles, cobbles, and small boulders. The right bank of the channel is confined by the valley wall for approximately 350 m of the reach, where the banks are very steep and vertical. Indicators such as exposed tree roots, leaning trees and minor channel undercutting of 5 to 10 cm provide evidence that the channel has widened to the right. The floodplain is easily accessed by flows on the left side of the channel along this section. Progressing downstream there is a stormwater outfall approximately 320 m downstream of the highway along the right bank. Banks within the vicinity of the outfall are hardened by gabion baskets, and there is a dissipation pad at the base of the outfall, before the water enters the Credit River. Channel undercutting up to 50 cm and toe erosion are observed on the right bank where the gabion treatment ends. Directly downstream of the outfall is a 1.2 m deep scour pool (water depth), with till exposure on the channel bed. There is evidence of bank slumping and vertical banks when the bank is no longer confined by the valley wall. Toward the downstream extent of the reach before the pedestrian bridge, there is a large grass-covered island approximately 90 m long and 20 m wide. It is unclear if this island formed as a result of bank slumping or grew naturally.

Overall, CR-2 was assessed with an RGA score of 0.33, indicating that it is in a Transitional or Stressed condition. Based on the indicators observed, the dominant geomorphic processes/modes of adjustment are widening and planimetric form adjustment. The reach was scored 27 using the RSAT protocol, indicating moderate stream health.

4.2.2 Mullet Creek at Highway 401

MC-1

Existing conditions of reach MC-1 are described between the downstream end of Derry Road West and the crossing with Highway 401 as well as downstream of the highway to Century Avenue. In general, the channel is moderately sinuous; however, the channel does not exhibit a natural meandering planform since channel form is heavily controlled by gabion basket-lined banks. In general, riffle-pool sequences are poorly defined and run-type morphology is more commonly observed. At the time of the survey, water in the channel was turbid. Between Derry Road and Highway 401 the channel bed substrate consists of riprap approximately 8 to 16 cm in diameter. Gabion baskets line channel banks along most of the reach and are generally in good condition, with minimal evidence of failure. Overall, it was difficult to determine bankfull channel dimensions since much of the watercourse is controlled by gabion baskets (i.e., the channel form is not the result of natural processes). Wetted dimensions of the channel at the time of visit ranged between 3 and 5 m in width and 0.15 to 0.30 m in depth. Much of the vegetation surrounding the channel between Derry Road and Highway 401 is herbaceous riparian vegetation, dominated by grass and occasional trees. Approaching the crossing with Highway 401, vegetation becomes cattail-dominated. At the crossing the left bank contains a shelf of cattails while the right bank is armoured by gabion baskets.

Downstream of Highway 401, the channel is lined with gabion baskets. This section of the watercourse is less sinuous than upstream, and was historically straightened. Approximately 50 m downstream of the highway, there is a plunge pool/headcut-type feature present at a location that coincides with what appears to be a constructed step/drop in the gabion basket-lined channel. At the step, gabion stones have been winnowed out from the basket with some stones transported downstream, creating a deeper and wider pool where the baskets were deformed or displaced at the drop. Along the corridor there is herbaceous vegetation consisting of tall grasses and some shrubs growing within the baskets.

Overall, MC-1 was assessed an RGA score of 0.18, indicating that it is In Regime with respect to its engineered form. Based on the indicators observed, there was minor evidence of aggradation with poor longitudinal sorting of bed material as well as deposition in the overbank zone. There was also minor evidence of channel widening, indicated by the presence of a basal scour on both sides along riffles and runs. The reach was scored 25 using the RSAT protocol, indicating moderate stream health. The limiting factors were poor water quality due to the turbidity of the water and the lack of biological indicators (i.e., macroinvertebrates).

4.3 Detailed Geomorphic Surveys

Using survey-grade GPS equipment (sub-centimetre accuracy) and total station equipment, detailed field data consisting of cross-sections and longitudinal profiles along the channel thalweg were surveyed. Cross-sections were measured both upstream and downstream of Highway 401 for the Credit River and Mullet Creek. The channel bed substrate (i.e., D_{50} , D_{84}) was measured using a pebble count approach (Wolman 1954). The survey was completed to obtain improved definition of channel geometry. Selected parameters and calculated hydraulics from the detailed assessment are provided in Tables 1 and 2.

4.3.1 Credit River at Highway 401

A longitudinal profile approximately 1,200 m long and ten cross-sections were measured along the Credit River in the study area. Cross-section locations are shown in Figure 1. Selected parameters and calculated bankfull hydraulics from the detailed assessment are provided in Table 1 and compared to similar parameters calculated by PARISH (2006) at the same location.

Cross-sectional dimensions are comparable to the results of PARISH (2006), which showed that the Credit River within the vicinity of Highway 401 had an approximate bankfull width of 29 m and an average bankfull depth of 0.74 m. For the current study, measured bankfull widths at riffle cross-sections range between 26 and 36 m, while average bankfull depths range between 0.50 and 1.01 m. The maximum bankfull depths range between 0.79 and 1.29 m. No cross-sections were taken at pools; however, maximum bankfull depths were measured to generally range between 1.2 and 1.8 m at these features. The overall bankfull gradient at the site is 0.17%.

TABLE 1 Comparison of Bankfull Parameters for the Credit River (Reach Average)

Channel Parameter	CR-1	CR-2	Credit River at Highway 401
	Matrix (2018)		PARISH (2006)
Measured			
Average bankfull width (m)	29.4	33.7	29
Average bankfull depth (m)	0.87	0.62	0.74
Maximum bankfull depth (m)	1.29	1.05	N/A
Average bankfull width-to-depth ratio	33.8	54.0	39.2
Bankfull gradient (m/m)	0.0015	0.0019	0.0030
Channel gradient (m/m)	0.0015	0.0019	N/A
Substrate D ₅₀ (mm)	64	62	49
Substrate D ₈₄ (mm)	124	169	130
Bank materials	Clay, silt, fine sand	Clay, silt, fine sand	Clay, silt, fine sand
Estimated Manning's roughness, <i>n</i>	0.035	0.035	0.035
Computed			
Average bankfull discharge (m ³ /s)	25.9	19.0	35.9
Average bankfull velocity (m/s)	1.00	0.91	1.72
Average bankfull shear stress (N/m ²)	12.8	11.6	N/A
Stream power at bankfull (W/m ²)	381	354	1811
Unit stream power (W/m ²)	12.9	10.5	62.4

Bankfull discharge for each reach was calculated using surveyed cross-sectional dimensions and profile slope with a Manning's roughness value (*n*) of 0.035. Reach CR1, with a bankfull gradient of 0.15%, was calculated to have a bankfull discharge of 25.9 m³/s with an average velocity of 1.0 m/s. Reach CR-2, with a bankfull gradient of 0.19% for was calculated to have a bankfull discharge of 19.0 m³/s with an average velocity of 0.9 m/s. Average bankfull shear stress values for CR-1 and CR-2 were calculated to be 12.8 N/m² and 11.6 N/m², respectively. Additional bankfull hydraulic information is summarized in Table 1.

One notable difference in channel parameters between the current study and that of PARISH Geomorphic (2006) is the bankfull channel gradient. PARISH (2006) calculated a higher bankfull gradient of approximately 0.3%, while the gradient for the current study ranges between 0.11 and 0.19%. Due to the higher gradient, PARISH's (2006) study resulted in higher calculated average bankfull discharge, velocity, and stream power. This difference in gradient can be attributed to how it was measured along the profile. The 2006 study measured channel gradient along a shorter, approximately 200 m length, profile that extended both upstream and downstream of the Highway 401. For the current study, a reach break was placed at the highway crossing and bankfull gradients were averaged for each reach individually, with CR-1 located upstream of Highway 401 and CR-2 located downstream of the highway.

4.3.2 Mullet Creek at Highway 401

Seven cross-sections and one longitudinal profile approximately 450 m long were measured for the Mullet Creek crossing. Cross-section locations are shown in Figure 2. Selected parameters and calculated hydraulics from the detailed assessment are provided in Table 2.

TABLE 2 Cross-section Parameters for Mullet Creek (Reach Average)

Channel Parameter*	MC-1
Average width (m)	6.3
Average depth (m)	0.20
Maximum depth (m)	0.55
Average width-to-depth ratio	31.5
Bankfull gradient (m/m)	0.007
Channel bed gradient (m/m)	0.010
Substrate D_{50} (mm)	90
Substrate D_{84} (mm)	128
Bank materials	Clay, silt
Estimated Manning's roughness, n	0.035
Average discharge (m^3/s)	1.04
Average velocity (m/s)	0.80
Average shear stress (N/m^2)	13.1
Stream power at I (W/m^2)	66.2
Unit stream power (W/m^2)	10.5

*For engineered channel capacity estimated in the field

Since the channel is lined with gabion baskets, the bankfull channel dimensions could not be identified along the majority of the reach as channel form is not a result of natural processes and visual indicators are not present. Some inflection points in the cross-section were observed upstream of Highway 401, and the widths and depths of the cross-sections associated with the inflection elevation were measured accordingly. Measured widths range between 5 and 9 m, while average depths range between 0.12 and 0.25 m. The maximum depth among the cross-sections ranges between 0.44 and 0.55 m. No distinct pools were identified; however, a drop observed downstream of Highway 401 was measured to be approximately 1.1 m high.

Hydraulics for the cross-sections surveyed were estimated using a Manning's roughness value (n) of 0.035 and a channel gradient of 0.7%. The resulting discharge is $1.04 m^3/s$, while the average velocity and shear stress are 0.80 m/s and $13.1 N/m^2$ respectively.

4.4 Sediment Characterization

A surface pebble count was conducted at each cross-section surveyed to determine the grain size distribution of the channel substrate. A step-toe pebble count procedure was employed by selecting 40 grains along each of the surveyed cross-sections. Averaged results from counts across all reaches are presented for the Credit River in Table 3 and Mullet Creek in Table 4.

Geotechnical borehole data (Golder 2019a; Golder 2019b) provided by Jacobs was examined to verify that the underlying material does not modify scour results. For example, a hard bedrock underlying the material may limit the estimated maximum scour depth.

4.4.1 Credit River

In general, bed substrates as counted were similar in range throughout the study area. Riffle/run bed substrate upstream in reach CR-1 is typically gravel and cobble-dominated, with fine sand accumulation on riffles embedding the coarser material. The median grain size (D_{50}), where 50% of the sampled grains have a diameter that is equal to or smaller than, is 64 mm (very coarse gravel/ small cobble). The D_{90} is 160 mm, representing the large cobble fraction of bed material. The maximum grain size recorded at a cross-section upstream was a small boulder 269 mm in diameter. A high proportion of the smaller sediment (D_{50} or smaller) was platy in nature and represents limestone/shale material likely sourced from bedrock exposures further upstream, while large cobble material (D_{90}) was often more rounded.

Riffle/run bed substrate downstream in reach CR-2 is also gravel and cobble-dominated, although there is an increase in large cobble material. The median grain size (D_{50}) is 62 mm (very coarse gravel). The D_{90} is 201 mm (large cobble). The maximum grain size recorded at a cross-section downstream was a boulder 310 mm in diameter. Downstream of the crossing, bedrock exposures were observed along the channel bed, and as a result the vast majority of the bed substrate was platy limestone/shale fragments eroded from underlying bedrock.

TABLE 3 Substrate Size Distribution for the Credit River at Highway 401 (Reach Average)

Parameter	Average Substrate Size (mm)	
	CR-1	CR-2
D_{10}	4	3
D_{50}	64	62
D_{84}	124	169

Borehole data (Golder 2019a; Golder 2019b) closest to the pipe crossing reveals underlying sediment consists of weak shale with interbeds of limestone and siltstone of the Georgian Bay Formation.

4.4.2 Mullet Creek

Bed substrate was relatively consistent throughout the reach, where riffles and runs were dominated by small cobbles. The median grain size (D_{50}) is 90 mm (small cobble). The D_{90} is 150 mm, representing large cobbles. The maximum grain size recorded at a cross-section was a large cobble 175 mm in diameter. Substrate shape mainly consists of angular riprap placed from a previous channel design.

TABLE 4 Substrate Size Distribution for Mullet Creek at Highway 401 (Reach Average)

Parameter	Average Substrate Size (mm)
	MC-1
D_{10}	20
D_{50}	90
D_{84}	128

Within the vicinity of the pipe crossing, borehole data (Golder 2019a; Golder 2019b) shows the pipe tunnelling through a thick sandy silty clay horizon as well as the top of an underlying shale unit.

4.5 Flow Rates

A 2009 HEC-RAS model for the Credit River and a 1998 HEC-2 model for Mullet Creek were provided to Matrix by CVC. The models contained flows between the 2-year event and Regional Flood event and are outlined in Table 5. Flow data for the Credit River was obtained from River Station 22.628 upstream of the Highway 401 crossing, while flow data for Mullet Creek was obtained from section 10+700 between Highway 401 and Century Avenue. Note that the bankfull discharge estimates based on the field data for both the Credit River and Mullet Creek are significantly lower than the lowest flow contained in the hydraulic models (2-year flows). The flows are used in the scour analyses, described in Section 6.

TABLE 5 Flow Data from HEC-RAS/HEC-2 Models (provided by Credit Valley Conservation)

Return Period	Flow (m ³ /s)	
	Credit River	Mullet Creek
2-year	90	15.7
5-year	160.3	23.1
10-year	211.1	25.5
25-year	286.2	34.9
50-year	350	40.2
100-year	420.6	45.2
Regional	694.1	58.7

5 MEANDER BELT WIDTH ASSESSMENT

Streams are dynamic features that change their configuration and position within a floodplain by means of erosion, meander evolution, and migration processes. When meanders change shape and position, the associated erosion and depositional processes that occur can cause loss or damage to property and infrastructure. Therefore, it is beneficial to forecast potential future planform extent to assist in the siting of infrastructure, such as the sanitary sewers and associated manholes. The *Belt Width Delineation Procedure* (PARISH 2004) was used to guide the fluvial geomorphology desktop assessment of planform geometry.

5.1 Preliminary Meander Belt Width

The space that a meandering watercourse occupies on its floodplain, within which all associated natural channel processes occur, is referred to as the meander belt. The *Belt Width Delineation Procedure* (PARISH 2004) is applicable to a range of systems and follows a process-based methodology for determining the MBW based on background information, historic data (including aerial photography), degree of valley confinement, and channel planform. This methodology best addresses hazards in an unconfined system where the watercourse is located in a poorly defined valley which lacks discernable slopes. For unconfined systems the potential hazard arises from channel erosion and migration across the landscape. As such, the *Belt Width Delineation Procedure* is applied to identify a preliminary MBW and the associated erosion allowance. Within the study area, reaches are partially confined.

Based on the current available mapping and digital aerial photography, a preliminary belt width was delineated for each of the study reaches. The preliminary belt width provides the lateral extent of the meanders of the watercourse, as it currently exists. To establish the meander belt, lines are drawn tangential to the governing outermost meanders of the channel planform, following the meander axis. Surrounding topography is also considered in this step. The distance between the two lines is measured and used to represent the width of the preliminary meander belt. Preliminary MBW values for the study area are summarized in Table 6 (below) with maps available in Appendix D.

Previous studies have reported much larger, long-term geomorphic MBW for the subject reaches in the range of 300 to 450 m for the preliminary and final MBW, respectively (e.g., 2006 Credit River Adaptive Management Strategy and subsequent reports for landowners upstream and downstream of Highway 401). The reassessed MBWs in the current report are considered to be more practical “engineering” erosion hazard limits, but do not necessarily supersede the values from previous reports which are considered to be the long-term “geomorphic” MBWs. The MBWs presented for this report are specifically to assist in the evaluation of higher risk lateral erosion for proposed crossings. The reassessed engineering MBWs in this report are not to be used for any other purpose.

5.2 Final Meander Belt Width

To establish the final MBW, an erosion setback is added to the preliminary belt width. The 100-year migration rate typically represents the erosion setback to be applied to either side of the preliminary belt width in order to account for long-term adjustments in channel form (i.e., bank erosion and channel migration over time). If possible, multiple years of historic imagery are used to measure channel migration rates at meander bends to establish an erosion setback. The average yearly rate is then calculated to a 100-year time frame and the distance added to each side of the preliminary belt width to arrive at the final belt width. In some cases, within the study area under consideration, the level of accuracy in quantifying migration rates was determined to be insufficient for application of a yearly rate in the MBW delineation.

In cases where a lateral migration rate cannot be accurately quantified, a FOS equivalent to 10% of the preliminary belt width is applied to either side of the channel (for a total of 20%). A FOS was applied to Mullet Creek, since migration rates could not be accurately calculated due to channel realignment. This approach was also applied to the Credit River crossing since 100-year migration rates were smaller than the FOS safety for the engineering MBWs. Final MBW values are presented in Table 6.

TABLE 6 Meander Belt Width Results (Engineering Meander Belt Width)

Reach	Preliminary Meander Belt Width (m)	Final Meander Belt Width (m) (20% Factor of Safety)
CR-1	84	101
CR-2	124	149
MC-1	20	24

Larger geomorphic meander belt width values for Credit River from past Credit Valley Conservation studies noted in the text

5.3 Lateral Erosion Hazard

Siting infrastructure outside of the engineering meander belt extent is preferred to limit future risk to the infrastructure from fluvial erosion processes. Matrix was provided sanitary sewer alignment drawings from Jacobs that are provided in Appendix E. Based on spatial constraints (e.g., existing infrastructure locations), siting infrastructure outside of the engineering MBW is not always a feasible option. For the current project, the utilities must cross under the Credit River and Mullet Creek and will be situated within the erosion hazard limits, and therefore infrastructure could be at risk from channel migration. Along the entire length of pipe burial locations within the engineering MBW, it is recommended that the pipe be buried below the maximum scour depth, should the channel occupy that location at some point in the future. Further information regarding the scour depth is provided in Section 6.

5.3.1 Credit River

Upstream of the proposed crossing location, the Credit River exhibits a highly sinuous, meandering planform. Some active bank erosion was observed on outer bends where banks are near-vertical. We note

that there is an existing sanitary sewer crossing (to be removed) in the Credit River floodplain and as per the figure titled *Highway 401 Crossing #11 1500 mm Proposed Sanitary Sewer* (Appendix E; provided by Jacobs), and the proposed new sanitary pipe will cross the main channel at approximately the same location as the existing sanitary sewer pipe. Regardless of the depth of the existing sewer, we recommend burying the proposed sanitary pipe below the maximum scour depth within the engineering MBW at this location to account for lateral channel migration (higher risk zone).

5.3.2 Mullet Creek

Upstream of Highway 401, Jacobs' proposed alignment has the pipe crossing diagonally across the channel corridor as per the figure titled *Highway 401 Crossing, Crossing #7 (South) 750 mm Proposed Sanitary Sewer, Plan No. C7-3* (Appendix E; provided by Jacobs). In this area, the Mullet Creek channel corridor was lined with gabion baskets in the past, limiting lateral channel adjustments and migration. The review of aerial imagery revealed that the channel planform as constructed has been relatively consistent since the gabion baskets were installed. However, during the field assessment, some bed erosion and local widening due to gabion basket deformation was noted. Therefore, at this location, the proposed pipe should be buried below the maximum scour depth underneath the channel invert and an additional distance of 12 m, one on each side of the valley toe (the span of the engineering MBW) to account for potential gabion basket failure/deformation and local widening.

6 SCOUR ASSESSMENT

To mitigate risk to the infrastructure from fluvial erosion processes where the pipe crosses the watercourse (vertical erosion risk), a scour assessment has been completed to predict the maximum scour depth below the creek bed. With reference to the CVC (2019) *Fluvial Geomorphic Guidelines: Factsheet VI Scour Analysis*, the scour assessment results for this report recommend a 100-year scour hazard limit (SHL) based on estimates of general and natural scour as defined in the guidelines, plus an additional FOS. Addition of local scour at the pipe crossings has not been considered. For each watercourse, application of detailed methods is provided for the final recommendation. Results of the CVC (2019) Simplified Standard Method are provided for comparison only.

6.1 Credit River Crossing at Highway 401

Various approaches to calculate the depth of scour at the Credit River crossing Highway 401 were considered and are outlined below.

6.1.1 Empirical Scour Equations (Detailed Methods)

Empirical scour equations were used to estimate scour depth of the Credit River based on the detailed channel characteristics collected during field surveys. The equations included those developed by Hey and Thorne (Hey and Thorne 1986) previously employed by PARISH ((2006) for the Credit River. The "regime" equations predict bankfull channel geometry as a function of channel grain size and bankfull discharge.

The equations are based on observations from a wide range of mobile, gravel, and cobble-dominated channels (Hey 1997). As these equations provide an assessment of the maximum bankfull depth in pools, this approach primarily provides an estimate of general scour; however, it is possible that the original empirical datasets used to derive the statistical relationships contained some partial signals of natural scour as well. Hey and Thorne (1986) use the following equation to predict average bankfull depth:

$$d = [0.22(Q^{0.37})(D_{50}^{-0.11})] \quad (1)$$

where Q is the average bankfull discharge and D_{50} is the median grain size. These values from Equation 1 can be used to predict average pool depth with the following relationship:

$$d_p = 1.049 d \quad (2)$$

Hey and Thorne (1986) also provide an equation to determine the maximum bankfull depth (reach-averaged):

$$d_m = [0.20(Q^{0.36})(D_{50}^{-0.56})(D_{84}^{0.35})] \quad (3)$$

where D_{84} is the grain size at the 84 percentile. The values calculated from Equation 3 can then be used to predict the maximum potential pool depth defined by:

$$d_{pm} = 1.088d_m \quad (4)$$

Results of the scour depth analysis are presented in Table 7 and are compared to the scour depth analysis completed by PARISH (2006). As the crossing is upstream of the highway, only the results from CR-1 are presented. Based on the bankfull discharge, the predicted maximum bankfull pool depth (1.6 m; or 0.9 m from riffle grade) is less than the deepest pool observed in the field (2.1 m; or 1.4 m from riffle grade). Depending on channel form at the site, the bankfull elevation may coincide with top of bank, however in the vicinity of the crossing the bankfull elevation was estimated based on visual indicators to be lower than the top of bank.

TABLE 7 Predicted and Observed Maximum Bankfull Pool Depth Measurements for the Credit River Crossing (Reach-Averaged)

Channel Parameter	CR-1 (MATRIX 2019)	Credit River at Highway 401 (PARISH 2006)
Bankfull gradient (m/m)	0.0015	0.0030
Bankfull discharge (m ³ /s)	25.9	35.9
Substrate D_{50} (mm)	64	49
Substrate D_{84} (mm)	124	130
Observed average bankfull depth (m)	0.87	0.74
Predicted average bankfull depth (m)	0.99	1.13
Observed maximum bankfull pool depth (m)	2.10	2.02
Predicted maximum bankfull pool depth (m)	1.58	2.05

Matrix evaluated the CVC existing conditions HEC-RAS model. Within the area of the proposed pipe crossing, the greatest main channel velocity and shear stress occur at the 5-year return flow (discharge of 160.3 m³/s). When this discharge is used in the Hey and Thorne (1986) equations along with the measured substrate sizes, a maximum bankfull pool depth of approximately 3 m or 2.3 m from riffle grade is calculated (Table 8).

TABLE 8 Predicted Maximum Pool Depth Based on Field-observed Bankfull Flow and HEC-RAS 2-year and 5-year Flows for CR-1

Channel Parameter	Bankfull Flow from Matrix Field Assessment	HEC-RAS 2-year Flow	HEC-RAS 5-year Flow
Discharge (m ³ /s)	25.9	90	160
Substrate D ₅₀ (mm)	64	64	64
Substrate D ₈₄ (mm)	124	124	124
Predicted average bankfull depth (m)	0.99	1.57	1.95
Predicted maximum bankfull pool depth (m)	1.58	2.47	3.04
Predicted maximum pool depth below riffle grade (m)	0.88	1.77	2.34

6.1.2 Maximum Observed Bankfull Pool Depth

Following recommendations summarized in the CVC (2019) *Fluvial Geomorphic Guidelines: Factsheet VI Scour Analysis*, a SHL has been calculated and incorporates the amount of general scour (G_s) and natural scour (N_s) occurring within the Credit River upstream of the Highway 401 crossing, in addition to a FOS. During the field investigation, the deepest pool identified had a maximum bankfull pool depth of 2.1 m or 1.4 m below the average riffle grade, representing the amount of general scour occurring at this location (Figure 4). To calculate natural scour, the average bankfull depth (d_{BF}) of 0.7 m observed measured during the field assessment is multiplied by 2.5 (CVC 2019), resulting in a natural scour value of 1.75 m. When comparing this natural scour value to the results of empirical studies for smaller fully urbanized watercourses, as summarized in Figure 3 of CVC (2019), this value appears too high for the Credit River. With reference to Figure 3 in CVC (2019), a natural scour rate of 0.5 m per century is deemed more appropriate for the main branch of the Credit River within the subject reach. A FOS consistent with the average observed bankfull depth is then applied to the general scour and natural scour values to arrive at the SHL as follows:

$$SHL = G_s + N_s + FOS \quad (5)$$

Where:

G_s is 1.4 m

N_s is 0.5 m

FOS (or 1 bankfull depth) is 0.7 m

Therefore, SHL = 1.4 m + 0.5 m + 0.7 m = 2.6 m below the average riffle grade (or 3.3 m below the bankfull grade).

6.1.3 Comparison with the Credit Valley Conservation (2019) Simplified Standard Method

Guidelines outlined in CVC (2019) use a Simplified Standard Method to standardize high-level scour assessments within the Credit River watershed as first estimate requiring minimal effort.

Based on results of the detailed fluvial geomorphic survey, the average bankfull depth of the assessed reach of the Credit River is 0.7 m. As outlined in CVC (2019), the SHL for main channels with a bankfull depth of 0.5 to 2 m is calculated using:

$$SHL = [d_{BF} \times 2.5] \times FS \tag{6}$$

Where:

d_{BF} is the average bankfull depth

FS is a 2.0 FOS

Using an average bankfull depth of 0.7 m, a SHL of 3.5 m is calculated for the Credit River. This estimate is higher than the value of 2.6 m recommended in the detailed methods described above in Section 6.1.2, and therefore an SHL of 3.5 m is not recommended for this study.

6.1.4 Final Depth of Scour Recommendation

A summary of the calculated depths of scour using three different standard methodologies is summarized in Table 9. For comparison, the summarized depths of scour have been adjusted to be vertically offset from the existing bankfull depth or riffle grade.

TABLE 9 Summary of Calculated Depths of Scour for General Scour and Scour Hazard Limit

Methodology Used	G _s Below Riffle Grade	G _s Below Bankfull Grade	SHL Below Riffle Grade (m)	SHL Below Bankfull Grade (m)
Empirical(Hey and Thorne 1986) - Q _{BF}	0.88	1.58		
Empirical(Hey and Thorne 1986) - Q ₂	1.77	2.47		
Empirical(Hey and Thorne 1986) - Q ₅	2.34	3.04		
Observed Bankfull Pool Depth (field-based)	1.4	2.1		
Detailed Method (CVC 2019)			2.60	3.30
Simplified Standard Method(CVC 2019)			3.50	4.20

Stable Channels with Mobile Gravel Beds (Hey and Thorne 1986)

Fluvial Geomorphic Guidelines: Factsheet VI Scour Analysis - Version 1.0 (CVC 2019)

G_s - general scour

SHL - scour hazard limit

Based on the above methodologies and using CVC (2019) Equation 2 for detailed methods, Matrix recommends a SHL of 2.6 m below the average riffle grade. This value was deemed appropriate as it similar to the Q_5 or “worst case” general scour value derived from empirical results; however, also incorporates natural scour and an added FOS. From a fluvial geomorphic perspective, it is recommended that the proposed pipe be buried at a minimum of 2.6 m below the riffle grade to ensure the pipe remains stable over a 100-year time period.

Based on the surveyed channel profile, the bed invert elevation at the proposed crossing location is approximately 160.3 m above sea level (asl; Figure 3). To minimize risk to the pipe from fluvial processes, the pipe should minimally be buried to at an elevation of 157.7 m asl at all locations that pipe is located within the MBW extents.

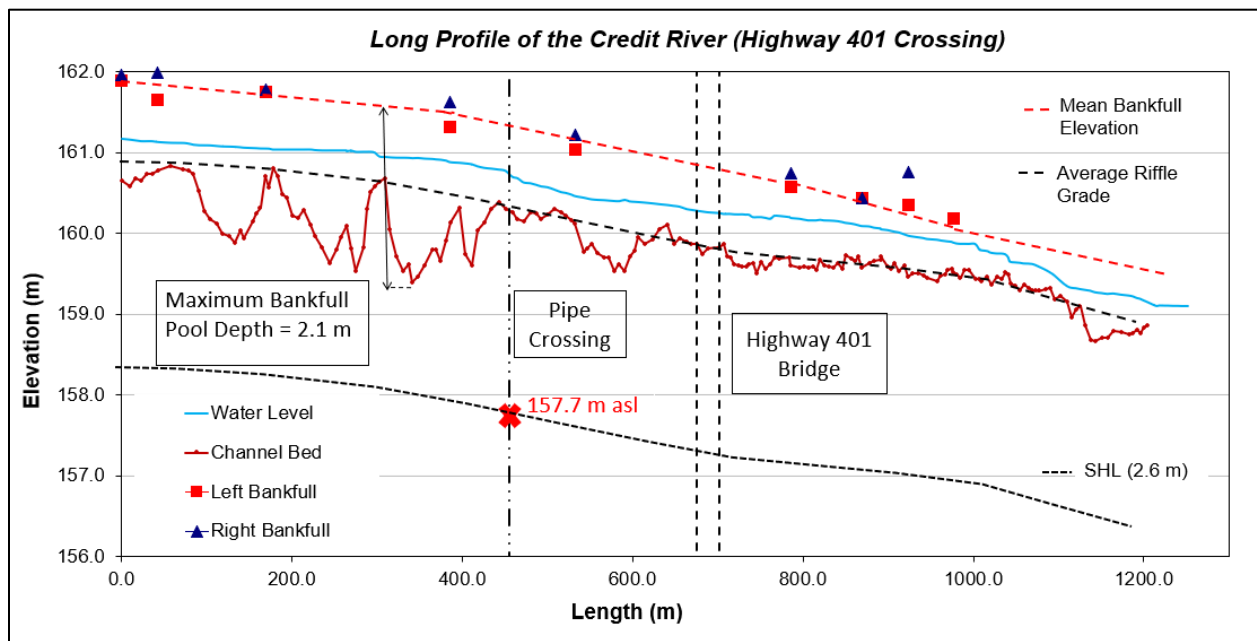


FIGURE 3 Surveyed Longitudinal Profile Showing Pipe Crossing the Credit River Relative to the Scour Hazard Limit

The channel cross-section near the proposed crossing in Figure 4 displays the potential maximum scour depth that would occur below the lowest point (thalweg) of the existing channel bed.

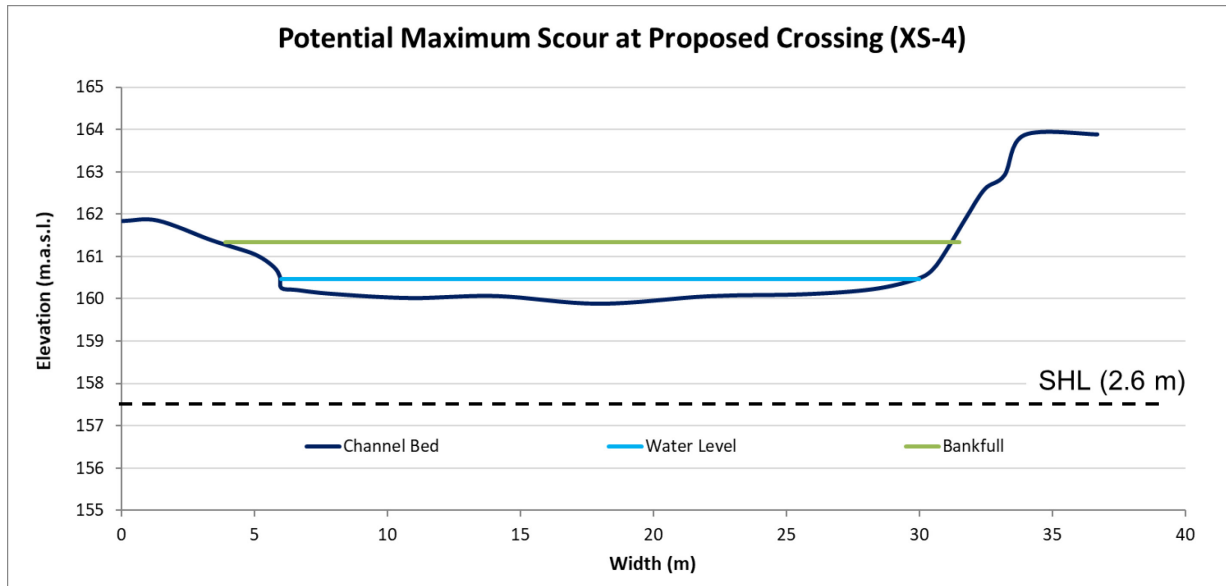


FIGURE 4 Surveyed Cross-Section 4 (XS-4) in the Credit River Representing the Potential Maximum Scour Depth Closest to Proposed Pipe Crossing

6.2 Mullet Creek Crossing at Highway 401

For Mullet Creek, the channel in the vicinity of the crossing location is lined entirely with gabion baskets. As a result, the channel form is not a result of natural processes and therefore the concept of the bankfull channel is not applicable. Consequently, the standard scour equations developed by Hey and Thorne (1986) that are based on bankfull channels cannot be applied and there are no distinct natural pool features observed; however, a 1.03 m drop in the profile was identified approximately 40 m downstream of Highway 401 (Figure 5). This location is downstream of the crossing location and appears to coincide with a step/drop purposely constructed when the gabion baskets were installed. The depth of the drop at this location has likely increased since construction due to winnowing out of gabion stone on the bed and banks and resultant gabion basket deformation. Due to the basket deformation, it appears that the cross-section has widened slightly. The drop at this location, visible in the survey profile, is approximately 1.03 m in height, measured from the existing invert (i.e., not measured from bankfull/top of bank elevation). Based on this occurrence, any infrastructure should minimally be buried 1.03 m below the existing channel invert. The lowest channel invert along the proposed pipe alignment that crosses under across Mullet Creek diagonally is 176.8 m asl (Figure 5). Incorporating a FOS of 1.5, the minimum burial depth is 1.55 m (burial elevation of 174.95 m asl) below the creek bed (or 1.75 m below the riffle grade representing the SHL) and it is confirmed this depth of scour is appropriate to use given the pipe crossing location is now upstream of the highway. For context, the invert at the Century Avenue culvert 30 m downstream is 173.59 m asl.

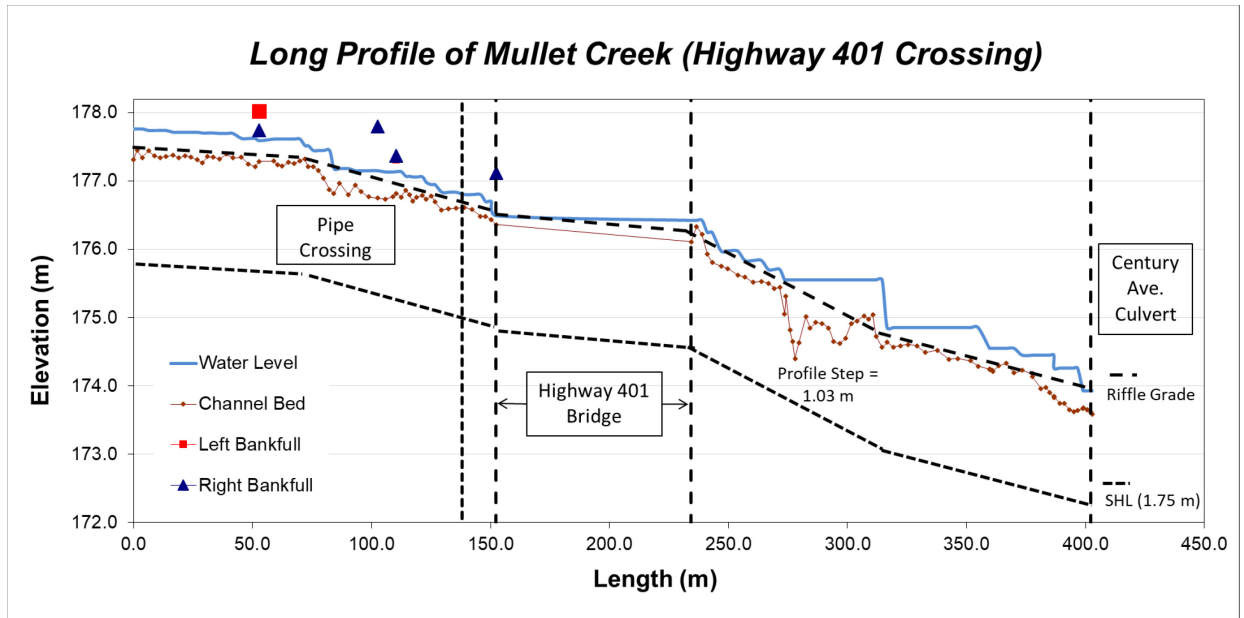


FIGURE 5 Surveyed Longitudinal Profile Showing Pipe Crossing Mullet Creek

The channel cross-section near the proposed crossing in Figure 6 displays the potential maximum scour depth that would occur below the lowest point (thalweg) of the existing channel bed.

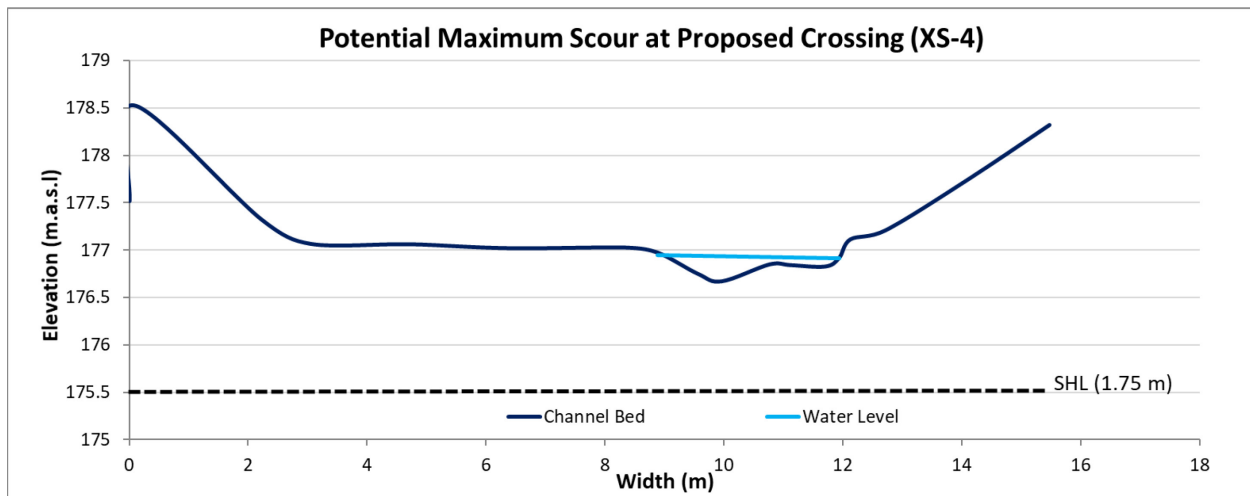


FIGURE 6 Surveyed Cross-Section 4 (XS-4) in Mullet Creek Representing the Potential Maximum Scour Depth Closest to Proposed Pipe Crossing

Note that drilling activities should be performed so as not to compromise the treatment that is protecting the channel boundaries as it mitigates against scour that could cause risk to underlying infrastructure. During the field investigation, no observations were noted of treatment failure within the proposed crossing extent. Freeman and Fischenich (2000) provide a critical velocity for various gabion treatments.

As the thickness of the treatment along Mullet Creek is unknown, the minimum value of 3.5 m/s is selected for comparison with velocities in Mullet Creek.

Channel hydraulics based on the recent survey cross-sections and longitudinal profile were presented in Section 4.3.2; however, recall that as the channel is lined with gabion baskets, the bankfull channel dimensions could not be identified along the majority of the reach as visual indicators resulting from natural processes are not present. The discharge for which the hydraulic characteristics were calculated (1.04 m³/s) is far below the 2-year return. Using the cross-section in the study reach and surveyed longitudinal profile information, an estimation of channel hydraulics based on the current channel configuration is possible. Using Manning’s equation with application of the channel slope in the vicinity of the pipe crossings (approximately 1%), a discharge roughly equivalent to the 100-year flow of 45 m³/s results in a water depth of 1.2 m and an average velocity of 3.2 m/s. Note that this calculation does not account for any backwatering effects and likely overestimates the velocities at the less frequent floods.

To further support assessment of channel hydraulics, the hydraulic model available for Mullet Creek at this location was reviewed. Note that the model is a 1998 HEC-2 model provided by CVC for which the geometry was developed based on channel characteristics prior to it being lined with gabion baskets. Resultantly it does not perfectly represent current conditions, however the output does provide insight that the highest velocities are experienced at the lower flows as the energy gradient decreases at larger flood events (Table 10).

TABLE 10 HEC-2 Hydraulics for Mullet Creek Downstream of Highway 401, Station 10+950

Return Period	Flow (m ³ /s)	Velocity (m/s)	Top Width (m)	Water Depth (m)	Slope (m/m)
2-year	15.7	1.1	22.3	1.43	0.001
5-year	23.1	1.01	34.43	1.88	0.004
10-year	25.5	0.98	38.25	2.02	0.004
25-year	34.9	0.83	55.23	2.55	0.0002
50-year	40.2	0.77	64.95	2.83	0.0001
100-year	45.2	0.71	73.76	3.08	0.0001
Regional	58.7	0.58	113.68	3.72	0.00006

Based on the velocity outputs (maximum velocity of 1.1 m/s at the 2-year return period) and comparison with the critical velocity of 3.5 m/s in Freeman and Fischenich (2000), the current gabion treatment should remain stable under all flow scenarios.

7 SUMMARY OF RECOMMENDATIONS

7.1 Credit River

The proposed 1,500 mm STS is being installed to convey wastewater to an existing 2,400 mm STS west of the Credit River. The proposed sewer is to cross underneath the Credit River approximately 200 m upstream of Highway 401 and is to be open-cut across the floodplain. The pipe burial extent and depth recommended by Matrix in this report is based solely on fluvial geomorphological considerations.

A channel migration analysis and delineation of the MBW was completed to ascertain lateral erosion risk. The pipe should be buried minimally to the scour depth at all locations that it is within the engineering MBW as the area of higher erosion risk, while the geomorphic MBW indicates the larger area of long-term risks. If spatial constraints do not allow for this configuration within the engineering MBW, erosion countermeasures (e.g., buried stone treatment) may be necessary to provide protection to infrastructure.

To prevent pipe exposure from channel incision, a scour assessment was completed to calculate the 100-year SHL as per CVC (2019) guidelines (i.e., maximum potential scour depth for vertical erosion risk). The estimated maximum scour depth of 2.6 m is measured from the riffle grade. The top of pipe must be minimally 2.6 m below the constructed riffle grade at the crossing to account for channel scour that could occur upstream or downstream of the pipe.

As per the 30% design drawings provided by Jacobs (*Highway 401 Crossing #11 1500 mm Proposed Sanitary Sewer*; Appendix E), a pipe burial depth of approximately 1.5 m below the bottom of the river is proposed and does not meet Matrix's recommended depth of scour of 2.6 m below the riffle grade. Based on geomorphic analyses, there is a potential risk of pipe exposure at a depth of scour of 1.5 m and is further supported by active erosion and pool scouring observed upstream of the pipe crossing location. Given the highest in-channel velocities occur on the creek bed at the 5-year return period, buried infrastructure could potentially be at risk if the depth of cover is not achieved or additional engineered pipe protection is not put in place.

As the STS design and construction methods are finalized, in-channel works (i.e., re-establishment of cover over the pipe for open-cut installation) should be developed with considerations of natural channel design principles and stream/riparian ecology. Consultation with and approval from CVC and the Ministry of Natural Resources and Forestry may be necessary to proceed with any in-stream works along the Credit River.

7.2 Mullet Creek

A 750 mm sanitary sewer and a 750 mm watermain are proposed to cross under Mullet Creek north of Highway 401, extending diagonally across the channel corridor for a distance of approximately 3 m via underground tunnelling methods.

A MBW assessment was also completed on Mullet Creek to predict the risk associated with channel migration and lateral erosion. With a FOS, the final MBW is 24. Typically, it is recommended that all infrastructure be sited outside of the MBW to prevent risk from fluvial processes. However, since the channel is entirely lined with gabion baskets that were observed to largely be in good condition, there is currently minimal risk of channel migration and it is recommended that the pipes be buried to the scour depth along the entire engineering MBW delineated to account for potential basket deformation as well as lateral channel migration.

To prevent pipe exposure from channel incision, a scour assessment was completed to calculate the maximum potential scour depth (vertical erosion risk). Natural fluvial processes do not occur at the site due to the presence of the gabion treatment. The recommended burial depth of 1.55 m below the creek bed (or 1.75 m below the riffle grade) is based on an observed step of 1.03 m downstream of the highway crossing with an added FOS of 1.5 applied to arrive at the final result. An assessment of channel velocities versus gabion treatment resistance revealed that the treatment should remain stable under all flow scenarios. It is important that construction activities do not compromise the integrity of the treatment. As the existing gabion basket treatment was identified to be stable within the crossing extent and the pipes are to be installed via horizontal directional drilling, no channel works are recommended for Mullet Creek.

As per the pipe crossing drawing provided by Jacobs *Highway 401 Crossing, Crossing #7 (South) 750 mm Proposed Sanitary Sewer, Plan No. C7-3* (Appendix E) a pipe burial depth of 2.58 m below the creek bed is proposed. Matrix's depth of scour of 1.55 m (1.75 m below riffle grade) was calculated to correspond to the 2-year return period where the greatest velocities on the channel bed occur and the proposed burial depth of the pipe is beyond our calculated scour depth, therefore buried infrastructure should not be at risk.

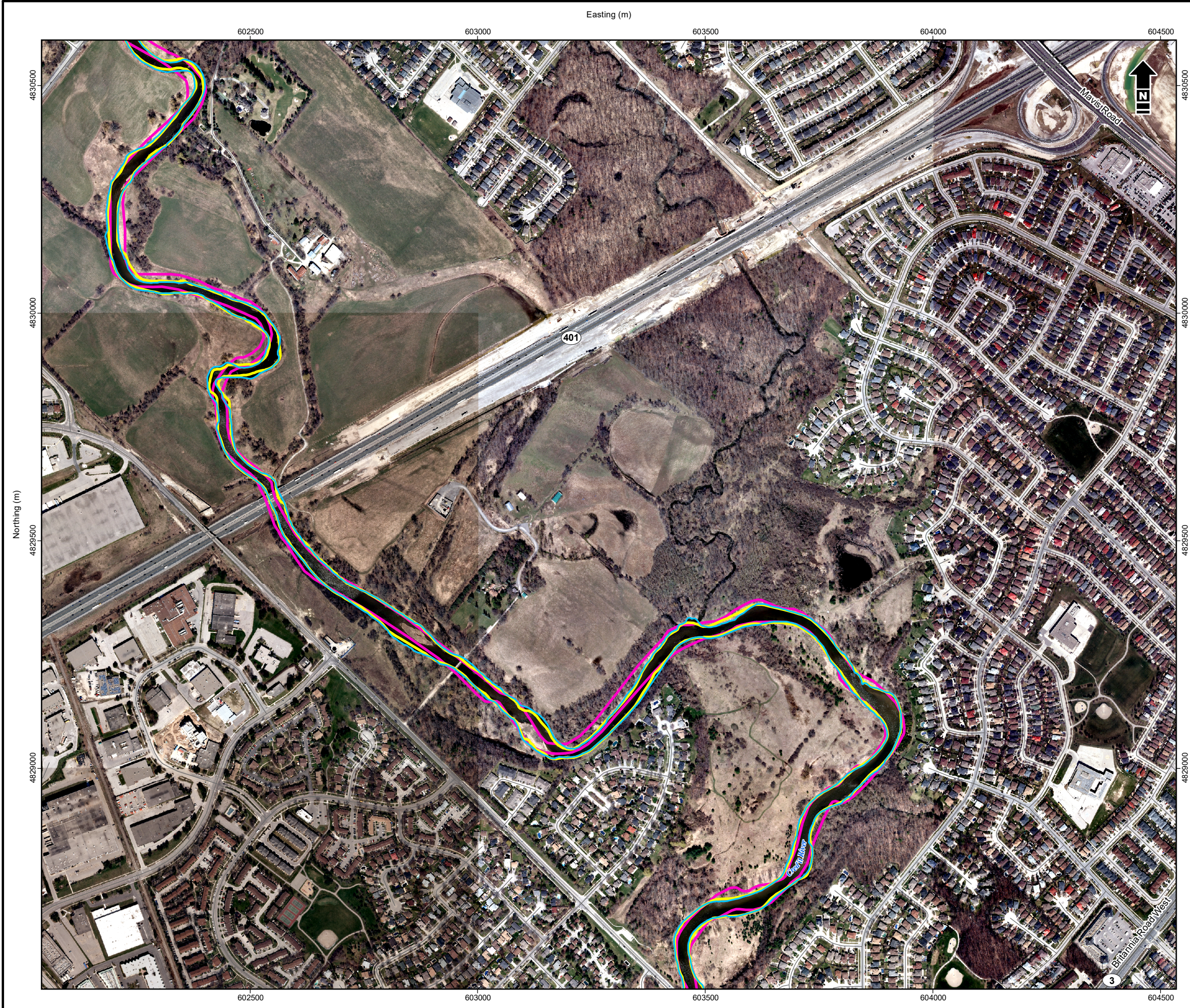
8 REFERENCES

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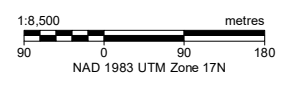
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APPENDIX A

Historical Channel Traces



- Watercourse - 2018
- Watercourse - 1999
- Watercourse - 1954
- Highway
- Road



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Jacobs Engineering Group Inc.
Highway 401 Watermain and Sanitary Trunk Sewer

Historical Channel Traces

Date:	Jan 2019	Project:	27896	Submitter:	N. Cycles	Reviewer:	A. Zaghal
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APPENDIX B

Rapid Assessment Protocols

APPENDIX B

RAPID GEOMORPHIC ASSESSMENT (MOE 2003)

For fluvial geomorphic studies, standardized rapid assessment techniques including The Rapid Geomorphic Assessment (RGA; MOE 2003) are typically completed to gain insight into existing geomorphic conditions and document evidence of active geomorphic processes (e.g. erosion and deposition). This qualitative technique is purely a presence/absence methodology designed to document evidence of channel instability such as exposed tree roots, undercut branches, etc. The various indicators are grouped into four categories indicating a specific geomorphic process:

- Aggradation
- Degradation
- Channel Widening
- Planimetric Form Adjustment

Over the course of the survey, the existing geomorphic conditions of each reach are noted and individual geomorphic indicators are documented. Upon completion of the field inspection, these indicators are tallied by category and used to calculate an overall reach stability index, which corresponds to one of three stability classes related to sensitivity to altered sediment and flow regimes:

TABLE A1. Rapid Geomorphic Assessment Classification

Factor Value	Classification	Interpretation
≤0.20	In Regime or Stable (Least Sensitive)	The channel morphology is within a range of variance for streams of similar hydrographic characteristics - evidence of instability is isolated or associated with normal river meander propagation processes
0.21 to 0.40	Transitional or Stressed (Moderately Sensitive)	Channel morphology is within the range of variance for streams of similar hydrographic characteristics but the evidence of instability is frequent
≥0.41	In Adjustment (Most Sensitive)	Channel morphology is not within the range of variance and evidence of instability is wide spread

REFERENCE

Ontario Ministry of the Environment (MOE). 2003. *Stormwater Management Planning and Design Manual*. Queen's Printer. Ottawa, Ontario. March 2003. 2003.
<http://www.ontario.ca/document/stormwater-management-planning-and-design-manual>

APPENDIX C
Site Investigation Photographs

APPENDIX C1
Mullet Creek Site Photographs

APPENDIX C1

MULLET CREEK SITE PHOTOGRAPHS



Photograph 1: Reach MC-1; upstream extent of field work at bridge crossing with Derry Road West; channel banks well vegetated with tall grass.



Photograph 2: Reach MC-1; gabion baskets upstream beginning to fail as evidenced by angular boulders along channel bank.



Photograph 3: Reach MC-1; view upstream with highway 401 along right bank (left side of photo); there is a fallen down tree across the channel and the banks remain lines with gabion baskets.



Photograph 4: Reach MC-1; downstream view of channel approaching bridge crossing with highway 401; banks are well-vegetated by tall grass and trees.



Photograph 5: Reach MC-1; looking downstream at bridge crossing with Highway 401 (on upstream side); tall grass within channel and cobble-sized sediment at culvert opening.



Photograph 6: Reach MC-1; looking upstream at bridge crossing with Highway 401 (on downstream side of highway); dense growth of in-stream grass; channel banks lined with gabion baskets.



Photograph 7: Reach MC-1; scour pool downstream of a knickpoint with a bankfull depth of ~1.1 m; gabion baskets lining channel banks.



Photograph 8: Reach MC-1; eroded banks downstream of knickpoint due to high flow velocity.



Photograph 9: Reach MC-1; cobble-dominated in-channel bar between Highway 401 crossing and Century Ave.



Photograph 10: Reach MC-1; view upstream of Century Ave.; abundant instream growth of tall grass, banks are lined with sloped gabion baskets.



Photograph 11: Reach MC-1; view downstream at bridge crossing with Century Avenue; stacked gabion baskets line banks on either side of the bridge.

APPENDIX C2
Credit River Site Photographs

APPENDIX C2

CREDIT RIVER SITE PHOTOGRAPHS



Photograph 1: Upstream extent of reach CR-1 (Credit River upstream of Highway 401); typical section of channel, vegetated on left bank with large trees, while right bank is dominated by tall grass and vertical banks.



Photograph 2: Reach CR-1; exposed tree roots and leaning trees over channel, as well as abundant woody debris within channel.



Photograph 3: Reach CR-1; large slabs of concrete (up to ~1.5 m in length) that have washed up along the left bank from further upstream.



Photograph 4: Reach CR-1; fallen down trees that have become entrained within the channel due to channel widening.



Photograph 5: Reach CR-1; large scour pool ~1.2 m deep (wetted depth); right banks are vertical.



Photograph 6: Reach CR-1; steep shelf/drop-off into 1.2 m deep scour pool; shelf is solidified and is cobble-dominated with a clay-matrix.



Photograph 7: Reach CR-1; typical section of channel looking downstream towards crossing with Highway 401; to the right side of the channel, there is a wide open grassy meadow, while the left side of the channel contains trees and tall grasses.



Photograph 8: Reach CR-1; bank slumping along the right side of channel resulting in a vertical bank.



Photograph 9: Reach CR-1; gravel point bar with a chute channel to the left that is active during high flows.



Photograph 10: Reach CR-1; view downstream approaching bridge at Highway 401; right bank has steepened.



Photograph 11: Reach CR-1; bridge crossing at Highway 401 representing reach break between CR-1 and CR-2; note concrete slabs that have washed up along the left bank.



Photograph 12: Credit River under the bridge crossing at Highway 401; algal growth in stagnant water; steep piles of angular boulders embedded in sand bordering the channel.



Photograph 13: Reach CR-2 (Credit River downstream of Highway 401); large concrete boulders and exposed rusted rebar along right bank.



Photograph 14: Reach CR-2; vertical right bank with exposed tree roots and leaning trees as well as washed up woody debris.



Photograph 15: Reach CR-2; large scour pool ~0.8 m deep downstream of a stormwater outfall with a water dissipation pad; gabion baskets along right bank have started to fail and banks have become undercut 10 to 20 cm.



Photograph 16: Reach CR-2; typical riffle containing highly embedded pebbles.



Photograph 17: Reach CR-2; view looking upstream of a large island vegetated with tall grass, where a chute channel has formed between the island and left bank.



Photograph 18: Reach CR-2; slumping along right bank.

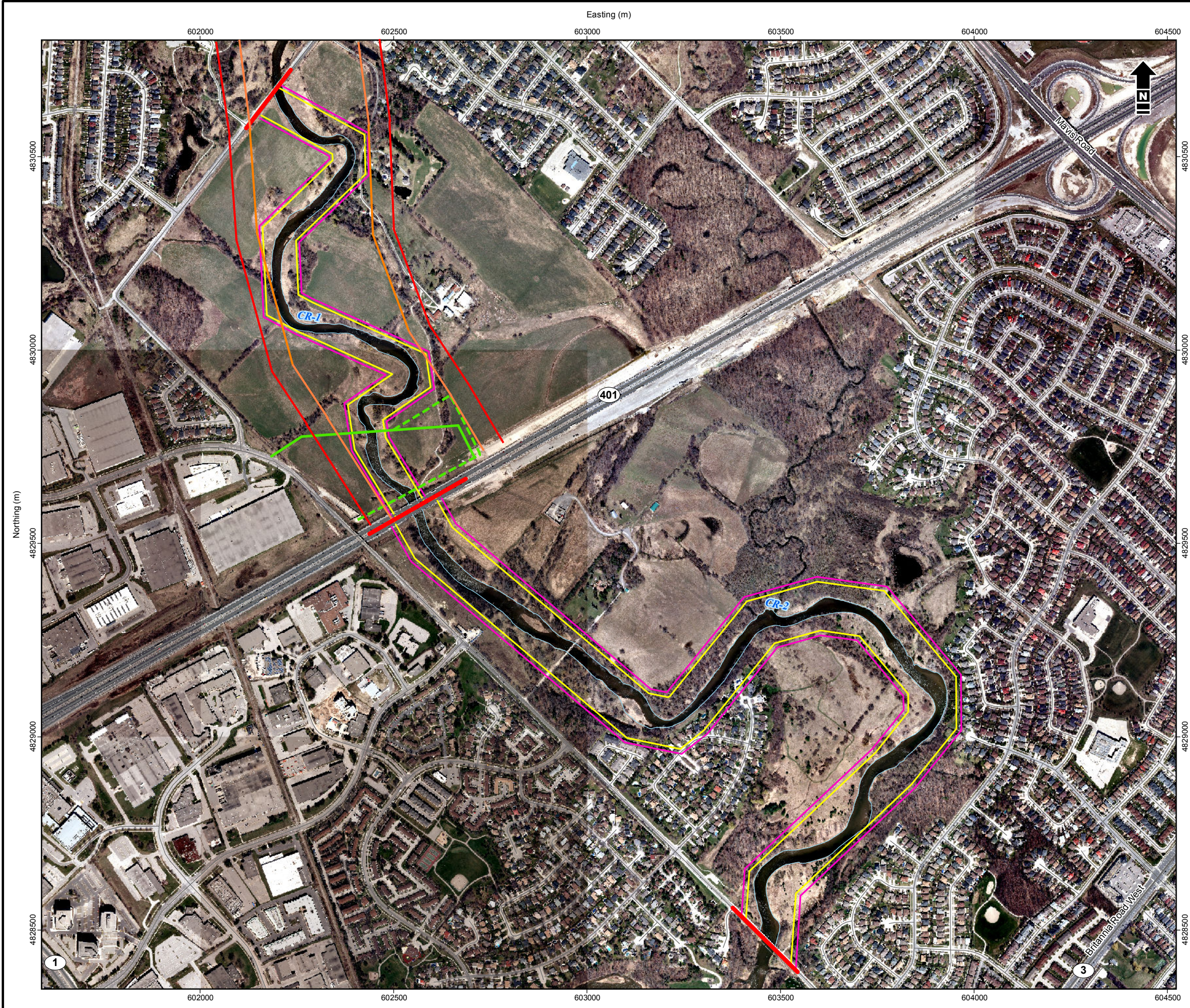


Photograph 19: Reach CR-2; vertical right bank in response to channel widening; right bank has been eroded back to the hydro line.

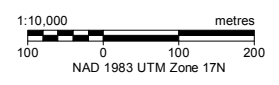


Photograph 20: Reach CR-2; downstream extent of reach towards crossing with pedestrian bridge.

APPENDIX D
Meander Belt Width



- Watercourse
- Highway
- Road
- Reach Break
- Preliminary Meander Belt Width (Engineering MBW)
- Final Meander Belt Width (Engineering MBW)
- Approximate Extents of Proposed Sanitary Sewer
- Approximate Extents of Existing Sanitary Sewer
- Preliminary Meander Belt Width (Geomorphological MBW)
- Final Meander Belt Width (Geomorphological MBW)



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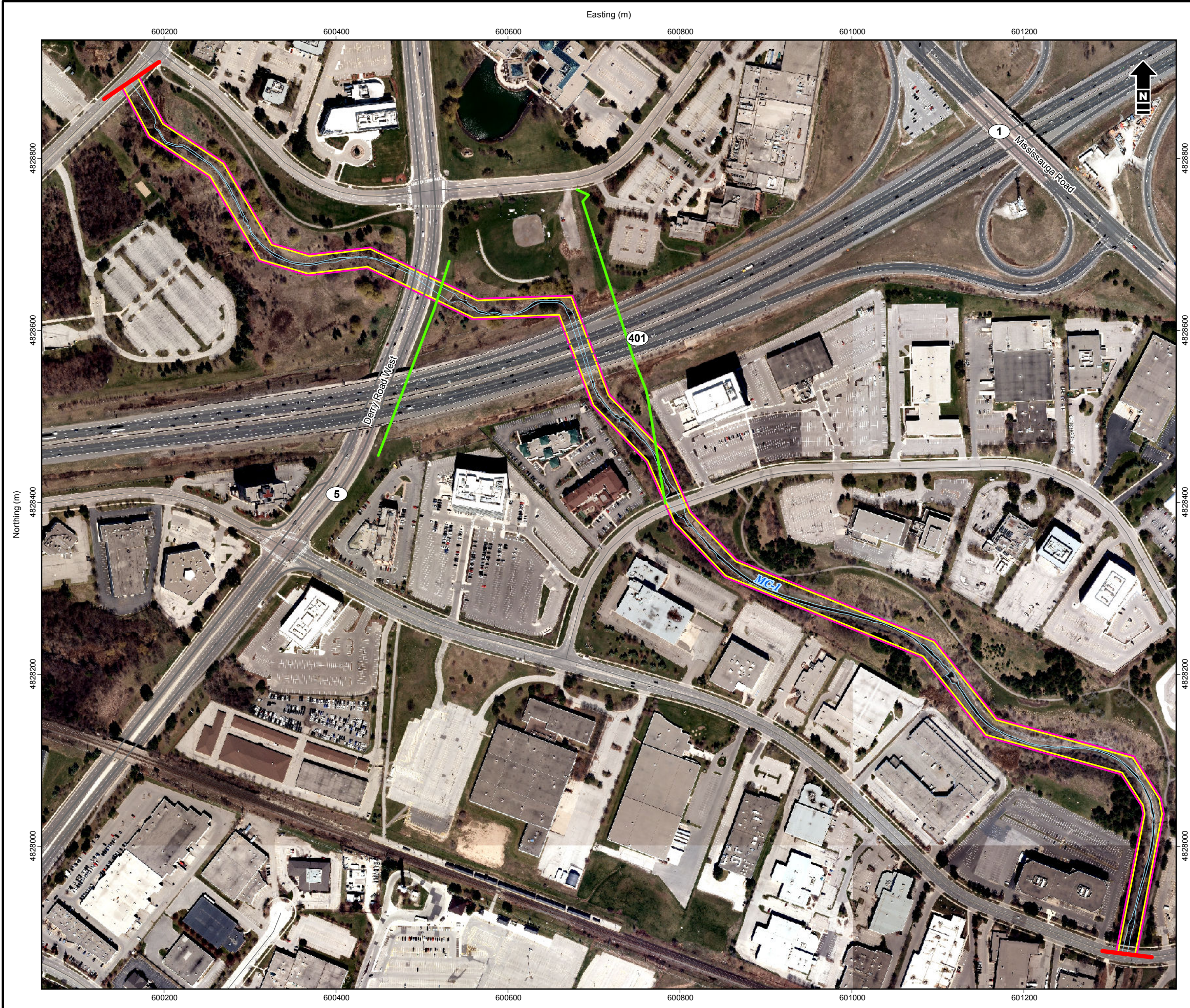
Jacobs Engineering Group Inc.
Highway 401 Watermain and Sanitary Trunk Sewer

Meander Belt Width - Credit River

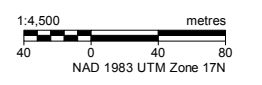
Date: Jan 2019 Project: 27896 Submitter: N. Cycles Reviewer: A. Zaghal

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- Watercourse
- Highway
- Road
- Reach Break
- Preliminary Meander Belt Width (Engineering MBW)
- Final Meander Belt Width (Engineering MBW)
- Approximate Extents of Proposed Sanitary Sewer



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Jacobs Engineering Group Inc.
 Highway 401 Watermain and Sanitary Trunk Sewer

Meander Belt Width - Mullet Creek

Date:	Jan 2019	Project:	27896	Submitter:	N. Cycles	Reviewer:	A. Zaghal
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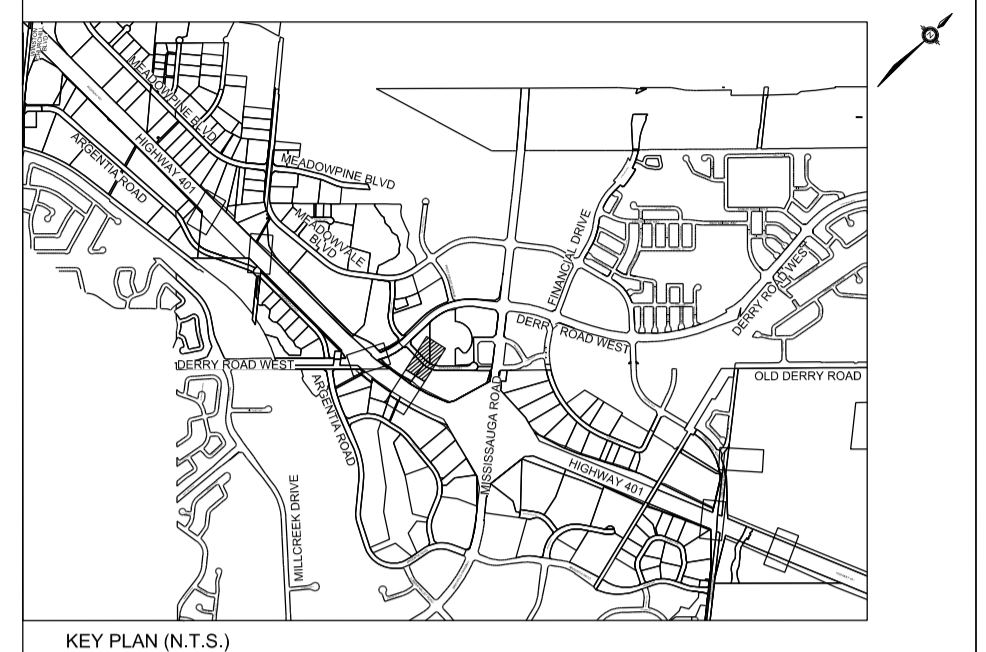
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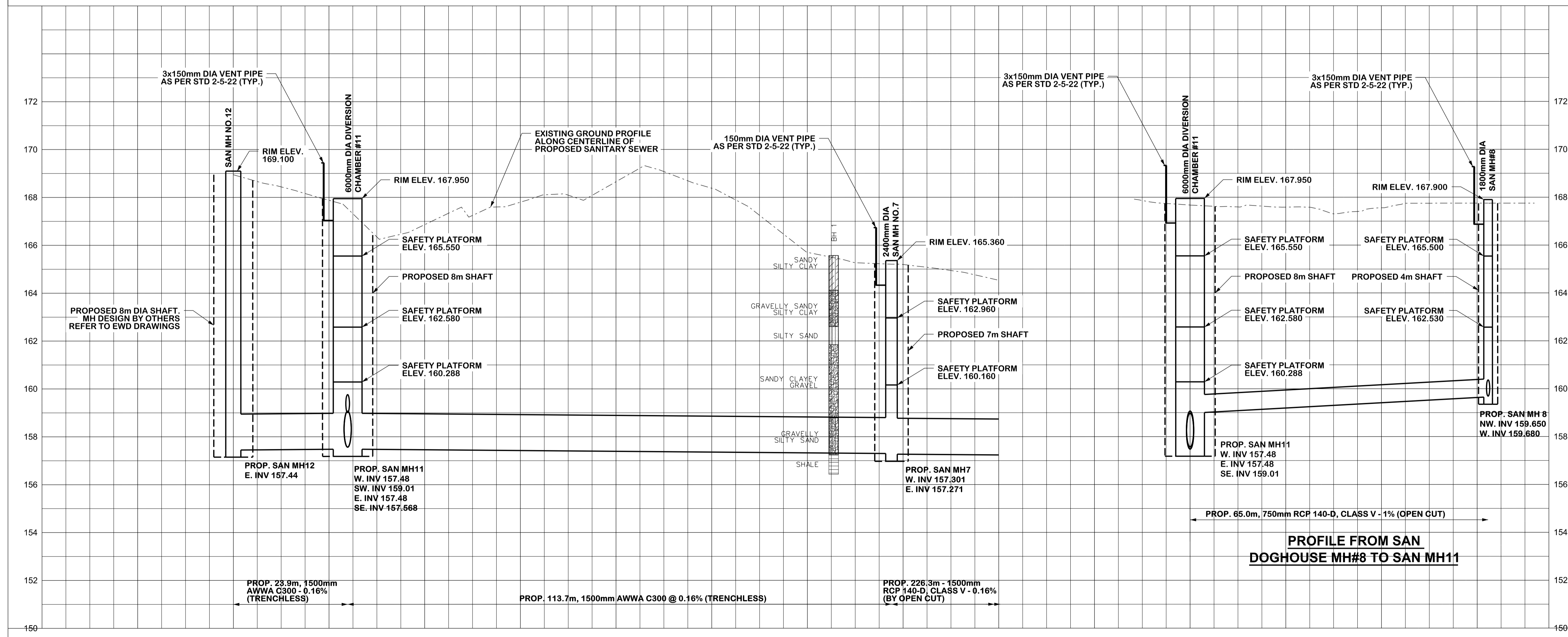
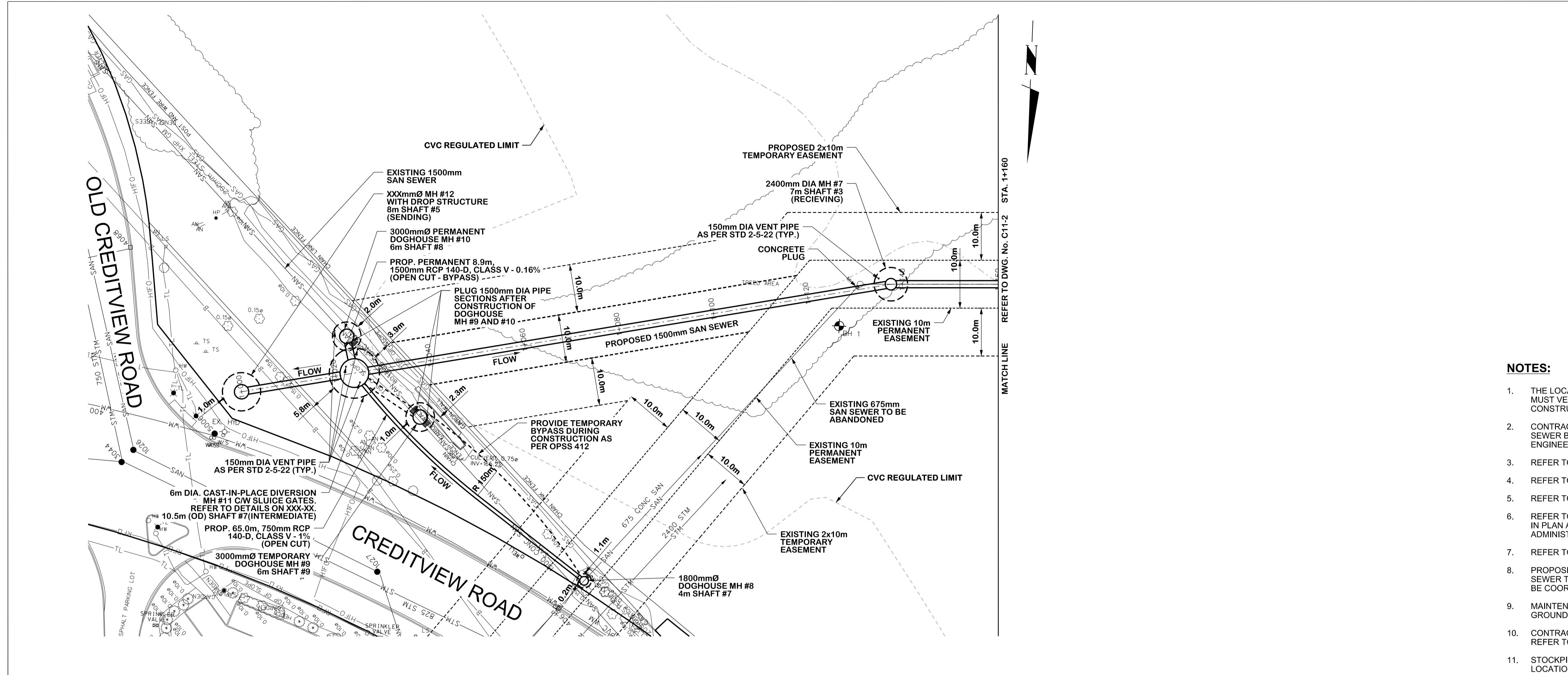
APPENDIX E
Sewer Crossing Figures (Provided by Jacobs)

SERVICE DATA					
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL UIG CABLE		
WATERMANS			HYDRO UIG CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS		
DATE	DETAILS	INIT.



- NOTES:**
- THE LOCATION OF ALL EXISTING UTILITIES ARE APPROXIMATE. THE CONTRACTOR MUST VERIFY THE LOCATION, DEPTH, INVERTS AND TOP IN THE FIELD PRIOR TO CONSTRUCTION.
 - CONTRACTOR SHALL PREPARE AND SUBMIT SEWER BYPASS AND SPILL PLANS. THE SEWER BYPASS PLAN SHALL BEAR THE SEAL AND SIGNATURE OF A PROFESSIONAL ENGINEER PRACTISING IN ONTARIO.
 - REFER TO DWG XXX FOR PROPOSED DIVERSION CHAMBER #10.
 - REFER TO DWG XXX FOR BENCHING DETAILS MH#4.
 - REFER TO STD DWG. 2-5-20 FOR BENCHING DETAILS.
 - REFER TO PEEL STD.DWG 2-5-22 FOR VENT PIPE DETAIL.LOCATION OF VENT PIPES IN PLAN ARE APPROXIMATE. CONTRACTOR SHALL CONFIRM WITH CONTRACT ADMINISTRATOR PROPER LOCATION.
 - REFER TO PEEL STD.DWG 2-5-12 FOR SAFETY PLATFORM DETAILS.
 - PROPOSED LOCATION MH#12 AND CONNECTION TO THE PROPOSED 2400mm DIA. SEWER TRUNK TO BE CONSIDERED AS THE APPROXIMATE LOCATION AND SHALL BE COORDINATED WITH EAST WEST DIVERSION PROJECT.
 - MAINTENANCE HOLES RIM ELEVATION SHALL BE MIN 150mm ABOVE EXISTING GROUND.
 - CONTRACTOR SHALL PREPARE AND SUBMIT CREDIT RIVER CROSSING OPTION. REFER TO DWG XXX.XX FOR CROSSING OPTION.
 - STOCKPILE CONTROL-CONTRACTOR TO PROVIDE MEASURES, DEPENDING ON LOCATION AND PROXIMITY OF SEDIMENT DEPOSIT.



General Notes

All Driveways Are ASPHALT Unless Otherwise Noted
 All Water And Sanitary Service Locations Are Approximate And Must Be Located Accurately In The Field
 All Horizontal And Vertical Bends Are In Degrees
 All Pipes Size In mm
 20C Existing Water Service, Size In mm
 WS25 Proposed Water Service, Size In mm
 B.M. No. Description Location
 Elev.

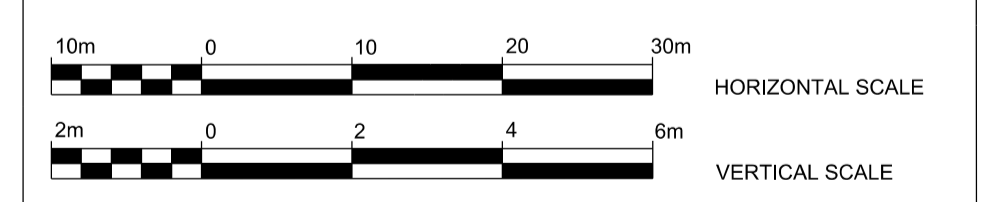
The Contractor Is Responsible For Locating And Protecting All Existing Utilities Prior To And During Construction. Location Of Existing Utilities Approximate Only. To Be Verified In Field By Contractor.



NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL	CABLE TELEVISION/FIBROPTIC PROVIDERS:
CITY OF MISSISSAUGA WORKS DEPT.	BELL CANADA
CITY OF BRAMPTON WORKS DEPT.	ENERSOURCE TELECOM
TOWN OF CALEDON WORKS DEPT.	HYDRO ONE TELECOM
BELL CANADA	RODGERS CABLE
ENBRIDGE INCORPORATED-GAS DISTRIBUTION	ALLSTREAM
ONTARIO MINISTRY OF TRANSPORTATION	PSN (PUBLIC SECTOR NETWORK)
ONTARIO CLEAN WATER AGENCY	FUTUREWAY (FCI BROADBAND)
HYDRO ONE NETWORKS	
ENERSOURCE, HYDRO MISSISSAUGA	
HYDRO ONE BRAMPTON	



HIGHWAY 401 CROSSING

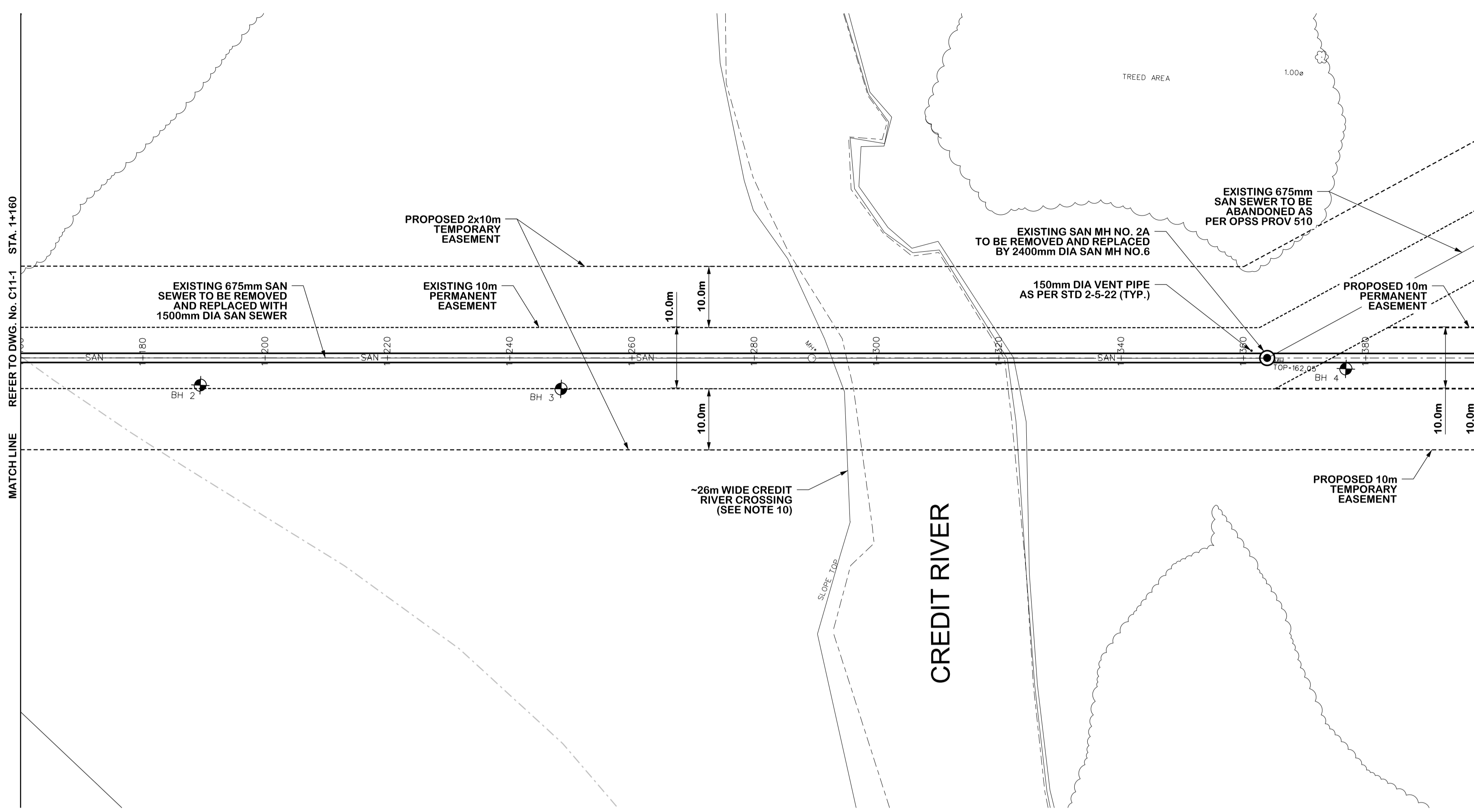
CROSSING # 11

1500mm PROPOSED SANITARY SEWER

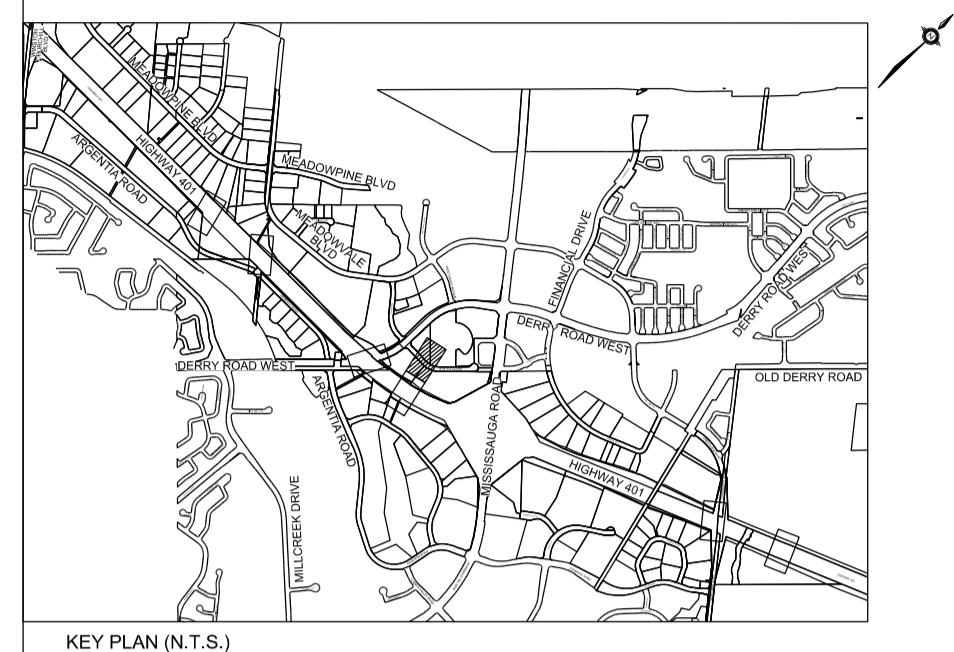
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0+980	168.94	167.88			18-1496
1+000	167.88	166.86			
1+020	166.86	167.80			
1+040	167.80	168.65			
1+060	168.65	168.38			
1+080	168.38	165.70			
1+100	165.70	165.19			
1+120	165.19	164.54			
1+140	164.54				
1+160					

REFER TO DWG. No. C11-1 STA. 1+160

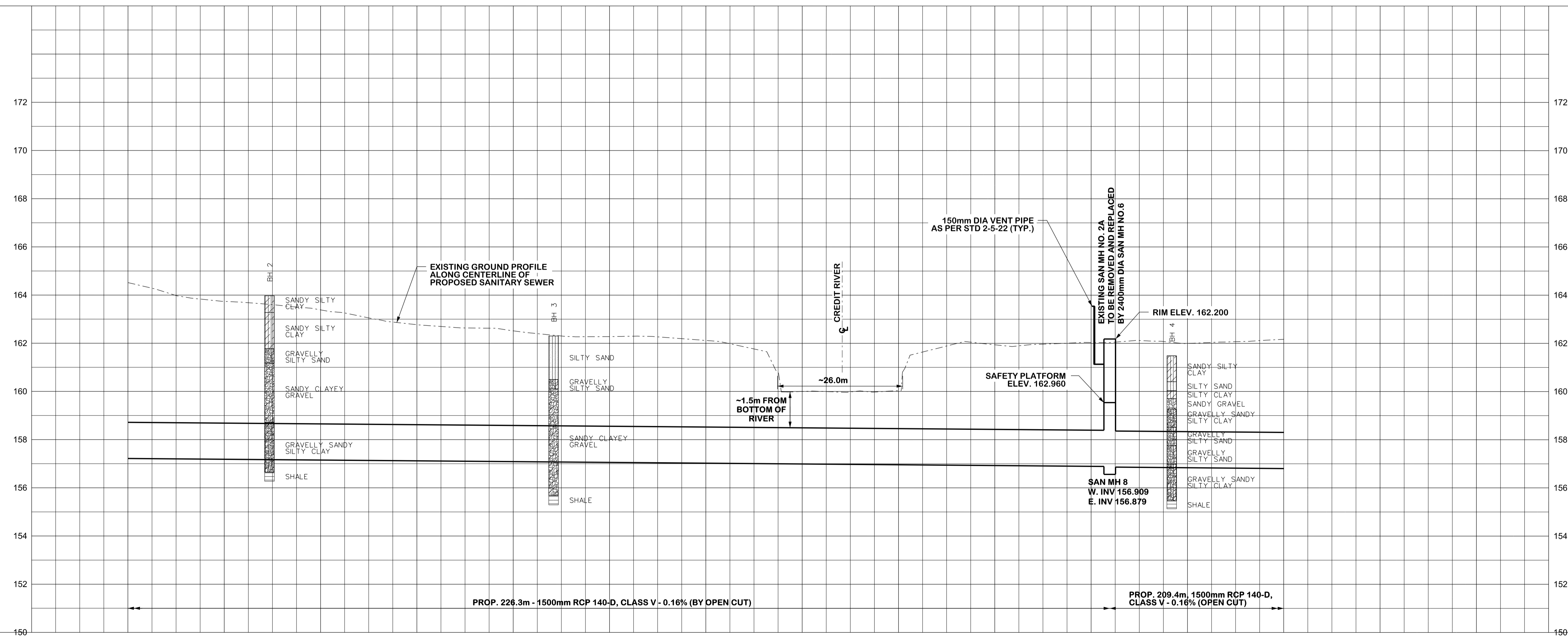
REFER TO DWG. No. C11-3 STA. 1+400



SERVICE DATA					
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATER MAINS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES		



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 B.M. No. Description Location
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JACOBS

Approved by _____

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CITY OF BRAMPTON WORKS DEPT.	ENERSOURCE TELECOM
TOWN OF CALEDON WORKS DEPT.	HYDRO ONE TELECOM
BELL CANADA	RODGERS CABLE
ENBRIDGE INCORPORATED-GAS DISTRIBUTION	ALLSTREAM
ONTARIO MINISTRY OF TRANSPORTATION	PSN (PUBLIC SECTOR NETWORK)
ONTARIO CLEAN WATER AGENCY	FUTUREWAY (FCI BROADBAND)
HYDRO ONE NETWORKS	
ENERSOURCE, HYDRO MISSISSAUGA	
HYDRO ONE BRAMPTON	

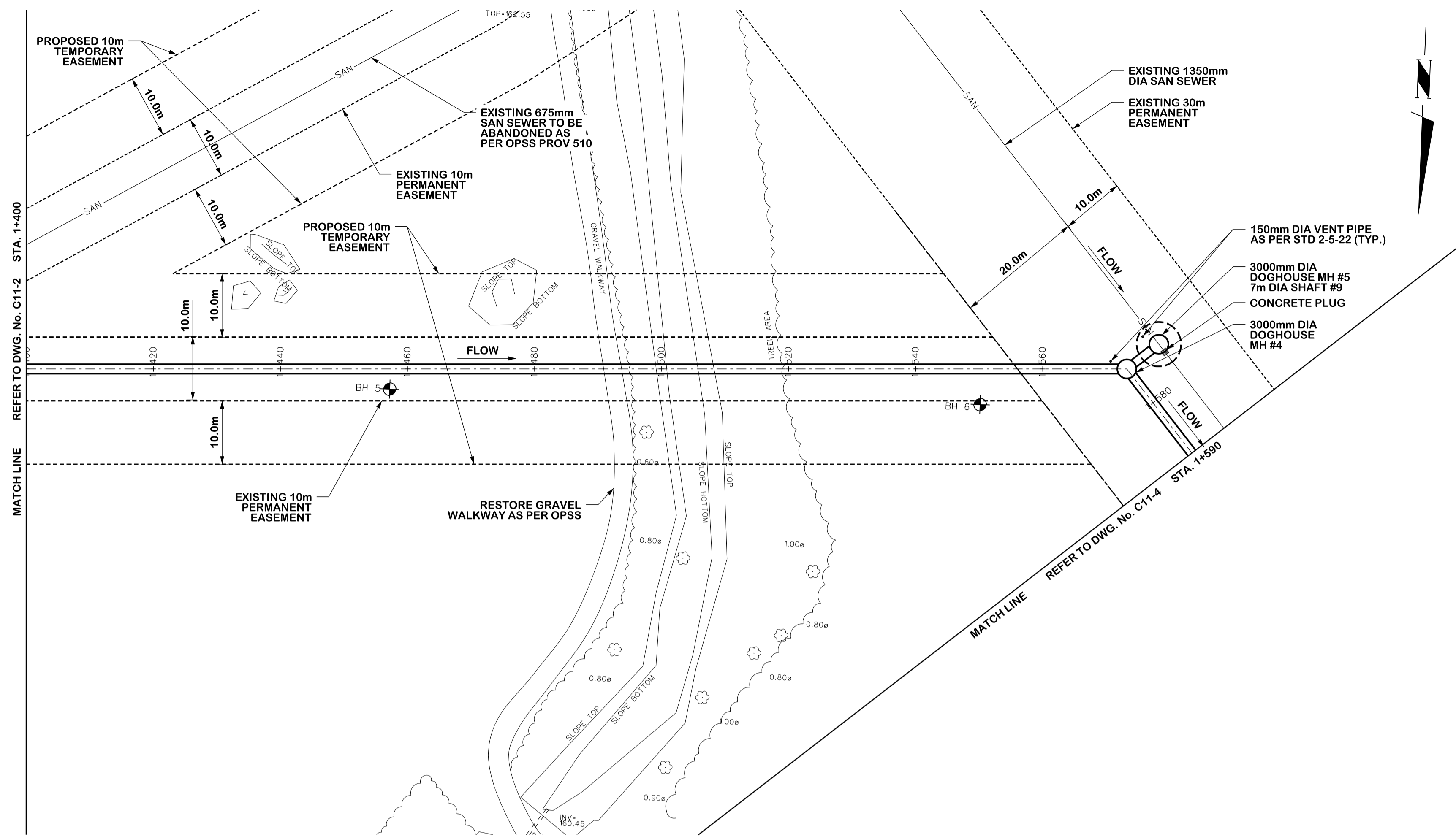
10m 0 10 20 30m HORIZONTAL SCALE
 2m 0 2 4 6m VERTICAL SCALE

Region of Peel
 working with you

HIGHWAY 401 CROSSING
 CROSSING # 11
 1500mm PROPOSED SANITARY SEWER

STATION	1+160	1+180	1+200	1+220	1+240	1+260	1+280	1+300	1+320	1+340	1+360	1+380	1+400
BOT. EL. OF SAN.	164.54	163.76	163.40	162.79	162.54	162.30	162.14	160.80	160.82	161.96	162.05	162.01	162.19
EX. GRADE ELEV.													
CHAINAGE													

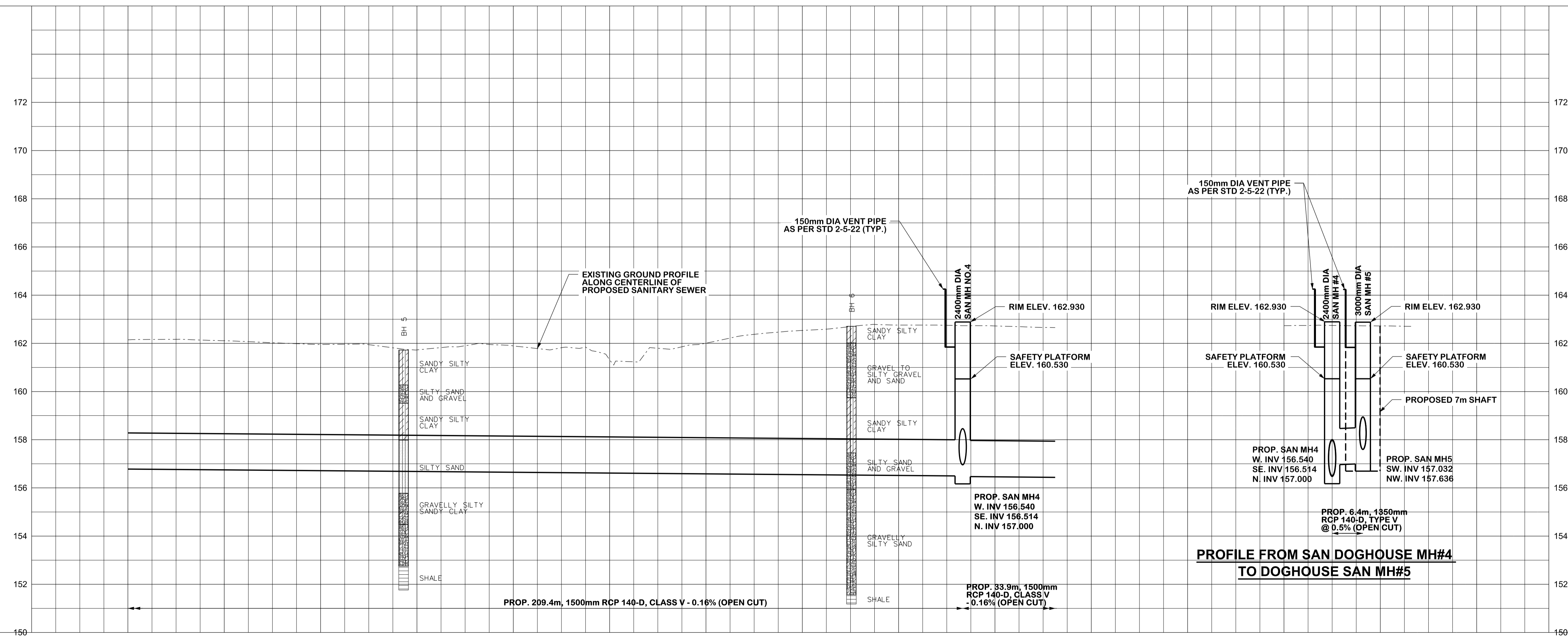
CAD Area	Area	Project No.	18-1496
Checked by	Drawn by F.C	Plan No.	C11-2
Date	Sheet of		



SERVICE DATA					
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS		
DATE	DETAILS	INIT.

- NOTES:**
- THE LOCATION OF ALL EXISTING UTILITIES ARE APPROXIMATE. THE CONTRACTOR MUST VERIFY THE LOCATION, DEPTH, INVERTS AND TOP IN THE FIELD PRIOR TO CONSTRUCTION.
 - CONTRACTOR SHALL PREPARE AND SUBMIT SEWER BYPASS AND SPILL PLANS. THE SEWER BYPASS PLAN SHALL BEAR THE SEAL AND SIGNATURE OF A PROFESSIONAL ENGINEER PRACTISING IN ONTARIO.
 - REFER TO DWG XXX FOR PROPOSED DIVERSION CHAMBER #10.
 - REFER TO DWG XXX FOR BENCHING DETAILS MH#4.
 - REFER TO STD DWG. 2-5-20 FOR BENCHING DETAILS.
 - REFER TO PEEL STD.DWG 2-5-22 FOR VENT PIPE DETAIL.LOCATION OF VENT PIPES IN PLAN ARE APPROXIMATE. CONTRACTOR SHALL CONFIRM WITH CONTRACT ADMINISTRATOR PROPER LOCATION.
 - REFER TO PEEL STD.DWG 2-5-12 FOR SAFETY PLATFORM DETAILS.
 - PROPOSED LOCATION MH#12 AND CONNECTION TO THE PROPOSED 2400mm DIA. SEWER TRUNK TO BE CONSIDERED AS THE APPROXIMATE LOCATION AND SHALL BE COORDINATED WITH EAST WEST DIVERSION PROJECT.
 - MAINTENANCE HOLES RIM ELEVATION SHALL BE MIN 150mm ABOVE EXISTING GROUND.
 - CONTRACTOR SHALL PREPARE AND SUBMIT CREDIT RIVER CROSSING OPTION. REFER TO DWG XXX.XX FOR CROSSING OPTION.
 - STOCKPILE CONTROL-CONTRACTOR TO PROVIDE MEASURES, DEPENDING ON LOCATION AND PROXIMITY OF SEDIMENT DEPOSIT.



General Notes

All Driveways Are ASPHALT Unless Otherwise Noted
 All Water And Sanitary Service Locations Are Approximate
 And Must Be Located Accurately In The Field
 All Horizontal And Vertical Bends Are In Degrees
 All Pipes Size In mm
 20C Existing Water Service, Size In mm
 WS25 Proposed Water Service, Size In mm
 B.M. No. Elev.
 Location
 The Contractor Is Responsible For Locating And Protecting All Existing Utilities Approximate Only, To Be Verified In Field By Contractor.

JACOBS

Approved by _____

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL	CABLE TELEVISION/FIBROPTIC PROVIDERS:
CITY OF MISSISSAUGA WORKS DEPT.	BELL CANADA
CITY OF BRAMPTON WORKS DEPT.	ENERSOURCE TELECOM
TOWN OF CALEDON WORKS DEPT.	HYDRO ONE TELECOM
BELL CANADA	RODGERS CABLE
ENBRIDGE INCORPORATED-GAS DISTRIBUTION	ALLSTREAM
ONTARIO MINISTRY OF TRANSPORTATION	FSN (PUBLIC SECTOR NETWORK)
ONTARIO CLEAN WATER AGENCY	FUTUREWAY (FCI BROADBAND)
HYDRO ONE NETWORKS	
ENERSOURCE, HYDRO MISSISSAUGA	
HYDRO ONE BRAMPTON	

10m 0 10 20 30m HORIZONTAL SCALE
 2m 0 2 4 6m VERTICAL SCALE

Region of Peel
 working with you

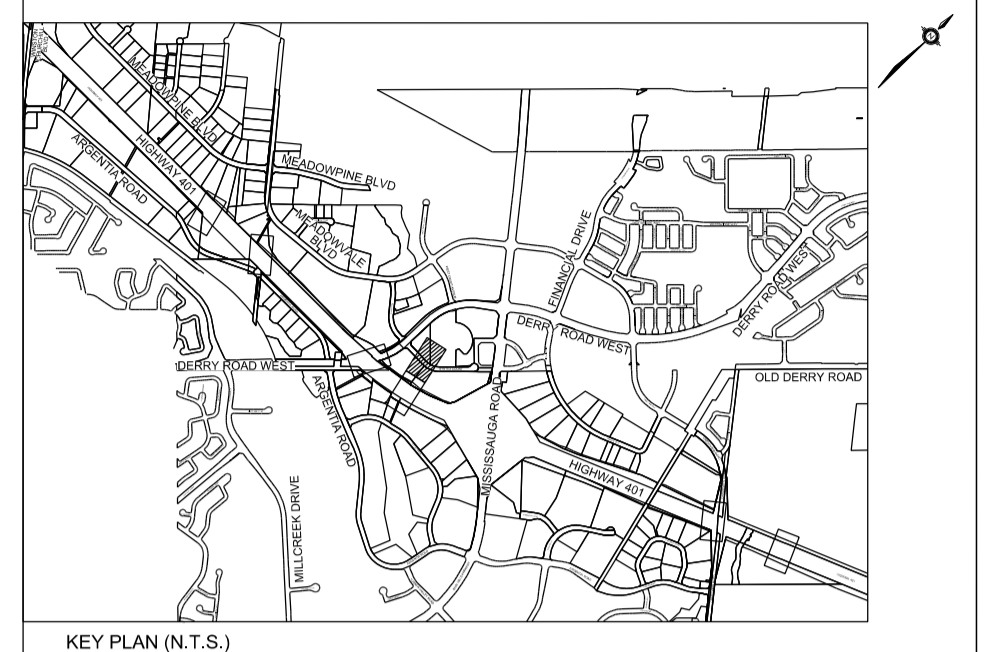
HIGHWAY 401 CROSSING
 CROSSING # 11
 1500mm PROPOSED SANITARY SEWER

162.19	162.15	161.99	161.77	161.94	161.35	162.05	162.58	162.80	162.76
1+400	1+420	1+440	1+460	1+480	1+500	1+520	1+540	1+560	1+580

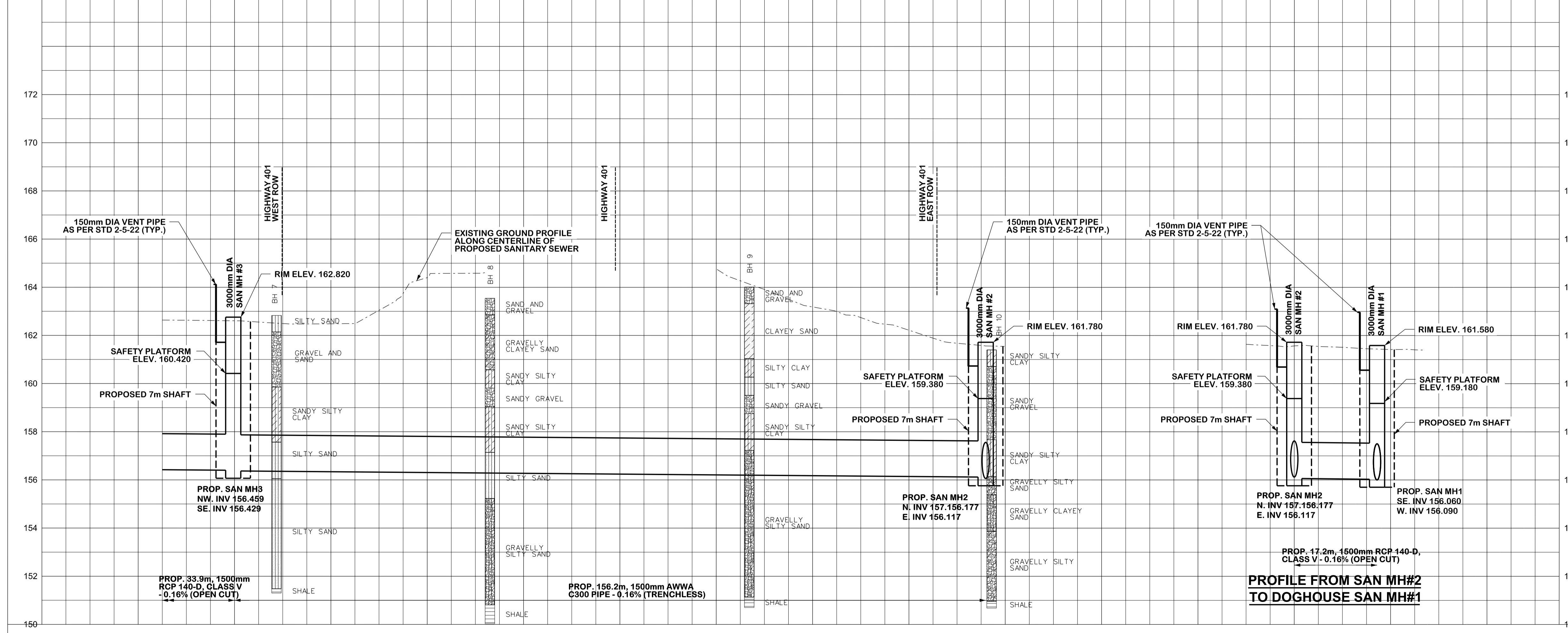
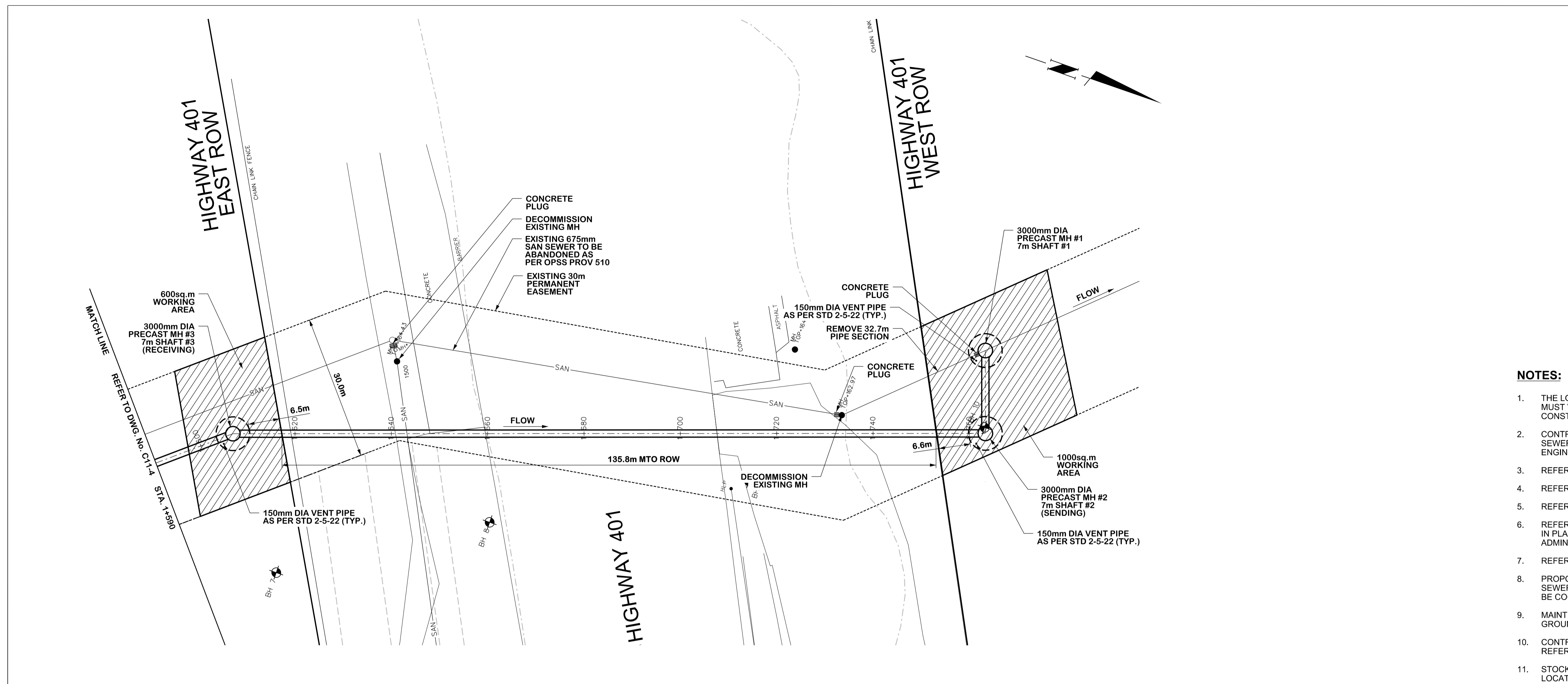
BOT.EL. OF SAN.	CAD Area	Area	Project No.	18-1496
EX. GRADE ELEV.	Checked by	Drawn by F.C	Sheet of	Plan No. C11-3
CHAINAGE	Date	Sheet of		

SERVICE DATA					
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATER MAINS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS		
DATE	DETAILS	INIT.



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 - REFER TO DWG XXX FOR BENCHING DETAILS MH#4.
 - REFER TO STD DWG. 2-5-20 FOR BENCHING DETAILS.
 - REFER TO PEEL STD.DWG 2-5-22 FOR VENT PIPE DETAIL.LOCATION OF VENT PIPES IN PLAN ARE APPROXIMATE. CONTRACTOR SHALL CONFIRM WITH CONTRACT ADMINISTRATOR PROPER LOCATION.
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 - STOCKPILE CONTROL:CONTRACTOR TO PROVIDE MEASURES, DEPENDING ON LOCATION AND PROXIMITY OF SEDIMENT DEPOSIT.



General Notes

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 All Pipes Size In mm
 20C Existing Water Service, Size In mm
 WS25 Proposed Water Service, Size In mm
 B.M. No. Description Location
 ELEV.

The Contractor Is Responsible For Locating And Protecting All Existing Utilities Approximate Only, To Be Verified In Field By Contractor.

JACOBS

Approved by _____

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL	CABLE TELEVISION/FIBROPTIC PROVIDERS:
CITY OF MISSISSAUGA WORKS DEPT.	BELL CANADA
CITY OF BRAMPTON WORKS DEPT.	ENERSOURCE TELECOM
TOWN OF CALEDON WORKS DEPT.	HYDRO ONE TELECOM
BELL CANADA	RODGERS CABLE
ENBRIDGE INCORPORATED-GAS DISTRIBUTION	ALLSTREAM
ONTARIO MINISTRY OF TRANSPORTATION	PSN (PUBLIC SECTOR NETWORK)
ONTARIO CLEAN WATER AGENCY	FUTUREWAY (FCI BROADBAND)
HYDRO ONE NETWORKS	
ENERSOURCE, HYDRO MISSISSAUGA	
HYDRO ONE BRAMPTON	

10m 0 10 20 30m HORIZONTAL SCALE
 2m 0 2 4 6m VERTICAL SCALE

Region of Peel
 working with you

HIGHWAY 401 CROSSING
 CROSSING # 11
 1500mm PROPOSED SANITARY SEWER

162.68	162.53	163.40	1+660	1+680	1+700	163.76	162.62	161.69	1+720	1+740	1+760	1+780
BOT.EL. OF SAN. EX. GRADE ELEV.												
CHAINAGE												

BOT.EL. OF SAN.	CAD Area	Area	Project No.	18-1496
EX. GRADE ELEV.	Checked by	Drawn by	F.C	
CHAINAGE	Date	Sheet of	Plan No.	C11-4

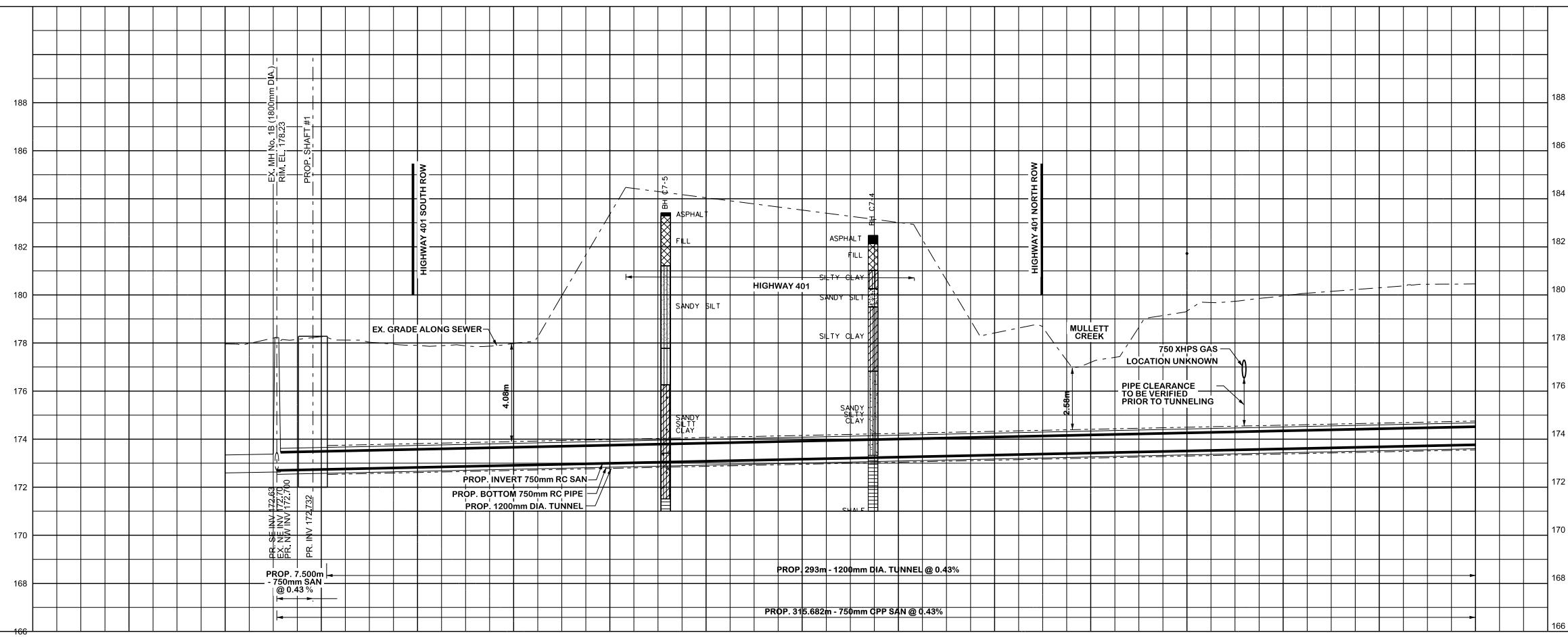


NOTES:

1. ALL EXISTING SERVICE LOCATIONS SHOWN ARE APPROXIMATE AND MUST BE LOCATED PRIOR TO CONSTRUCTION.
2. PIPE MATERIAL AS PER CONTRACT DRAWINGS AND SPECS.
3. ALL OPEN CUT INSTALLATION TO HAVE BEDDING FILLING MATERIAL AS PER PEEL STANDARD DWG. 2-3-1.
4. PROVIDE 1m MINIMUM OFFSET FROM EXISTING GAS LINE TO ANY STRUCTURE.
5. EXISTING SANITARY SEWER TO BE DISCONNECTED AFTER THE JOB COMPLETION AND REGION OF PEEL RECOMMENDATION.
6. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PROTECTION AND TEMPORARY RELOCATION OF UNDERGROUND AND ABOVE GROUND UTILITIES PRIOR TO AND DURING CONTRACT.
7. CONTRACTOR SHALL CONFIRM AND VERIFY LOCATION OF ALL INVERTS AND UNDERGROUND UTILITIES PRIOR TO COMMENCING ANY WORK.
8. CONTRACTOR SHALL NOT REMOVE ANY TREES UNLESS THEY ARE INDICATED IN REMOVAL PLAN.
9. REFER TO STD2-5-20 FOR BENCHING DETAILS.
10. REFER TO STD 5-2-13 FOR SILT FENCE DETAILS.
11. REFER TO STD 2-3-1 FOR BEDDING DETAILS

SERVICE DATA					
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMANS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CTV		
INT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS		
DATE	DETAILS	INIT.



General Notes

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 All Horizontal And Vertical Bends Are In Degrees
 All Pipes Size In mm
 20C Existing Water Service, Size In mm
 WS25 Proposed Water Service, Size In mm

B.M. No. Description Location
 Elev.

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JACOBS

Approved by _____

NOTICE TO CONTRACTOR

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CITY OF BRAMPTON WORKS DEPT.	ENERSOURCE TELECOM
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BELL CANADA	ROGERS CABLE
ENBRIDGE INCORPORATED-GAS DISTRIBUTION	ALLSTREAM
ONTARIO MINISTRY OF TRANSPORTATION	PSN (PUBLIC SECTOR NETWORK)
ONTARIO CLEAN WATER AGENCY	FUTUREWAY (FCI BROADBAND)
HYDRO ONE NETWORKS	
ENERSOURCE, HYDRO MISSISSAUGA	
HYDRO ONE BRAMPTON	

10m 0 10 20 30m HORIZONTAL SCALE
 2m 0 2 4 6m VERTICAL SCALE

Region of Peel
 working with you

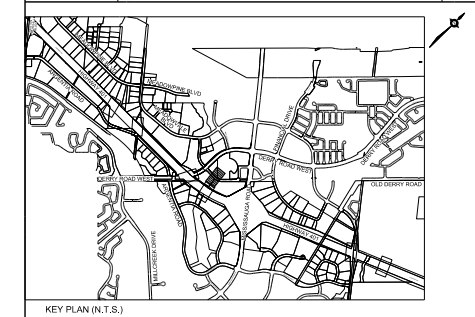
HIGHWAY 401 CROSSING
 CROSSING # 7 (SOUTH)
 750mm PROPOSED SANITARY SEWER

172.592	172.739	172.825	172.910	172.996	173.081	173.167	173.252	173.338	173.424	173.509	173.595	173.680	173.765	BOT. EL. OF SAN.
177.96	178.27	177.90	177.98	183.36	184.04	183.49	183.01	178.42	177.20	179.33	179.96	180.30	180.46	EX. GRADE ELEV.
0+080	0+100	0+120	0+140	0+160	0+180	0+200	0+220	0+240	0+260	0+280	0+300	0+320	0+340	CHAINAGE

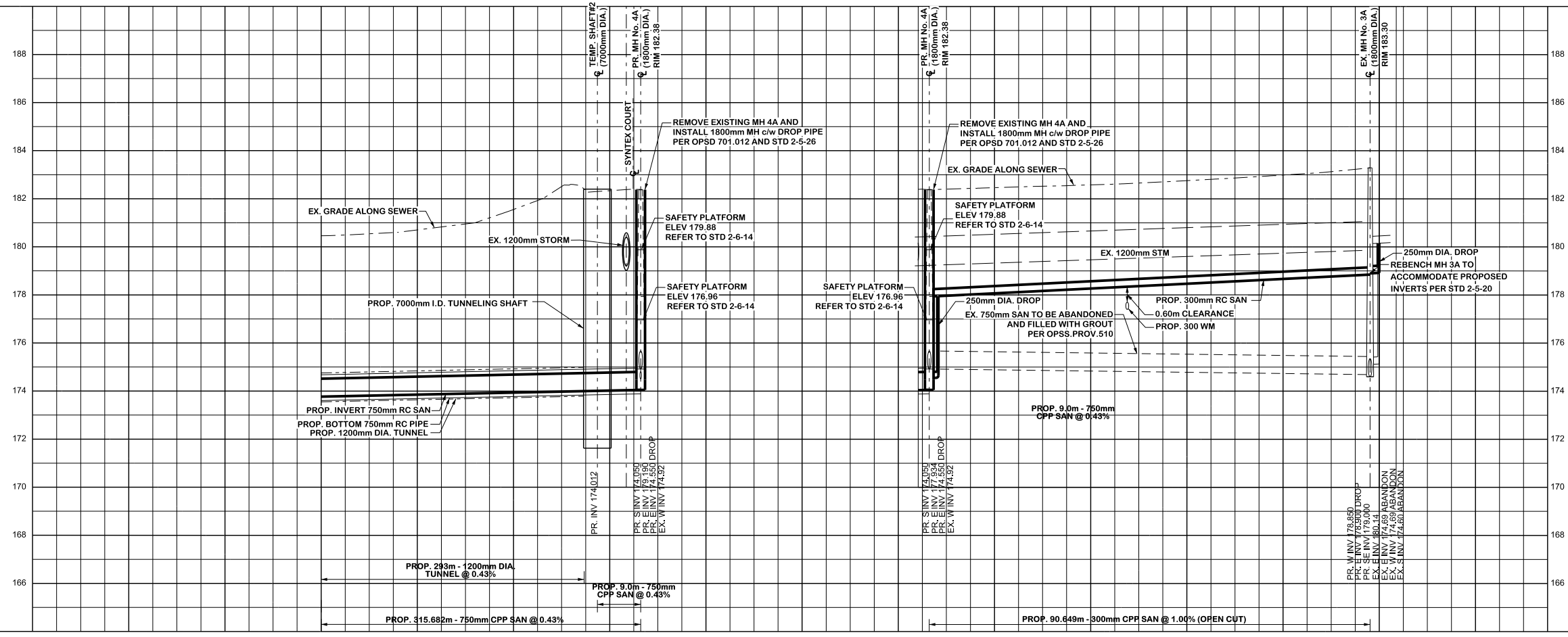
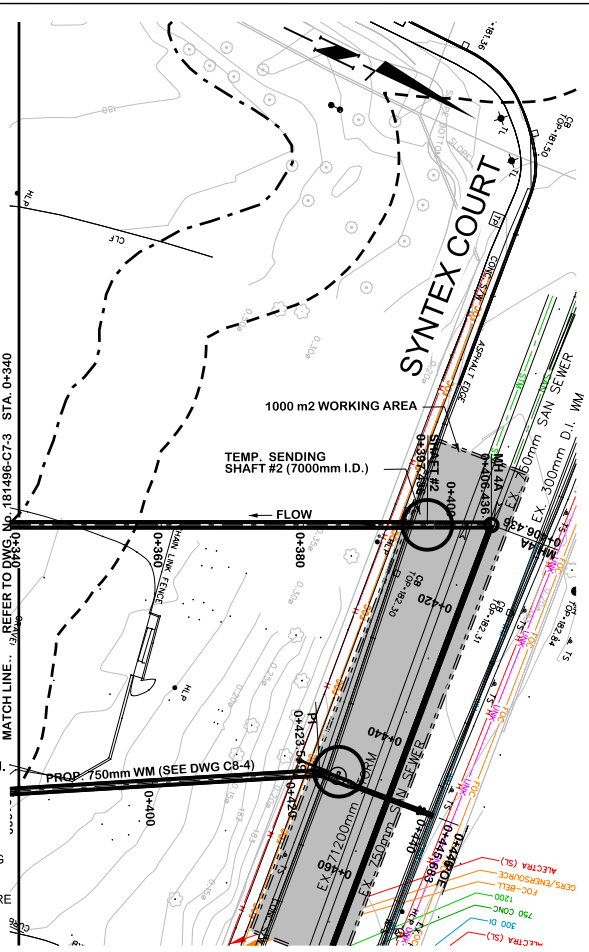
CAD Area	Area	Project No.	18-1496
Checked by	Drawn by	Date	Sheet of
Date	Sheet of	Plan No.	C7-3

SERVICE DATA					
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMANS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC			CTV		
CONT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS		
DATE	DETAILS	INIT.



- NOTES:**
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 - PIPE MATERIAL AS PER CONTRACT DRAWINGS AND SPECS.
 - ALL OPEN CUT INSTALLATION TO HAVE BEDDING FILLING MATERIAL AS PER PEEL STANDARD DWG, 2-3-1.
 - PROVIDE 1m MINIMUM OFFSET FROM EXISTING GAS LINE TO ANY STRUCTURE.
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 - REFER TO STD2-5-20 FOR BENCHING DETAILS.
 - REFER TO STD 5-2-13 FOR SILT FENCE DETAILS.
 - REFER TO STD 2-3-1 FOR BEDDING DETAILS



General Notes

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 All Pipes Size In mm
 20C Existing Water Service, Size In mm
 WS25 Proposed Water Service, Size In mm

B.M. No. _____ Elev. _____
 Description _____
 Location _____

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JACOBS

Approved by _____

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL	CABLE TELEVISION/FIBROPTIC PROVIDERS:
CITY OF MISSISSAUGA WORKS DEPT.	BELL CANADA
CITY OF BRAMPTON WORKS DEPT.	ENERSOURCE TELECOM
TOWN OF CALEDON WORKS DEPT.	HYDRO ONE TELECOM
BELL CANADA	ROGERS CABLE
ENBRIDGE INCORPORATED-GAS DISTRIBUTION	ALLSTREAM
ONTARIO MINISTRY OF TRANSPORTATION	PSN (PUBLIC SECTOR NETWORK)
ONTARIO CLEAN WATER AGENCY	FUTUREWAY (FCI BROADBAND)
HYDRO ONE NETWORKS	
ENERSOURCE, HYDRO MISSISSAUGA	
HYDRO ONE BRAMPTON	

10m 0 10 20 30m HORIZONTAL SCALE
 2m 0 2 4 6m VERTICAL SCALE

Region of Peel
 working with you

HIGHWAY 401 CROSSING
 CROSSING # 7 (NORTH)
 750mm PROPOSED SANITARY SEWER

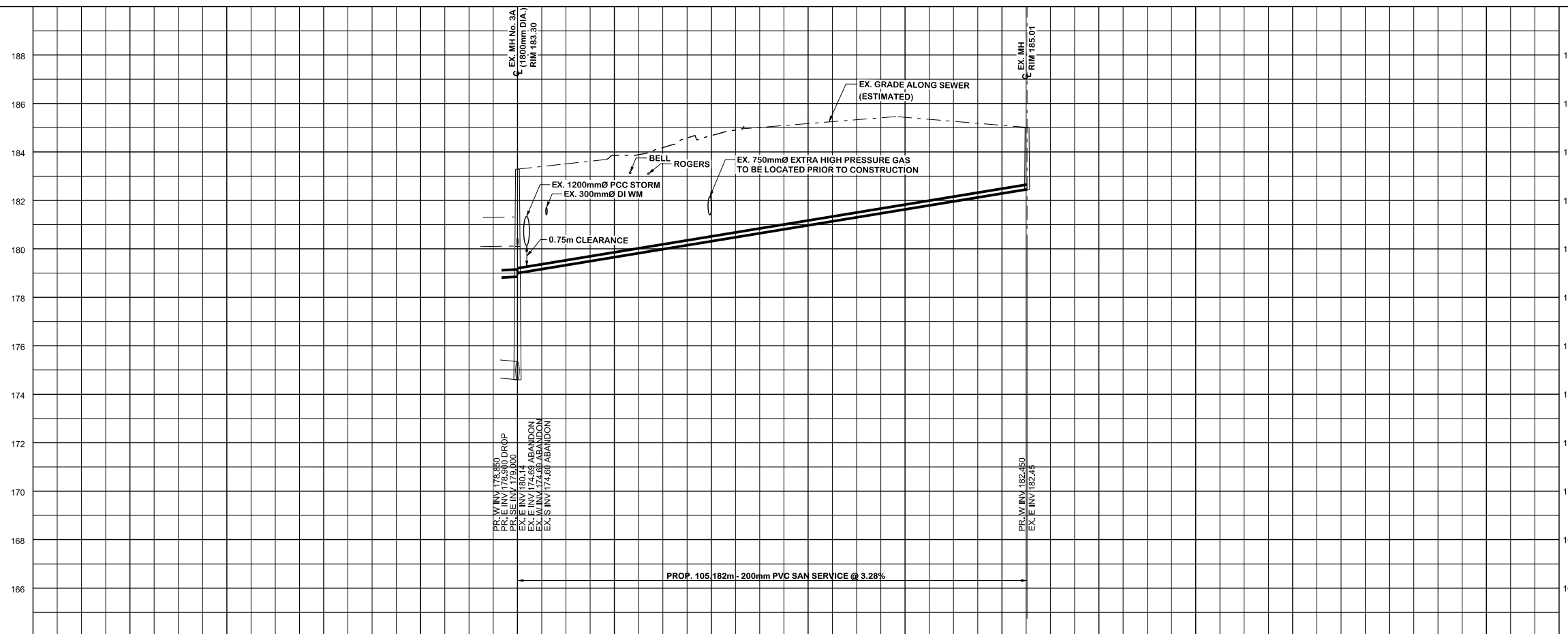
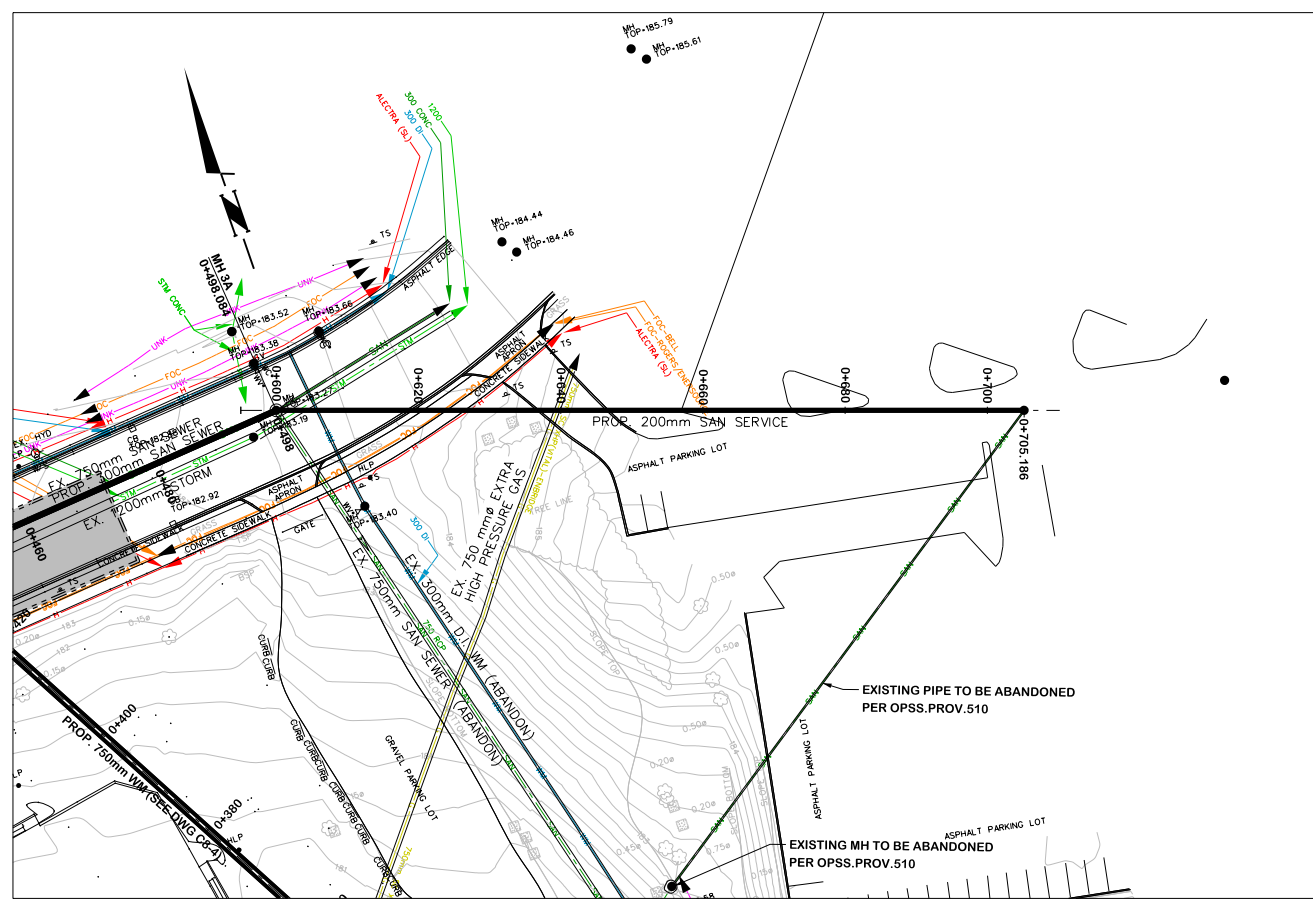
173.766	173.851	173.937	174.022	179.325(174.89)	179.523(174.84)	179.722(174.79)	179.920(174.74)	PROP. (EX.) BOT. EL. OF SAN.
180.47	180.71	181.53	182.35	182.47	182.59	182.76	183.00	EX. GRADE ELEV.
0+340	0+360	0+380	0+400	0+400	0+420	0+440	0+460	CHAINAGE

CAD Area	Area	Project No.	18-1496
Checked by	Drawn by	Date	Sheet of
Date		Plan No. C7-4	

SERVICE DATA					
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMANS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC			CTV		
INT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS		
DATE	DETAILS	INIT.

- NOTES:**
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 - ALL OPEN CUT INSTALLATION TO HAVE BEDDING FILLING MATERIAL AS PER PEEL STANDARD DWG. 2-3-1.
 - PROVIDE 1m MINIMUM OFFSET FROM EXISTING GAS LINE TO ANY STRUCTURE.
 - EXISTING SANITARY SEWER TO BE DISCONNECTED AFTER THE JOB COMPLETION AND REGION OF PEEL RECOMMENDATION.
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 20C Existing Water Service, Size In mm
 WS25 Proposed Water Service, Size In mm

B.M. No. Elev.
 Description
 Location

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JACOBS

Approved by _____

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

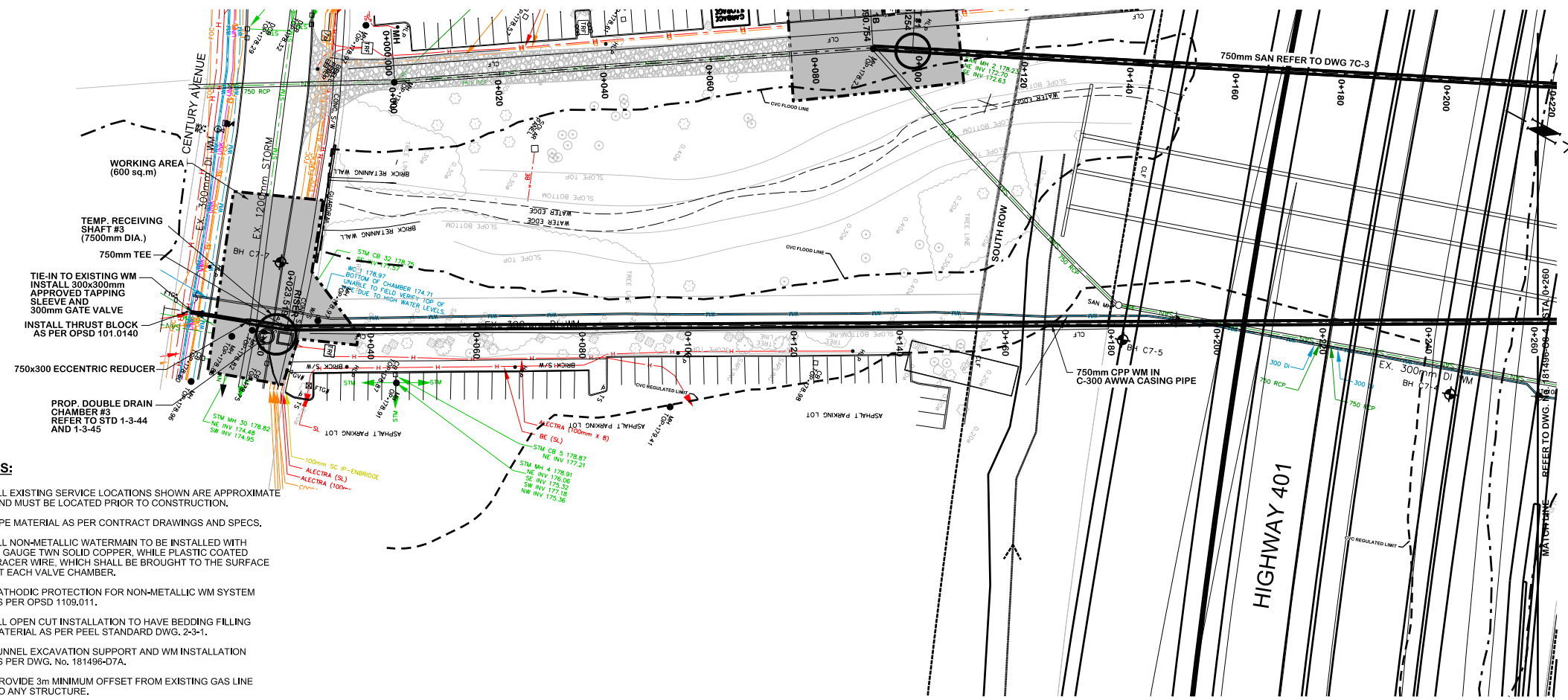
THE REGIONAL MUNICIPALITY OF PEEL	CABLE TELEVISION/FIBROPTIC PROVIDERS:
CITY OF MISSISSAUGA WORKS DEPT.	BELL CANADA
CITY OF BRAMPTON WORKS DEPT.	ENERSOURCE TELECOM
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BELL CANADA	ROGERS CABLE
ENBRIDGE INCORPORATED-GAS DISTRIBUTION	ALLSTREAM
ONTARIO MINISTRY OF TRANSPORTATION	PSN (PUBLIC SECTOR NETWORK)
ONTARIO CLEAN WATER AGENCY	FUTUREWAY (FCI BROADBAND)
HYDRO ONE NETWORKS	
ENERSOURCE, HYDRO MISSISSAUGA	
HYDRO ONE BRAMPTON	

10m 0 10 20 30m HORIZONTAL SCALE
 5m 0 1 2 3m VERTICAL SCALE

Region of Peel
 working with you

HIGHWAY 401 CROSSING
 CROSSING # 7 (NORTH)
 200mm PROPOSED SANITARY SERVICE

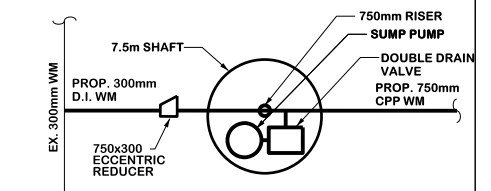
179.000	179.656	180.312	180.968	181.624	182.280	BOT. EL. OF SAN,	CAD Area	Area	Project No.	18-1496
183.30	183.85	184.67	185.2	185.4	185.1	EX. ROAD ELEV.	Checked by	Drawn by	Date	Sheet of
0+500	0+520	0+540	0+560	0+580	0+600	ROAD CHAINAGE	Date	Sheet of	Plan No.	C7-4a



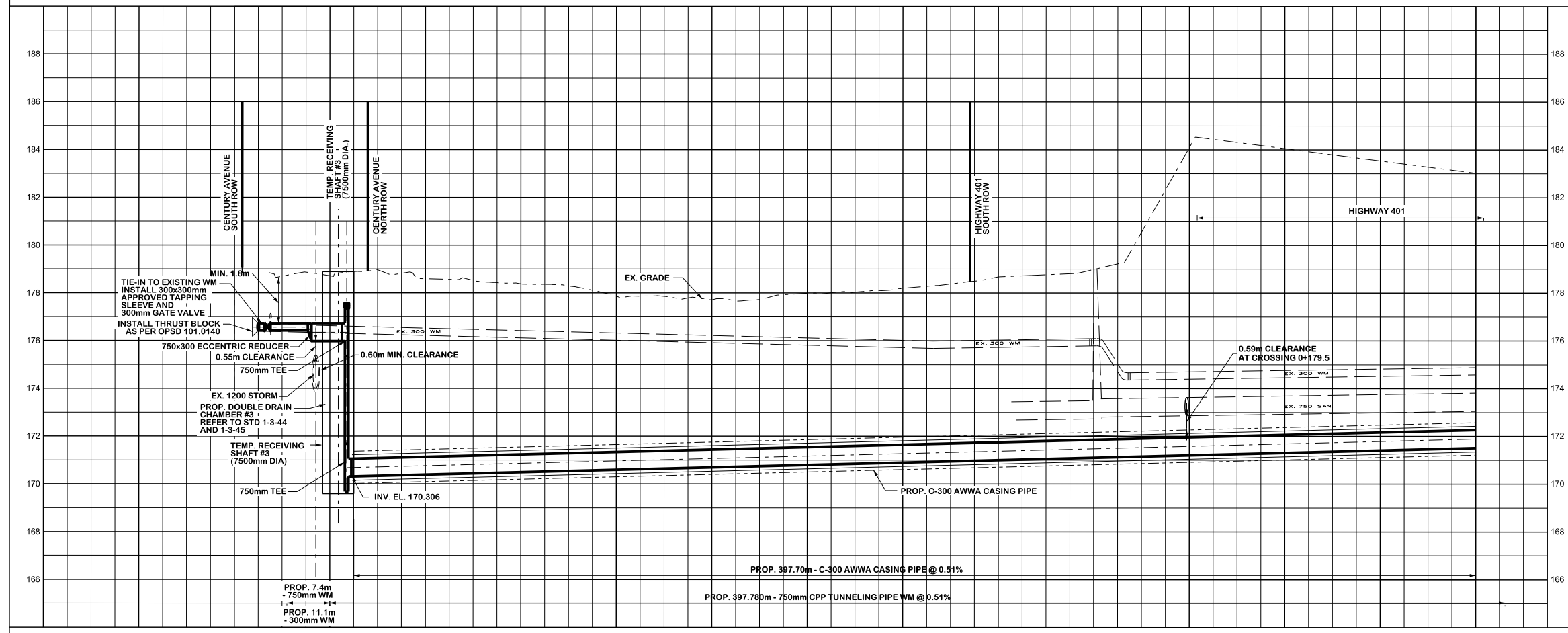
- NOTES:**
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 - PIPE MATERIAL AS PER CONTRACT DRAWINGS AND SPECS.
 - ALL NON-METALLIC WATERMAIN TO BE INSTALLED WITH 12 GAUGE TWN SOLID COPPER, WHILE PLASTIC COATED TRACER WIRE, WHICH SHALL BE BROUGHT TO THE SURFACE AT EACH VALVE CHAMBER.
 - CATHODIC PROTECTION FOR NON-METALLIC WM SYSTEM AS PER OPSD 1109.011.
 - ALL OPEN CUT INSTALLATION TO HAVE BEDDING FILLING MATERIAL AS PER PEEL STANDARD DWG. 2-3-1.
 - TUNNEL EXCAVATION SUPPORT AND WM INSTALLATION AS PER DWG. No. 181496-D7A.
 - PROVIDE 3m MINIMUM OFFSET FROM EXISTING GAS LINE TO ANY STRUCTURE.
 - ALL EXISTING UTILITIES (SEWER, WATER) TO BE DISCONNECTED AFTER THE JOB COMPLETION AND REGION OF PEEL RECOMMENDATION.

SERVICE DATA					
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMANS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CTV		
INT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS		
DATE	DETAILS	INIT.



DOUBLE DRAIN AND PUMP CHAMBERS
(PEEL STD 1-3-44 AND 1-3-45)



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 All Pipe Size In mm
 20C Existing Water Service, Size In mm
 WS25 Proposed Water Service, Size In mm
 B.M. No. Elevation
 Description Location
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JACOBS

Approved by _____

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TOWN OF CALEDON WORKS DEPT.	HYDRO ONE TELECOM
BELL CANADA	ROGERS CABLE
ENBRIDGE INCORPORATED-GAS DISTRIBUTION	ALLSTREAM
ONTARIO MINISTRY OF TRANSPORTATION	PSN (PUBLIC SECTOR NETWORK)
ONTARIO CLEAN WATER AGENCY	FUTUREWAY (FCI BROADBAND)
HYDRO ONE NETWORKS	
ENERSOURCE, HYDRO MISSISSAUGA	
HYDRO ONE BRAMPTON	

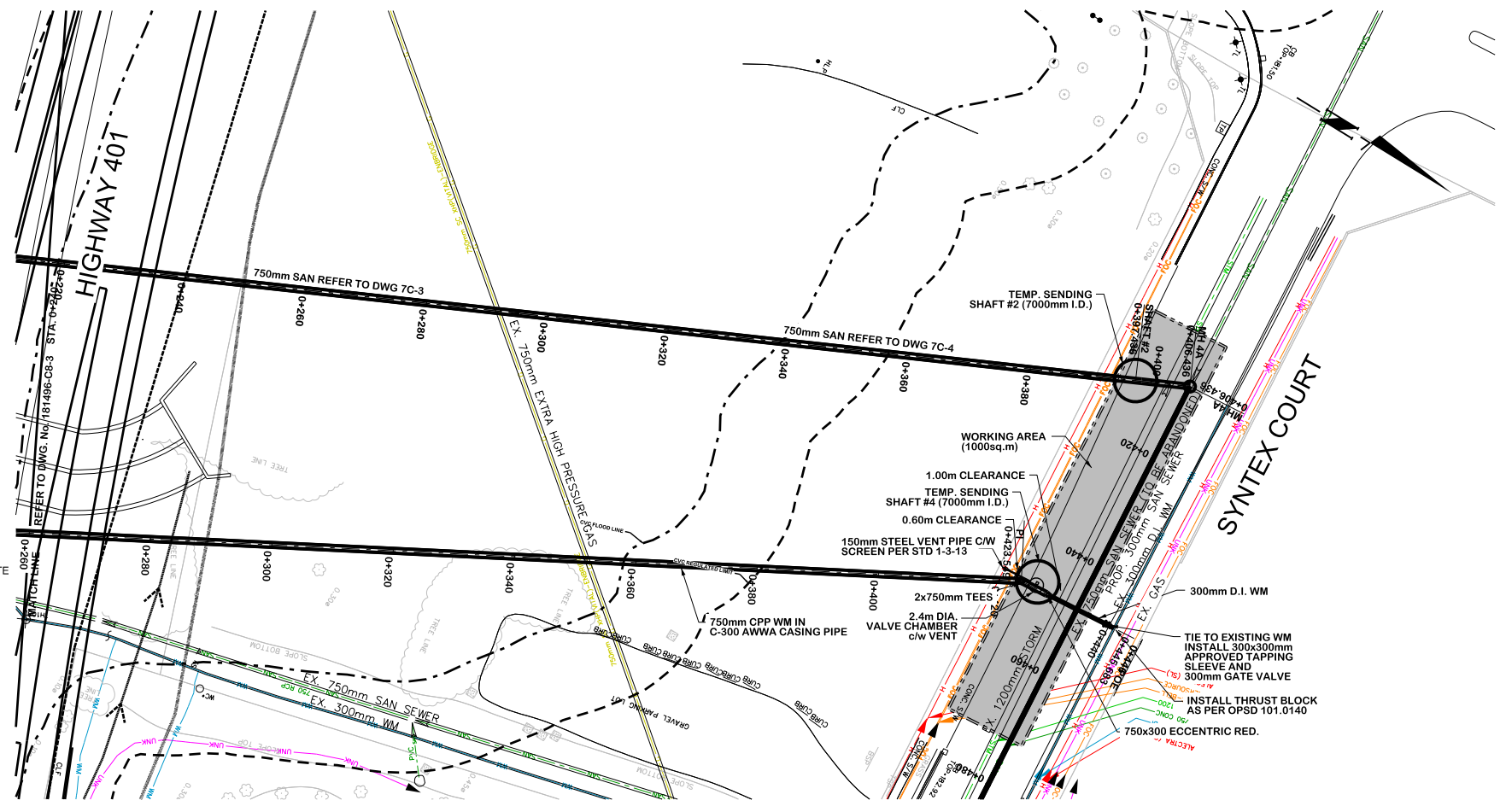
10m 0 10 20 30m HORIZONTAL SCALE
 2m 0 2 4 6m VERTICAL SCALE

Region of Peel
working with you

HIGHWAY 401 CROSSING
CROSSING # 8 (SOUTH)
750mm PROPOSED WATERMAIN

177.975	170.385	170.487	170.590	170.693	170.795	170.898	171.001	171.103	171.206	171.309	171.411	171.514	BOT.EL OF WAT.
178.71	178.59	178.38	177.83	177.71	177.99	178.19	178.68	178.99	184.09	184.05	183.54	183.02	EX. GRADE
0+000	0+020	0+040	0+060	0+080	0+100	0+120	0+140	0+160	0+180	0+200	0+220	0+240	0+260

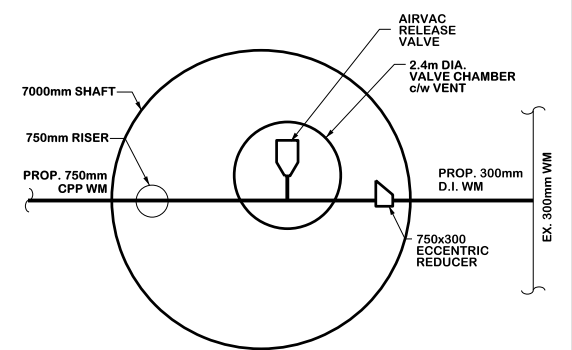
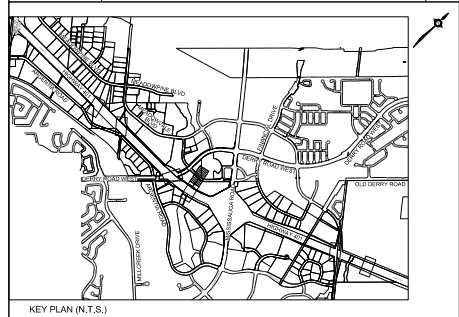
CAD Area	Area	Project No.	18-1496
Checked by	Drawn by	Date	Sheet of
Plan No.		C8-3	



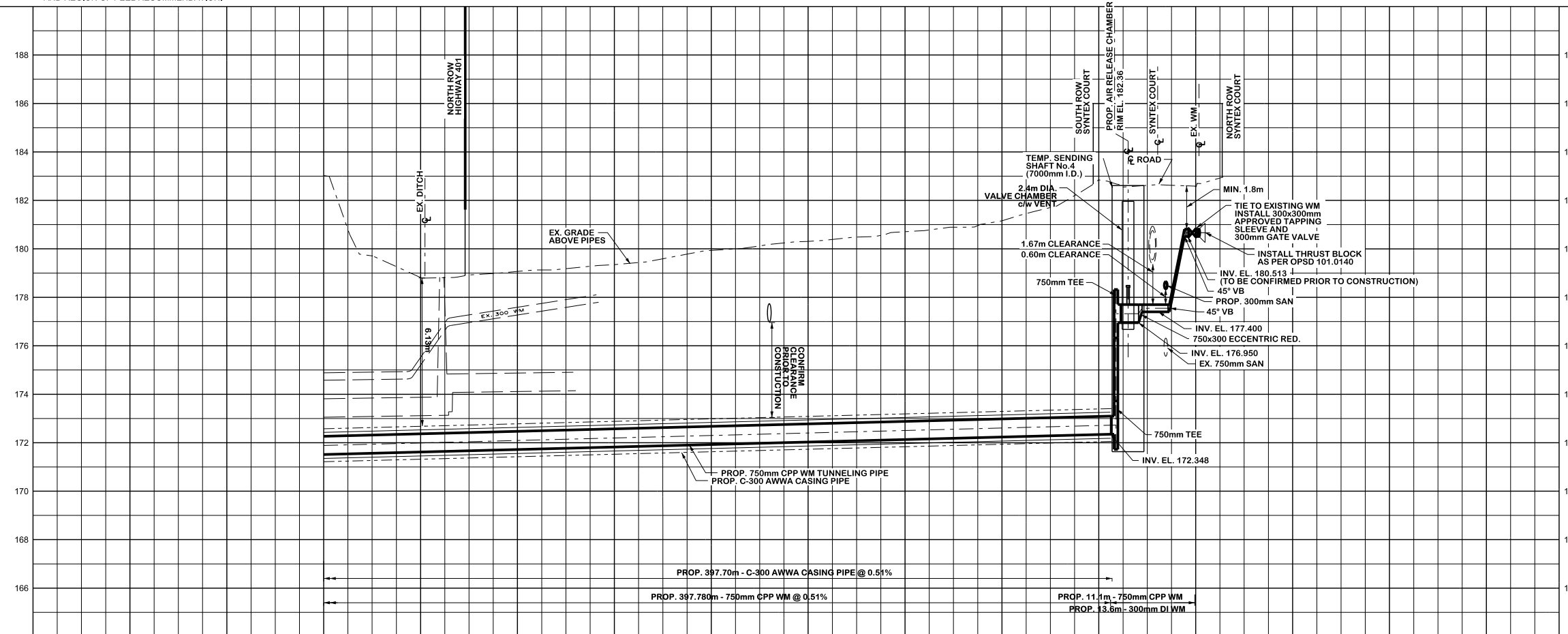
- NOTES:**
- ALL EXISTING SERVICE LOCATIONS SHOWN ARE APPROXIMATE AND MUST BE LOCATED PRIOR TO CONSTRUCTION.
 - PIPE MATERIAL AS PER CONTRACT DRAWINGS AND SPECS.
 - ALL NON-METALLIC WATERMAIN TO BE INSTALLED WITH 12 GAUGE TWIN SOLID COPPER, WHILE PLASTIC COATED TRACER WIRE, WHICH SHALL BE BROUGHT TO THE SURFACE AT EACH VALVE CHAMBER.
 - CATHODIC PROTECTION FOR NON-METALLIC WM SYSTEM AS PER OPSD 1109.011.
 - ALL OPEN CUT INSTALLATION TO HAVE BEDDING FILLING MATERIAL AS PER PEEL STANDARD DWG. 2-3-1.
 - TUNNEL EXCAVATION SUPPORT AND WM INSTALLATION AS PER DWG. No. 181496-D7A.
 - PROVIDE 3m MINIMUM OFFSET FROM EXISTING GAS LINE TO ANY STRUCTURE.
 - ALL EXISTING UTILITIES (SEWER, WATER) TO BE DISCONNECTED AFTER THE JOB COMPLETION AND REGION OF PEEL RECOMMENDATION.

SERVICE DATA					
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMANS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CTV		
INT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS		
DATE	DETAILS	INIT.



LINE VALVE CHAMBER #4 WITH AIR RELEASE VALVE
(PEEL STANDARD 1-3-13)



General Notes

All Driveways Are ASPHALT Unless Otherwise Noted

All Water And Sanitary Service Locations Are Approximate And Must Be Located Accurately In The Field

All Horizontal And Vertical Bends Are In Degrees

All Pipes Size In mm

20C Existing Water Service, Size In mm

WS25 Proposed Water Service, Size In mm

B.M. No. Elev.

Description Location

The Contractor Is Responsible For Locating And Protecting All Existing Utilities Prior To And During Construction. Location Of Existing Utilities Approximate Only. To Be Verified In Field By Contractor.

JACOBS

Approved by _____

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL	CABLE TELEVISION/FIBROPTIC PROVIDERS:
CITY OF MISSISSAUGA WORKS DEPT.	BELL CANADA
CITY OF BRAMPTON WORKS DEPT.	ENERSOURCE TELECOM
TOWN OF CALEDON WORKS DEPT.	HYDRO ONE TELECOM
BELL CANADA	ROGERS CABLE
ENBRIDGE INCORPORATED-GAS DISTRIBUTION	ALLSTREAM
ONTARIO MINISTRY OF TRANSPORTATION	PSN (PUBLIC SECTOR NETWORK)
ONTARIO CLEAN WATER AGENCY	FUTUREWAY (FCI BROADBAND)
HYDRO ONE NETWORKS	
ENERSOURCE, HYDRO MISSISSAUGA	
HYDRO ONE BRAMPTON	

10m 0 10 20 30m HORIZONTAL SCALE

2m 0 2 4 6m VERTICAL SCALE

Region of Peel
working with you

HIGHWAY 401 CROSSING
CROSSING # 8 (NORTH)
750mm PROPOSED WATERMAIN

171.514	171.617	171.719	171.822	171.925	172.027	172.130	172.232	172.335	180.513	BOT.EL OF WAT.	CAD Area	Area	Project No.	18-1496
183.02	178.82	179.07	179.35	179.94	180.31	180.71	181.16	182.85	182.57	EX. GRADE	Checked by	Drawn by	Date	Sheet of
0+260	0+280	0+300	0+320	0+340	0+360	0+380	0+400	0+420	0+440	CHAINAGE	Date	Sheet of	Plan No.	C8-4

Appendix C. Stage 2 Archaeological Assessment

Region of Peel

Stage 2 Archaeological Assessment Highway 401 Crossings, Various Locations

Lots 11-14, Concession 6, Lots 10-12, Concession 5, and Lot 9, Concession 3, West of Centre Road, Geographic Township of Toronto, Peel County, Now the City of Mississauga, Region of Peel

Prepared by:

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February 4, 2021
Original Report

Project Number: 60604572

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Revision History

Revision #	Date	Revised By:	Revision Description

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The attached Report (the "Report") has been prepared by AECOM Canada Ltd. ("AECOM") for the benefit of the Client ("Client") in accordance with the agreement between AECOM and Client, including the scope of work detailed therein (the "Agreement").

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Laboratory Specialist

DRAFT

Glenn Kearsley, MA
Project Archaeologist

Executive Summary

AECOM Canada Ltd. (AECOM) was retained by the Region of Peel to conduct Stage 2 archaeological assessments (AA) for the proposed relocation of 11 trenchless Highway 401 Crossings in the Region of Peel, Ontario. The study areas are located on Lots 11-14, Concession 6, Lots 10-12, Concession 5, and Lot 9, Concession 3, West of Centre Road, Geographic Township of Toronto, Peel County, Now the City of Mississauga, Ontario.

This report was prepared to detail the rationale, methods and results of the Stage 2 archaeological assessment. All areas that were not obviously disturbed, sloped or permanently low and wet were surveyed. Test pit survey began at 5m intervals and then changed to 10m once disturbance was found. No intact soils were encountered in these areas. Pedestrian survey was completed in areas of recently ploughed lands at 5m intervals. A total of three archaeological sites were located during this Stage 2 AA. P1 site (AjGw-646) was located within Area 7.1 (Crossing 11) and P2 site (AjGw-647) and H1 site (AjGw-648) were identified within Area 7.2 (Crossing 11). The Stage 2 AA of the remaining areas (Area 3 (Crossing 3), Area 4.1 (Crossing 4), Area 4.2 (Crossing 4), Area 5.1 (Crossing 6), Area 5.2 (Crossing 6), Area 6.1 (Crossing 7), Area 6.2 (Crossing 8), Area 6.3 (Crossing 8) and Area 9 (Crossing 1)) did not produce any archaeological resources.

Given the results of this assessment, AECOM makes the following recommendations:

- 1) Areas marked in yellow or orange hatching in **Figures 6-1 to 6-6** have been subject to Stage 2 assessment and should be cleared of further archaeological concern as no archaeological resources were recovered.
- 2) Areas marked in red hatching in **Figures 6-1 to 6-6** were confirmed as deeply disturbed through visual assessment, as described in the Stage 1 archaeological assessment (AECOM 2011). These areas should be cleared of further archaeological concern.
- 3) Areas marked in blue cross-hatching in **Figures 6-1 to 6-6** are permanently low and wet or severely sloped. These areas should be cleared of further archaeological concern.
- 4) Areas marked in orange and green cross-hatching in **Figure 6-5** were subject to Stage 2 assessment and require additional Stage 3 archaeological assessment prior to any ground disturbance.
- 5) If it cannot be avoided by future construction, the P1 site (AjGw-646) in **Supplementary Documentation: Figure 2** site should be subject to Stage 3 AA. The Stage 3 assessment should consist of both the controlled surface pick-up and hand excavated test unit methodology as outlined in Section 3.2 as well as Table 3.1, as found in the *Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011). Prior to conducting the field work, the area should be re-ploughed and allowed to weather for the controlled surface pick-up. The test unit excavation should consist of one metre by one metre square test units laid out in a five metre grid and should be excavated by hand to a depth of five centimetres within the subsoil. Additional test units (representing 20% of the initial grid) should be excavated in areas of interest within the site extent. The monitoring work should be conducted with the engagement of the Mississaugas of the Credit First Nation and other Indigenous groups expressing interest in the archaeological resources of the area.
- 6) If it cannot be avoided by future construction, the P2 site (AjGw-647) in **Supplementary Documentation: Figure 2** should be subject to Stage 3 AA. The Stage 3 assessment should consist of the hand excavated test unit methodology as outlined in Section 3.2 as well as Table 3.1, as found in the *Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011). The test unit excavation should consist of one metre by one metre square test units laid out in a five metre grid and should be excavated by hand to a depth of five centimetres within the subsoil. Additional test units (representing 20% of the initial grid) should be excavated in areas of interest within the site extent. The monitoring work should be conducted with the engagement of the

Mississaugas of the Credit First Nation and other Indigenous groups expressing interest in the archaeological resources of the area.

- 7) If it cannot be avoided by future construction, the H1 site (AjGw-648) in **Supplementary Documentation: Figure 2** should be subject to Stage 3 AA. The Stage 3 assessment should consist of the hand excavated test unit methodology as outlined in Section 3.2 as well as Table 3.1, as found in the *Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011). The test unit excavation should consist of one metre by one metre square test units laid out in a five metre grid and should be excavated by hand to a depth of five centimetres within the subsoil. Additional test units (representing 20% of the initial grid) should be excavated in areas of interest within the site extent. Site specific land registry research to supplement the previous background study concerning the land use and occupation history should also be conducted as part of the Stage 3 assessment. The monitoring work should be conducted with the engagement of the Mississaugas of the Credit First Nation and other Indigenous groups expressing interest in the archaeological resources of the area.

Project Personnel

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Acknowledgements

Proponent Contact	Region of Peel
Approval Authority	Region of Peel

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Figure 1: Location of the Sites Located During the Stage 2 Archaeological Assessment
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Figure 4: Location of the H1 Site (AjGw-648), P1 Site (AjGw-646) and P2 Site (AjGw-647) in Relation to the 1877 Historical Atlas Map

Table 1: GPS Site Location Information for the H1 Site (AjGw-648)

Table 2: GPS Site Location Information for the P1 Site (AjGw-646)

Table 3: GPS Site Location Information for the P2 Site (AjGw-647)

1. Project Context

1.1 Development Context

AECOM Canada Ltd. (AECOM) was retained by the Region of Peel to conduct Stage 2 AA for the proposed relocation of 11 trenchless Highway 401 Crossings in Mississauga, the Region of Peel, Ontario. The Stage 2 is comprised of 12 study areas located on Lots 11-14, Concession 6, Lots 10-12, Concession 5, and Lot 9, Concession 3, West of Centre Road, Geographic Township of Toronto, Peel County, Now the City of Mississauga, Ontario (**Figures 1 and 2**).

The Region of Peel is responsible for the operation and maintenance of the sanitary sewer network, pumping stations, and wastewater treatment plants within the Regional Municipality of Peel boundaries. As a result of the road widening of Highway 401 by the Ministry of Transportation of Ontario (MTO) between Creditview Road and the Town of Milton, a total of 11 trenchless crossings between Winston Churchill Boulevard and the Creditview Road are being relocated. Modification of these infrastructure crossings owned by the Agency is required to remove the existing watermain valves and chambers, as well as sanitary maintenance holes, from within the new widened Highway 401 Right-Of-Way (ROW).

The Stage 2 archaeological assessment was triggered by the requirements of the *Environmental Assessment Act* in accordance with subsection 11(1) (Ontario Government 1990a). This project is subject to the requirements of the *Ontario Heritage Act* (Ontario Government 1990b) and the *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011).

All archaeological consulting activities were conducted under PIF number P123-0426-2019 issued to Professional Archaeologist Glenn Kearsley in accordance with the Ministry of Heritage, Sport, Tourism and Culture Industries' (MHSTCI) *Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011). Permission to enter the property to conduct fieldwork, including the collection of artifacts when present, was provided by Region of Peel on behalf of the current landowner.

1.1.1 Objectives

The objective of the Stage 2 archaeological assessment is to provide an overview of archaeological resources on the property, make a determination as to whether any of the resources might be artifacts or archaeological sites with cultural heritage value or interest requiring further assessment, and to recommend appropriate Stage 3 assessment strategies for any archaeological sites identified.

1.2 Historical Context

Years of archaeological research and assessments in southern Ontario have resulted in a well-developed understanding of the historic use of land in Peel County from the earliest First Nation people to the more recent Euro-Canadian settlers and farmers. **Table 1** provides a breakdown of the cultural and temporal history of past occupations in Peel County.

Table 1: Cultural Chronology for Peel County

Archaeological Period	Characteristics	Time Period	Comments
Early Paleo	Fluted Points	9000-8400 BC	Arctic tundra and spruce parkland, caribou hunters
Late Paleo	Holcombe, Hi-Lo and Lanceolate Points	8400-8000 BC	Slight reduction in territory size
Early Archaic	Notched and Bifurcate base Points	8000-6000 BC	Growing populations
Middle Archaic	Stemmed and Brewerton Points, Laurentian Development	6000-2500 BC	Increasing regionalization
Late Archaic	Narrow Point	2000-1800 BC	Environment similar to present
	Broad Point	1800-1500 BC	Large lithic tools
	Small Point	1500-1100 BC	Introduction of bow
Terminal Archaic	Hind Points, Glacial Kame Complex	1100-950 BC	Earliest true cemeteries
Early Woodland	Meadowood Points	950-400 BC	Introduction of pottery
Middle Woodland	Dentate/Pseudo-scallop Ceramics	400 BC – AD 500	Increased sedentism
	Princess Point	AD 550-900	Introduction of corn horticulture
Late Woodland	Early Ontario Iroquoian	AD 900-1300	Agricultural villages
	Middle Ontario Iroquoian	AD 1300-1400	Increased longhouse sizes
	Late Ontario Iroquoian	AD 1400-1650	Warring nations and displacement
Contact Period	Various Algonkian and Iroquoian Groups	AD 1600-1875	Early written records and treaties
Historic	French and English Euro-Canadian	AD 1749-present	European settlement

Notes: Taken from Ellis and Ferris (1990)

The following sections provide a detailed summary of the archaeological cultures that have settled in the vicinity of the study area. As Chapman and Putnam (1984) illustrate, the modern physiography of southern Ontario is largely a product of events of the last major glacial stage and the landscape is a complex mosaic of features and deposits produced during the last series of glacial retreats and advances prior to the withdrawal of the continental glaciers from the area. Southwestern Ontario was finally ice free by 12,500 years ago. With continuing ice retreat and lake regressions the land area of southern Ontario progressively increased while barriers to the influx of plants, animals, and people steadily diminished (Karrow and Warner 1990). The lands within Peel County have been extensively utilized by pre-contact First Nation people who began occupying southwestern Ontario as the glaciers receded from the land, as early as 11,000 BC.

1.2.1 Pre-Contact First Nation Settlement

The Paleo Period

In this area the first human settlement can be traced back to 11,000 BC; these earliest well-documented groups are referred to as Paleo which literally means old or ancient. During the Paleo period, people were non-agriculturalists who depended on hunting and gathering of wild food stuffs, they moved their encampments on a regular basis to be in the locations where these resources naturally became available and the size of the groups occupying any particular location would vary depending on the nature and size of the available food resources (Ellis and Deller 1990). The

picture that has emerged for the early and late Paleo is of groups at low population densities who were residentially mobile and made use of large territories during annual cycles of resource exploitation (Ellis and Deller 1990).

The Archaic Period

The next major cultural period following the Paleo is termed the Archaic, which is broken temporally into the Early, Middle, and Late Archaic periods. There is much debate on how the term Archaic is employed; general practice bases the designation off assemblage content as there are marked differences in artifact suites from the preceding Paleo and subsequent Woodland periods. As Ellis *et al.* (1990) note, from an artifact and site characteristic perspective the Archaic is simply used to refer to non-Paleo manifestations that pre-date the introduction of ceramics. Ellis *et al.* (1990) stress that Archaic groups can be distinguished from earlier groups based on site characteristics and artifact content.

Early Archaic sites have been reported throughout much of southwestern Ontario and extend as far north as the Lake Huron Basin region and as far east as Rice Lake (Deller *et al.* 1986). A lack of excavated assemblages from southern Ontario has limited understandings and inferences regarding the nature of stone tool kits in the Early Archaic and tool forms other than points are poorly known in Ontario; however, at least three major temporal horizons can be recognized and can be distinguished based on projectile point form (Ellis *et al.* 1990). These horizons are referred to as Side-Notched (*ca.* 8,000-7,700 BC), Corner-Notched (*ca.* 7,700-6,900 BC), and Bifurcated (*ca.* 6,900-6,000 BC) (Ellis *et al.* 1990). Additional details on each of these horizons and the temporal changes to tool types can be found in Ellis *et al.* (1990).

The Middle Archaic period (6,000-2,500 BC), like the Early Archaic, is relatively unknown in southern Ontario. Ellis *et al.* (1990) suggest that artifact traits that have come to be considered as characteristic of the Archaic period as a whole, first appear in the Middle Archaic. These traits include fully ground and polished stone tools, specific tool types including banner stones and net-sinkers, and the use of local and/or non-chert type materials for lithic tool manufacture (Ellis *et al.* 1990).

The Late Archaic begins around approximately 2,000 BC and ends with the beginning of ceramics and the Meadowood Phase at roughly 950 BC. Much more is known about this period than the Early and Middle Archaic and a number of Late Archaic sites are known. Sites appear to be more common than earlier periods, suggesting some degree of population increase. True cemeteries appear and have allowed for the analysis of band size, biological relationships, social organization, and health. Narrow and Small point traditions appear as well as tool recycling wherein points were modified into drills, knives, end scrapers, and other tools (Ellis *et al.* 1990). Other tools including serrated flakes used for sawing or shredding, spokeshaves, and retouched flakes manufactured into perforators, graters, micro-perforators, or piercers. Tools on coarse-grained rocks such as sandstone and quartz become common and include hammerstones, net-sinkers, anvils, and cobble spalls. Depending on preservation, several Late Archaic sites include bone and/or antler artifacts which likely represent fishing toolkits and ornamentation. These artifacts include bone harpoons, barbs or hooks, notched projectile points, and awls. Bone ornaments recovered have included tubular bone beads and drilled mammal canine pendants (Ellis *et al.* 1990).

Throughout the Early to Late Archaic periods the natural environment warmed, and vegetation changed from closed conifer-dominated vegetation cover, to the mixed coniferous and deciduous forest in the north and deciduous vegetation in the south we see in Ontario today (Ellis *et al.* 1990). During the Archaic period there are indications of increasing populations and decreasing size of territories exploited during annual rounds; fewer moves of residential camps throughout the year and longer occupations at seasonal campsites; continuous use of certain locations on a seasonal basis over many years; increasing attention to ritual associated with the deceased; and, long range exchange and trade systems for the purpose of obtaining valued and geographically localized resources (Ellis *et al.* 1990).

The Woodland Period

The Early Woodland period is distinguished from the Archaic period primarily by the addition of ceramic technology, which provides a useful demarcation point for archaeologists but is expected to have made less difference in the lives of people during the Early Woodland. The settlement and subsistence patterns during the Early Woodland Period show much continuity with the earlier Archaic with seasonal camps occupied to exploit specific natural resources (Spence *et al.* 1990).

During the Middle Woodland well-defined territories containing several key environmental zones were exploited over the yearly subsistence cycle. Large sites with structures and substantial middens appear in the Middle Woodland associated with spring macro-band occupations focussed on utilizing fish resources and created by consistent returns to the same site (Spence *et al.* 1990). Groups would come together into large macro-bands during the spring-summer at lakeshore or marshland areas to take advantage of spawning fish; in the fall inland sand plains and river valleys were occupied for deer and nut harvesting and groups split into small micro-bands for winter survival (Spence *et al.* 1990). This is a departure from earlier Woodland times when macro-band aggregation is thought to have taken place in the winter (Ellis *et al.* 1988; Granger 1978).

The period between the Middle and Late Woodland was both technically and socially transitional for the ethnically diverse populations of southern Ontario and these developments formed the basis for the emergence of settled villages and agriculturally based lifestyles (Fox 1990). The first agricultural villages in southwestern Ontario date to the 10th century AD. Unlike the riverine base camps of the Middle Woodland period, these sites are located in the uplands, on well-drained sandy soils. The Late Woodland period is often sub-divided into the Early (900-1300 AD), Middle (1300-1400 AD), and Late Iroquoian (1400-1650 AD) periods.

Early Ontario Iroquoian (900-1300 AD) villages tended to be small settlements with nearby camps and hamlets that served as temporary spaces for hunting game and gathering resources outside of the villages. Corn may have been introduced into southwestern Ontario from the American Midwest as early as 600 AD; however, it did not become a dietary staple until at least three to four hundred years later. Small amounts of corn appear to have been a dietary component at this time; however, archaeological evidence suggests that its role was not as a dietary staple at this time and was supplemental in nature. Village sites dating between 900 and 1300 AD, share many attributes with the historically reported Iroquoian sites, including the presence of longhouses and sometimes palisades. However, these early longhouses were actually not all that large, averaging only 12.4 metres (m) in length. It is also quite common to find the outlines of overlapping house structures, suggesting that these villages were occupied long enough to necessitate re-building. The Jesuits reported that the Huron moved their villages once every 10-15 years, when the nearby soils had been depleted by farming and conveniently collected firewood grew scarce. It's likely that Early Ontario Iroquoians occupied their villages for considerably longer, as they relied less heavily on corn than did later groups, and since their villages were much smaller, there was less demand on nearby resources.

The Middle Ontario Iroquoian period (1300-1400 AD) witnessed several interesting developments in terms of settlement patterns and artifact assemblages. Changes in ceramic styles have been carefully documented, allowing the placement of sites in the first or second half of this 100-year period and widespread similarities in ceramic and smoking pipe styles suggest increasing levels of inter-community communication and integration. Village size, which previously averaged approximately 0.6 hectares (ha) in extent during the Early Ontario Iroquoian period, grew significantly to between one and two ha. The Middle Iroquoian not only marks the emergence of fully developed horticulture, including the cultivation of corn, beans, and squash, but also the development of complex community political systems. House lengths also change dramatically, more than doubling to an average of 30 m in length. A number of hypotheses have been put forward to explain this radical increase in longhouse length. The simplest possibility is that increased house length is the result of a gradual, natural increase in population. Other possible explanations involve changes in economic and socio-political organization. One suggestion is that during the Middle Ontario Iroquoian period small villages were amalgamating to form larger communities for mutual defense. If this was the case, the more successful military leaders may have been able to absorb some of the smaller family groups

into their households, thereby requiring longer structures. This hypothesis draws support from the fact that some sites had up to seven rows of palisades, indicating at least an occasional need for strong defensive measures. There are, however, other Middle Ontario Iroquoian villages which had no palisades present.

By the beginning of the fourteenth century, most Iroquoian people inhabited large and often fortified villages throughout southern Ontario as a result of an increasing reliance on horticulture. Larger village sites were often cleared to accommodate the cultivation of corn, beans, and squash. Between 1400 and 1450 AD house length continued to grow, reaching an average length of 62 m. However, after 1450 AD, house lengths began to decrease, with houses from 1500-1580 AD averaging only 30 m length. The reason house lengths decrease after 1450 AD is poorly understood, but it is believed that drastically shorter houses documented on historic period sites may be partially attributed to population reductions associated with the introduction of European diseases.

1.2.2 Post-Contact Period Settlement

The following language was provided by the Mississaugas of the New Credit First Nation (email communication MNCFN 2020):

“The Haudenosaunee (Five Nations Confederacy) living below Lake Ontario moved into southern Ontario, dispersing Iroquoian groups such as the Neutral, Petun, and Wendat in an effort to gain control of the fur trade. By the mid-1650’s, southern Ontario had become a Haudenosaunee hunting ground with the newcomers raiding northward into the territory of the Three Fires Confederacy: the Ojibway, Ottawa, and Pottawatomie. Eventually, members of the Three Fires pushed back driving the Haudenosaunee out of southern Ontario and back to their homelands below Lake Ontario in what is now York State. The Mississaugas, a sub-group of the Ojibway, helped to push the Haudenosaunee out of the area north of Lake Ontario and around the Head of the Lake. The period of time known as the Beaver Wars was formally ended with the Great Peace of Montreal (1701) and found southern Ontario in control of the Algonkians. Peel Region, in particular, was controlled, occupied, and stewarded by the ancestors of the Mississaugas of the Credit First Nation.”

The Mississaugas were seasonally migrant, following the four seasons and twelve moons (Smith 2013:7). Their winter hunting and trapping season was between November and March. This was followed by the sap season of spring. During this time, they would tap the maple trees and boil the sap, often visiting the trading post and the Credit River for the white sucker run. They held their religious festivals before breaking up into smaller bands and planting corn. In the summer, they would gather berries, harvest the corn, and visit shallow lakes and slow streams for rice. Fall, the fading season, the Mississaugas would often gather once again at the Credit River for the fall salmon run. Before the winter season, they would again leave to travel to the interior to family hunting grounds (Smith 2013:8).

As European newcomers encroached on their territory the nature of Indigenous population distribution, settlement size and material culture changed. Despite these changes it is possible to correlate historically recorded villages with archaeological manifestations and the similarity of those sites to more ancient sites reveal an antiquity to documented cultural expressions that confirms a long historical continuity to systems of ideology and thought (Ferris 2009).

It is important to note that, when discussing the historical documentation of the movement of Indigenous people, what has been documented by early European explorers and settlers represents only a very small snap-shot in time. Where Indigenous groups were residing during European exploration and settlement is restricted to only a very short period of time and does not reflect previous and subsequent movements of these groups. This brief history does not reflect the full picture of the pre- or post-contact period occupation of Indigenous groups or cultures. As such, relying on historic documentation in regard to Indigenous occupation and movement across the landscape can lead to misinterpretation. For example, historic documentation of the movement of Indigenous groups into an area

may suggest to the reader that these groups had not occupied the area previously; however, this is not the case. It is clear from Indigenous oral histories and the archaeological record that pre-contact Indigenous populations were extremely mobile and not tied to any one specific area. Over the vast period of time prior to the arrival of Europeans, Indigenous groups, language families, and cultures were fluid across the landscape.

The study areas fall within Treaty 14 Head of the Lake Purchase, signed on September 12, 1806 by representatives of the Crown and the ancestors of the Mississaugas of the Credit. The following description of the impacts of Treaty 14 was retrieved from MCFN.CA:

“A day after the Toronto Purchase agreement was reached in 1805, the Mississaugas of the Credit were asked to sell lands immediately west of the lands they had ceded the day before. A provisional agreement was reached with the Crown on August 2, 1805, in which the Mississaugas ceded 70 784 acres of land bounded by the Toronto Purchase of 1787 in the east, the Brant Tract in the west, and a northern boundary that ran six miles back from the shoreline of Lake Ontario. In return for the land, the Mississaugas were to receive £1000 of trade goods and the sole right of fisheries at 12 and 16 Mile Creeks along with the possession of each creek’s flats. In addition, the Mississaugas also reserved the sole right of fishing at the Credit River and were to retain a 1-mile strip of land on each of its banks. On September 5, 1806, the signing of Treaty 14 confirmed the Head of the Lake Purchase between the Mississaugas of the Credit and the Crown. Modern cities found within the lands of the Head of the Lake Purchase include Oakville, Mississauga, and parts of Burlington.”

The treaty text is as follows:

“SIR — I am directed by His Excellency the Lieutenant Governor to transmit you herewith the deed of conveyance and release for the lands purchased from the Mississagua Indians for the use of His Majesty in the Home District, dated the 6th September, 1806, to which is annexed a plan of the same; also a lease of the above tract from the Indians for one year, dated the 5th September, 1806, the receipt of which will please to acknowledge.

I have the honor to be, Sir

Your most obedient servant,

WM. HATTON, Secretary.
JOHN SMALL, Esq., &c., &c., &c.

THIS INDENTURE, made the fifth day of September, in the Year of Our Lord one thousand eight hundred and six, between Chechalk, Quenepenon, Wabukanyne, Okemapenesse, Wabenose, Kenonecence, Osenego, Acheton, Patequan and Wabakagego, Principal Chiefs, Warriors and people of the Missisague Nation of Indians of the one part and His Majesty George the Third, by the Grace of God of the United Kingdom of Great Britain and Ireland King, Defender of the Faith, of the other part. Witnesseth: that the said Chechalk, Quenepenon, Wabukanyne, Okemapenesse, Wabenose, Kenonecence, Osenego, Acheton, Patequan and Wabakagego in consideration of five shillings apiece of lawful money of Great Britain to them in hand paid His said Majesty at or before the ensiling and delivery of those presents (the receipt whereof is hereby acknowledge) and for other good causes and considerations them the said Chechalk, Quenepenon, Wabukanyne, Okemapenesse, Wabenose, Kenonecence, Osenego, Acheton, Patequan and Wabakagego, hereunto specially moving, have bargained, and sold, and by these presents do, and each of them doth bargain and sell unto His said Majesty, His heirs and successors, all that parcel or tract of land situate in the Home District of the Province of Upper Canada, containing by admeasurement eighty-five thousand acres, be the same more or less,

together with all the woods and waters thereon lying and being, which said eighty-five thousand acres of land are butted and bounded or may be otherwise known as follows, that is to say:

Commencing at the eastern bank of the mouth of the River Etobicoke, being on the limit of the western boundary line of the Toronto purchase in the year of Our Lord, one thousand seven hundred and eighty-seven; then north twenty-two degrees west six miles; then south thirty-eight degrees west twenty-six miles, more or less, until it intersects a line on a course north forty-five degrees west produced from the outlet at Burlington Bay being the north-eastern boundary line of the Township of Flamborough East, and of the purchase in the year of Our Lord one thousand seven hundred and ninety two; then along the said line south forty-five degrees east two hundred and thirty-three chains and fifty-eight links, more or less, to the lands granted to Captain Joseph Brant; then north forty-five degrees east one hundred and twenty-seven chains, to the northerly angle of said lands; then south-forty five degrees east two hundred and ninety-three chains, more or less, to Lake Ontario; then north-easterly along the water's edge of said lake to the eastern bank of the River Etobicoke, the place of beginning; and the reversion and reversions, remainder and remainders, yearly and other rents, issues and profits thereof and of every part and parcel thereof, to have and to hold the said parcel or tract of land and all and singular other the premises hereinbefore mentioned, or intended to be bargained and sold, and every part and parcel thereof, with their and every of their rights, members and appurtenances, unto His said Majesty, His heirs and successors, from the day next before the day of the date of these presents for and during and unto the full end and term of one whole year from thence next ensuing and fully to be completed and ended. Yielding and paying therefore unto the said Chechalk, Quenepenon, Wabukanyne, Okemapenesse, Wabenose, Kenonecence, Osenego, Acheton, Patequan and Wabakagego the yearly rent of one peppercorn at the expiration of the said term if the same shall be lawfully demanded.

To the intent and purpose that by virtue of these presents and of the statute made for transferring uses into possession His said Majesty may be in the actual possession of the premises, and be thereby enabled to take and accept a grant and release of the freehold reversion and inheritance of the same premises and every part and parcel thereof to him His said Majesty, His heirs and successors, to the uses into possession His said Majesty may be in the actual possession of the premises, and be thereby enabled to take and accept a grant and release of the freehold reversion and inheritance of the same premises and every part and parcel thereof to him His said Majesty, His heirs and successors, to the uses to be declared by another Indenture, intended to bear date the next day after the day of the date hereof.

IN WITNESS WHEREOF, the parties first above named have to these presents set and put their hands and seals the day and year first above written.

Signed, sealed and delivered in the presence of us:

D. CAMERON,}
DONALD MACLEAN,} Com's. on behalf of the Prov.
GEO. R. FERGUSON,} Capt. Canadian Regt.,
WM. L. CROWTHER, Lieut. 41st Regt.,
JAMES DAVIDSON, Hospital Staff,
H.M. SMITH.
P. SELBY, Asst. Secy. I.A.,
J. B. ROUSSEAU,
DAVID PRICE, Interpreter.

WM. CLAUS, D.S.G., on behalf of the Crown. [L.S.]

CHECHALK, (totem) [L.S.]
QUENEPENON, (totem) [L.S.]
WABUKANYNE, (totem) [L.S.]
OKEMAPENESSE, (totem) [L.S.]
WABENOSE, (totem) [L.S.]
KEBONECENCE, (totem) [L.S.]
OSENAGO, (totem) [L.S.]
ACHETON, (totem) [L.S.]
PATAQUAN, (totem) [L.S.]
WABAKAGEGO, (totem) [L.S.]

THIS INDENTURE, made the sixth day of September, in the year of Our Lord one thousand eight hundred ad six, between Chechalk, Quenepenon, Wabukanyne, Okemapenesse, Wabenose, Kenonecence, Osenago, Acheton, Patequan and Wabakagego, the Principal Chiefs, Warriors and people of the Mississague Nation of Indians of the one part, and His Majesty George the Third, by the Grace of God of the United Kingdom of Great Britain and Ireland, King, Defender of the Faith, of the other part, witnesseth: that for and in consideration of the sum of one thousand pounds of lawful money of Upper Canada to the said Chechalk, Quenepenon, Wabukanyne, Okemapenesse, Wabenose, Kenonecence, Osenago, Acheton, Patequan and Wabakagego, in hand well and truly paid by His said Majesty at or before the ensealing and delivery of these presents, the receipt whereof they the said Chechalk, Quenepenon, Wabukanyne, Okemapenesse, Wabenose, Kenonecence, Osenago, Acheton, Patequan and Wabakagego do hereby acknowledge, and from the same and every part thereof do severally and respectively acquit, release and discharge His said Majesty, His heirs and successors forever by these presents.

They the said Chechalk, Quenepenon, Wabukanyne, Okemapenesse, Wabenose, Kenonecence, Osenago, Acheton, Patequan and Wabakagego, have and every of them hath granted, bargained, sold, aliened, released and confirmed, and by these presents do and every of them doth grant, bargain, sell, alien, release and confirm unto His said Majesty (in his actual possession now being by virtue of a bargain and sale to him thereof made by the said Chechalk, Quenepenon, Wabukanyne, Okemapenesse, Wabenose, Kenonecence, Osenago, Acheton, Patequan and Wabakagego, in consideration of five shillings apiece, by Indenture bearing date the day next before the day of the date of these presents for the term of one whole year, commencing from the day next before the day of the date of then same Indenture of bargain and sale an by force of the statue made for transferring uses into possession) and to his Heirs and successors – all that parcel or tract of land situate in the Home District of the Province of Upper Canada, containing by admeasurement eighty-five thousand acres, be the sae more or less, together withal the woods and waters, thereon lying and being under the reservation hereinafter expressed; which said eighty-five thousand acres of land are butted and bounded or may be otherwise known as follows, that is to say: Commencing at the eastern bank of the mouth of the River Etobicoke, being on the limit of the western boundary line of the Toronto purchase in the year of Our Lord one thousand seven hundred and eighty-seven; then north twenty-two degrees west six miles; then south thirty-eight degrees west twenty-six miles, more or less, until it intersects a line on a course north forty-five degrees west produced from the outlet at Burlington Bay, being the north-eastern boundary line of the Township of Flamborough East, and o the purchase in the year of Our Lord one thousand seven hundred and ninety-two; then along the said line south forty-five degrees east two hundred and twenty-seven chains to the northerly angle of said lands; then south forty-five degrees east two hundred and ninety-three chains more, or less, to the lands granted to Captain

Joseph Brant; then north forty-five degrees east one hundred and twenty-seven chains to the northerly angle of said lands; then south forty-five degrees east two hundred and ninety-three chains more or less to Lake Ontario; then north-easterly along the water's edge of said lake to the eastern bank of the River Etobicoke, the place of beginning. And the reversion and reversions, remainder and remainders, yearly and other rents, issues and profits thereof; and also all the estate, right, title inheritance, use, trust, possession, property, claim and demand whatsoever of them the said Chechalk, Quenepenon, Wabukanyne, Okemapenesse, Wabenose, Kenonecence, Osenego, Acheton, Patequan and Wabakagego, and every of them in, to, or out of the same premises and every or any part thereof – except and always reserved out of this presents grant unto the said Chechalk, Quenepenon, Wabukanyne, Okemapenesse, Wabenose, Kenonecence, Osenego, Acheton, Patequan and Wabakagego and the people of the Missisagua Nation of Indians, and their posterity for ever – the sole right of the fisheries in the Twelve Mile Creek, the Sixteen Mile Creek, the River Credit and the River Etobicoke, together with the lands on each side of the said creeks and the River Credit as delineated and laid down on the annexed plan, the said right of fishery and reserves extending from the Lake Ontario up the said creeks and River Credit the distance hereinafter mentioned and described and no further.

And the right of fishery in the River Etobicoke from the mouth of the said river to the allowance for road between the first and second concessions south side of Dundas street, and no further.

The reserve on the River Credit commencing on Lake Ontario at a white oak squared post, piled with stones, and standing at the distance of one mile north-easterly from the centre of the said river at the first bend thereof; then north sixty-nine degrees west one hundred and ninety-six chains; then south sixty-four degrees west one hundred and fifty-five chains; then north forty-five degrees west one hundred and seventy-seven chains, more or less, to the rear boundary of the purchase line; then along said purchase line, and crossing the said river south thirty-eight degrees west two miles, or one hundred and sixty-chains, to the western boundary line of said Reserve; then south forty-five degrees east two hundred and seventy chains; then north sixty-four degrees east one hundred and ninety-one chains; then south sixty-nine degrees east sixty-three chains, more or less, to Lake Ontario at another white oak squared post standing on the bank of said lake at the distance of two miles south-westerly from the place of beginning; then along the water's edge of Lake Ontario north easterly to the place of beginning. The reservation on the Sixteen Mile Creek, commencing on the shore of Lake Ontario at an oak post squared and marked "M.I.R. N. 45° W." – at the distance of forty chains north easterly from the centre of said creek; then north forty-five degrees east one hundred and eighteen chains, more or less, to the allowance for road between the second and third concession south of Dundas street; then south thirty-eight degrees west and crossing the said creek one mile to the western boundary line of said reservation: then south forty-five degrees east one hundred and twenty-four chains more or less to Lake Ontario, at a large black ash tree (two trunks issuing from one root) marked "M.I.R., N. 45° W.;" then north-easterly along the water's edge to the place of beginning. And also all the waters and low grounds lying between the high banks on both sides of said creek extending from the southern boundary of the allowance for road between the aforesaid second and third concessions to the southern boundary of the allowance for road between the first and second concessions south of Dundas street – and no further. And the reservation on the Twelve Mile Creek – commencing on the shore of the Lake Ontario at a post squared and marked "M.I.R., N. 45° W.;" at the distance of forty chains north-easterly from the centre of said creek; then north sixty-six degrees west one hundred and seven chains' then north thirty-six degrees west fifty-seven chains more or less to the southern boundary of the allowance for road between the second and third concessions south of Dundas street; then south thirty-eight degrees west one mile, crossing said creek to the western boundary line of said reservation; then south thirty-six degrees east fifty-seven chain then south sixty-six degrees east one hundred and seventeen chains, more or less to Lake Ontario; then north-

easterly along the water's edge to the place of beginning. And also the waters and low grounds lying between the high banks on each side of the said creek, extending from the southern boundary of the allowance for road between the second and third concessions before mentioned to the southern boundary of the allowance for road between the first and second concessions south of Dundas street, and no further: To have and to hold the said parcel or tract of land and all and singular other the premises mentioned to be hereby granted and released as aforesaid with their and every of their appurtenances unto His said Majesty, His heirs and successors, to the use of His said Majesty, His heirs and successors for ever.

In witness whereof, the said parties first above named have to these presents set and put their hands and seals the day and year first above written.

Signed, sealed and delivered in the presence of us:

D. CAMERON,}
DONALD MACLEAN,} Commissioners on behalf of the Province
H.M. SMITH.
GEO. R. FERGUSON,} Capt. Canadian Regiment,
P. SELBY, Asst. Secy. I.A.,
J. B. ROUSSEAU,
WM. L. CROWTHER, Lieut. 41st Regt., JAMES DAVIDSON, Hospital Staff,
DAVID PRICE, Interpreter.

WM. CLAUS, D.S.G., on behalf of the Crown. [L.S.]

CHECHALK, (totem) [L.S.]
QUENEPENON, (totem) [L.S.]
WABUKANYNE, (totem) [L.S.]
OKEMAPENESSE, (totem) [L.S.]
WABENOSE, (totem) [L.S.]
KEBONECENCE, (totem) [L.S.]
OSENAGO, (totem) [L.S.]
ACHETON, (totem) [L.S.]
PATAQUAN, (totem) [L.S.]
WABAKAGEGO, (totem) [L.S.]”*

(Government of Canada 2016)

1.2.3 Euro-Canadian Settlement

The County of Peel was formed in 1788, as part of the “Nassau District”, an extensive area later known as the “Home District” (Walker and Miles 1877). In 1858, the Home District was abolished and replaced by the Counties of York, Ontario and Peel. The County of Peel is comprised of the Townships of Toronto, Toronto Gore, Chinguacousy, Caledon and Albion, as well as the incorporated Town of Brampton, and the incorporated Villages of Streetsville and Bolton. The County had mostly been settled by 1819, with Toronto North Township primarily settled by an Irish Colony from New York. Peel had a total population of 1,425 in 1821, while the Township of Toronto was 803. By 1851, the Township had grown to 6,572 and 5,974 in 1871.

Toronto Township was part the Old Survey that was laid out in 1806 to the east of the Credit Reserve and settled by Loyalists. When Treaty 19 was signed October 28th, 1818 between the Crown and the Mississauga First Nation a new survey was carried out in the former reserve land and opened for settlement the following year. Several settlements developed in the Township, including Malton, Meadowvale, Streetsville, Palestine, Derry West and Churchville.

The railways had an important influence on the Townships development, beginning with the Grand Trunk Railway (1854), which connected Toronto and Sarnia, with stops in Malton, Guelph and Stratford. Malton was transformed from a small hamlet into a thriving community. Incorporated in 1871, the Credit Valley went into service in 1877. This rail line connected Toronto to Orangeville, via Streetsville (Heritage Mississauga 2009).

Major roads running through the Toronto Township include Dundas Street and Hurontario Street. Dundas was completed to the Humber River by 1796, before the townships had been surveyed, so that it served as a baseline for concessions SDS (south of Dundas Street) and NDN (north of Dundas Street) in Nelson, Trafalgar and Toronto South Townships. Early land grants on the lake frontage of the new townships were issued to retired officers and soldiers (Middleton and Landon 1927).

In the 1930's, with the recognition of the congestion along Highway 2, planning for a new four-lane highway began. The first section of Highway 401 was completed in 1947, with the remaining phases completed during the 1950s and 1960s (Bever 2014).

1.2.3.1 Study Area Specific Research

Historic Maps were consulted to gain insights into the inhabitants of the study areas. The historic atlas maps were done by subscription and as such property owners had to pay to be included and/or have their houses and other structures included. The study areas are located within the historical Toronto Township, County of Peel. The following table highlights the 19th century homesteads and any noted occupants.

Table 2: Landowners and Features from the Historical Mapping

Concession	Lot	Study Area No.	1859	1877
6 WCR	14	9	John McClure (W ½) John M. Forster (E ½)	John McClure, 1 structure, orchards (W ½) John McClure 1 structure, orchards (E ½)
6 WCR	13	9	Martin Justin (W ½) John Atchinson (E ½)	Martin Justin, 1 structure, orchards (W ½) Thomas Brownbridge, 2 structures, orchards (E ½)
6 WCR	12	3 4.1	William Justin (W ½) James Hillis (NE ¼) Thomas McClure (SE ¼)	William Justin, 1 structure, orchards (W ½) Thomas McClure (SE ¼) James Hillis (NE ¼)
6 WCR	11	4.2	Isaac Wait (White)	Mrs. Isaac White, 2 structures, orchards, church, Railway
5 WCR	12	4.1	Hamilton Row (W ½) Thomas McClure, Toll Bar (E ½)	John Leslie, 2 structures, 2 orchards

5 WCR	11	4.2 5.1 5.2 5.3 6.1	Samuel Switzer (W ½) Henry Rutledge (SE ¼)	Joshua Switzer, 1 building, orchards, school (W ½) Thomas McClure, 2 structures, orchards (E ½)
5 WCR	10	6.2 6.3	William Rutledge (W ½) Christopher Rutledge (E ½)	John Mason, 1 structure, orchards (W ½) William N. Rutledge, 1 structure, orchards, N.R. (E ½) D. Mason, 1 structure (NE corner)
3 WCR	9	7.1 7.2	John Simpson Jacob McCracken, 1 structure	John Simpson, 1 structure, orchards (N ½) Jacob McCracken, 1 structure, orchards (S ½)

1.3 Archaeological Context

1.3.1 Natural Environment

The study areas are located in the Peel Plain and the South Slope Physiographic Regions of Ontario (Chapman and Putnam 1984: 174). The Peel Plain region is composed of clay soils which span across the central portions of York, Peel and Halton Municipalities. The Peel Plains comprise an area of approximately 300 square miles (Chapman & Putnam, 1984: 209). The sediments within the Peel Plain Region typically have been found to be 10 feet deep and heavy in texture. The heavy clays overlay less calcareous shale till in much of the region.

Hardwood forest was the most common type of vegetation before residential and commercial land use development occurred in this area. The better drained parts of the Peel Plain yielded sugar maple, beech, white oak, hickory, basswood and some white pine (Chapman & Putnam 1984: 175). The soil that dominates the region contains differences between horizons. The first 15 centimetres of horizon is typically dominated by dark brown, crumb-structured, stone free soils followed by a brownish grey clay loam that spans approximately 13 centimetres. Subterraneous to these layers is blocky clay that is dark brown and 23-31 centimetres in depth (Chapman & Putnam 1984: 175).

The South Slope itself extends from the Niagara Escarpment to the Trent River, between Lake Ontario and the Oak Ridges Moraine (Chapman and Putnam 1984: 172). This region is a ground moraine with irregular knolls and hollows. This physiographic region is underlain by carbonate rich Palaeozoic rock with a variety of overlying glacial deposits. In the region of the study area, the slope is smoothed, faintly drumlinized and intersected by tributaries to the Humber, Rouge and Don Rivers (Chapman and Putman 1984). A number of South Slope soil types are well-suited to agricultural use. Generally, soils vary in an east-west direction according to till content. Clay and shale content in soils increases moving west from the Regional Municipality of Durham.

The single most important environmental feature necessary for extended human occupation is potable water. As such, proximity to water is regarded as a useful index for the determination of potential for the presence of archaeological resources. The Creditview River is located to the southwest of Areas 7.1 and 7.2. Mullet Creek is found near Areas 5.2, 6.1, 6.2 and 6.3.

These environmental characteristics would have provided an ideal environment for both temporary and permanent settlement throughout the pre-and post-contact periods. These water sources would have served as important pre-and post-contact transportation routes as well as sources of potable water and riverine resources.

During the 19th and 20th century, rapid deforestation resulted in significant land clearance across Toronto Township and over time, the once diverse forest life and wide range of tree species and natural resources would have also been depleted as agricultural and modern residential and commercial development continued. As a result of continuing urban development, this part of southern Ontario is almost completely deforested today.

1.3.2 Reports with Relevant Background Information

Previous Archaeological Work

To inform the current Stage 2 archaeological assessment and further establish the archaeological context of the study area, a search of the OASD was conducted by AECOM on DATE to determine if any previous archeological work has been completed within the current study area or within 50m of the study area boundaries. **Table 3** lists reports regarding previous archaeological work relevant to the study area.

Table 3: Archaeological Reports with Relevant Background Information

Year	Title	Author	PIF Number
2011	<i>Stage 2 Archaeological Assessment, Twinning of the West Trunk Sewer, Project 08-2205, Geographic Township of Toronto, City of Mississauga, Regional Municipality of Peel, Ontario</i>	Archaeological Research Associates, Ltd.	P007-250-2010 P007-319-2011
2012	<i>Stage 1 Archaeological Assessment, Highway 401 Widening From East of the Credit River to Trafalgar Road, Class Environmental Assessment, Region of Peel and Region of Halton, Ontario</i>	URS Canada	P088-031-2010
2012	<i>Stage 3 Archaeological Assessment Shaft 10 FS 1 (AjGw-512) Twinning of the West Trunk Sewer Project 08-2205 Part of Lot 8, Concession 3 W.H.S. Geographic Township of Toronto City of Mississauga, Ontario</i>	Archaeological Research Associates, Ltd.	P007-383-2011
2015	<i>Stage 1 and 2 Archaeological Assessment of Part of Lot 9, Concession 3 WHS, Geographic Township of Toronto, Peel County, City of Mississauga, Regional Municipality of Peel</i>	ASI	P049-0696-2014 & P049-0718-2014
2016	<i>Stage 1 Archaeological Assessment, Region of Peel East to West Wastewater Diversion Strategy Class EA, former Township of Toronto, Peel County, now City of Mississauga, Region of Peel, Ontario</i>	Golder Associates	P362-0107-2015
2017	<i>Stage 2 Archaeological Assessment, Region of Peel East to West Wastewater Diversion Strategy Class EA, former Township of Toronto, Peel County, now City of Mississauga, Region of Peel, Ontario</i>	Golder Associates	P362-0131-2016
2019a	<i>Stage 1 and 2 Archaeological Assessment of the Humphries West Development, Sanford Farm, part of 1200 Old Derry</i>	ASI	P398-0019-2018

Year	Title	Author	PIF Number
	<i>Road, part of Lots 9 and 10, Concession 3 WHS, Geographic Township of Toronto, Peel County, City of Mississauga, Regional Municipality of Peel</i>		
2019b	<i>Stage 1 and 2 Archaeological Assessment of the Humphries East Development, Sanford Farm, part of 1200 Old Derry Road, part of Lots 9 and 10, Concession 3 WHS, Geographic Township of Toronto, Peel County, City of Mississauga, Regional Municipality of Peel.</i>	ASI	P398-0018-2018

ARA completed a Stage 2 AA within proximity to the eastern most study areas 7.1 and 7.2, and a Stage 3 of a multi-component site approximately 350m west of Area 7.2 (ARA 2011, 2012).

URS Canada completed the Stage 1 AA of portions of the study area in 2012 (URS 2012). This report covers areas 3, 4.1, 4.2, 5.1, 5.2, 5.3, 6.1, 6.2, 6.3, 7.2, and 9. These areas were recommended for Stage 2 AA prior to any ground disturbance.

Golder's Stage 1 AA report covers area 7.1 and recommended further archaeological assessment (Golder 2016).

ASI completed two Stage 1-2 AA of Lots 9 and 10, Concession 3 WHS (ASI 2019a, 2019b). This Stage 2 AA resulted in the identification of AjGw-591 and the Simpson site (AjGw-597), both of which were recommended for Stage 3 AA (ASI 2019a).

To the best of our knowledge, there are no other reports concerning archaeological work conducted within or in close proximity (i.e. within 50m) of the study area; however, it should be noted that the MHSTCI does not maintain a database of all properties that have had past archaeological investigations and searches of the MHSTCI public register do not always result in a complete listing of all archaeological work conducted in a given area. In consequence, in some cases the only way a consulting archaeologist will know that a past assessment has been conducted in a given area is if they have personal knowledge of it, or if the assessment resulted in the discovery and registration of one or more archaeological sites.

1.3.3 Known Archaeological Sites

In Ontario, information concerning archaeological sites is stored in the Ontario Archaeological Sites Database (OASD) maintained by the MHSTCI. This database contains registered archaeological sites within the Borden system. Under the Borden system, Canada has been divided into grid blocks based on latitude and longitude. A Borden block is approximately 13 km east to west, and 8.5 km north to south. Each Borden block is referred to by a four-letter designation and sites located within the block are numbered sequentially as they are found. The study area is situated within the Borden blocks AjGw.

AECOM conducted a data search of the OASD on August 13, 2019 to determine if any registered archaeological sites are located within the study area as well as within 1 km of the current study area boundaries. This search resulted in the identification of 44 registered archaeological sites. **Table 4** provides details on the registered archaeological sites within 1 km of the current study area.

Table 4: Registered Archaeological Sites within 1 km of the Study Area

Borden #	Site Name	Cultural Affiliation	Site Type	Cultural Heritage Value or Interest
AjGw-1	Rowancroft	Euro-Canadian	camp/campsite	No Further CHVI
AjGw-37	Packnowski	Euro-Canadian	Unknown	Unknown
AjGw-38	Olesen	Indigenous	Unknown	Unknown
AjGw-46	Tree Plantation	Indigenous, Woodland, Post Contact Euro-Canadian	Findspot	Unknown
AjGw-71	Mullett Ponds	Indigenous Early and Middle Woodland	village	Unknown
AjGw-72	Bob	Indigenous	findspot	Unknown
AjGw-73	-	Indigenous	camp/campsite	No Further CHVI
AjGw-74	-	Indigenous	findspot	No Further CHVI
AjGw-75	-	Indigenous	camp/campsite	Unknown
AjGw-98	Birdsall 1	Euro-Canadian; Indigenous	findspot; homestead	Unknown
AjGw-99	Birdsall 2	Euro-Canadian	homestead	Unknown
AjGw-165	-	Euro-Canadian	Unknown	Unknown
AjGw-141	Sharp	Post-Contact Euro-Canadian	Homestead	Unknown
AjGw-167	-	Euro-Canadian	Unknown	Unknown
AjGw-205	New Parcel	Pre-contact Indigenous	camp/campsite	Further CHVI
AjGw-493	Ornstock P3	Unknown	Unknown	Unknown
AjGw-512	Zhishodewe	Indigenous Late Woodland, Early Paleo-Indian, Late Woodland	Unknown	Further CHVI
AjGw-523	Meadowvale Mill Complex	Euro-Canadian	Mill	Further CHVI
AjGw-538	-	Indigenous	Unknown	Further CHVI
AjGw-539	-	Indigenous	Unknown	Further CHVI
AjGw-561	Pearson-Harris	Euro-Canadian; Indigenous Late Woodland	Unknown; residential	Further CHVI
AjGw-562	Simpson	Euro-Canadian	homestead	Further CHVI
AjGw-586	-	Indigenous	Scatter	No further CHVI
AjGw-587	-	Indigenous	Scatter	Further CHVI
AjGw-588	-	Indigenous	Scatter	Further CHVI
AjGw-589	-	Indigenous	Scatter	Further CHVI
AjGw-590	-	Indigenous	Scatter	Further CHVI
AjGw-591	-	Indigenous	Scatter	Further CHVI
AjGw-592	-	Indigenous	Scatter	Further CHVI
AjGw-593	-	Indigenous	Scatter	No further CHVI

Borden #	Site Name	Cultural Affiliation	Site Type	Cultural Heritage Value or Interest
AjGw-594	-	Indigenous	Scatter	No further CHVI
AjGw-595	-	Indigenous	Scatter	Further CHVI
AjGw-596	Simpson 2	Euro-Canadian	homestead	Further CHVI
AjGw-597	Simpson 3	Euro-Canadian	homestead	Further CHVI
AjGw-598	-	Indigenous Late Woodland	Scatter	Further CHVI
AjGw-599	-	Indigenous Early Archaic	scatter	Further CHVI
AjGw-600	-	Indigenous	Scatter	Further CHVI
AjGw-601	-	Indigenous	Scatter	Further CHVI
AjGw-602	-	Indigenous	Scatter	Further CHVI
AjGw-603	-	Indigenous	Scatter	Further CHVI
AjGw-604	-	Indigenous	Scatter	Further CHVI
AjGw-605	-	Indigenous	Scatter	Further CHVI
AjGw-606	-	Indigenous	Scatter	Further CHVI
AjGw-607	-	Indigenous	Scatter	Further CHVI
AjGw-608	Simpson 4	Euro-Canadian	Unknown	Further CHVI
AjGw-609	Simpson 5	Post-Contact	homestead	Further CHVI
AjGw-610	Simpson 6	Post-Contact, Pre-Contact	Shed, mill, scatter	Further CHVI
AjGw-611	Simpson 7	Post-Contact	homestead	Further CHVI
AjGw-612	Simpson 8	Post-Contact	homestead	Further CHVI
AjGw-630	P1	Indigenous Pre-contact, Early Archaic, Late Archaic, Early Woodland	camp / campsite	Further CHVI
AjGw-645	P67	Unknown	Unknown	Unknown

The New Parcel site (AjGw-205) is located immediately west of Area 4.2. and is described as a circa 13th century Indigenous campsite. While there is no other information available in Past Portal, it should be considered to retain archaeological potential.

The Pearson-Harris site (AjGw-561), a post-contact Euro-Canadian site dating to the mid to late 19th century, is located to the south of Area 7.2.

Information concerning specific site locations is protected by provincial policy and is not fully subject to the *Freedom of Information Act*. The release of such information in the past has led to looting or various forms of illegally conducted site destruction. Confidentiality extends to all media capable of conveying location, including maps, drawings, or textual descriptions of a site location. The MHSTCI will provide information concerning site location to the party or an agent of the party holding title to a property, or to a licensed archaeologist with relevant cultural resource management interests.

1.3.4 Existing Conditions

The study areas are comprised of a variety of environments. Areas 7.1 and 7.2 are primarily agricultural land, while Areas 4.2, 5.1, 5.2, 5.3, 6.1 and 6.2 are found along roadways and were graded, manicured, sloped or ditched. Area 3 and Area 4.1 are found alongside commercial areas and consisted primarily of scrub and graded, manicured lawn and slope.

2. Field Methods

AECOM conducted the Stage 2 AA of the proposed relocation of 11 trenchless Highway 401 Crossings in the Region of Peel between August 6, 2019 and September 10, 2020 under the field direction of Alex Mullan [P1006], Dayle Elder [P335] and Melissa Wallace [R496]. As per *section 2.1, Standard 3 and Section 3.2, Standard 2 of the Standard and Guidelines for Consultant Archaeologists* (2011) fieldwork was carried out in weather and lighting conditions which permitted excellent ground visibility.

In accordance with the *Standards and Guidelines for Consultant Archaeologists* (Section 2.1.2, Standards 1-9, Government of Ontario 2011), the portions of the study area under scrub meadow or manicured lawn were subject to assessment by the standard shovel test pit method at an interval of 5 m in areas demonstrating no or subtle disturbance. Based on professional judgment, test pit intervals were increased to 10 m in areas that demonstrated noticeable disturbance. Each test pit was dug at least 30 cm in diameter and 5 cm into subsoil if encountered. All soil was screened through 6 millimetres (mm) mesh and all test pits were backfilled to grade after investigation. When cultural material was identified, the test pit survey was intensified around the positive test pits to determine whether a recommendation for Stage 3 assessment should be made. The intensification strategy included an additional eight test pits every 2.5 metres around the positive test pit as well as a 1 m by 1 m square test unit placed over the positive grid test pit (Section 2.1.3, Standard 2, Government of Ontario 2011).

The portions of the study area subject to Stage 2 field investigation that were comprised of agricultural fields that had recently been ploughed and weathered prior to assessment and surface visibility was at least 90%. In accordance with the *Standards and Guidelines for Consultant Archaeologists* (Section 2.1.2, Standards 1-9, Government of Ontario 2011) the ploughed agricultural fields were subject to pedestrian survey at a 5 m interval. When archaeological resources were found, survey intervals were decreased to a 1 m interval over a minimum of a 20 m radius around the find. Pedestrian survey continued at a 1 m interval until the full extent of the surface scatter was defined.

Areas that have severe slopes (>20°), or extensive and deep land alterations were not subjected to further Stage 2 investigation, consistent with *Standards 2a, 2b and 2c of Section 2.1 of the Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011). Disturbance and access-limiting conditions were photo-documented and are illustrated in **Section 8** and **Section 9**. In the areas of the property where disturbance was evident testing was still completed judgements at 10m intervals to verify conditions following the standards established in Section 2.1.8 of the Standards and Guidelines. A summary of the conditions and Stage 2 field methods employed at each of the study areas assessed is presented below in **Table 5**.

Table 5: Results of the Stage 2 Archaeological Assessment

Area	Field Director	Survey Date	Weather	Vegetation	Topography	Topsoil	Subsoil	Subsoil Depth (cm)	Comments
3	Melissa Wallace	October 24, 2019	warm and sunny, 13°C	Overgrown scrub vegetation	Slope up to graded area	Light brown grey sand with compacted gravels	N/A	N/A	Stage 2 test pitting at 10m completed, 100% disturbed
4.1	Alex Mullan	August 6, 2019	Hot and overcast, 28°C	Overgrown scrub vegetation with some areas of manicured lawn	Flat	Light grey compacted sand and gravel	N/A	N/A	Stage 2 test pitting at 10m completed, 100% disturbed
4.2	Alex Mullan	August 6, 2019	Hot and overcast, 28°C	Dense shrubs and small trees	Mostly flat with a ditch/culvert running through the study area	Light brown grey sand with compacted gravels	N/A	N/A	Stage 2 test pitting at 10m completed, 100% disturbed
5.1	Alex Mullan	August 6, 2019	Hot and overcast, 28°C	Manicured and graded lawn	Flat to gently sloping, ditch in the northern area of study area	Light brown grey sand with compacted gravels	N/A	N/A	Stage 2 test pitting at 10m completed, 100% disturbed
5.2	Alex Mullan	August 6, 2019	Hot and overcast, 28°C	Manicured and graded lawn	Flat to gently sloping	Light brown and grey sand with compacted gravels mottled with light orange sand	N/A	N/A	Stage 2 test pitting at 10m completed, 100% disturbed
5.3	Dayle Elder	August 25, 2020	Hot and sunny, 27.5°C	Graded manicured lawn	90% sloped	Mottle light brown soil	N/A	N/A	Stage 2 test pitting at 10m completed,

Area	Field Director	Survey Date	Weather	Vegetation	Topography	Topsoil	Subsoil	Subsoil Depth (cm)	Comments
						with gravel and pebbles			100% disturbed
6.1	Alex Mullan	August 6, 2019	Hot and overcast, 28°C	Manicured lawn and sidewalk	Flat, sloping to the south	Medium grey sand with compacted gravels	N/A	N/A	Stage 2 test pitting at 10m completed, 100% disturbed
6.2	Alex Mullan	August 6, 2019	Hot and overcast, 28°C	Dense shrubs and small trees with a section of manicured lawn	Flat	Light grey compacted with gravels mottled with light brown sand	N/A	N/A	Stage 2 test pitting complete at 10m, 100% disturbed
6.3	Dayle Elder	August 25, 2020	Hot and sunny, 27.5°C	Overgrown scrub and trees with small area of low and wet	Flat	N/A	Light brown	N/A	95% tested at 10m intervals to confirm disturbance, 5% low and wet
7.1	Melissa Wallace	May 28, 2020	Warm and overcast, 22.2°C	N/A	Flat	N/A	N/A	N/A	100% pedestrian surveyed at 5m intervals, P1 site located
7.2	Dayle Elder	September 9-10, 2020	Warm and overcast, 16°C	Scrub meadow with planted trees	Flat	Medium brown sandy loam	Brown-orange clay loam	32-45	100% test pitted at 5m intervals, P2 and H1 site located
9	Alex Mullan	August 6, 2019	Hot and overcast, 28°C	Manicured and landscaped lawn	Flat, graded and artificially mounded	Light grey-brown sand and compacted gravel	N/A	N/A	Stage 2 test pitting at 10m completed, 100% disturbed

2.1 P1 Site (AjGw-646)

The P1 site (AjGw-646) was located within Area 7.1 during pedestrian survey on May 28, 2020. The site consists of a light scatter of 29 chipped stone tools covering an area measuring approximately 75 m by 80 m. While a few of these artifacts were subsequently identified as being outside of the study area, the majority were found in the eastern section of the study area on gently sloping ground with a sharp rise to the northeast. The Credit River is located to the west, with the 401 to the south.

2.2 P2 Site (AjGw-647)

The P2 site (AjGw-647) was also located within Area 7.2 during test pit survey on September 9th and 10th, 2020, measuring approximately 40 m by 10 m. A total of 3 positive test pits containing a total of 3 lithics were excavated. Test pits ranged from 35-45 cm in depth. Following intensified test pit survey, two test units were placed over two of the three positive test pits. Test Unit 1 was composed of 3 layers which produced a total of 19 lithics and a possible feature. Layer 1 was comprised of light brown sandy loam with cobbles and extended to a depth of 33 cm. A total of 7 lithics were recovered in layer 1. Layer 2 produced 7 lithics and consisted of light brown soil mottled with red and yellow sandy loam. Layer 2 was found at 33 cm to a depth of 40 cm. Layer 3, a possible feature, consisted of a medium red, compact soil covering approximately 75% of the unit. Five lithics were located within this layer, which extended to a depth of 44 cm. The subsoil was a light brown yellow compact sandy loam in the remaining northeast portion of the unit. The possible feature was covered with geotextile fabric followed by backfilling. Test unit 2 was 36 cm in depth and yielded 6 lithics. Soil consisted of a light brown friable sandy loam, overlying a light brown yellow compact sandy loam subsoil.

2.3 H1 Site (AjGw-648)

The H1 site (AjGw-648) was located within Area 7.2, during test pit survey at 5m intervals. A total of 18 positive test pits over an area measuring approximately 70 m by 30 m. The majority of artifacts consisted of historic material, although three test pits also contained a single lithic. Test pits ranged between 32 and 45 cm deep. The topsoil consists of medium brown sandy loam overlying brown-orange subsoil.

3. Record of Finds

3.1 Artifact Analysis of the P1 Site (AjGw-646)

The Stage 2 pedestrian survey of Area 7.1 resulted in the recovery of the P1 site (AjGw-646). The site consists of a total of 29 chipped stone artifacts from an area 70 x 80 m. The assemblage is comprised of bipolar flakes (n=2), biface thinning flakes (n=5), edge retouch flakes (n=1), flake fragments (n=13), primary reduction flakes (n=4), and

secondary reduction flakes (n=3) (Table 8). There was one formal tool, a thumbscraper. All of the lithics were manufactured from Onondaga chert with the exception of one primary reduction flake of Selkirk chert. The small assemblage size makes it difficult to infer a site type or function at this time.

Table 6: Lithic Totals for the P1 site (AjGw-646)

Debitage	f	% f
Primary Reduction Flake	4	13.8
Secondary Reduction Flake	3	10.3
Bipolar Flake	2	6.9
Biface Thinning Flake	5	17.2
Edge Retouch Flake	1	3.4
Flake Fragment	13	44.8
Sub-totals	28	96.6
Formal Tools		
<i>Thumbscraper</i>	1	3.4
Totals	29	100.0

3.2 Artifact Analysis of the P2 Site (AjGw-647)

The test pit survey of Area 7.2 resulted in the recovery of 28 lithics from three test pits and two test units. The P2 site (AjGw-647) is comprised of biface thinning flakes (n=8), bipolar flakes (n=2), edge retouch flakes (n=1), and flake fragments (n=17). In Test Unit 1, two flake fragments showed evidence of thermal alteration while one other demonstrated utilization. There were no diagnostic artifacts located from the P2 site (AjGw-647). Due to the small size of the assemblage, it is not possible to infer a site type or function at this point.

Table 7: Lithic Totals for the P2 Site (AjGw-647)

Debitage	f	% f
Bipolar Flake	2	7.14
Biface Thinning Flake	8	28.57
Edge Retouch Flake	1	3.57
Flake Fragment	17	60.71
Totals	28	99.99

3.3 Artifact Analysis of the H1 Site (AjGw-648)

The Stage 2 test excavations across Area 7.2 recovered 248 historic artifacts and 3 pre-contact chipped stone artifacts, known as the H1 site (AjGw-648). The lithics consisted of 2 flake fragments and 1 biface thinning flake, all manufactured from Onondaga chert. The early to mid-19th century to late 19th century Euro-Canadian assemblage consisted of 218 historic artifacts and 30 faunal specimen remains. Of the Euro-Canadian assemblage, 86 (34.68%) were ceramic tableware, 69 (27.82%) were kitchen ware items, 47 (18.95%) were architectural remains, 4 (1.61%) were personal / clothing items, 1 (0.40%) were stable equipment and 30 (12.10%) were faunal remains (**Table 8**).

Table 8: H1 Site (AjGw-648) Euro-Canadian Artifact Summary

Ceramic Tableware			
Ceramic Type	Decoration	f	%
Pearlware	Edged	2	2.33
Refined White Earthenware	Undecorated	44	51.16
Refined White Earthenware	Partial Design	2	2.33
Refined White Earthenware	Sponged	11	12.79
Refined White Earthenware	Hand Painted	3	3.49
Refined White Earthenware	Painted Band	5	5.81
Refined White Earthenware	Banded ware	2	2.33
Refined White Earthenware	Edged	4	4.65
Refined White Earthenware	Flow Blue	3	3.49
Refined White Earthenware	Transfer Print	7	8.14
Ironstone	Decal Ware	1	1.16
Ironstone	Undecorated	1	1.16
Semi-Porcelain	Moulded	1	1.16
Tableware Total		86	34.68
Kitchen / Household Related Items			
Artifact	Comments	f	%
Glass	Bottle	36	52.17
Refined Red Earthenware	Unglazed	9	13.04
Yellowware	Rockingham	1	1.45
Refined Red Earthenware	Glazed	23	33.33
Kitchenware Total		69	27.82
Architectural Remains			
Artifact	Material	f	%
Machine Cut Nail	Metal	18	38.30
Wire Cut Nail	Metal	1	2.13
Hand-made Wrought Nail	Metal	1	2.13
Brick	Clay	7	14.89
Concrete	-	1	2.13
Eye Bolt	Metal	1	2.13
Swivel Caster	Metal	1	2.13
Window Glass	Thick	7	14.89
Window Glass	Thin	10	21.28
Architectural Remains Total		47	18.95
Personal Items			
Artifact	Material	f	%
Smoking Pipe Stem	Clay	2	50.00
Button	Glass	1	25.00
Shoe Eyelet	Metal	1	25.00

Personal Total		4	1.61
Miscellaneous Items			
Artifact	Material	f	%
Misc. Metal Fragment	Metal	11	100.00
Miscellaneous Total		11	4.44
Stable Equipment			
Artifact	Material	f	%
Horseshoe Nail	Metal	1	100.00
Stable Equipment		1	0.40
Faunal Remains			
Artifact	Material	f	%
Bone Fragments	-	30	100.00
Faunal Total		30	12.10
Total		248	100.00

The 86 ceramic tableware fragments that were recovered during the Stage 2 assessment included refined white earthenware (RWE) (n=81), followed by two ironstone, 2 pearlware and 1 semi-porcelain fragments. Pearlware (1780-1830) was introduced by Josiah Wedgwood in 1779 in England (exported to North America in the 1780s) as an alternative to creamware. The thin-bodied cream-white paste was much harder than creamware and displays a blue to green glaze. The decorative styles of pearlware were limited to only transfer print, edged ware and hand painted motifs and because of this lack of variety refined white earthenware (RWE) was able to dominate throughout the 19th and 21st century (Majewski, T. & M.J. O'Brien, 1987). Both pearlware fragments from the site were decorated with the green edged motif with a scalloped rim and curved incising.

As noted, RWE (clear glaze and nearly white porous paste) provided more selection when it came to decorative styles and colours than its predecessor's pearlware and creamware and because of this RWE became a popular ceramic type throughout the 19th century and well into the 21st century (Majewski, T. & M.J. O'Brien, 1987). The decorative motifs found on the RWE assemblage consisted of partial designs (n=2), sponged ware (n=11), hand painted (n=3), painted bands (n=5), banded ware (n=2), edged ware (n=4), flow blue (n=3) and transfer print (n=7); the remaining 44 fragments were undecorated.

Sponged ware (1843-1885) involved the application of paint (can also be applied with multiple colours) with a sponge over the entire vessel. This technique involved the use of minimal skilled workers to decorate the pottery. Sponged tableware such as tea ware and hollowware became a popular, low-priced alternative to hand painted ceramics around the 1840's (Kenyon 1985: 15). All of the sponged ware fragments found at the site were decorated with a blue slip.

Hand painted floral motifs were popular wares in the late 18th century and through the 21st century. The earlier pieces also known as "early palette" were painted with intricate designs in colours such as brown, orange, yellow and olive green (prior to 1830). By the 1830's, the colour palette expanded to a large variety of colours called "Late Palette" displaying designs with bright greens, reds and blacks. Decorating vessels with this motif required considerable expertise because each design was applied by hand (Kenyon and Doroszenko, 1994). The floral fragment collected from the site was of "late palette" with a floral design in bright green, black, red and brown paint (post-date 1830).

Banded wares (1830-1850) were raised decorative bands along the surface of the pottery; this mocha ware variation was applied on utilitarian and table wares. Banded wares were typical of the late 18th and 19th centuries but are still present in the 21st century, however in simpler form. The colours used were light to dark brown, black, blue, yellow

and green (Kenyon and Doroszenko, 1994). The slip colours used to decorate the vessel fragments from the site were brown and blue.

Shell edged ceramics (which were an attempt to imitate the appearance of aquatic shells) were produced in England and exported to North America by the 1780s (Majewski, T. and M.J. O'Brien, 1987). This decorative style became popular in the late-18th century and by the 1830s, had become relatively inexpensive and common tableware. The manufacturing of this vessel required minimal skilled workers because the colour was only applied along the rim (Kenyon and Doroszenko, 1994). The motif was most commonly used to decorate plates, shallow bowls and platters. Colours used on the edged ware pottery included blue (most popular), green, brown and purple. Scalloped and green edged ceramics diminished in popularity around the 1830s when they were replaced with straight edged ceramics (Majewski, T. and M.J. O'Brien, 1987). The edged ware fragments collected displayed a scalloped rim with curved incising (1800-1830) and a scalloped rim with impressed bud (1800-1850).

Flow blue printed wares (1845-1900) are similar to the transfer printing technique but the pigment was allowed to bleed or "flow" in the undecorated portions of the vessel. Flow blue pottery was created around the 1840's and continued to be popular into the 1850's; however, after this the decorative technique declined in popularity. The flow blue style did revive in the 1890's (Kenyon and Doroszenko 1994: 102). The decorative technique was applied on RWE and ironstone pottery. The flow blue ceramic from the site was decorated on RWE and displayed structures and geometric motifs.

The transfer print method allowed a wider range of vessel forms to be decorated cheaply with increased speed and accuracy. Durable tissue paper was used to transfer an inked design from an engraved hot copper plate and then transferred to the ceramic. The design was engraved deep within the copper plate to allow enough coloured ink to be transferred to the tissue paper. Dark blue ink was the first colour used in transfer printing prior to 1830. However, around 1830, an assortment of new colours became available such as green, black, yellow, brown and red. The manufacturers discovered that those colours could be applied on the pottery without distortion by mixing the ink with tar (Majewski, T. and M.J. O'Brien, 1987). The transfer printed fragments (7 in total) from the site were decorated with brown (n=1), blue (n=5) and red (n=1) ink displaying floral and geometric motifs. None of the fragments displayed any diagnostic maker's marks. An illustration of the decorative styles found on the ceramic tableware assemblage can be found on **Plates 3 & 4**.

Ironstone is a more vitrified and durable ceramic than RWE (Kenyon 1980: 5). It was introduced into southern Ontario after 1840 and it became a dominant tableware type by 1870 and continued to be produced into the early 20th century. Ironstone was manufactured specifically for export to North America. During the 1870's there was a shift from heavier ironstone vessels to lighter-weight wares exhibiting delicate floral motifs (Majewski, T. and M.J. O'Brien, 1987). The ironstone fragments found during the test unit excavation were thin-bodied and were decorated with a floral printed decal and undecorated. Semi-porcelain was most common after 1890 (Kenyon and Doroszenko 1994: 103). This ceramic type was an alternative to porcelain; it was heavier than porcelain as well as cheaper to manufacture. The one semi-porcelain fragment found was moulded and was likely part of a figurine.

The kitchen related items (69 in total) consisted of 36 bottle & container glass, 32 refined red earthenware (9 unglazed, 23 glazed) and 1 yellowware fragment. The bottle and container glass assemblage include sherds from amber (n=4), aqua (n=6), clear (n=23), olive green (n=2) and purple (n=1). The bottle assemblage collected were likely from pharmaceutical, beverage / alcohol and food preservation / storage vessels which are typical items associated with a domestic dwelling. A few of the bottle sherds did contain partial maker's marks but they were unidentifiable. Refined red earthenware (RRE) was used in the manufacturing of utilitarian wares such as mugs, flowerpots and storage vessels. Brown slip was the only decorative colour used to glaze the RRE fragments that were collected from the site. Yellowware has a yellow-buff paste with a lead clear glaze. It became popular in the 1840s and was used in the manufacturing of both tableware and utilitarian wares like mixing bowls, plates and jugs. The one yellowware fragment was decorated with a mottled brown glaze called Rockingham. The Rockingham glazing technique (1855-1890) was applied in such a way that it produced a mottled effect on the pottery.

The 47 architectural remains recovered from the Stage 3 test unit survey consisted of machine cut nails (n=18), wire cut nail (n=1), wrought nail (n=1), brick remains (n=7), concrete (n=1), metal eye bolt (n=1), swivel caster (n=1), thick window glass (n=7) and thin window glass (n=10). Hand-made wrought nails were the dominant nail type prior to 1830 and were used for framing, lathing and concealing work. Wrought nails continued to be used when machine cut nails were first introduced, especially for clinching or for trim work. Eventually, the wrought nails were replaced by machine cut nails in the 1830's due to their cheaper price and faster production (Nelson 1968). Cut nails were machine cut with a flat head. Wire cut nails have a flat, round head and wire shaft, they began to replace machine cut nails during the 1850s, but it became a dominant nail type around the 1890s. The transition was slower because wire nails were not made for building construction at first but rather for small items like cigar boxes and packing crates (Adam 2002). Thin window glass was manufactured up until 1845 when a change in English tax (based on weight) was lifted. Before the tax was lifted glass makers would create window glass as thin as possible to minimize the effect of the tax (Kenyon and Doroszenko 1994: 93).

The personal assemblage contained 2 smoking pipe stem fragments, 1 opaque white glass button and 1 shoe eyelet (**Plate 2**). None of the fragments found displayed any diagnostic features. The miscellaneous items included 11 metal fragments with extensive corrosion. The stable assemblage contained one horseshoe nail and the faunal remains consisted of 30 bone fragments with two being teeth fragments (1 molar & 1 incisor) which were likely from a domesticated animal while the remaining fragments were too small and unidentifiable with no signs of thermal altering or butchering.

Based on the nature of the diagnostic artifacts from site 7.2 the Stage 2 archaeological assemblage appears to represent an early to late 19th century Euro-Canadian occupation. The assemblage is indicative of daily household activities associated with food storage / preservation (ex. utilitarian wares, bottles), table and serving vessels (plates & bowls), structural remains (brick, window glass, nails), personal items (smoking pipes, button) and farmstead equipment (horseshoe nail). Machine cut nails, wire nails, wrought nails, window glass, brick remains, and other structural remains represent a significant portion of the assemblage and does indicate that perhaps a building (at least partly made of brick) was situated in the vicinity at one time. RWE is found in most Euro-Canadian homes throughout the first half of the 19th century and this ceramic type is also prevalent at this location, representing 94.19% of the ceramic tableware assemblage. Diagnostic decorative styles included: sponged ware (1843-1885), banded wares (1830-1850), edged ware: scalloped rim with curved incising (1800-1830), scalloped rim with impressed bud (1800-1850) and flow blue (1845-1900). Pearlware (1780-1830) decorated with a green edged design was also collected. The kitchen related items recovered were also typical items found at a domestic dwelling with glass fragments from preserving / storage of goods, beverage and pharmaceutical bottles and utilitarian ceramic vessels. One of the utilitarian ceramic vessels was decorated with the Rockingham mottled glaze which dates 1855 to 1890. All recovered artifacts will remain in the possession of the licence holder until such time as a transfer can be made to an appropriate MHSTCI-approved repository. The artifacts will be held in AECOM's secure laboratory facility in Richmond Hill, ON and have been stored in 1 banker's box. A complete artifact inventory of site 7.2 can be found in **Section 10**.

This Stage 2 archaeological assessment was conducted by employing the methods outlined in Section 2 of this report. **Table 9** provides a listing of the documentary record generated by the Stage 2 fieldwork and indicates the location of each document type. Any maps that show actual archaeological locations and all UTM coordinates recorded during the assessment are provided in the supplementary documentation to this report.

Table 9: Inventory of Documentary Record

Document Type	Quantity	Location	Additional Comments
Field Notes	1	AECOM Richmond Hill Office	In original field folder and stored digitally in project file
Hand Drawn Maps	1	AECOM Richmond Hill Office	In original field folder and stored digitally in project file
Proponent Maps	1	AECOM Richmond Hill Office	Hard copy and digital copy in project file

Document Type	Quantity	Location	Additional Comments
Digital Photographs	87	AECOM Richmond Hill Office	Stored digitally in project file
Artifact Boxes	1	AECOM Richmond Hill Office	Stores in secure office location

4. Analysis and Conclusions

The Stage 2 AA for the proposed relocation of 11 trenchless Highway 401 Crossings in Mississauga for the Region of Peel was completed between August 6, 2019 and September 10, 2020. While the majority of the study areas were found to be disturbed by previous construction, a total of 3 archaeological sites were located during this survey, including two lithics scatters (P1 site (AjGw-646) and P2 site (AjGw-647)) and one historic Euro-Canadian site (H1 site (AjGw-648)). With the exception of the 3 sites located during Stage 2, the remaining areas subject to test pitting and pedestrian survey yielded negative evidence for archaeological resources.

5. Recommendations

The Ministry of Heritage, Sport, Tourism and Culture Industries is asked to accept this report into the Ontario Public Register of Archaeological Reports thereby concurring with the recommendations presented herein. As further archaeological assessment is required, archaeological concerns for the Highway 401 Crossings in the City of Mississauga, Region of Peel, Ontario have not been fully addressed.

- 1) Areas marked in yellow or orange hatching in **Figures 6-1 to 6-6** have been subject to Stage 2 assessment and should be cleared of further archaeological concern as no archaeological resources were recovered.
- 2) Areas marked in red hatching in **Figures 6-1 to 6-6** were confirmed as deeply disturbed through visual assessment, as described in the Stage 1 archaeological assessment (AECOM 2011). These areas should be cleared of further archaeological concern.
- 3) Areas marked in blue cross-hatching in **Figures 6-1 to 6-6** are permanently low and wet or severely sloped. These areas should be cleared of further archaeological concern.
- 4) Areas marked in orange and green cross-hatching in **Figure 6-5** were subject to Stage 2 assessment and require additional Stage 3 archaeological assessment prior to any ground disturbance. Recommendations for these areas are as follows:
- 5) If it cannot be avoided by future construction, the P1 site (AjGw-646) in **Supplementary Documentation: Figure 2** site should be subject to Stage 3 AA. The Stage 3 assessment should consist of both the controlled surface pick-up and hand excavated test unit methodology as outlined in Section 3.2 as well as Table 3.1, as found in the *Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011). Prior to conducting the field work, the area should be re-ploughed and allowed to weather for the controlled surface

pick-up. The test unit excavation should consist of one metre by one metre square test units laid out in a five metre grid and should be excavated by hand to a depth of five centimetres within the subsoil. Additional test units (representing 20% of the initial grid) should be excavated in areas of interest within the site extent. The monitoring work should be conducted with the engagement of the Mississaugas of the Credit First Nation and other Indigenous groups expressing interest in the archaeological resources of the area.

- 6) If it cannot be avoided by future construction, the P2 site (AjGw-647) in **Supplementary Documentation: Figure 2** should be subject to Stage 3 AA. The Stage 3 assessment should consist of the hand excavated test unit methodology as outlined in Section 3.2 as well as Table 3.1, as found in the *Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011). The test unit excavation should consist of one metre by one metre square test units laid out in a five metre grid and should be excavated by hand to a depth of five centimetres within the subsoil. Additional test units (representing 20% of the initial grid) should be excavated in areas of interest within the site extent. The monitoring work should be conducted with the engagement of the Mississaugas of the Credit First Nation and other Indigenous groups expressing interest in the archaeological resources of the area.
- 7) If it cannot be avoided by future construction, the H1 site (AjGw-648) in **Supplementary Documentation: Figure 2** should be subject to Stage 3 AA. The Stage 3 assessment should consist of the hand excavated test unit methodology as outlined in Section 3.2 as well as Table 3.1, as found in the *Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011). The test unit excavation should consist of one metre by one metre square test units laid out in a five metre grid and should be excavated by hand to a depth of five centimetres within the subsoil. Additional test units (representing 20% of the initial grid) should be excavated in areas of interest within the site extent. Site specific land registry research to supplement the previous background study concerning the land use and occupation history should also be conducted as part of the Stage 3 assessment. The monitoring work should be conducted with the engagement of the Mississaugas of the Credit First Nation and other Indigenous groups expressing interest in the archaeological resources of the area.

6. Advice on Compliance with Legislation

This report is submitted to the Ontario Minister of Tourism, Culture and Sport as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, R.S.O. 1990, c 0.18. The report is reviewed to ensure that it complies with the standards and guidelines that are issued by the Minister, and that the archaeological fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario. When all matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the Ministry of Heritage, Sport, Tourism and Culture Industries, a letter will be issued by the ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development.

It is an offence under Sections 48 and 69 of the *Ontario Heritage Act* for any party other than a licensed archaeologist to make any alteration to a known archaeological site or to remove any artifact or other physical evidence of past human use or activity from the site, until such time as a licensed archaeologist has completed fieldwork on the site, submitted a report to the Minister stating that the site has no further cultural heritage value or interest, and the report has been filed in the Ontario Public Register of Archaeology Reports referred to in Section 65.1 of the *Ontario Heritage Act*.

Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48(1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48(1) of the *Ontario Heritage Act*.

Archaeological sites recommended for further archaeological fieldwork or protection remain subject to section 48 (1) of the *Ontario Heritage Act* and may not be altered, or have artifacts removed from them, except by a person holding an archaeological license.

The *Funeral, Burial and Cremation Services Act*, 2002, S.O. 2002, c.33 (when proclaimed in force in 2012) require that any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries at the Ontario Ministry of Government and Consumer Services.

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8. Images

8.1 Fieldwork Photos



Photo 1: Crew test pitting at 10m intervals to confirm disturbance within Area 3 (Crossing 3), note the slope up to the area; view east



Photo 2: Example of disturbed test pit within Area 3 (Crossing 3); view down



Photo 3: Overview of Area 3 (Crossing 3); view southeast



Photo 4: Overview of Area 4.1 (Crossing 4); view east



Photo 5: Example of a disturbed test pit in Area 4.1; view down



Photo 6: Crew at work test pitting Area 4.1 at 10m intervals; view southwest



Photo 7: Overview of Area 4.1; view south



Photo 8: Overview of graded and disturbed area along the parking lot in Area 4.1; view north



Photo 9: Example of the disturbance found within Area 4.1; view northeast



Photo 10: Culvert located within Area 4.2; view down



Photo 11: Slope down to culvert within Area 4.2; view northwest



Photo 12: Utility box found within Area 4.2; view west



Photo 13: Disturbed test pit located within Area 4.2; view down



Photo 14: Overview of the eastern portion of Area 4.2; view east



Photo 15: Example of disturbed test pit in the manicured portion of 4.2; view down



Photo 16: Overview of disturbance in Area 4.2; view northwest



Photo 17: Overview of the grading and disturbance found within Area 5.1 (Crossing 6); view north



Photo 18: Crew at work test pitting at 10m intervals; view west



Photo 19: Overview of surface disturbance in Area 5.1; view south



Photo 20: Example of disturbed test pit found within Area 5.1; view down



Photo 21: Overview of Area 5.1; view south



Photo 22: Buried utilities located throughout Area 5.1; view down



Photo 23: Overview of Area 5.2 (Crossing 6); view west



Photo 24: Example of disturbance and grading found within Area 5.2; view south



Photo 25: Example of disturbed test pit in Area 5.2; view down



Photo 26: Overview of grading and ditching in Area 5.2; view south



Photo 27: Severe slope and disturbance within Area 5.3 west of Derry Road; view south



Photo 28: Overview of the slope located along Syntex Court in Area 6.1 (Crossing 7); view west



Photo 29: Example of disturbed test pit within Area 6.1; view down



Photo 30: Crew at work test pitting at 10m intervals in Area 6.3 to confirm disturbance; view south



Photo 31: Example of disturbed test pit located within Area 6.3; view down



Photo 32: Driveway within Area 6.3; view northeast



Photo 33: Example of disturbance and grading in Area 6.2 (Crossing 8); view north



Photo 34: Evidence of buried utilities in Area 6.2; view northwest



Photo 35: Example of disturbed test pit within Area 6.2; view down



Photo 36: Overview of Area 6.2; view northeast



Photo 37: Example of the severe slope found in Area 6.2; view southwest



Photo 38: Overview of Area 6.1 (Crossing 8) showing low and wet area; view south



Photo 39: Example of a typical test pit within area test pitted at 5m intervals in Area 6.1; view down



Photo 40: Crew at work completing pedestrian survey at 5 m intervals in Area 7.1 (Crossing 11); view southwest



Photo 41: Typical conditions encountered in Area 7.1; view down



Photo 42: Crew at work intensifying around findspot; view southeast



Photo 43: Overview of the study area; view northeast



Photo 44: Crew completing pedestrian survey of field west of the tree line; view east



Photo 45: Overview of the study area found on the west side of the tree line; view west



Photo 46: Overview of the graded and manicured lawn within Area 9 (Crossing 1); view north



Photo 47: Overview of the graded and manicured lawn within Area 9 (Crossing 1); view east



Photo 48: Crew at work test pitting at 10 m intervals to confirm disturbance; view southeast



Photo 49: Example of disturbed test pits found in Area 9; view down



Photo 50: Overview of study area showing mounding, slope and low and wet area; view southeast



Photo 51: Overview of Area 7.2; view east



Photo 52: Crew at work test pitting Area 7.2; view northwest



Photo 53: Typical test pit from Area 7.2; view down



Photo 54: Recently planted saplings by the City of Mississauga; view down



Photo 55: Plan view of Test Unit 1 at the P2 site (AjGw-647); view down



Photo 56: Profile view of Test Unit 1 at the P2 site (AjGw-647); view down



Photo 57: Plan view of Test Unit 2 at the P2 site (AjGw-647); view down



Photo 58: Profile view of Test Unit 2 at the P2 site (AjGw-647); view down

8.2 Artifact Photos





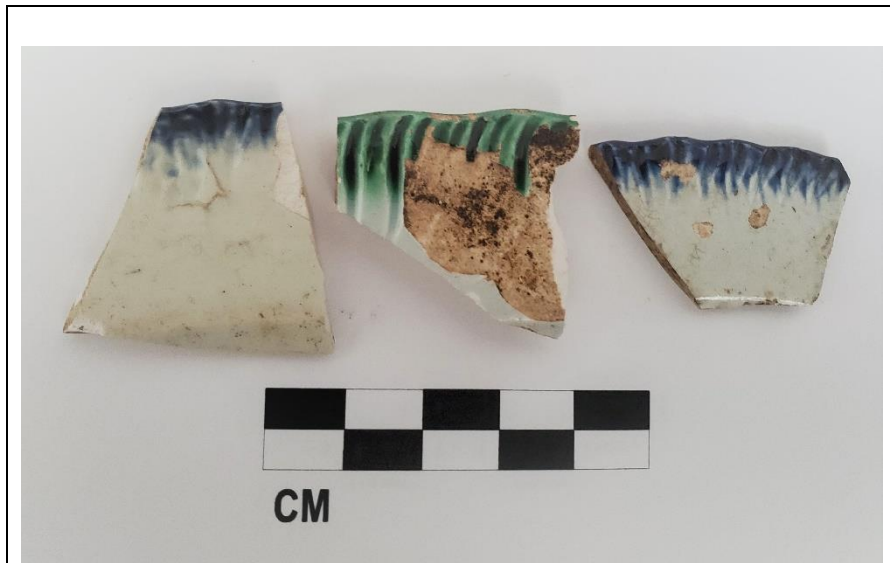


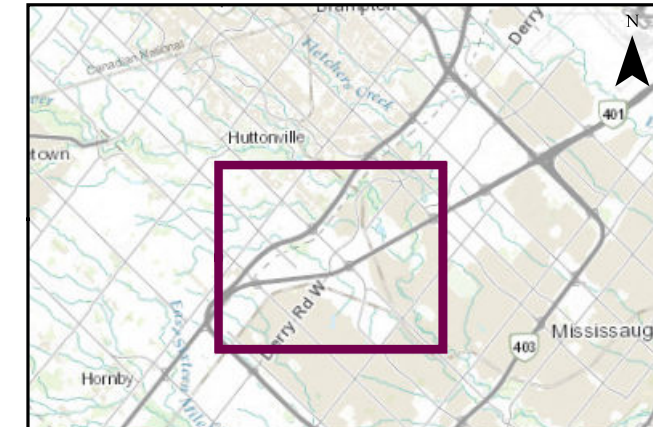
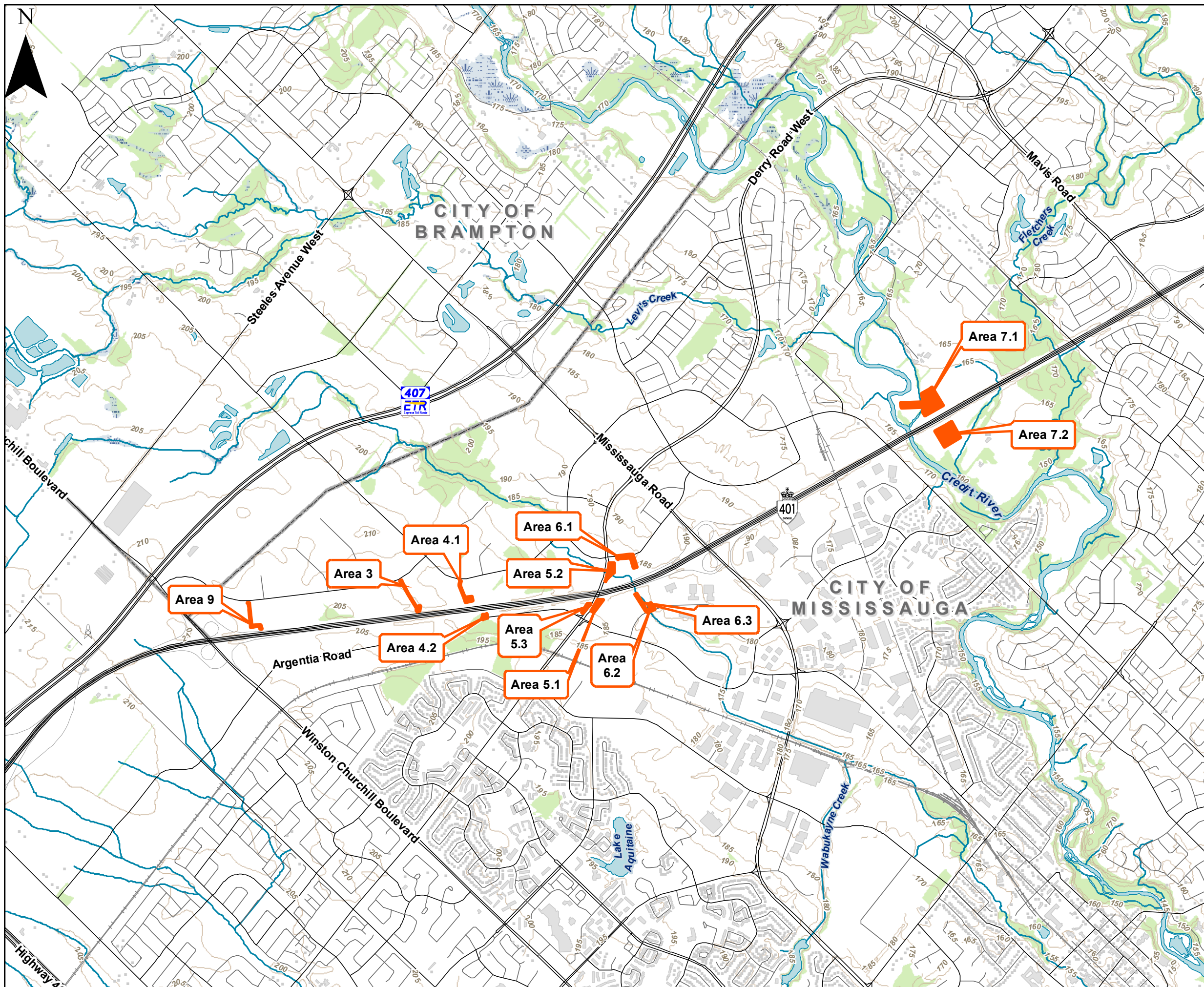
Plate 5: Representative Sample of the H1 Site (AjGw-648): Left: RWE, blue edged ware (Cat.47), Pearlware, green edged ware (Cat.48), RWE, blue edged ware (Cat.49).















Plate 6: Representative Sample of the H1 Site (AjGw-648): Left: Onondaga, biface thinning flake (Cat.130), Onondaga, flake fragment (Cat.134), Onondaga, flake fragment (Cat.126).

9. Figures

All figures pertaining to the Stage 2 archaeological assessment for the Highway 401 Crossings in the City of Mississauga, Region of Peel, Ontario are provided on the following pages.



Legend

-  Sites
 -  Tower
 -  Freeway
 -  Major Road
 -  Local Road
 -  Ramp
 -  Railway
 -  Contour (5m intervals)
 -  Watercourse
 -  Waterbody
 -  Wetland
 -  Wooded Area
- 0 250 500 1,000 1,500
Meters

**Stage 2 Archaeological Assessment
Region of Peel 401 Crossings**

Site Locations

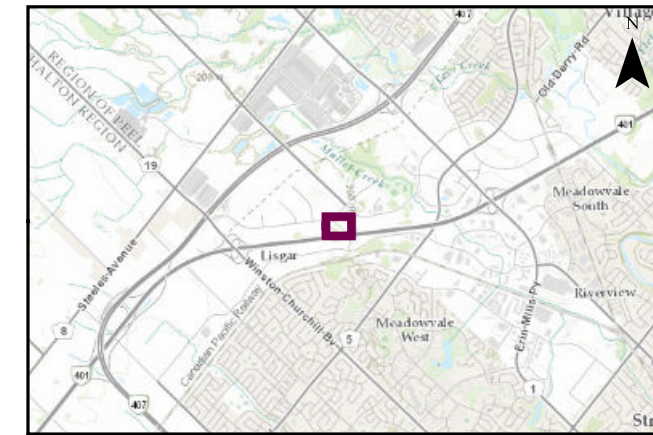
Nov 2020	1:25,000	Datum: NAD 1983 UTM Zone 17N Source: LIO
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AECOM

Figure 1

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Map location: C:\Users\Stephanie.Couette\Desktop\ArchProj\Stage2\Design\01_Reports\Stage_2_401\Figures_1_RegionalMap.mxd
Date saved: 11/02/2020 11:22:11 AM



Legend

 Study Area 3

0 10 20 40 60



Meters

**Stage 2 Archaeological Assessment
Region of Peel - 401 Crossings**

Study Area 3

Nov 2020

1:1,000

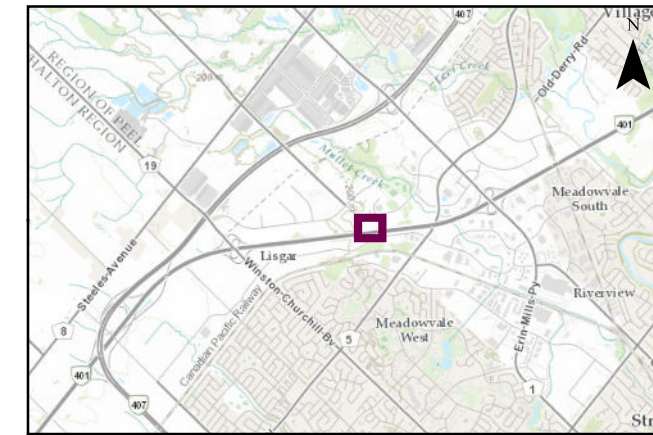
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Source: LIO

AECOM

Figure 2-1

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Map location: C:\Users\Stephanie.Couette\Desktop\ArchProj\Reports\Stage_2_401_Crossings\Study Area 3.mxd
Date saved: 11/02/20 11:30:22 AM



Legend

 Study Areas 4.1 and 4.2

0 10 20 40 60



Meters

**Stage 2 Archaeological Assessment
Region of Peel - 401 Crossings**

Study Areas 4.1 and 4.2

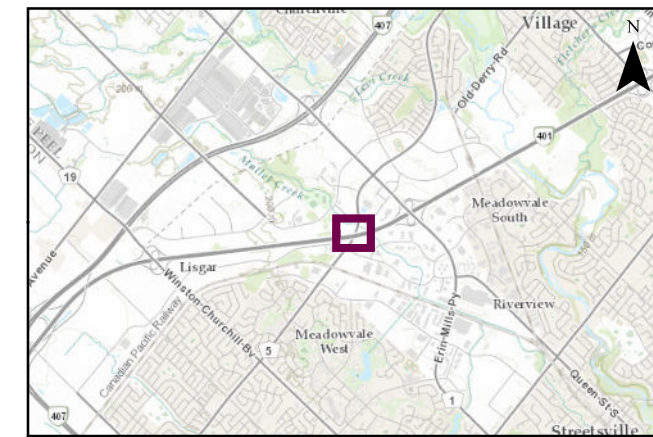
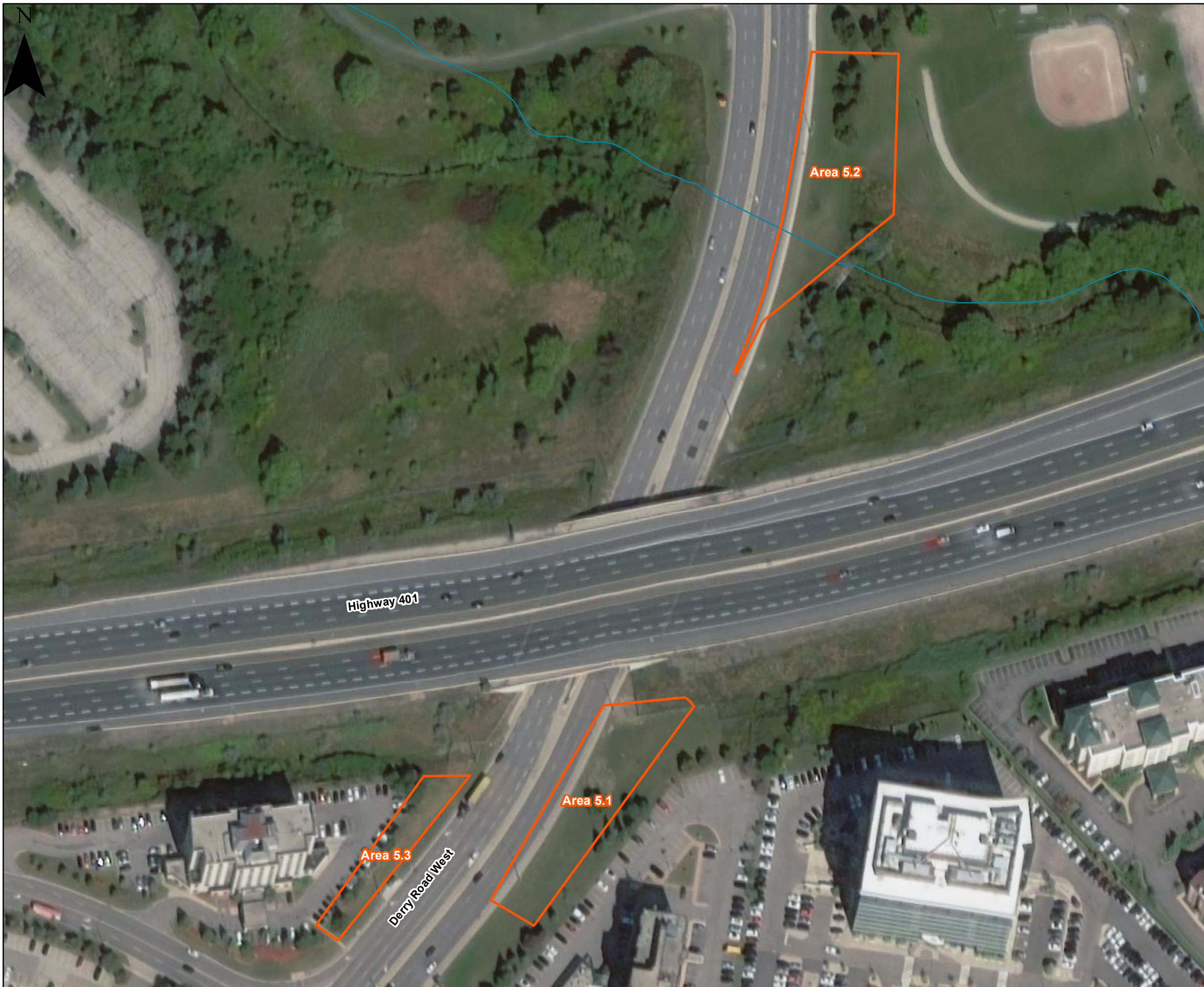
Nov 2020	1:1,000	Datum: NAD 1983 UTM Zone 17N Source: LIO
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AECOM

Figure 2-2

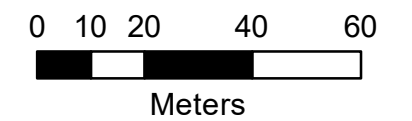
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Map location: C:\Users\Stephane\OneDrive\Work\Projects\66804572\Design\01_Report\66804572_01\Figures\Figure 2-2_StudyArea4.mxd
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Legend

 Study Areas 5.1, 5.2 and 5.3



**Stage 2 Archaeological Assessment
Region of Peel - 401 Crossings**

Study Areas 5.1, 5.2 and 5.3

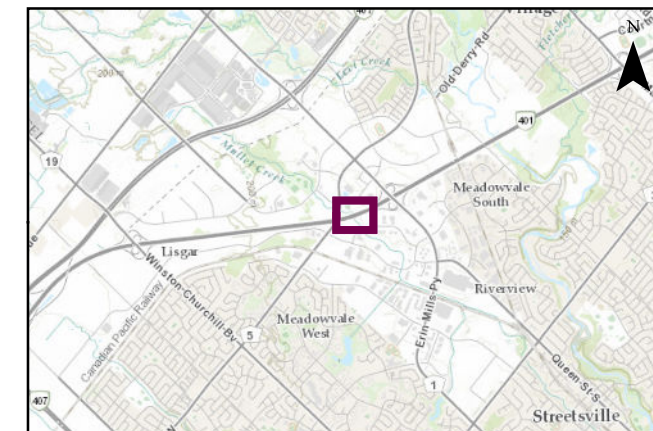
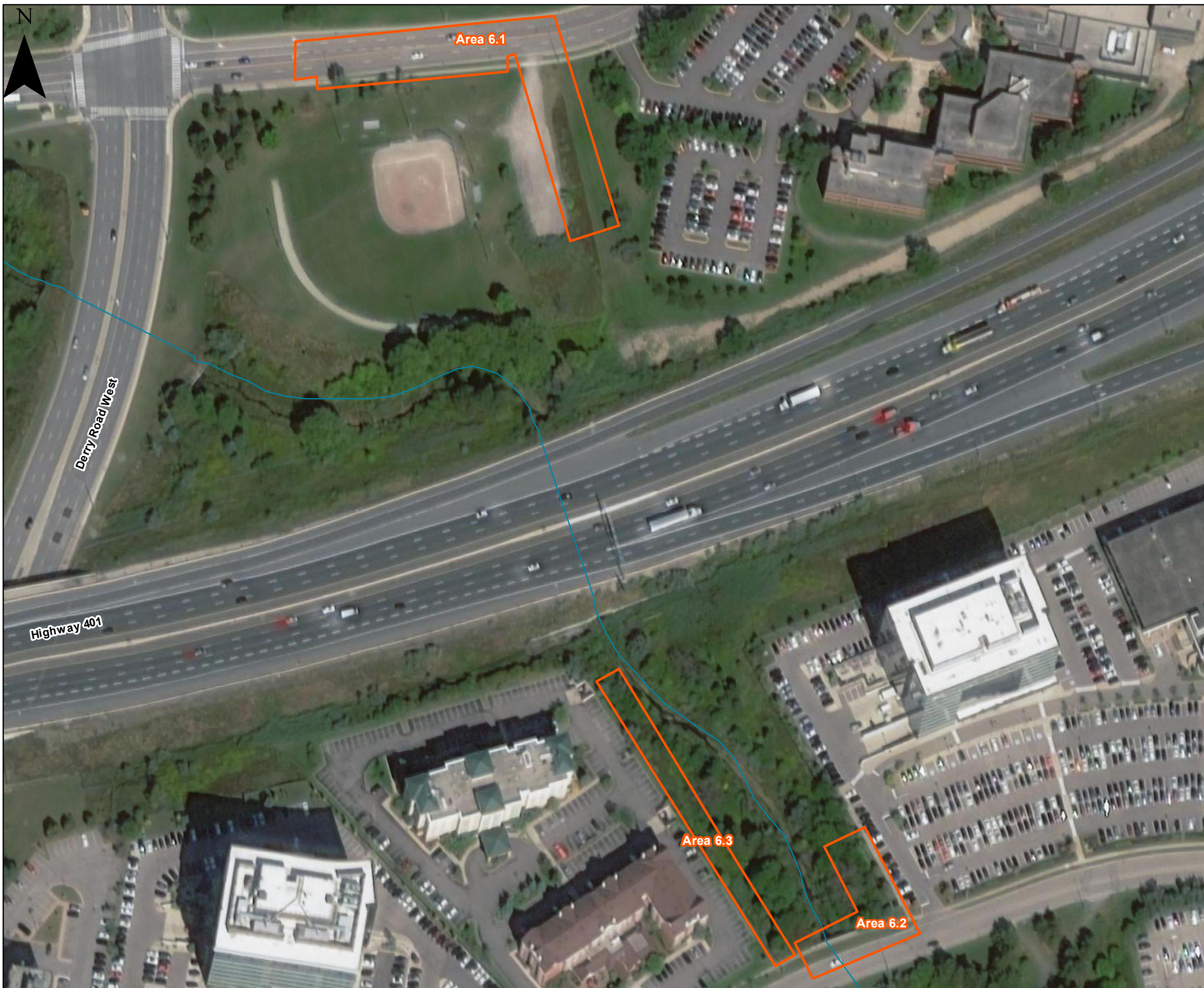
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AECOM

Figure 2-3

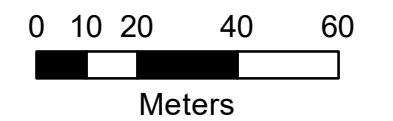
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Map location: C:\Users\Stephanie\OneDrive\Work\Projects\66804572\Design\01_Report\Stage2_401\Figures_Study_Areas.mxd Date saved: 11/02/2020 11:40:20 AM



Legend

 Study Areas 6.1, 6.2 and 6.3



**Stage 2 Archaeological Assessment
Region of Peel - 401 Crossings**

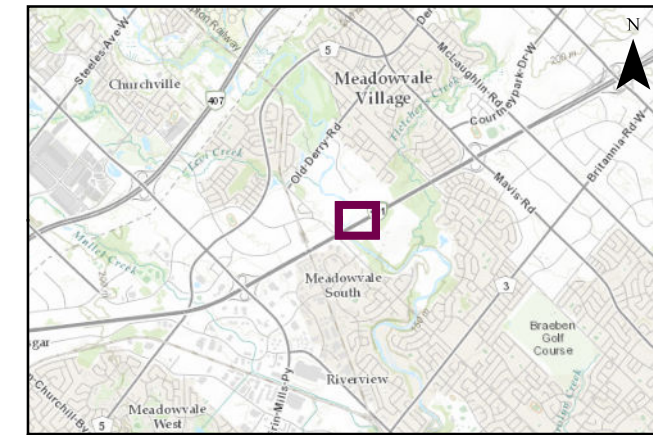
Study Areas 6.1, 6.2 and 6.3

Nov 2020	1:1,500	Datum: NAD 1983 UTM Zone 17N Source: LIO
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AECOM

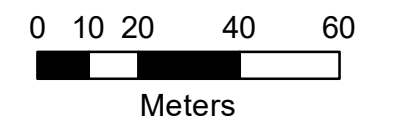
Figure 2-4

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Legend

 Study Areas 7.1 and 7.2



**Stage 2 Archaeological Assessment
Region of Peel - 401 Crossings**

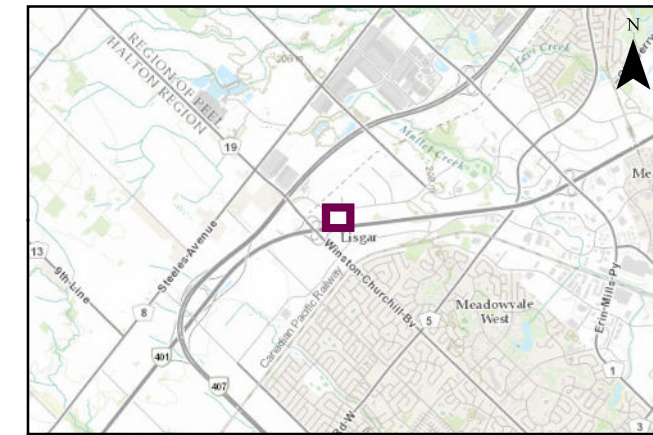
Study Areas 7.1 and 7.2

Nov 2020	1:1,500	Datum: NAD 1983 UTM Zone 17N Source: LIO
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AECOM

Figure 2-5

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Legend

 Study Area 9



**Stage 2 Archaeological Assessment
Region of Peel - 401 Crossings**

Study Area 9

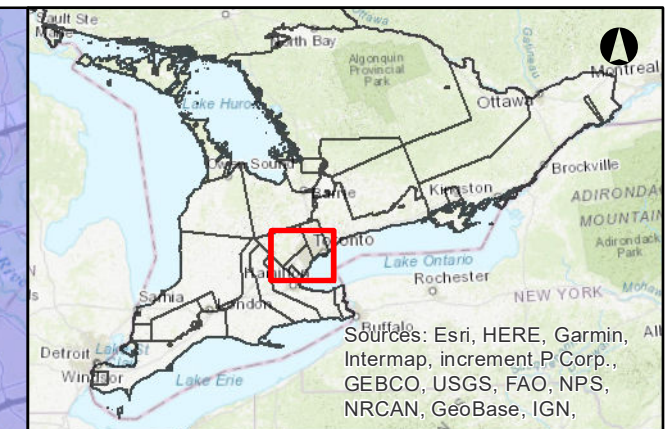
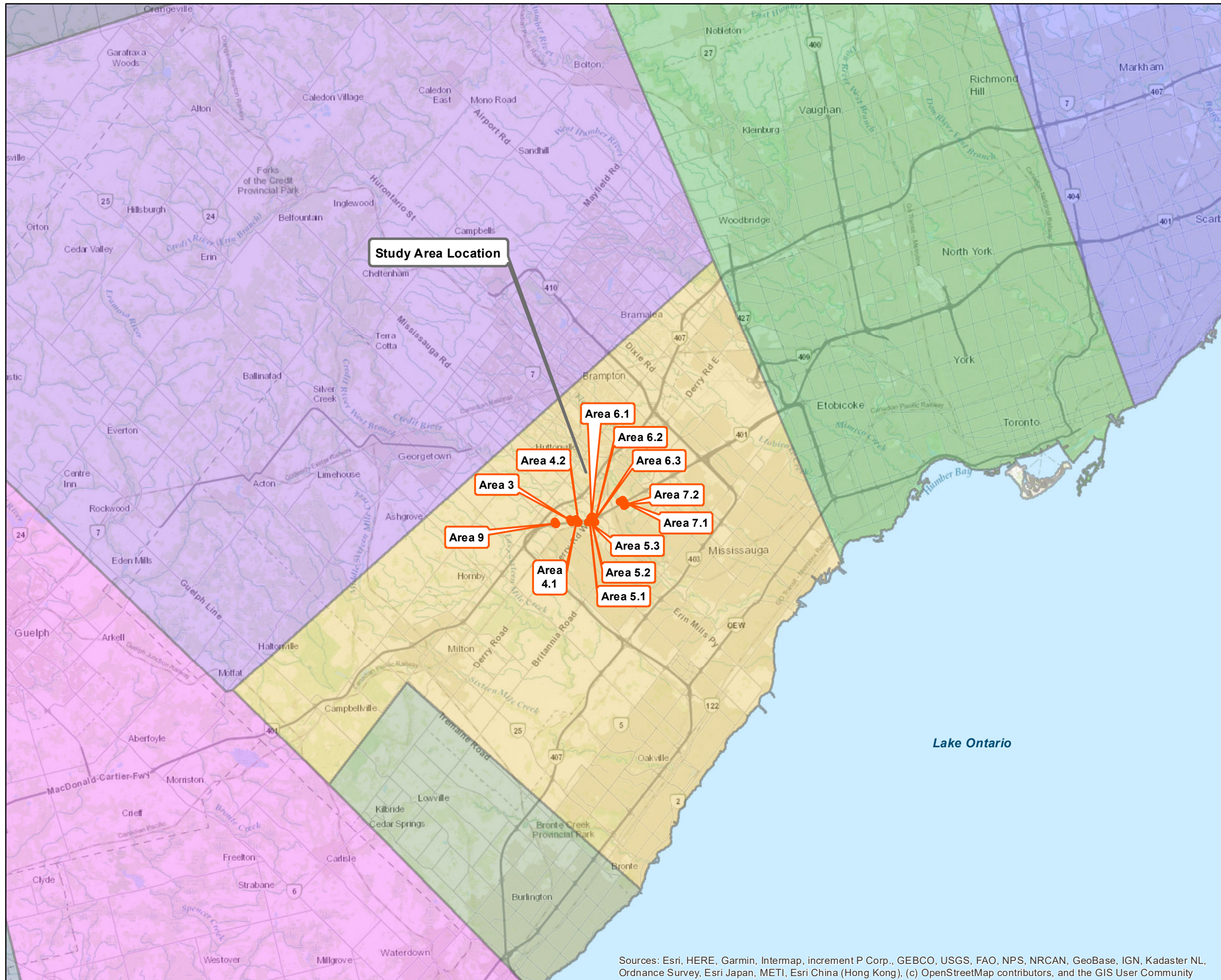
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AECOM

Figure 2-6

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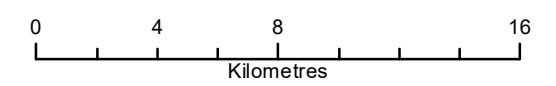
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Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN,

Legend

- Study Area
 - First Nations
- Treaties**
- Ajetance Purchase, Treaty 19, October 28, 1818
 - Between the Lakes Purchase, Treaty 3, December 2, 1792
 - Brant Tract, Treaty 3 3/4, October 24, 1795
 - Crown Grant to the Six Nations or Haldimand Tract, Treaty 4, January 14, 1793
 - Head of the Lake Purchase, Treaty 13A, August 2, 1805
 - Johnson-Butler Purchase, Signed 1787-1788
 - Nottawasaga Purchase, Treaty 18, October 17, 1818
 - Toronto Purchase, Treaty 13, August 1, 1805



**Stage 2 Archaeological Assessment
Region of Peel - 401 Crossings**

Ontario Treaties Map

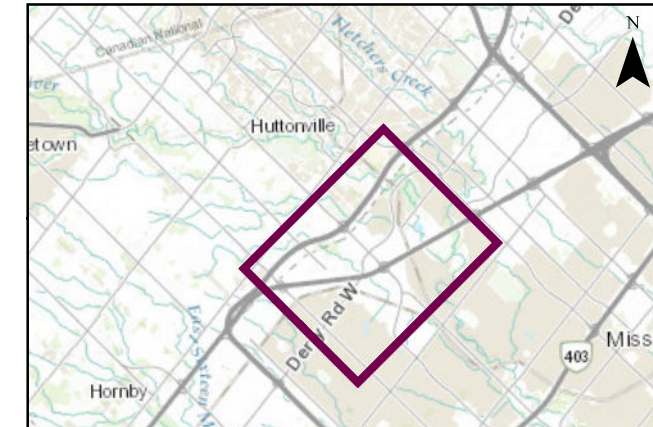
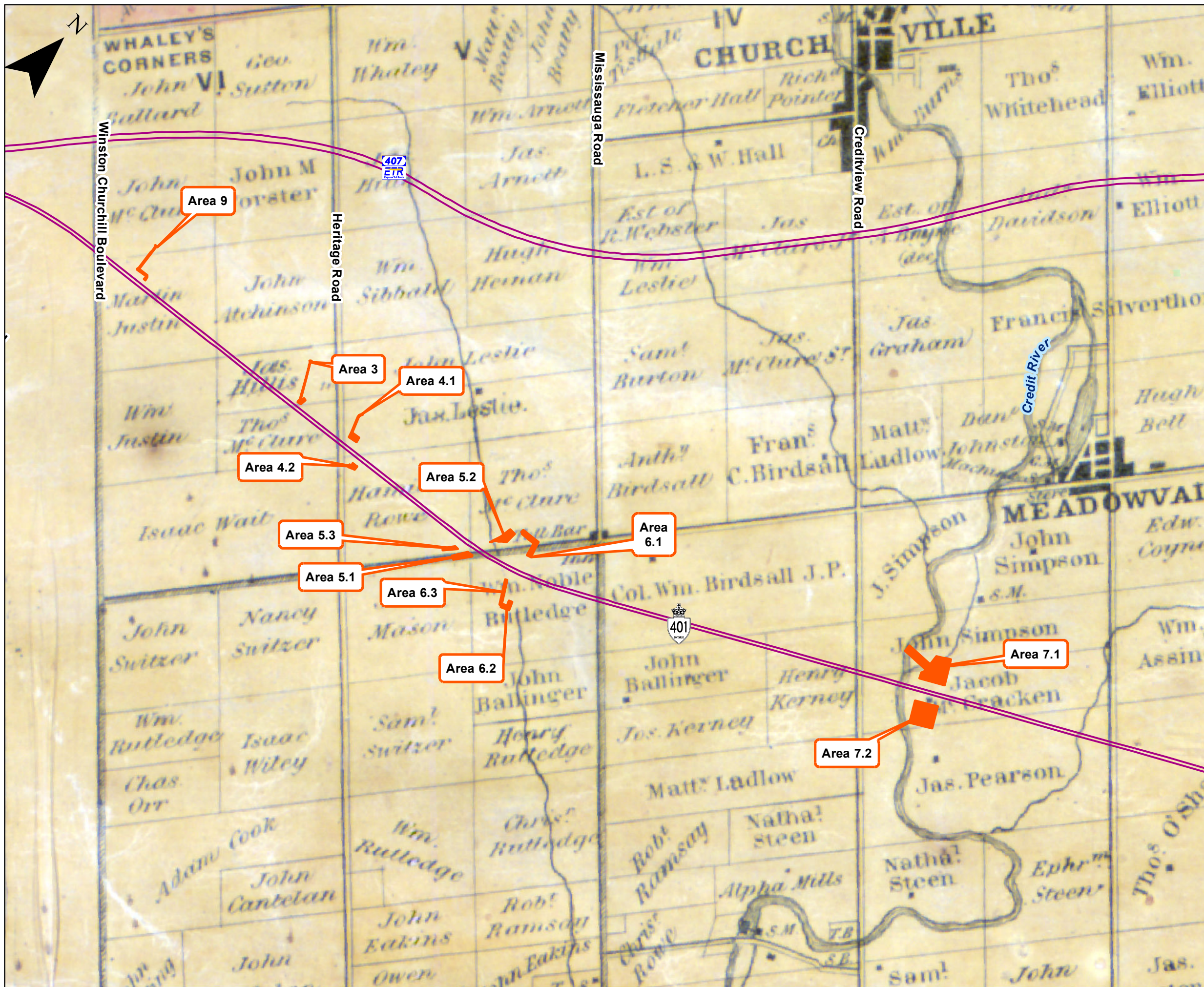
November 2020	1:250,000	Datum: NAD83 UTM17 Source: www.ontario.ca/page/map-ontario-treaties-and-reserves#17
P#: 60537129	V#:	



Figure 3

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

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Legend

Study Area

0 250 500 1,000 1,500
Meters

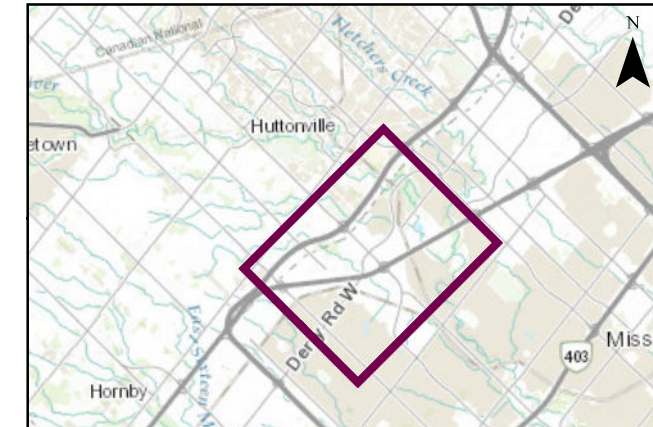
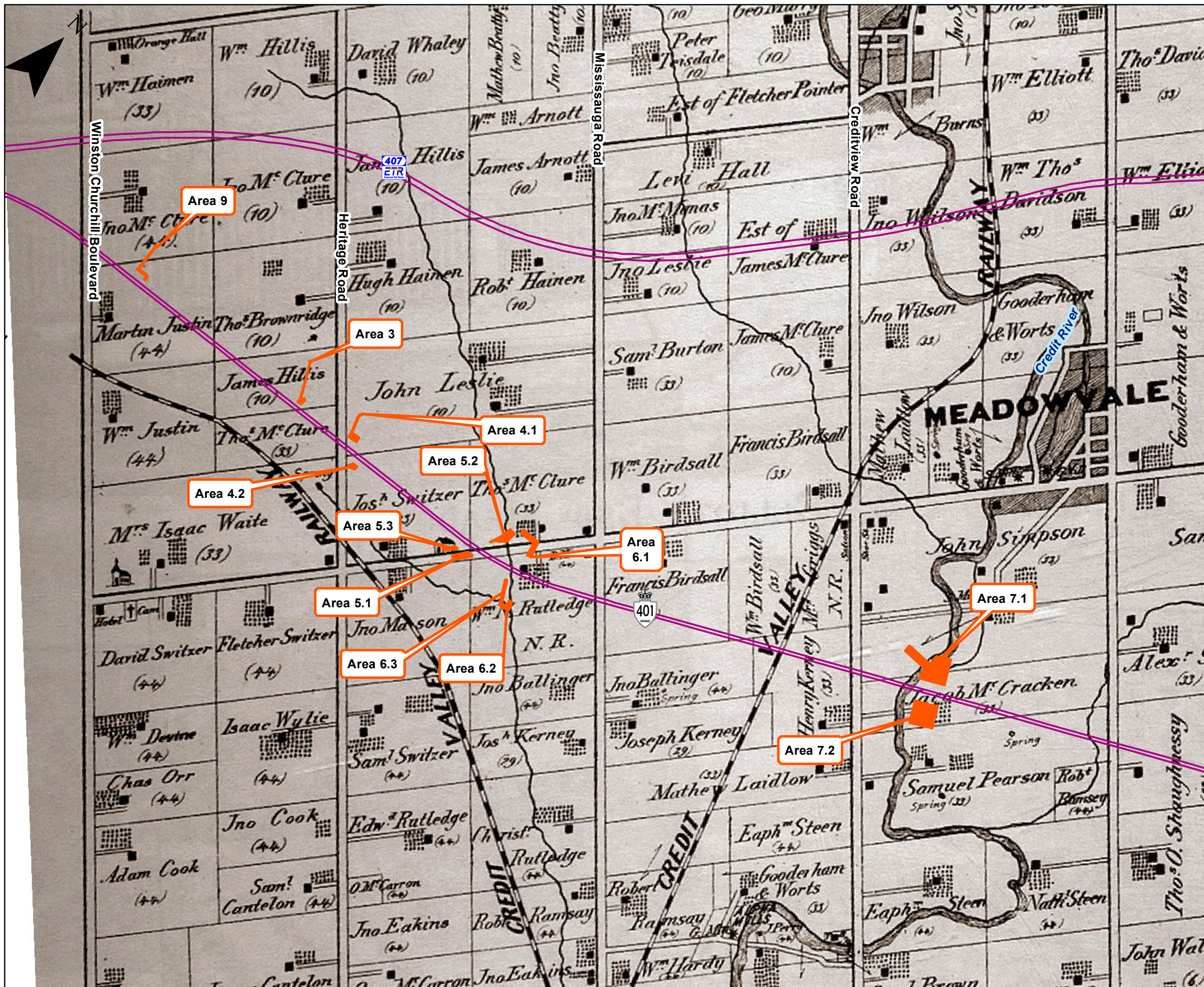
**Stage 2 Archaeological Assessment
Region of Peel - 401 Crossings**

Study Areas in relation to the 1859
Tremaine Map of Peel County

Dec 2020	1:20,000	Datum: NAD 1983 UTM Zone 17N Sources: https://digital.library.mcgill.ca/countyatlas/peel.htm & LIO
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AECOM **Figure 4**

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Legend

Study Area

0 250 500 1,000 1,500
Meters

**Stage 2 Archaeological Assessment
Region of Peel - 401 Crossings**

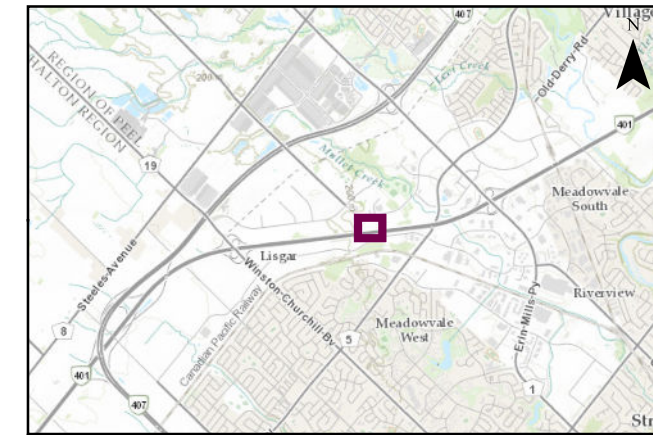
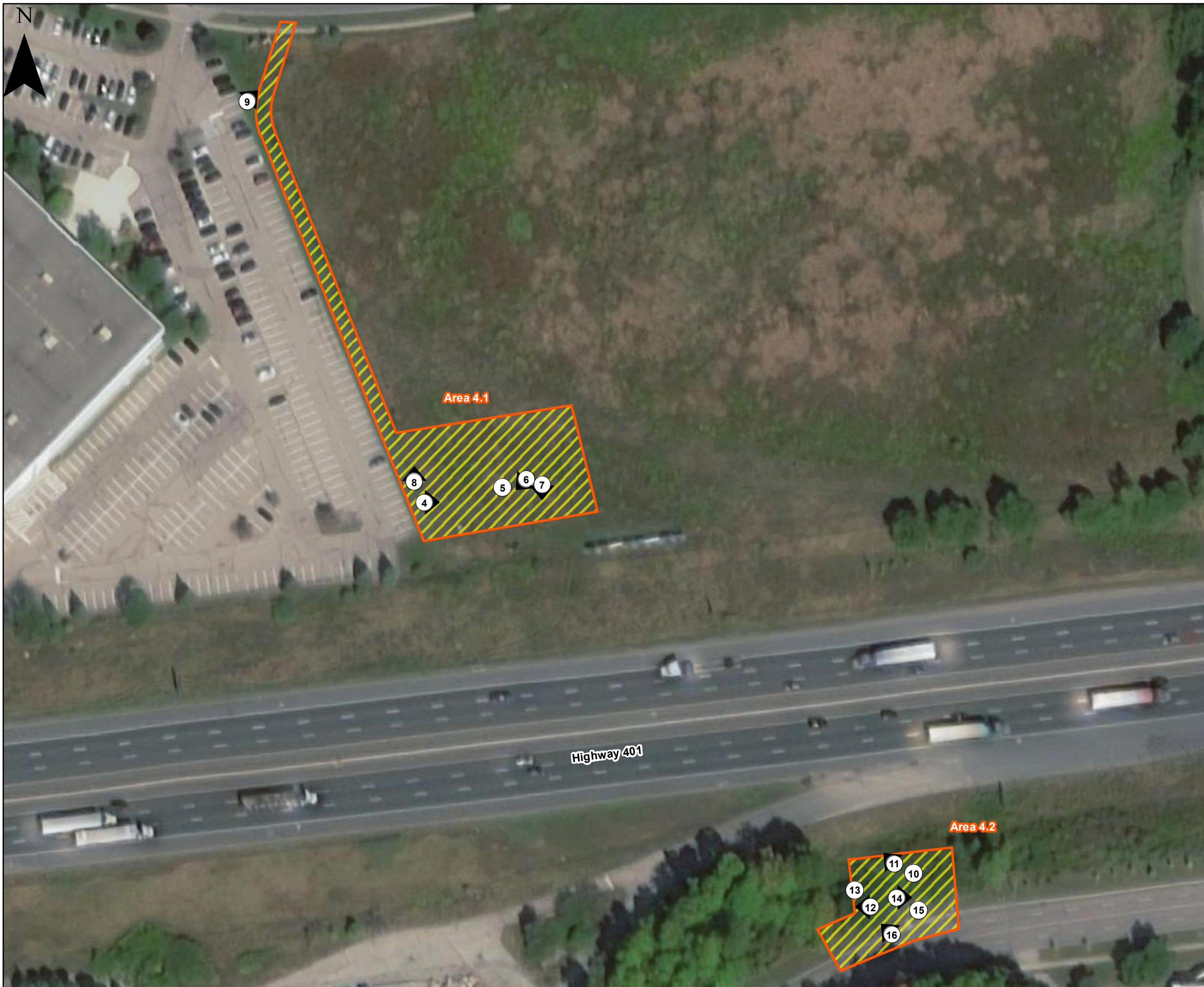
Study Areas in relation to the 1877
Historic Atlas Map of North Toronto

Dec 2020	1:20,000	Datum: NAD 1983 UTM Zone 17N Sources: https://digital.library.mcgill.ca/countyatlas/peel.htm & LIO
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AECOM Figure 5

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C:\Users\jstewart\OneDrive\Documents\Projects\60604572\Design\01_Region\Stage_2_401\Figures\Figures_1677.mxd
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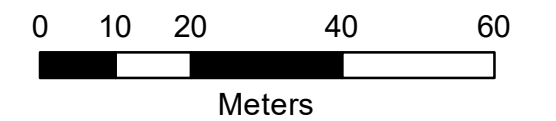


Legend

- Study Areas 4.1 and 4.2
- Photo Location - Ground Shot
- N
 Photo Location and Direction

Results

- Test Pitted at 10m Intervals - Disturbed



**Stage 2 Archaeological Assessment
Region of Peel - 401 Crossings**

Study Areas 4.1 and 4.2 Results
and Photo Locations

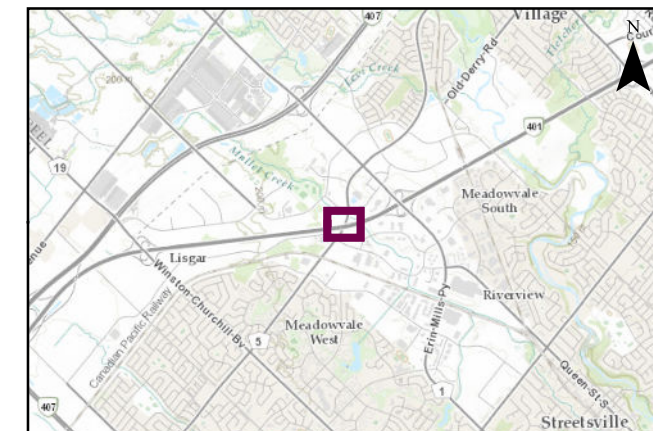
Nov 2020	1:1,000	Datum: NAD 1983 UTM Zone 17N Source: LIO
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AECOM

Figure 6-2

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Map location: C:\Users\Stephanie.Courner\Desktop\Archeo\Projects\60605720\Design\01_Reports\Stage_2_401\Figures\Figure_02_StudyAreaResults.mxd Date saved: 11/02/2020 11:16:21 AM



Legend

Study Areas 5.1, 5.2 and 5.3

Photo Location - Ground Shot

Photo Location and Direction

Results

Test Pitted at 10m Intervals - Disturbed

Test Pitted at 5m Intervals - Disturbed

Visually Assessed as Disturbed

0 10 20 40 60

Meters

**Stage 2 Archaeological Assessment
Region of Peel - 401 Crossings**

Study Areas 5.1, 5.2 and 5.3 Results
and Photo Locations

Nov 2020

1:1,300

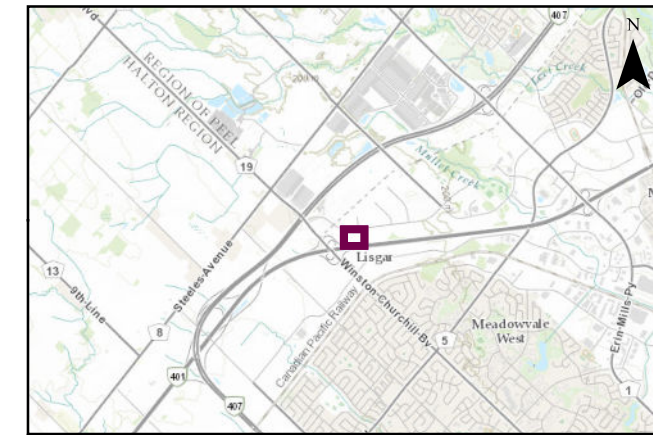
Datum: NAD 1983 UTM Zone 17N
Source: LIO

AECOM

Figure 6-3

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Map location: C:\Users\james\OneDrive\Documents\Projects\401_Crossings\Stage_2_401F\figure6-3_StudyAreasResults.mxd Date saved: 11/02/2020 11:28:30 AM



Legend

- Study Areas 9
- Photo Location - Ground Shot
- Photo Location and Direction
- Test Pitted at 10m Intervals - Disturbed

Results

- Test Pitted at 10m Intervals - Disturbed



**Stage 2 Archaeological Assessment
Region of Peel - 401 Crossings**

Study Areas 9 Results
and Photo Locations

Nov 2020	1:850	Datum: NAD 1983 UTM Zone 17N Source: LIO
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AECOM

Figure 6-6

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Map location: C:\Users\Shayma\OneDrive\Documents\401_Crossings\401_Crossings\Stage_2_401_Crossings\Stage_2_401_Crossings_Results.mxd
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10. Catalogue

Table 10: Pre-Contact Artifact Catalogue from the P1 site (AjGw-646)

Site Type	Findspot	Cat#	Artifact Type	Material	Debitage Description	N	Comments
Scatter	Flake 24	1	Debitage	Selkirk	Primary Reduction Flake	1	
Scatter	Flake 12 + 13 + 14	2	Debitage	Onondaga	Flake Fragment	2	
Scatter	Flake 12 + 13 + 14	3	Debitage	Onondaga	Biface Thinning Flake	1	
Scatter	Flake 18 + 19 + 20	4	Debitage	Onondaga	Biface Thinning Flake	1	
Scatter	Flake 18 + 19 + 20	5	Debitage	Onondaga	Flake Fragment	2	
Scatter	Flake 10	6	Debitage	Onondaga	Primary Reduction Flake	1	
Scatter	Flake 22 + 23	7	Debitage	Onondaga	Primary Reduction Flake	1	
Scatter	Flake 22 + 23	8	Debitage	Onondaga	Bipolar Flake	1	
Scatter	Flake 16 + 17	9	Debitage	Onondaga	Edge Retouch Flake	1	
Scatter	Flake 16 + 17	10	Debitage	Onondaga	Flake Fragment	2	
Scatter	Flake 6	11	Debitage	Onondaga	Flake Fragment	1	
Scatter	Flake 26	12	Debitage	Onondaga	Flake Fragment	1	
Scatter	Flake 11	13	Debitage	Onondaga	Secondary Reduction Flake	1	retouch; thumbscraper
Scatter	Flake 21	14	Debitage	Onondaga	Secondary Reduction Flake	1	
Scatter	Flake 27	15	Debitage	Onondaga	Flake Fragment	1	
Scatter	Flake 2	16	Debitage	Onondaga	Secondary Reduction Flake	1	
Scatter	Flake 9	17	Debitage	Onondaga	Biface Thinning Flake	1	
Scatter	Flake 28	18	Debitage	Onondaga	Flake Fragment	1	
Scatter	Flake 25	19	Debitage	Onondaga	Biface Thinning Flake	1	
Scatter	Flake 3 + 4	20	Debitage	Onondaga	Flake Fragment	1	
Scatter	Flake 3 + 4	21	Debitage	Onondaga	Primary Reduction Flake	1	
Scatter	Flake 15	22	Debitage	Onondaga	Flake Fragment	1	
Scatter	Flake 7 + 8	23	Debitage	Onondaga	Bipolar Flake	1	
Scatter	Flake 7 + 8	24	Debitage	Onondaga	Secondary Reduction Flake	1	
Scatter	Flake 5	25	Debitage	Onondaga	Biface Thinning Flake	1	

Site Type	Findspot	Cat#	Artifact Type	Material	Debitage Description	N	Comments
Scatter	Flake 1	26	Debitage	Onondaga	Flake Fragment	1	

Table 11: Euro-Canadian Ceramic Artifact Catalogue from the H1 Site (AjGw-648)

TP #	Top Depth (cm)	Bottom Depth (cm)	Cat#	Identification Category	Artifact Description	Ceramic Ware	Ceramic Description & Technique	Portion	N	Begin Date	End Date	Comments
2	0	36	20	Tableware		RWE	Blue Painted Band	Body	1	1830		small fragment
2	0	36	21	Tableware	Unidentifiable	RWE	Brown Transfer Print	Body	1	1830		burnt
2	0	36	22	Tableware	Unidentifiable	RWE	Flow Blue	Body	2	1845	1900	
2	0	36	23	Household Item	Utilitarian Ware	Refined Red Earthenware	Unglazed	Body	4			
2	0	36	24	Tableware	Unidentifiable	RWE	Blue Transfer Print	Body	2	1830		floral motif; small fragments
2	0	36	25	Tableware	Unidentifiable	RWE	Undecorated	Body	2	1830		
2	0	36	26	Tableware	Unidentifiable	Semi-Porcelain	Moulded	Incomplete	1			possible figurine fragment?
2	0	36	29	Household Item	Utilitarian Ware	Refined Red Earthenware	Brown Glazed	Body	6			
3	0	34	112	Tableware	Unidentifiable	RWE	Flow Black	Body	1	1845	1900	
3	0	34	118	Tableware	Unidentifiable	Ironstone	Undecorated	Body	1	1855		
3	0	34	120	Tableware	Unidentifiable	RWE	Undecorated	Body	4	1830		
3	0	34	122	Household Item	Utilitarian Ware	Refined Red Earthenware	Clear Glazed	Body	6			
3	0	34	123	Tableware	Unidentifiable	RWE	Brown Painted Band	Rim	2	1830		
4	0	33	98	Tableware	Unidentifiable	RWE	Undecorated	Body	4	1830		
4	0	33	101	Household Item	Utilitarian Ware	Refined Red Earthenware	Brown Glazed	Body	1			small fragment
4	0	33	103	Tableware	Unidentifiable	RWE	Blue Partial Design	Rim	1	1830		exfoliated
4	0	33	104	Tableware	Unidentifiable	Ironstone	Decal ware	Rim	1	1855		faded floral motif

TP #	Top Depth (cm)	Bottom Depth (cm)	Cat#	Identification Category	Artifact Description	Ceramic Ware	Ceramic Description & Technique	Portion	N	Begin Date	End Date	Comments
5	0	37	15	Household Item	Utilitarian Ware	Refined Red Earthenware	Brown Glazed	Body	3			
5	0	37	16	Household Item	Utilitarian Ware	Refined Red Earthenware	Unglazed	Body	1			
5	0	37	17	Tableware	Unidentifiable	RWE	Blue Sponged	Body	1	1843	1885	small fragment
5	0	37	19	Tableware	Unidentifiable	RWE	Blue & Brown, Banded ware	Body	2	1830	1850	small exfoliated fragments
6	0	25	69	Tableware	Unidentifiable	RWE	Blue Partial Design	Body	1	1830		small exfoliated fragment
7	0	33	30	Tableware	Unidentifiable	RWE	Black Painted Band	Body	1	1830		small fragment
7	0	33	31	Tableware	Unidentifiable	RWE	Blue Transfer Print	Body	1	1830		small fragment
7	0	33	32	Tableware	Unidentifiable	RWE	Red Transfer Print	Body	1	1830		geometric motif
7	0	33	33	Tableware	Unidentifiable	RWE	Green & Black, Hand painted	Body	1	1830		floral motif with black stem
7	0	33	34	Tableware	Unidentifiable	RWE	Red Hand painted	Body	1	1830		floral motif
7	0	33	35	Tableware	Unidentifiable	RWE	Brown Hand painted	Body	1	1830		floral motif
7	0	33	36	Household Item	Utilitarian Ware	Refined Red Earthenware	Brown Glazed	Body	1			exfoliated
7	0	33	44	Tableware	Unidentifiable	RWE	Undecorated	Body	9	1830		
7	0	33	45	Tableware	Unidentifiable	RWE	Blue Sponged	Rim - Body	5	1843	1885	
7	0	33	46	Tableware	Unidentifiable	RWE	Brown Painted Band	Rim	1	1830		painted band on edge of rim
7	0	33	47	Tableware	Unidentifiable	RWE	Blue Edged	Rim	1	1800	1850	scalloped rim with incising and

TP #	Top Depth (cm)	Bottom Depth (cm)	Cat#	Identification Category	Artifact Description	Ceramic Ware	Ceramic Description & Technique	Portion	N	Begin Date	End Date	Comments
												impressed bud
7	0	33	48	Tableware	Unidentifiable	Pearlware	Green Edged	Rim	2	1780	1830	scalloped rim with curved incising; exfoliated
7	0	33	49	Tableware	Unidentifiable	RWE	Blue Edged	Rim	2	1800	1830	scalloped rim with curved incising
8	0	43	58	Household Item	Utilitarian Ware	Refined Red Earthenware	Brown Glazed	Body	2			
8	0	43	59	Household Item	Utilitarian Ware	Refined Red Earthenware	Unglazed	Body	1			
8	0	43	61	Tableware	Unidentifiable	RWE	Blue Transfer Print	Body	1	1830		
8	0	43	62	Tableware	Unidentifiable	RWE	Undecorated	Body	2	1830		
9	0	40	50	Tableware	Unidentifiable	RWE	Blue Sponged	Body	1	1843	1885	small fragment
10	0	39	80	Household Item	Utilitarian Ware	Refined Red Earthenware	Brown Glazed	Body	1			
10	0	39	81	Tableware	Unidentifiable	RWE	Undecorated	Body	2	1830		
11	0	30	52	Tableware	Unidentifiable	RWE	Blue Sponged	Body	2	1843	1885	exfoliated
11	0	30	53	Household Item	Utilitarian Ware	Refined Red Earthenware	Unglazed	Body	2			
11	0	30	54	Tableware	Unidentifiable	RWE	Undecorated	Body	1	1830		
12	0	32	75	Household Item	Utilitarian Ware	Refined Red Earthenware	Unglazed	Body	1			
13	0	32	86	Tableware	Unidentifiable	RWE	Blue Sponged	Body	1	1843	1885	small fragment
13	0	32	87	Tableware	Unidentifiable	RWE	Undecorated	Body	5	1830		
13	0	32	91	Household Item	Utilitarian Ware	Refined Red Earthenware	Brown Glazed	Body	3			
14	0	14	106	Tableware	Unidentifiable	RWE	Blue Sponged	Body	1	1843	1885	small exfoliated fragment

TP #	Top Depth (cm)	Bottom Depth (cm)	Cat#	Identification Category	Artifact Description	Ceramic Ware	Ceramic Description & Technique	Portion	N	Begin Date	End Date	Comments
14	0	14	109	Tableware	Unidentifiable	RWE	Undecorated	Body	9	1830		
15	0	32	4	Tableware	Unidentifiable	RWE	Undecorated	Body	3	1830		
16	0	33	7	Tableware	Unidentifiable	RWE	Blue Edged	Rim	1	1800	1830	scalloped rim with curved moulding; exfoliated
16	0	33	8	Tableware	Unidentifiable	RWE	Blue Transfer Print	Rim	1	1830		floral motif
16	0	33	9	Tableware	Unidentifiable	Rockingham (Yellowware)	Brown Mottled Glaze	Body	1	1855	1890	
16	0	33	10	Tableware	Unidentifiable	RWE	Undecorated	Body	1	1830		
18	0	41	82	Tableware	Unidentifiable	RWE	Undecorated	Body	2	1830		

Table 12: Euro-Canadian Non-Ceramic Artifact Catalogue from the H1 Site (AjGw-648)

TP #	Top Depth (cm)	Bottom Depth (cm)	Cat#	Identification Category	Material	Artifact Description	Portion	N	Begin Date	End Date	Comments
1	0	42	1	Household Item	Clear Glass	Bottle Glass Fragment	Body	5			
1	0	42	2	Personal	White Ball Clay	Smoking Pipe Stem	Fragment	1			plain; burnt
2	0	36	27	Household Item	Clear Glass	Bottle Glass Fragment	Rim	1			
2	0	36	28	Household Item	Clear Glass	Bottle Glass Fragment	Body	4			
3	0	34	113	Household Item	Clear Glass	Bottle Glass Fragment	Body	2			
3	0	34	114	Architecture	Metal, Iron	Machine Cut Nail	Incomplete	2	1830		
3	0	34	115	Architecture	Clear Glass	Window Glass	Incomplete	2			thick
3	0	34	116	Household Item	Coloured Glass	Aqua Bottle Glass Fragment	Body	2			
3	0	34	117	Household Item	Coloured Glass	Amber Bottle Glass Fragment	Body	1			
3	0	34	119	Architecture	Red Clay	Brick	Fragment	2			small fragments
3	0	34	121	Personal	White Ball Clay	Smoking Pipe Stem	Fragment	1			plain
3	0	34	124	Misc. Metal	Metal	Misc. Metal Fragment	Incomplete	1			

TP #	Top Depth (cm)	Bottom Depth (cm)	Cat#	Identification Category	Material	Artifact Description	Portion	N	Begin Date	End Date	Comments
4	0	33	95	Architecture	Clear Glass	Window Glass	Incomplete	1			thin
4	0	33	96	Household Item	Coloured Glass	Aqua Bottle Glass Fragment	Body	1			
4	0	33	97	Household Item	Clear Glass	Bottle Glass Fragment	Body	1			
4	0	33	99	Architecture	Metal, Iron	Machine Cut Nail	Incomplete	1	1830		extensive corrosion
4	0	33	100	Architecture	Red Clay	Brick	Fragment	1			small fragment
4	0	33	102	Household Item	Clear Glass	Bottle Glass Fragment	Body	1			embossed partial lettering: "R"
4	0	33	105	Misc. Metal	Metal	Scrap Metal Fragments	Fragment	3			
5	0	37	11	Misc. Metal	Metal	Misc. Metal Object	Incomplete	1			misc. fragment with gears
5	0	37	12	Horse Hardware	Metal, Iron	Horse Shoe Nail	Incomplete	1			extensive corrosion
5	0	37	13	Architecture	Metal, Iron	Hand-made Wrought Nail	Incomplete	1		1830	
5	0	37	14	Architecture	Metal, Iron	Machine Cut Nail	Incomplete	2	1830		
5	0	37	18	Architecture	Clear Glass	Window Glass	Incomplete	1			thin; small fragment
6	0	25	67	Architecture	-	Concrete	Fragment	1			
6	0	25	68	Architecture	Red Clay	Brick	Fragment	1			small fragment
6	0	25	70	Household Item	Clear Glass	Bottle Glass Fragment	Incomplete	1			partial finish fragment
6	0	25	71	Household Item	Clear Glass	Bottle Glass Fragment	Body	1			small fragment
6	0	25	72	Architecture	Metal, Iron	Machine Cut Nail	Incomplete	5	1830		
6	0	25	73	Architecture	Red Clay	Brick	Fragment	2			large fragments
7	0	33	37	Household Item	Clear Glass	Bottle Glass Fragment	Body	2			burnt

TP #	Top Depth (cm)	Bottom Depth (cm)	Cat#	Identification Category	Material	Artifact Description	Portion	N	Begin Date	End Date	Comments
7	0	33	38	Household Item	Clear Glass	Bottle Glass Fragment	Body	4			
7	0	33	39	Architecture	Clear Glass	Window Glass	Incomplete	5			thin
7	0	33	40	Household Item	Coloured Glass	Olive Green Bottle Glass	Body	1			
7	0	33	41	Household Item	Coloured Glass	Aqua Bottle Glass Fragment	Body	1			
7	0	33	43	Misc. Metal	Metal	Scrap Metal Fragments	Fragment	5			
8	0	43	56	Architecture	Metal, Iron	Machine Cut Nail	Incomplete	3	1830		
8	0	43	57	Household Item	Coloured Glass	Aqua Bottle Glass Fragment	Body	1			rectangular-shaped bottle
8	0	43	60	Architecture	Clear Glass	Window Glass	Incomplete	1			thick; crazing
8	0	43	63	Architecture	Clear Glass	Window Glass	Incomplete	1			thick
8	0	43	64	Architecture	Clear Glass	Window Glass	Incomplete	1			thin
8	0	43	65	Household Item	Coloured Glass	Amber Bottle Glass Fragment	Body	3			
8	0	43	66	Household Item	Coloured Glass	Aqua Bottle Glass Fragment	Body	1			embossed letter ("...CO"; "...K") on rectangular-shaped bottle
10	0	39	79	Architecture	Clear Glass	Window Glass	Incomplete	1			thin
11	0	30	55	Architecture	Clear Glass	Window Glass	Incomplete	1			thin
12	0	32	74	Household Item	Coloured Glass	Olive Green Bottle Glass	Body	1			
13	0	32	88	Architecture	Clear Glass	Window Glass	Incomplete	2			thick
13	0	32	89	Household Item	Clear Glass	Bottle Glass Fragment	Body	1			small fragment
13	0	32	90	Personal	Metal	Shoe Eyelet	Incomplete	1			small
13	0	32	92	Architecture	Metal, Iron	Machine Cut Nail	Incomplete	3			

TP #	Top Depth (cm)	Bottom Depth (cm)	Cat#	Identification Category	Material	Artifact Description	Portion	N	Begin Date	End Date	Comments
14	0	14	107	Architecture	Red Clay	Brick	Fragment	1			small fragment
14	0	14	108	Architecture	Metal, Iron	Machine Cut Nail	Incomplete	1	1830		
14	0	14	110	Architecture	Metal	Eye Bolt	Complete	1			includes nut
14	0	14	111	Misc. Metal	Metal	Misc. Metal Fragment	Incomplete	1			
15	0	32	3	Architecture	Metal, Iron	Machine Cut Nail	Incomplete	1	1830		
15	0	32	5	Architecture	Clear Glass	Window Glass	Incomplete	1			thick
15	0	32	6	Household Item	Coloured Glass	Purple Bottle Glass	Body	1			embossed lettering: "LIM..."; "..OR.."
18	0	41	83	Personal	Coloured Glass	Opaque White Button	Incomplete	1			4-holed
18	0	41	84	Architecture	Metal	Wire Cut Nail	Incomplete	1			
18	0	41	85	Architecture	Metal	Swivel Caster	Incomplete	1			corrosion; first invented in 1876

Table 13: Faunal Artifact Catalogue from the H1 Site (AjGw-648)

TP #	Top Depth (cm)	Bottom Depth (cm)	Cat#	N	Class	Order	Family	Species	Element	Portion	Age	Comments
7	0	33	42	4	Mammalia	Unknown	-	-	Unidentifiable	Fragments	Unknown	
10	0	39	77	1	Mammalia	Unknown	-	-	Tooth	Tooth Fragment	Unknown	
10	0	39	78	3	Mammalia	Unknown	-	-	Unidentifiable	Fragments	Unknown	small bone fragments
11	0	30	51	2	Mammalia	Unknown	-	-	Unidentifiable	Fragments	Unknown	small fragments
12	0	32	76	8	Mammalia	Unknown	-	-	Unidentifiable	Fragments	Unknown	small bone fragments
13	0	32	93	2	Mammalia	Artiodactyla	Suidae	Sus scrofa	Tooth	Molar Fragments	Adult	
13	0	32	94	10	Mammalia	Unknown	-	-	Unidentifiable	Fragments	Unknown	small bone fragments

Table 14: Diagnostic Artifacts from the H1 Site (AjGw-648)

Cat#	TP#	Artifact Description	Ceramic Type or Category	Decorative Technique / Diagnostic Features	Date Range	N	Comments
22	2	Tableware	RWE	Flow Blue	1845-1900	2	
112	3	Tableware	RWE	Flow Black	1845-1900	1	
17	5	Tableware	RWE	Blue Sponged ware	1843-1885	1	small fragment
13	5	Architecture	Hand-made Wrought Nail	Wrought Nail	End date 1830	1	
19	5	Tableware	RWE	Blue & Brown, Bandedware	1830-1850	2	small exfoliated fragments
45	7	Tableware	RWE	Blue Sponged ware	1843-1885	5	
47	7	Tableware	RWE	Blue Edged ware: scalloped rim with incising and impressed bud	1800-1850	1	
48	7	Tableware	Pearlware	Green edged ware: scalloped rim with curved incising	1780-1830	2	exfoliated
49	7	Tableware	RWE	Blue Edged ware: scalloped rim with curved incising	1800-1830	2	
50	9	Tableware	RWE	Blue Sponged ware	1843-1885	1	small fragment
52	11	Tableware	RWE	Blue Sponged ware	1843-1885	2	exfoliated
86	13	Tableware	RWE	Blue Sponged ware	1843-1885	1	small fragment
106	14	Tableware	RWE	Blue Sponged ware	1843-1885	1	small exfoliated fragment
7	16	Tableware	RWE	Blue Edged ware: scalloped rim with curved incising	1800-1830	1	exfoliated
9	16	Tableware	Yellowware	Rockingham: Brown Mottled Glaze	1855-1890	1	

Table 15: Pre-Contact Lithic Artifact Catalogue from the H1 Site (AjGw-648)

TP #	Top Depth (cm)	Bottom Depth (cm)	Layer	Cat#	Artifact Type	Material	Debitage Description	N	Comments
17	0	32		130	Debitage	Onondaga	Biface Thinning Flake	1	
5	0	37		126	Debitage	Onondaga	Flake Fragment	1	
9	0	40		134	Debitage	Onondaga	Flake Fragment	1	

Table 16: Pre-Contact Lithic Artifact Catalogue from the P2 Site (AjGw-647)

TP #	Top Depth (cm)	Bottom Depth (cm)	Layer	Cat#	Artifact Type	Material	Debitage Description	N	Comments
19	0	32		125	Debitage	Onondaga	Biface Thinning Flake	1	
20	0	37		127	Debitage	Onondaga	Flake Fragment	1	
21	0	46		135	Debitage	Onondaga	Flake Fragment	1	
Test Unit# 1	33	40	2	128	Debitage	Onondaga	Biface Thinning Flake	1	
Test Unit# 1	33	40	2	129	Debitage	Onondaga	Flake Fragment	6	
Test Unit# 1	40	44	3	131	Debitage	Onondaga	Biface Thinning Flake	1	
Test Unit# 1	40	44	3	132	Debitage	Onondaga	Flake Fragment	1	thermally altered
Test Unit# 1	40	44	3	133	Debitage	Onondaga	Flake Fragment	3	
Test Unit# 1	0	33	1	140	Debitage	Onondaga	Biface Thinning Flake	3	
Test Unit# 1	0	33	1	141	Debitage	Onondaga	Flake Fragment	1	
Test Unit# 1	0	33	1	142	Debitage	Onondaga	Bipolar Flake	1	
Test Unit# 1	0	33	1	143	Debitage	Onondaga	Flake Fragment	1	thermally altered
Test Unit# 1	0	33	1	144	Debitage	Onondaga	Flake Fragment	1	utilized
Test Unit# 2	0	36	1	136	Debitage	Onondaga	Biface Thinning Flake	2	
Test Unit# 2	0	36	1	137	Debitage	Onondaga	Flake Fragment	2	
Test Unit# 2	0	36	1	138	Debitage	Onondaga	Bipolar Flake	1	
Test Unit# 2	0	36	1	139	Debitage	Onondaga	Edge Retouch Flake	1	

About AECOM

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From high-performance buildings and infrastructure, to resilient communities and environments, to stable and secure nations, our work is transformative, differentiated and vital. A Fortune 500 firm, AECOM companies had revenue of approximately US\$19 billion during the 12 months ended June 30, 2015.

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Contact
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Region of Peel

Stage 2 Archaeological Assessment Supplementary Documentation Highway 401 Crossings, Various Locations

Lots 11-14, Concession 6, Lots 10-12, Concession 5, and Lot 9, Concession 3, West of Centre Road, Geographic Township of Toronto, Peel County, Now the City of Mississauga, Region of Peel

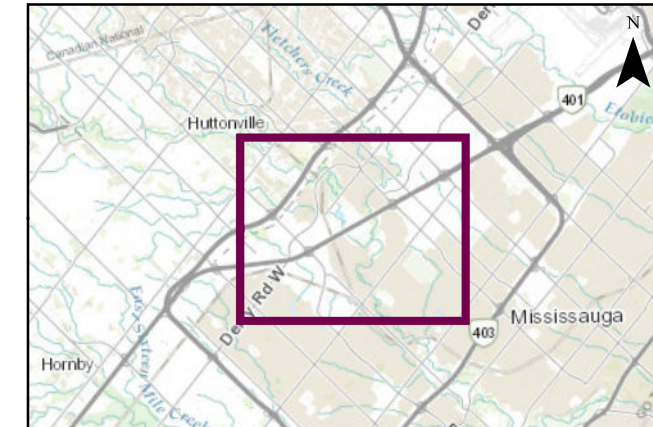
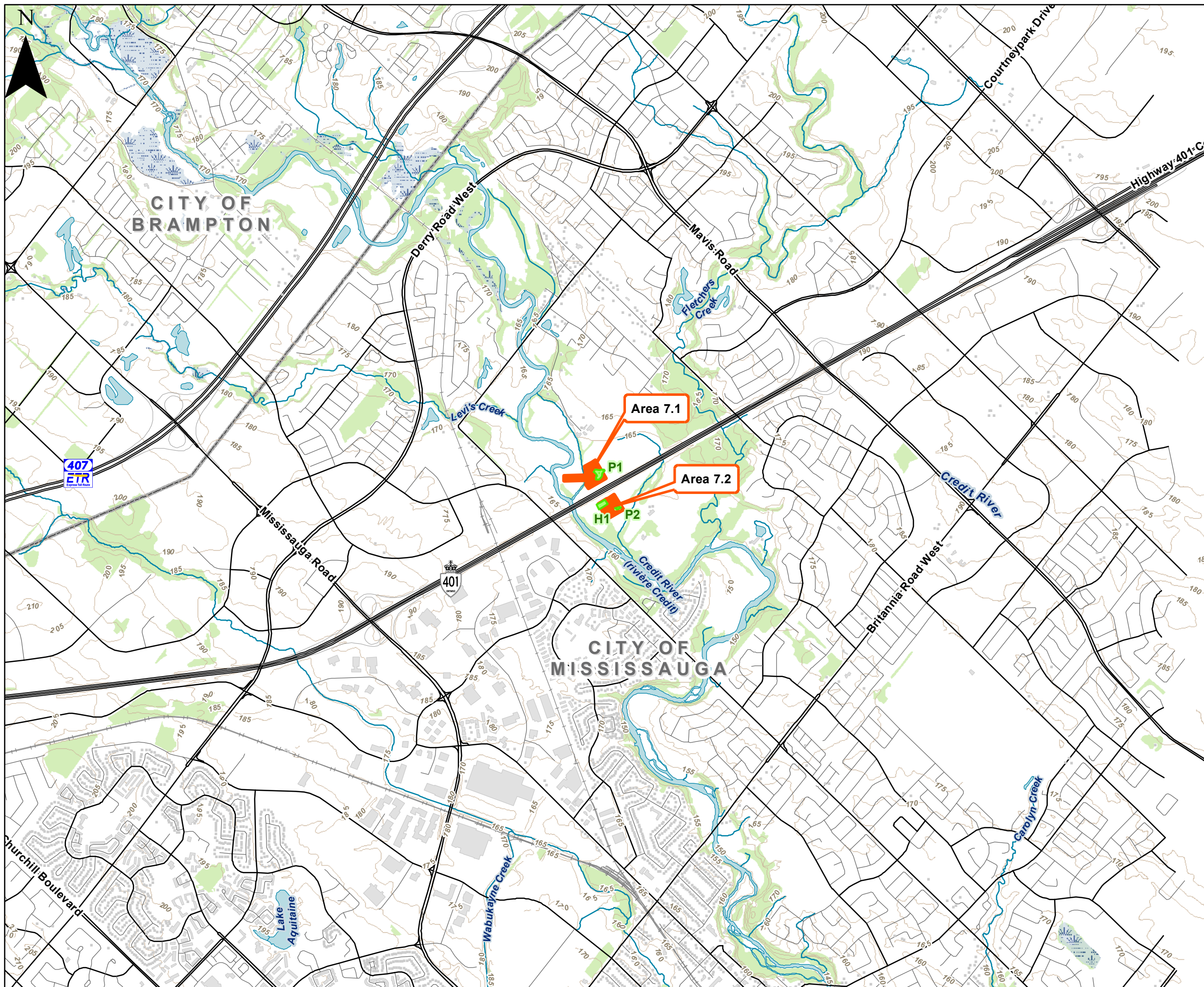
Prepared by:

AECOM
30 Leek Crescent (4th Floor) 905 418 1400 tel
Richmond Hill, ON, Canada L4B 4N4
www.aecom.com

Licensee: Glenn Kearsley
License: P123
PIF Number: P123-0426-2019
Related PIFs: P007-250-2010, P007-319-2011 and P123-0427-2019

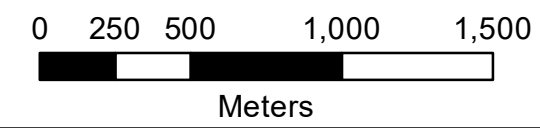
February 4, 2021
Original Report

Project Number: 60604572



Legend

- Study Areas
- Site Boundary
- Freeway
- Major Road
- Local Road
- Ramp
- Railway
- Contour (5m intervals)
- Watercourse
- Waterbody
- Wetland
- Wooded Area



**Stage 2 Archaeological Assessment
Region of Peel 401 Crossings**

Site Locations - Supplementary
Documentation

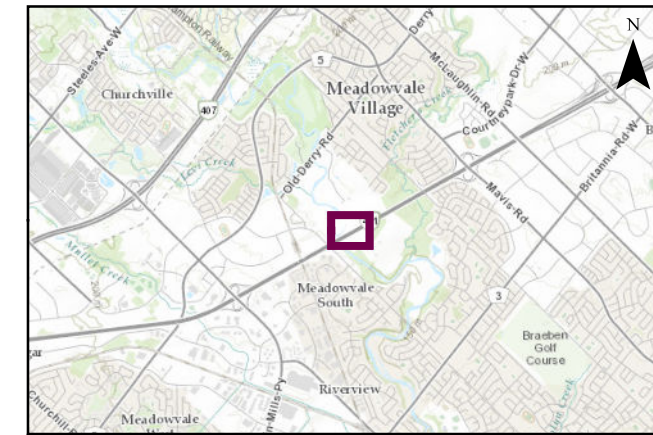
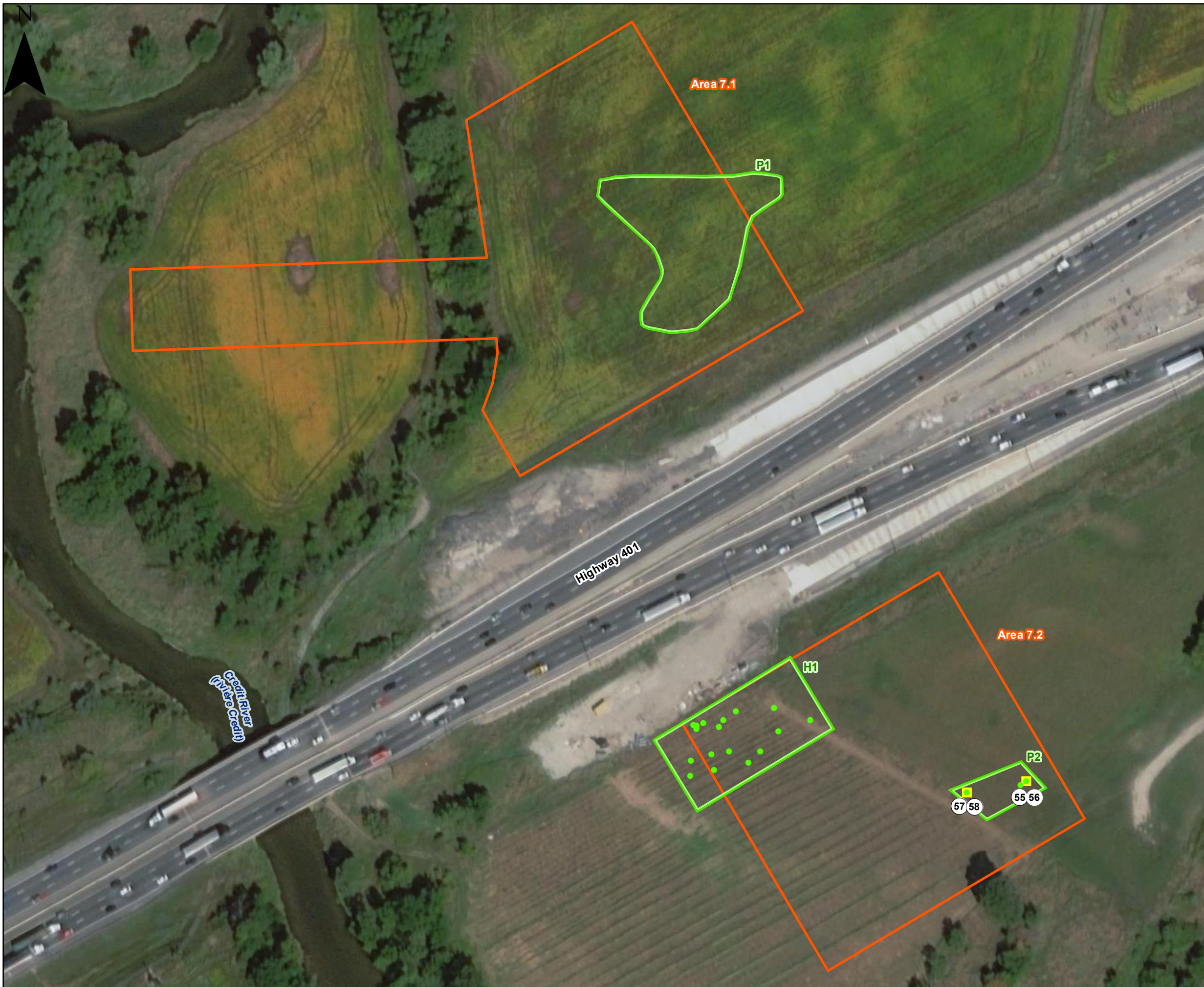
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AECOM

Figure 1

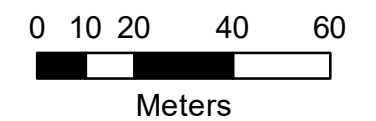
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Map location: C:\Users\stephane\OneDrive\Desktop\Projects\6604572\Design\01_Reports\Stage_2_401\SuppDoc_Fig_1_Sites_Location.mxd
Date saved: 11/02/2020 10:14:24 AM



Legend

- Study Areas 7.1 and 7.2
- Site Boundary
- Stage 2 Test Pit
- Stage 2 Test Unit
- ⬆ Photo Location and Direction



**Stage 2 Archaeological Assessment
Region of Peel - 401 Crossings**

Identified Sites - Supplementary
Documentation

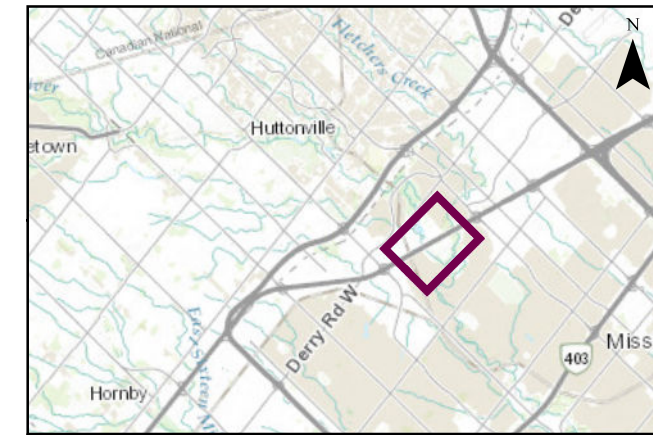
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Figure 2

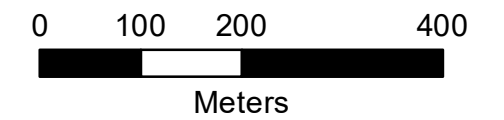
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Map location: C:\Users\Stephane\OneDrive\Desktop\Projects\66804572\Design\01_Report\Stage2_for\SuppDoc_Fig_2_Sites.mxd
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Legend

- Study Areas
- Site Boundary



**Stage 2 Archaeological Assessment
Region of Peel - 401 Crossings**

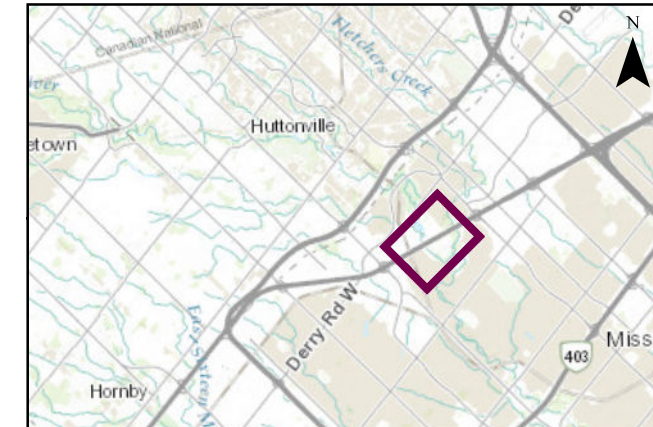
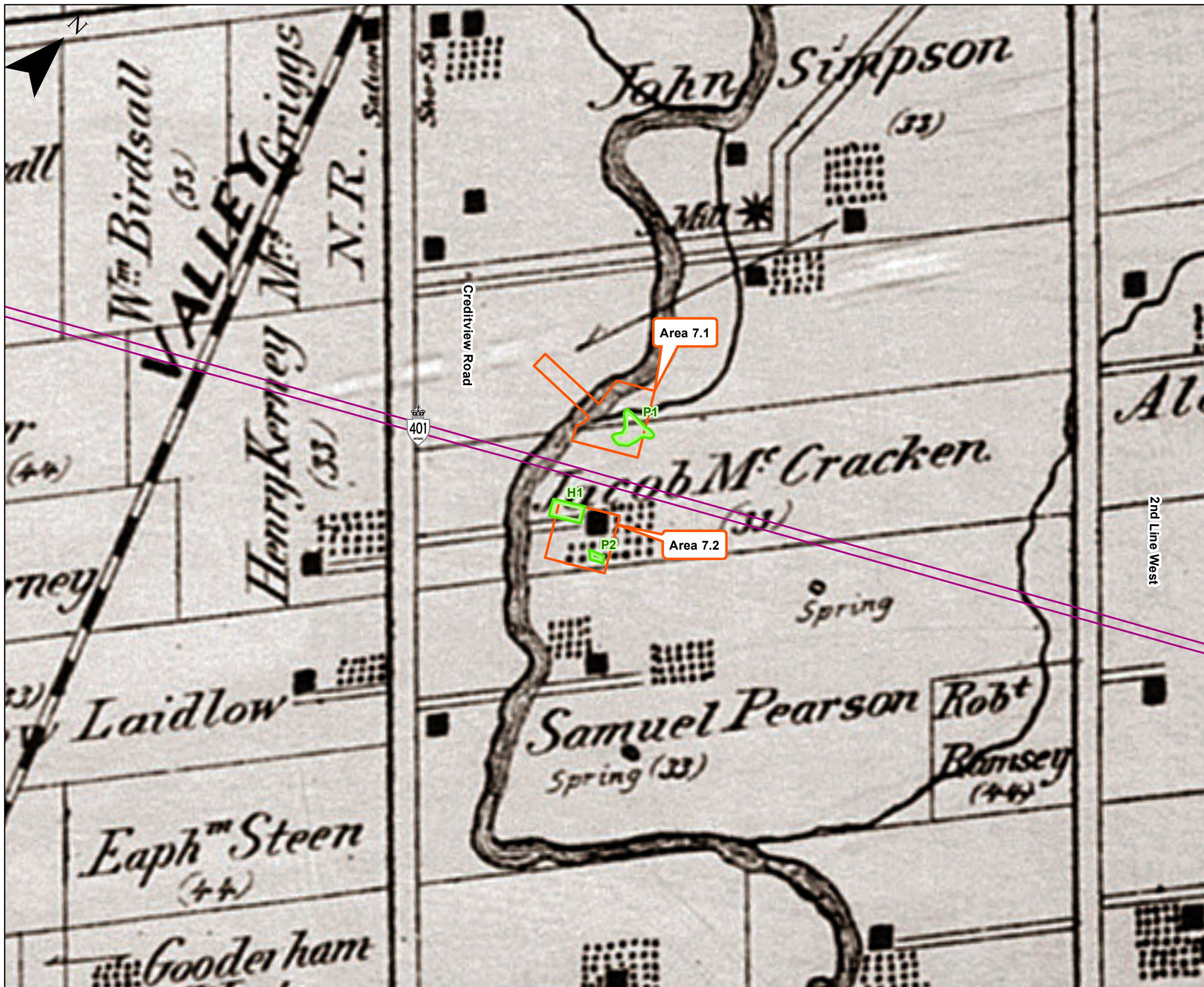
Study Areas in relation to the 1859 Tremaine Map
of Peel County - Supplementary Documentation

Dec 2020	1:7,500	Datum: NAD 1983 UTM Zone 17N Sources: https://digital.library.mcgill.ca/countyatlas/peel.htm & LIO
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AECOM	Figure 3
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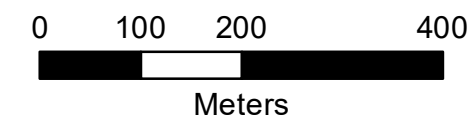
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Legend

- Study Areas
- Site Boundary



**Stage 2 Archaeological Assessment
Region of Peel - 401 Crossings**

Study Areas in relation to the 1877 Historic Atlas Map of North Toronto - Supplementary Documentation

Dec 2020	1:7,500	Datum: NAD 1983 UTM Zone 17N Sources: https://digital.library.mcgill.ca/countyatlas/peel.htm & LIO
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AECOM	Figure 4
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File location: C:\Users\AECOM\Desktop\Projects\Region of Peel\Stage 2\SuppDoc\Fig_4_1877.mxd Date saved: 12/02/2020 9:14:42 AM

These locations were recorded using a handheld Garmin GPSmap 60CSx GPS unit set to NAD83. The readings were taken under open skies and WAAS was activated at the time of use. The margin of error was between +/- 2-6m.

Table 1: GPS Site Location Information for the H1 Site (AjGw-648)

Location	Easting	Northing
H1 Centre	602755	4829611
H1 North	602751	4829629
H1 East	602791	4829619
H1 South	602761	4829594
H1 West	602724	4829600

Table 2: GPS Site Location Information for the P1 Site (AjGw-646)

Location	Easting	Northing
P1 Centre	602736	4829826
P1 North	602734	4829846
P1 East	602760	4829829
P1 South	602733	4829781
P1 West	602706	4829827

Table 3: GPS Site Location Information for the P2 Site (AjGw-647)

Location	Easting	Northing
P2 Centre	602863	4829589
P2 North	602863	4829597
P2 East	602883	4829589
P2 South	602865	4829579
P2 West	602842	4829588

Region of Peel

Statement of Indigenous Engagement Stage 2 Archaeological Assessment Highway 401 Crossings, Various Locations

Lots 11-14, Concession 6, Lots 10-12, Concession 5, and Lot 9, Concession 3, West of Centre Road, Geographic Township of Toronto, Peel County, Now the City of Mississauga, Region of Peel

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Licensee: Glenn Kearsley

License: P123

PIF Number: P123-0426-2019

Related PIFS: P007-250-2010, P007-319-2011 and P123-0427-2019

February 4, 2021
Original Report

Project Number: 60604572

STATEMENT OF INDIGENOUS ENGAGEMENT

The Stage 2 archaeological assessment for the Highway 401 Crossings in the Region of Peel, Ontario involved the engagement with the Indigenous community whose ancestral and treaty territories are affected by the study area. The study area falls within the ancestral and treaty territory of the Mississaugas of the Credit First Nation (MCFN).

In accordance with the draft technical bulletin entitled *Engaging Aboriginal Communities in Archaeology* the MCFN were consulted at the Stage 2 Archaeological Assessment report reviewing phase of the project. Field Archaeologist Peter Epler reviewed the report and identified some language concerns in *Section 1.2.2, Post-Contact Period Settlement* and a mapping error. These issues have now been addressed accordingly.

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Contact
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E glenn.kearsley@aecom.com

Appendix D. Consultation Documentation

Notice of Commencement



Swim instructor [redacted] teaches students on their kick boards at the Frank McKechnie Pool. /Torstar file photo

4 INDOOR POOLS TO PLAY, COOL OFF OR EXERCISE IN THIS SUMMER

STEVE CORNWELL
scornwell@metroland.com

Outdoor pools often steal the spotlight in the summer time, and for good reason. But rain or shine, Mississauga's indoor pools can offer reliable active fun, exercise and cooling for all ages and abilities.

Clarkson Swimming and Therapeutic Pool

2475 Truscott Dr., Mississauga, Ont., L5J 2B3

Clarkson has a bit of everything for everyone. The facility features a 25-metre, a five-lane pool and a warm water therapy pool and has time slots for fitness, family, therapy and leisure swims. The pool has male-only and female-only sessions on the week-ends and for youth, or those young at heart, the pool has a diving board, basketball net and deep end slide. The pool also has a wheelchair to water lift and an accessible change room.

Frank McKechnie

310 Bristol Rd. E., Mississauga, Ont., L4Z 2B3

Frank McKechnie Pool is a destination for those looking to entertain youngsters. The facility has a toddler's play pool which has a swan slide and water sprays, while the 25-metre, six-lane pool features its own swing rope and slide. There's also a 15-person whirlpool at Frank McKechnie, which is only minutes away from the 401 and 403 highways.

Huron Park

830 Paisley Blvd. W., Mississauga, Ont., L5C 3P5

For those who like a challenge when touching the bottom of the pool, Huron Park Swimming and Therapeutic Pool has the deepest deep end of Mississauga's pools at 12 feet. But the facility, which is right in the heart of Huron Park, also has a shallow and warm water therapy pool great for gentle workouts.

The pool also has a wheelchair to water lift and an accessible change room.

River Grove

5800 River Grove Ave., Mississauga, Ont., L5M 4R8

River Grove Pool has three unique features for indoor thrill-seekers. The East Credit-located facility has a 30-person whirlpool, a two-storey slide and a five-lane lap pool. The slide is available seven-days a week and all five lanes of the facility's lap pool are open at 6 to 8:55 a.m. every weekday morning.

Adult swim memberships cost \$192 for 12 months, while single visits are \$3.80. Youth (four to 17 years old), older adult (65 and older), full-time students and persons with a disability cost \$153.60 for 12 months or \$3.05 for a single visit. Groups of up to five adults or children can swim for \$12 per single visit, or \$604.80 for year pass.

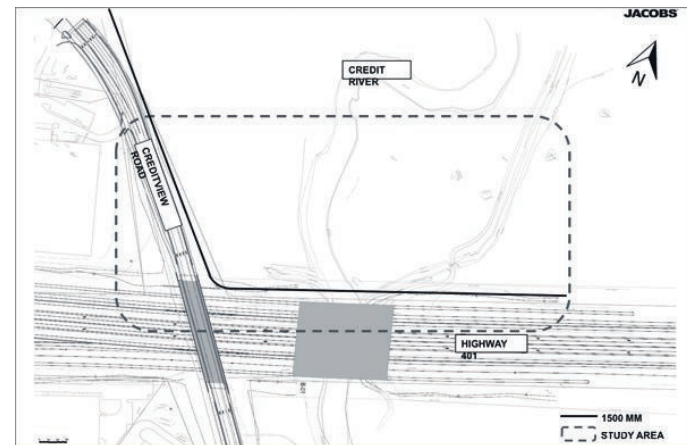
Public Notice

Region of Peel
working with you

Environmental Assessment Study Notice of Study Commencement Relocation of the 1500 mm Credit Valley Sanitary Trunk Sewer

Background

The Region of Peel has initiated a Detailed Design and Environmental Assessment (EA) study for the realignment of a section of the 1500 mm Credit Valley Sanitary Trunk Sewer (CVS) in the City of Mississauga. The need to realign this section of the CVS is driven by the Ministry of Transportation Ontario's (MTO) plan to widen Highway 401 from 6-lanes to 12-lanes between Creditview Road and the Town of Milton.



Process

A number of realignment options are being evaluated and a recommended plan will be developed in coordination with the MTO and in consultation with stakeholders and members of the public.

Your Input is Important

Once the study has been completed, a Project File Report will be prepared and be available for 30 days for public review and comment on the Region of Peel's website at: peelregion.ca/pw/water/enviro-assess and select *Mississauga*.

If you have any comments or questions, wish to be added to the project mailing list, or have any accessibility requirements, please let us know by reaching out to the contact listed below:

Frank Pugliese, P.Eng

Project Manager

Region of Peel

10 Peel Centre Drive, Brampton, ON L6T 4B9

Email: frank.pugliese@peelregion.ca

Phone: 1-905-791-7800 ext. 5943

The Region of Peel is committed to ensure that all Regional services, programs and facilities are inclusive and accessible for persons with disabilities. Please contact the Project Manager if you need any disability accommodations to provide comments or feedback for this study.

This notice was first issued on July 18, 2019.

With the exception of personal information, all comments will become part of the public record of the study. The study is being conducted according to the requirements of the Municipal Class Environmental Assessment, which is a planning process approved under Ontario's Environmental Assessment Act.

NOTICE OF STUDY COMMENCEMENT

Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer Environmental Assessment Study

PROJECT DESCRIPTION

The Region of Peel (Region) is completing an Environmental Assessment (EA) study for the realignment of a section of the 1,500-millimetre (mm) Credit Valley Sanitary Trunk Sewer (CVS) in the City of Mississauga. The realignment will require identifying a potential solution to carry wastewater to the existing Credit Valley Trunk Sewer. The need to realign this section of the CVS is driven by the expropriation of the land by the Ministry of Transportation (MTO) where the existing trunk sewer is located as part of its plan to widen Highway 401 from 6 lanes to 12 from immediately west of Regional Road 25 in the Town of Milton to west of Mavis Road in the City of Mississauga. The trunk sewer must be relocated in order to continue safe and efficient operation. A number of realignment options are being evaluated, and a recommended plan will be developed in coordination with the MTO and in consultation with stakeholders and members of the public.

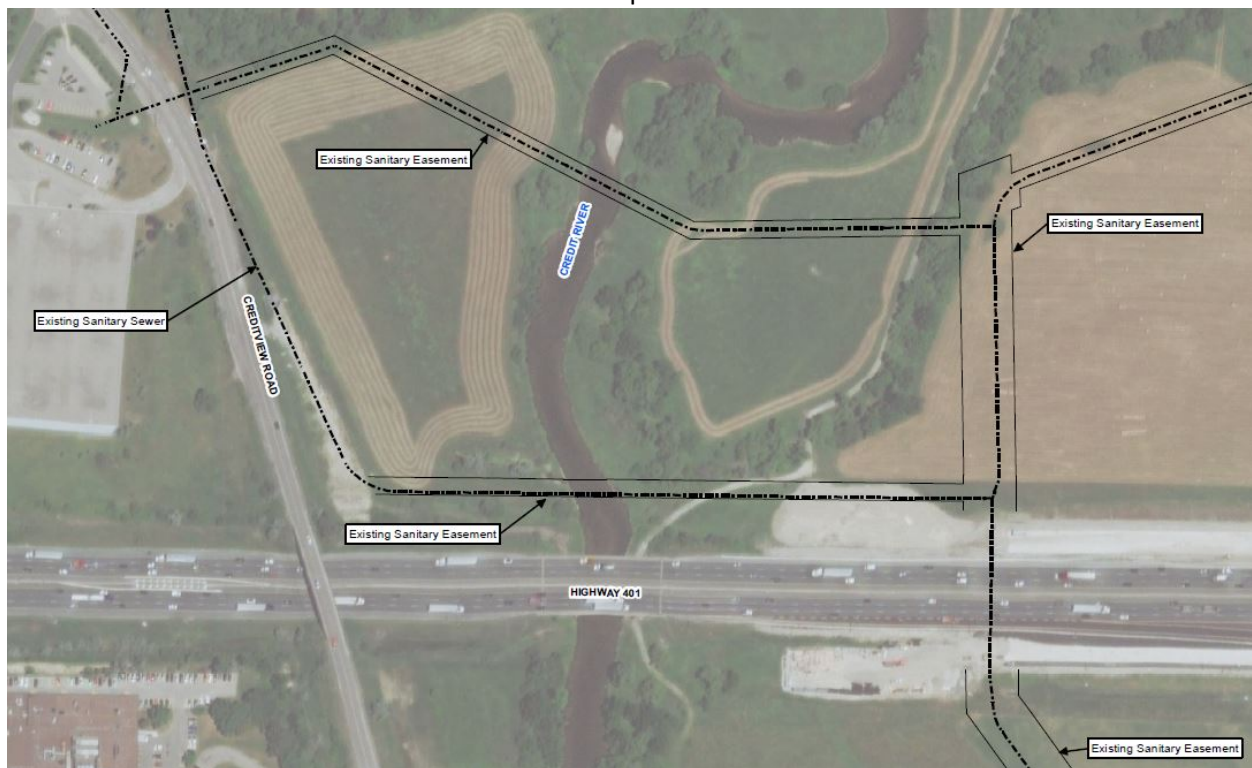


Figure 1. Environmental Assessment Study Area.

PROCESS

The EA study is being carried out in accordance with the planning and design process for “Schedule B” projects under the *Environmental Assessment Act* as outlined in the Municipal Engineers Association’s *Municipal Class Environmental Assessment* document (2000, as amended in 2007, 2011, and 2015). Once the study has been completed, a Project File Report will be prepared and made available for 30 days for public review and comment.

To find out more about the project, please visit the Region’s website at <https://www.peelregion.ca/pw/water/enviro-assess/relocation-of-credit-valley-sanitary-trunk-sewer.asp>. If you have any comments or questions, wish to be added to the project mailing list, or have accessibility requirements, please let us know by reaching out to either of the contacts listed as follows:

Paramjit Dhillon, P.Eng.

Project Manager
Jacobs
245 Consumers Road, Suite 400
Toronto, ON M2J 1R3
Email: Paramjit.Dhillon@jacobs.com
Phone: 1-416-499-0090 ext. 73699

Ajay Puri, P.Eng.

Project Manager
The Regional Municipality of Peel
Suite B, 4th Floor, 10 Peel Centre Drive
Brampton, ON L6T 4B9
Email: Ajay.Puri@peelregion.ca
Phone: 1-905-791-7800 ext. 5073

All personal information included in a submission, such as name, address, telephone number, and property location, is collected, maintained, and disclosed by the Ministry of the Environment, Conservation and Parks for the purpose of transparency and consultation. The information is collected under the authority of the *Environmental Assessment Act* or is collected and maintained for the purpose of creating a record that is available to the general public as described in Section 37 of the *Freedom of Information and Protection of Privacy Act*. Personal information you submit will become part of a public record that is available to the general public unless you request that your personal information remain confidential. For more information, please contact the Project Officer or the Ministry of the Environment, Conservation and Parks’ Freedom of Information and Privacy Coordinator at 416-819-5148.

This Notice was reissued on September 11, 2020.

Newton, Dorin/TOR

From: Eby, Bryden
Sent: Thursday, September 24, 2020 3:57 PM
Cc: Thannickal, Jimmy/TOR; Dhillon, Paramjit/TOR; Henderson, Emma/KWO; ajay.puri@peelregion.ca
Subject: Notice of Study Commencement: Relocation of the 1,500-millimetre Credit Valley Trunk Sewer
Attachments: Notice of Study Commencement - Credit Valley Trunk Sewer.pdf

Hello,

The Region of Peel is conducting an Environmental Assessment for the relocation of the 1,500-millimetre Credit Valley Trunk Sewer in the City of Mississauga. A number of realignment options are being evaluated, and a recommended plan will be developed in coordination with the MTO and in consultation with stakeholders and members of the public.

Please see the attached Notice of Study Commencement for additional information. If you would like to provide comments or have further questions, please contact a member of the Project Team listed in the attached notice.

Regards,

Bryden Eby, BBA, MES, LEED AP ND
Jacobs
Environmental Planner | Global Environmental Solutions
(519) 514-1612
bryden.eby@jacobs.com

Newton, Dorin/TOR

From: ROWCC <rowcentre@bell.ca>
Sent: Thursday, September 24, 2020 3:57 PM
To: Eby, Bryden
Subject: [EXTERNAL] Automatic reply: [EXT]Notice of Study Commencement: Relocation of the 1, 500-millimetre Credit Valley Trunk Sewer

Due to the Covid-19 pandemic our team is working remotely and response time to your e-mail may be delayed. Please be patient and we will respond to your e-mail as soon as possible.

Thank you,
Right of Way Control Centre

Newton, Dorin/TOR

From: Chris Pincombe <Chris.Pincombe@enbridge.com>
Sent: Thursday, September 24, 2020 4:05 PM
To: Eby, Bryden
Cc: Thannickal, Jimmy/TOR; Dhillon, Paramjit/TOR; Henderson, Emma/KWO; Puri, Ajay
Subject: RE: [External] Notice of Study Commencement: Relocation of the 1, 500-millimetre Credit Valley Trunk Sewer

Hi,

I have taken a new position within Enbridge and am no longer the Crossing Coordinator for Enbridge Pipelines Inc. – Eastern Region.

For crossing related matters, please contact the Right-of-Way Group at 1-800-668-2951 or est.reg.crossing@enbridge.com.

Thank you,

Chris Pincombe, CET, SR/WA
Advisor Lands & ROW

ENBRIDGE
TEL: 519-862-6092 | CELL: 519-381-1408
3501 Tecumseh Rd., Mooretown ON N0N 1M0
enbridge.com
Safety. Integrity. Respect.

From: Eby, Bryden <Bryden.Eby@jacobs.com>
Sent: Thursday, September 24, 2020 3:57 PM
Cc: Thannickal, Jimmy/TOR <Jimmy.Thannickal@jacobs.com>; Dhillon, Paramjit/TOR <Paramjit.Dhillon@jacobs.com>; Henderson, Emma/KWO <Emma.Henderson@jacobs.com>; Puri, Ajay <ajay.puri@peelregion.ca>
Subject: [External] Notice of Study Commencement: Relocation of the 1, 500-millimetre Credit Valley Trunk Sewer

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Jacobs

Environmental Planner | Global Environmental Solutions

(519) 514-1612

bryden.eby@jacobs.com

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Newton, Dorin/TOR

From: Monica Lapointe <Monica.LaPointe@rci.rogers.com>
Sent: Friday, September 25, 2020 7:25 AM
To: Eby, Bryden; Rogers.MOC
Subject: [EXTERNAL] RE: Notice of Study Commencement: Relocation of the 1,500-millimetre Credit Valley Trunk Sewer
Attachments: Notice of Study Commencement - Credit Valley Trunk Sewer.pdf

Your request has been forwarded to our mark up team Rogers. MOC Telecon mark ups Rogers.MOC@telecon.ca
Please send all your mark up requests to GTAW.Markups@rci.rogers.com and Rogers.MOC@telecon.ca when falling within Mississauga, Caledon, Orangeville, Brampton, Georgetown, Milton, Halton, Halton Hills, Burlington and Oakville.

From: Eby, Bryden <Bryden.Eby@jacobs.com>
Sent: September 24, 2020 3:57 PM
Cc: Thannickal, Jimmy/TOR <Jimmy.Thannickal@jacobs.com>; Dhillon, Paramjit/TOR <Paramjit.Dhillon@jacobs.com>; Henderson, Emma/KWO <Emma.Henderson@jacobs.com>; Puri, Ajay <ajay.puri@peelregion.ca>
Subject: Notice of Study Commencement: Relocation of the 1,500-millimetre Credit Valley Trunk Sewer

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Newton, Dorin/TOR

From: George Carlson <George.CARLSON@mississauga.ca>
Sent: Wednesday, September 30, 2020 11:43 AM
To: Eby, Bryden
Subject: [EXTERNAL] RE: Notice of Study Commencement: Relocation of the 1,500-millimetre Credit Valley Trunk Sewer

Good Morning,

Councillor Carlson has read your email and has no comments at this time.

Kimberly Duarte, Admin. Asst. to
George Carlson, Councillor Ward 11
City of Mississauga
300 City Centre Drive, 3rd Floor
Mississauga, ON L5B 3C1
Office: 905-896-5011
Fax: 905-896-5863
Email: george.carlson@mississauga.ca
Ward 11 E-newsletters: <http://www.georgecarlson.ca/e-newsletter/>



Join Our Mailing List!

From: Eby, Bryden <Bryden.Eby@jacobs.com>
Sent: Thursday, September 24, 2020 3:57 PM
Cc: Thannickal, Jimmy/TOR <Jimmy.Thannickal@jacobs.com>; Dhillon, Paramjit/TOR <Paramjit.Dhillon@jacobs.com>; Henderson, Emma/KWO <Emma.Henderson@jacobs.com>; Puri, Ajay <ajay.puri@peelregion.ca>
Subject: Notice of Study Commencement: Relocation of the 1,500-millimetre Credit Valley Trunk Sewer

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Regards,

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Jacobs

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(519) 514-1612
bryden.eby@jacobs.com

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Virtual Public Information Centre

Environmental Assessment Study

NOTICE OF VIRTUAL PUBLIC INFORMATION EVENT

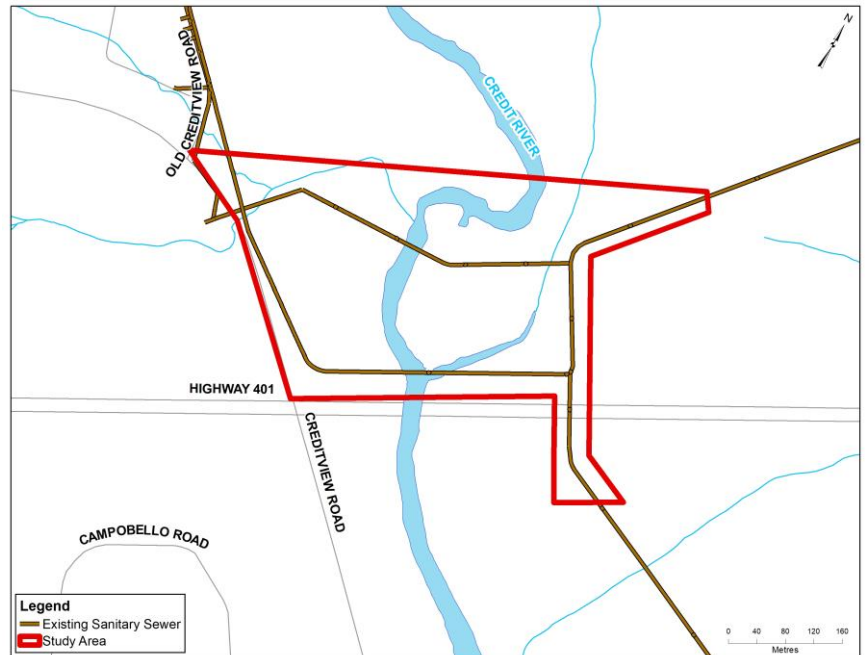
Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer

The Study

The Region of Peel (Region) is completing an Environmental Assessment (EA) study for the realignment of a section of the 1,500-millimetre (mm) Credit Valley Sanitary Trunk Sewer (CVSTS) in the City of Mississauga. The study area for this Class EA is shown in the map. The realignment will require identifying a potential solution to carry wastewater to the existing CVSTS.

The need to realign this section of the CVSTS is driven by the expropriation of the land by the Ministry of Transportation (MTO) where the existing trunk sewer is located as part of its plan to widen Highway 401 from 6 lanes to 12 from immediately west of Regional Road 25 in the Town of Milton to west of Mavis Road in the City of Mississauga.

The study will evaluate alternative solutions with the goal of ensuring the safe and reliable operation of the sanitary system. The study will document the existing baseline setting, evaluate the alternatives, and select the preferred solution to relocate this section of the CVSTS.



Your Input is Important

Due to current COVID-19 guidelines, *Online Public Engagement* has been arranged to provide members of the public an overview of the Class EA process and background information and an opportunity to provide input on alternative solutions.

Display boards will be made available to the public on peelregion.ca/public-works/environmental-assessments/#current and search under **Mississauga**, beginning **February 10, 2021**. Paper copies of the display boards will be made available upon request. Please submit any questions or comments, to the Project Manager listed below, by **March 3, 2021**.

The results of the Study will then be published in a Project File and placed on public record for review.

Comments

To be added to the mailing list or to receive further information about the project, please contact:

Ajay Puri, M.E. (Env.), P.Eng.
Project Manager, Capital Works
Wastewater Division
Tel.: (905) 791-7800 x. 5073
Ajay.Puri@peelregion.ca

This notice was first issued on January 28, 2021.

The Region of Peel is committed to ensure that all Regional services, programs and facilities are inclusive and accessible for persons with disabilities. Please contact the Project Manager if you need any disability accommodations to provide comments or feedback for this study.

Newton, Dorin/TOR

From: Microsoft Outlook
To: Kelvin.Chu@infrastructureontario.ca; Wayne.H.Bell@ontario.ca;
maxwell.watters@alectrautilities.com; michael.maceacheron@enbridge.com;
GTAW.Markups@rci.rogers.com
Sent: Monday, February 1, 2021 1:50 PM
Subject: Relayed: Notice of Virtual Public Information Event: Relocation of the 1,500-millimetre
Credit Valley Trunk Sewer

Delivery to these recipients or groups is complete, but no delivery notification was sent by the destination server:

Kelvin.Chu@infrastructureontario.ca (Kelvin.Chu@infrastructureontario.ca)

Wayne.H.Bell@ontario.ca (Wayne.H.Bell@ontario.ca)

maxwell.watters@alectrautilities.com (maxwell.watters@alectrautilities.com)

michael.maceacheron@enbridge.com (michael.maceacheron@enbridge.com)

GTAW.Markups@rci.rogers.com (GTAW.Markups@rci.rogers.com)

Subject: Notice of Virtual Public Information Event: Relocation of the 1,500-millimetre Credit Valley Trunk Sewer

Newton, Dorin/TOR

From: Microsoft Outlook
To: jkilis@creditvalleyca.ca; brian.mackay@canada.ca; rob.dobos@canada.ca; dave.gibson@dfo-mpo.gc.ca; emilie.st-onge@canada.ca; cleo.bigeagle@canada.ca; monique.mousseau@tc.gc.ca; [REDACTED]; jocko@sixnationsns.com; administration@cnhw.qc.ca; info@scugogfirstnation.com; Imarray@creditvalleyca.ca; office.clerk@mncfn.ca; mno@metisnation.org; Sammy.Lee@altusgroup.com; daellis@aecon.com; mayor@mississauga.ca; chris.rouse@mississauga.ca; darlene.utarid@mississauga.ca; darren.morita@mississauga.ca; eniber.cabrera@mississauga.ca; george.carlson@mississauga.ca; gino.delacruz@mississauga.ca; markhill@sixnations.ca; john.mcdougall@mississauga.ca; leslie.green@mississauga.ca; scott.sorenson@mississauga.ca; andrew.farr@peelregion.ca; margie.chung@peelregion.ca; nando.iannicca@peelregion.ca; paul.callanan@peelregion.ca; peter.dundas@peelregion.ca; lisa.myslicki@infrastructureontario.ca; karla.barboza@ontario.ca; michele.doncaster@ontario.ca; trevor.bell@ontario.ca; Rebecca.Quach@ontario.ca; thomas.nightingale@mississauga.ca; lise.chabot@ontario.ca; steven.strong@ontario.ca; ruth.lindenburger@ontario.ca; dawn.irish@ontario.ca; rowcentre@bell.ca; Jacquelyn.Scott@enbridge.com; lan.Moase@enbridge.com; jim.arnott@enbridge.com; est.reg.crossing@enbridge.com; Monica.LaPointe@rci.rogers.com; Rogers.MOC@telecon.ca; diana.spadafora@ontario.ca; ontariochapter@sierraclub.ca; mcccocommodore@mississaugacanoclub.ca
Sent: Monday, February 1, 2021 1:50 PM
Subject: Relayed: Notice of Virtual Public Information Event: Relocation of the 1,500-millimetre Credit Valley Trunk Sewer

Delivery to these recipients or groups is complete, but no delivery notification was sent by the destination server:

[jkilis@creditvalleyca.ca \(jkilis@creditvalleyca.ca\)](mailto:jkilis@creditvalleyca.ca)

[brian.mackay@canada.ca \(brian.mackay@canada.ca\)](mailto:brian.mackay@canada.ca)

[rob.dobos@canada.ca \(rob.dobos@canada.ca\)](mailto:rob.dobos@canada.ca)

[dave.gibson@dfo-mpo.gc.ca \(dave.gibson@dfo-mpo.gc.ca\)](mailto:dave.gibson@dfo-mpo.gc.ca)

[emilie.st-onge@canada.ca \(emilie.st-onge@canada.ca\)](mailto:emilie.st-onge@canada.ca)

[cleo.bigeagle@canada.ca \(cleo.bigeagle@canada.ca\)](mailto:cleo.bigeagle@canada.ca)

[monique.mousseau@tc.gc.ca \(monique.mousseau@tc.gc.ca\)](mailto:monique.mousseau@tc.gc.ca)

[rabelljr@hotmail.com \(rabelljr@hotmail.com\)](mailto:rabelljr@hotmail.com)

[jocko@sixnationsns.com \(jocko@sixnationsns.com\)](mailto:jocko@sixnationsns.com)

[administration@cnhw.qc.ca \(administration@cnhw.qc.ca\)](mailto:administration@cnhw.qc.ca)

[info@scugogfirstnation.com \(info@scugogfirstnation.com\)](mailto:info@scugogfirstnation.com)

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markhill@sixnations.ca (markhill@sixnations.ca)

john.mcdougall@mississauga.ca (john.mcdougall@mississauga.ca)

leslie.green@mississauga.ca (leslie.green@mississauga.ca)

scott.sorenson@mississauga.ca (scott.sorenson@mississauga.ca)

andrew.farr@peelregion.ca (andrew.farr@peelregion.ca)

margie.chung@peelregion.ca (margie.chung@peelregion.ca)

nando.iannicca@peelregion.ca (nando.iannicca@peelregion.ca)

paul.callanan@peelregion.ca (paul.callanan@peelregion.ca)

peter.dundas@peelregion.ca (peter.dundas@peelregion.ca)

lisa.myslicki@infrastructureontario.ca (lisa.myslicki@infrastructureontario.ca)

karla.barboza@ontario.ca (karla.barboza@ontario.ca)

michele.doncaster@ontario.ca (michele.doncaster@ontario.ca)

trevor.bell@ontario.ca (trevor.bell@ontario.ca)

Rebecca.Quach@ontario.ca (Rebecca.Quach@ontario.ca)

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lise.chabot@ontario.ca (lise.chabot@ontario.ca)

steven.strong@ontario.ca (steven.strong@ontario.ca)

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rowcentre@bell.ca (rowcentre@bell.ca)

Jacquelyn.Scott@enbridge.com (Jacquelyn.Scott@enbridge.com)

Ian.Moase@enbridge.com (Ian.Moase@enbridge.com)

jim.arnott@enbridge.com (jim.arnott@enbridge.com)

est.reg.crossing@enbridge.com (est.reg.crossing@enbridge.com)

Monica.LaPointe@rci.rogers.com (Monica.LaPointe@rci.rogers.com)

Rogers.MOC@telecon.ca (Rogers.MOC@telecon.ca)

diana.spadafora@ontario.ca (diana.spadafora@ontario.ca)

ontariochapter@sierraclub.ca (ontariochapter@sierraclub.ca)


Subject: Notice of Virtual Public Information Event: Relocation of the 1,500-millimetre Credit Valley Trunk Sewer

From: George Carlson <George.CARLSON@mississauga.ca>
Sent: Monday, February 1, 2021 2:59 PM
To: Eby, Bryden <Bryden.Eby@jacobs.com>
Cc: Puri, Ajay <ajay.puri@peelregion.ca>; Dhillon, Paramjit/TOR <Paramjit.Dhillon@jacobs.com>
Subject: [EXTERNAL] RE: Notice of Virtual Public Information Event: Relocation of the 1,500-millimetre Credit Valley Trunk Sewer

Thank you for your email, it will be brought to Councillor Carlson's attention.

Kimberly Duarte, Admin. Asst. to
George Carlson, Councillor Ward 11
City of Mississauga
300 City Centre Drive, 3rd Floor
Mississauga, ON L5B 3C1
Office: 905-896-5011
Fax: 905-896-5863
Email: george.carlson@mississauga.ca
Ward 11 E-newsletters: <http://www.georgecarlson.ca/e-newsletter/>



From: Eby, Bryden <Bryden.Eby@jacobs.com>
Sent: Monday, February 1, 2021 1:50 PM
Cc: Puri, Ajay <ajay.puri@peelregion.ca>; Dhillon, Paramjit/TOR <Paramjit.Dhillon@jacobs.com>
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Bryden Eby, BBA, MES, LEED AP ND
Jacobs
Environmental Planner | Global Environmental Solutions
(519) 514-1612
bryden.eby@jacobs.com

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Newton, Dorin/TOR

From: Eastern Region Crossing <est.reg.crossing@enbridge.com>
Sent: Monday, February 1, 2021 2:48 PM
To: Eby, Bryden
Subject: RE: [External] Notice of Virtual Public Information Event: Relocation of the 1, 500-millimetre Credit Valley Trunk Sewer

Enbridge Pipelines Inc. (crude oil division) is not affected by the proposed construction.

From: Eby, Bryden <Bryden.Eby@jacobs.com>
Sent: Monday, February 1, 2021 1:50 PM
Cc: Puri, Ajay <ajay.puri@peelregion.ca>; Dhillon, Paramjit/TOR <Paramjit.Dhillon@jacobs.com>
Subject: [External] Notice of Virtual Public Information Event: Relocation of the 1, 500-millimetre Credit Valley Trunk Sewer

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Credit Valley Sanitary Trunk Sewer Relocation Schedule 'B' Municipal Class Environmental Assessment

Online Public Engagement

February 10, 2021



Jacobs

Challenging today.
Reinventing tomorrow.

Welcome!

The Purpose of this Online Public Engagement is to:

Project Overview



Provide a project overview and explain why the project is being undertaken.

Receive Feedback



Provide details and seek input on the alternative solutions developed

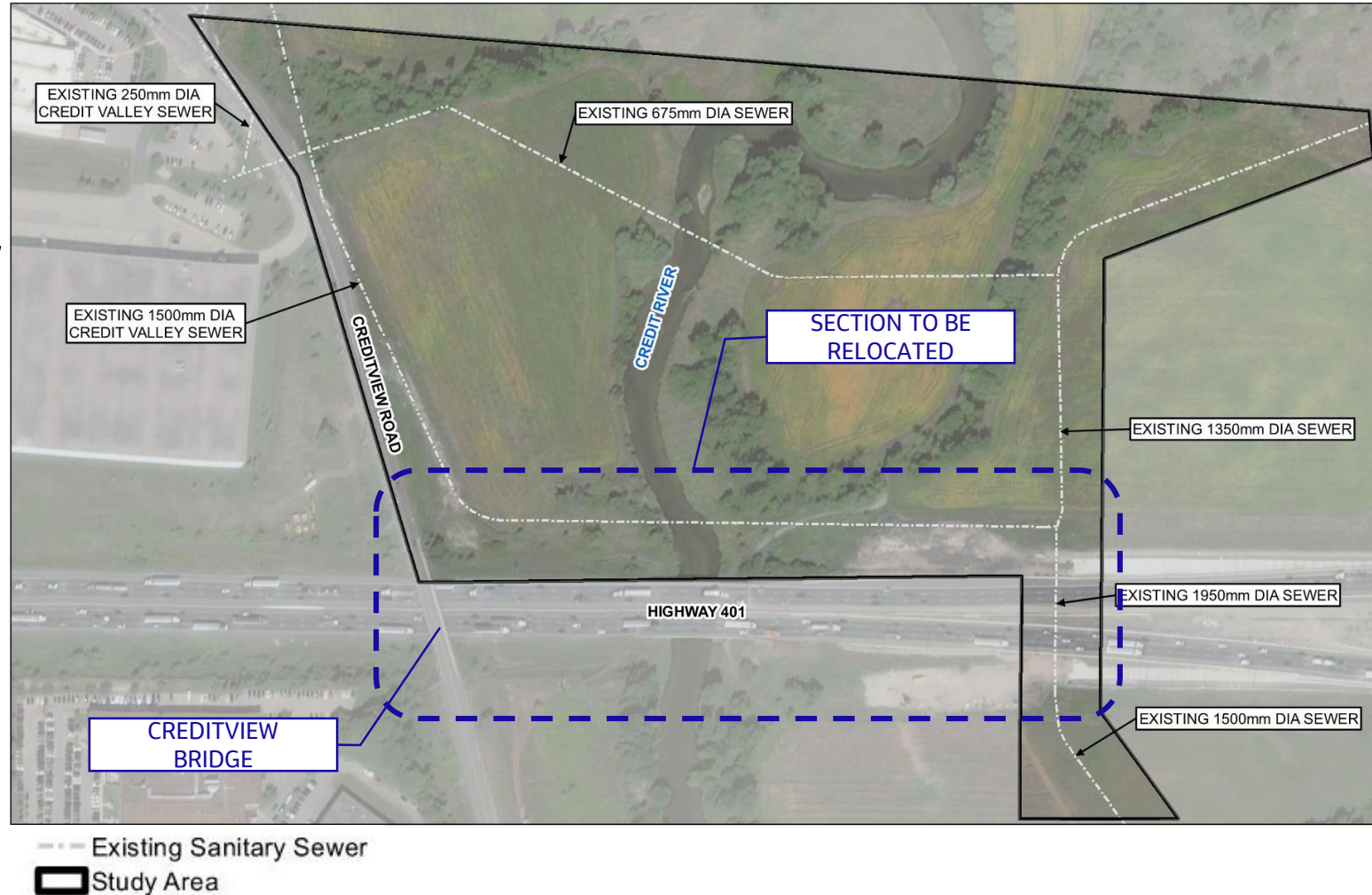
Next Steps



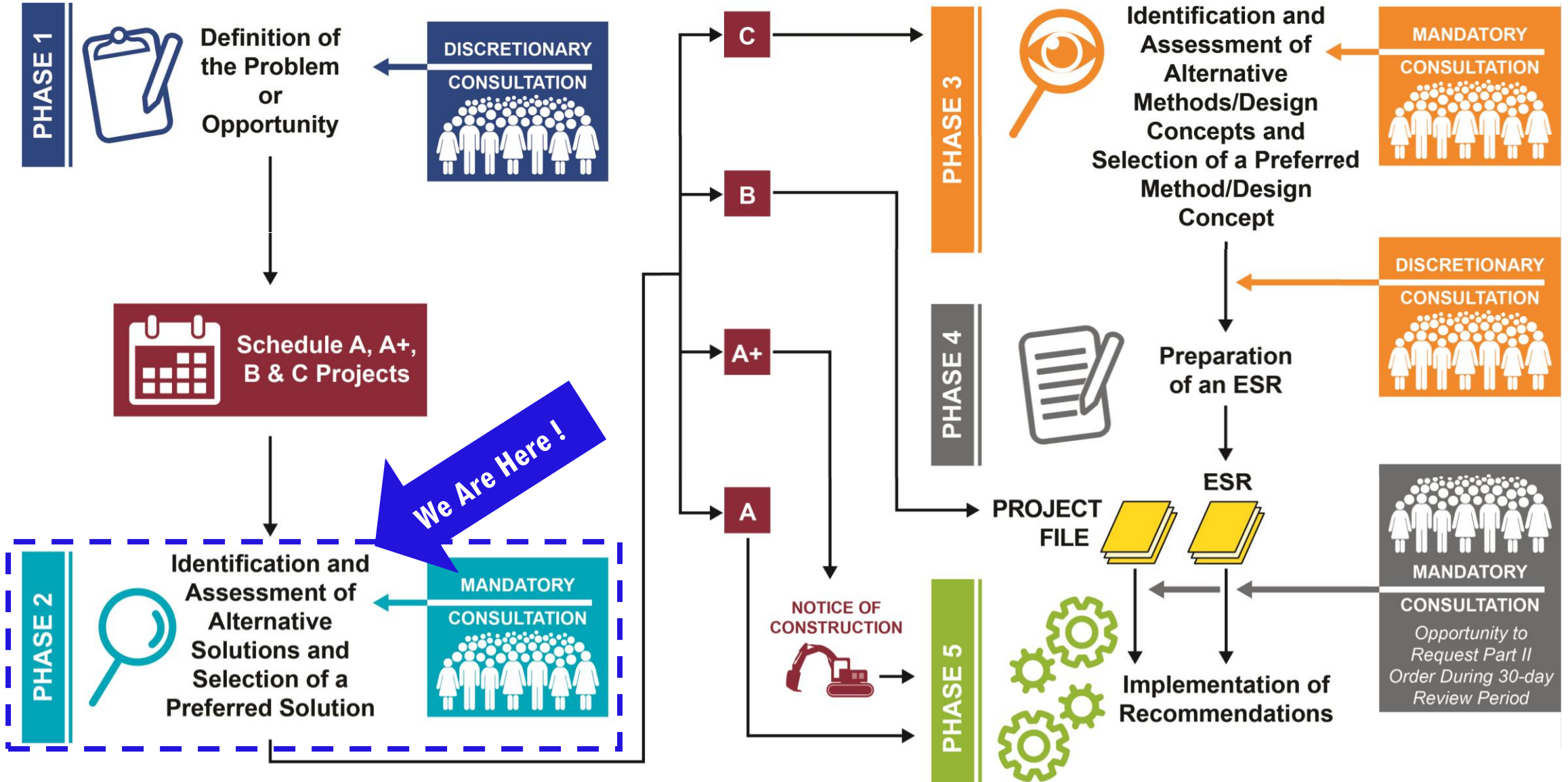
Provide information on the next stages of the project.

Project Overview: What, why and how?

- The Credit Valley Sanitary Trunk Sewer (CVSTS) is integral to the Region's wastewater collection system.
- A section of it from east of Creditview Road to south of Highway 401 in the City of Mississauga needs to be relocated due to the Province's widening of Highway 401 and reconstruction of the widened Creditview Bridge.
- A Schedule 'B' Municipal Class Environmental Assessment (EA) Study is being undertaken to identify the preferred alignment for the section to be relocated.



Class Environmental Assessment Process



Problem Statement: Why are we doing this?



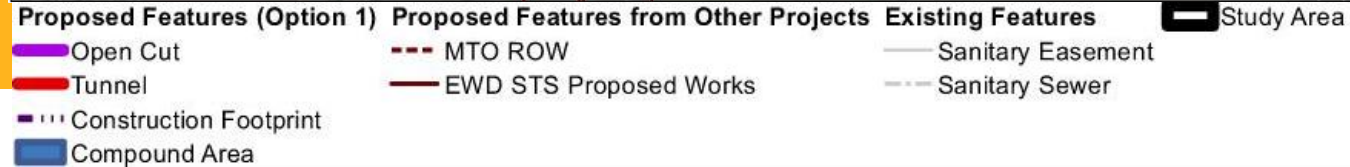
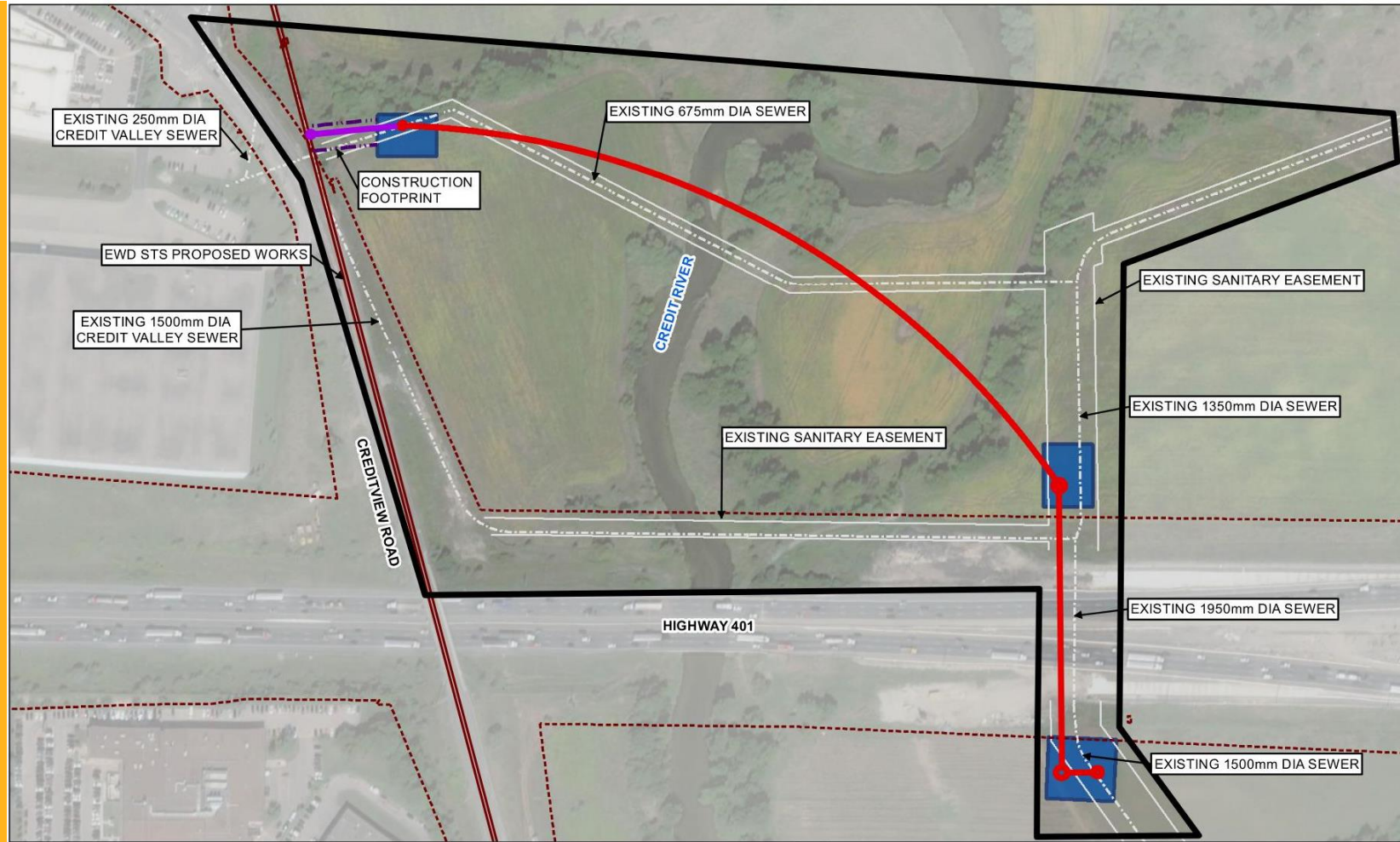
Due to the widening of Highway 401 and the reconstruction of the Creditview Bridge, accessibility for operation and maintenance of the existing CVSTS along the highway will be very difficult. The highway works could also impact the structural integrity of the existing CVSTS.

An existing 675 mm sewer that crosses the Credit River within the study area is at risk of being exposed by stream flow. An opportunity exists to remove this sewer and reroute flows into the new realigned 1500 mm sewer.

Identification of Alternatives

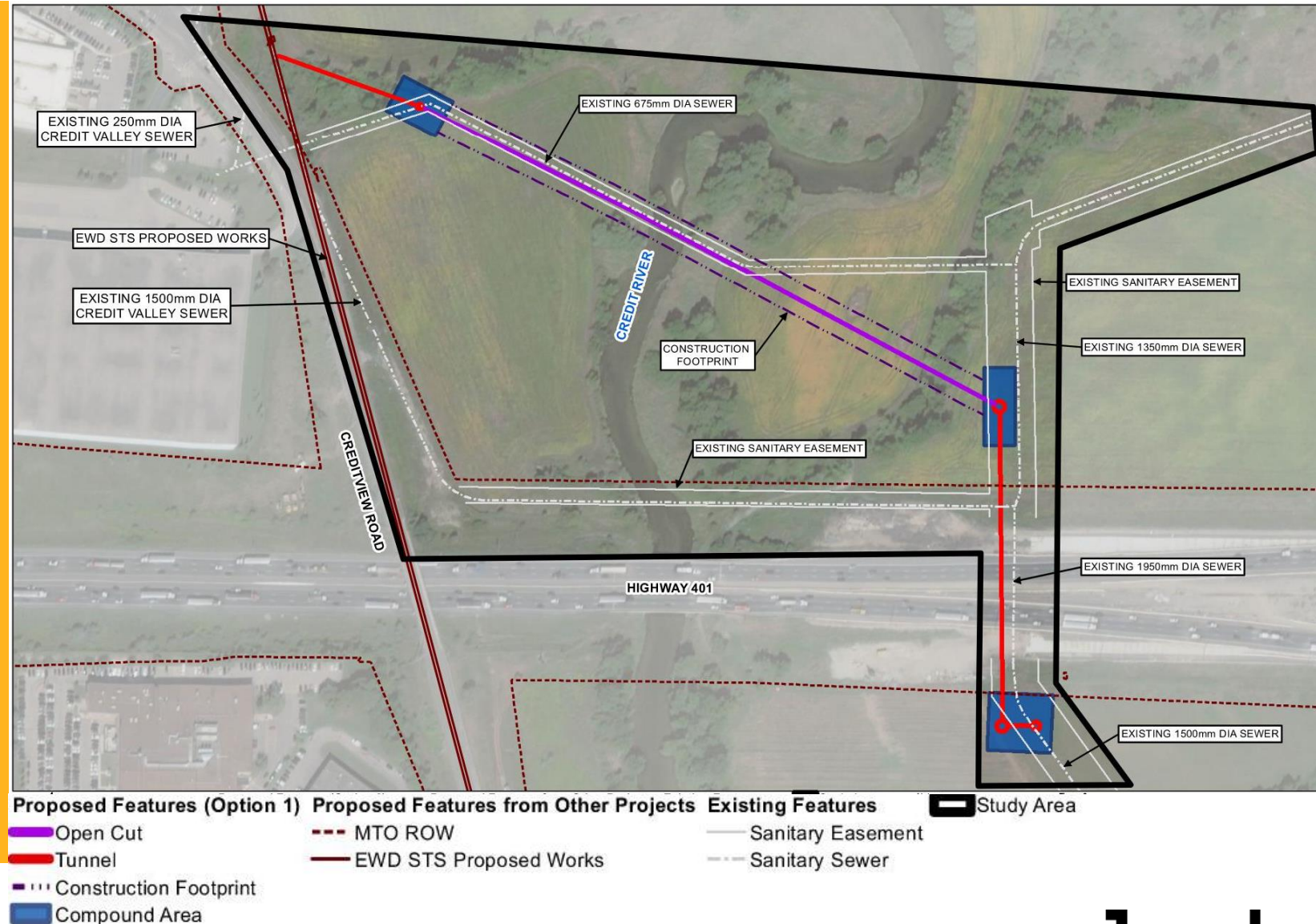
Alternative No. 1: 70 m Open-Cut and 640 m Tunnel

- Replace existing 1,500 mm sewer with a new sewer installed in a new easement for a 500 m radius tunnel.
- Consists of approximately 70 m open-cut section and 640 m of tunnelling.
- Requires a new permanent easement.
- Allows for tunneled crossing of the Credit River; however, there may be some construction challenges due to the shallow depth at the crossing.
- Existing 675 mm sewer is left in place.



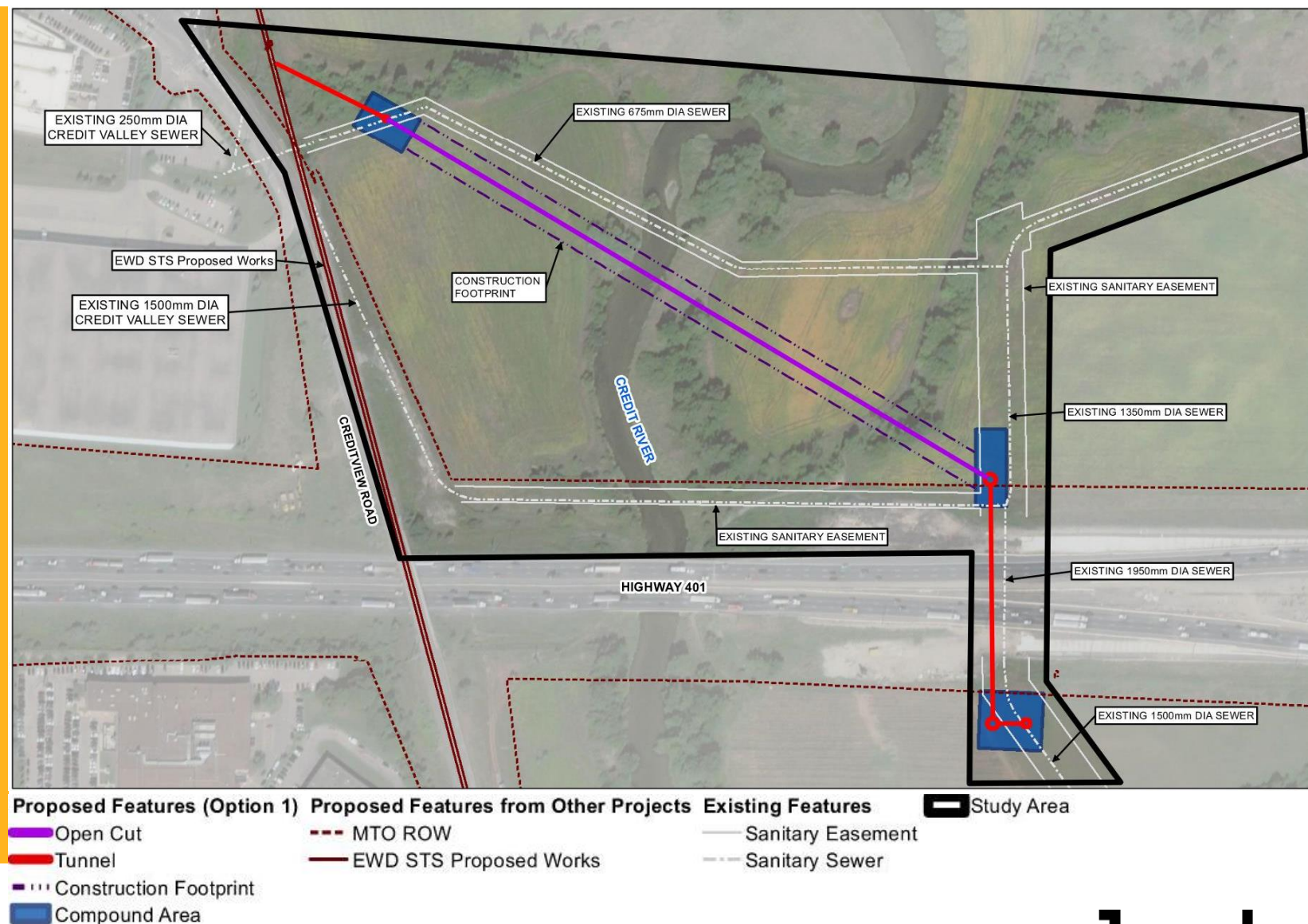
Alternative No. 2: 510 m Open-Cut and 200 m Tunnel for Highway 401 Crossing

- Replace existing 1,500 mm sewer with a new sewer installed in the easement for the existing 675 mm sewer.
- New sewer to be installed in 510 m long open-cut trench with 200 m long tunnel for Highway 401 crossing.
- Allows for open-cut crossing of Credit River to avoid technical challenges of tunneled crossing.
- Existing 675 mm sewer will be decommissioned and removed



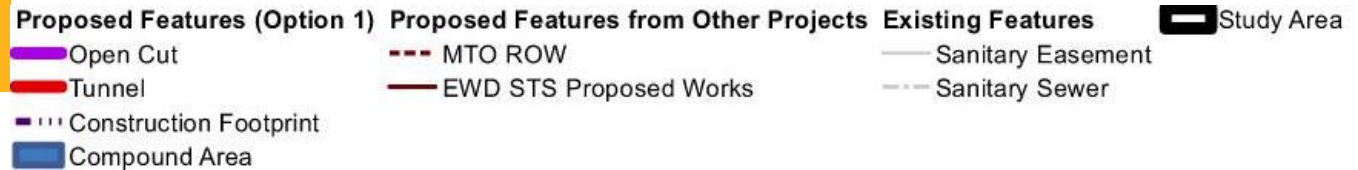
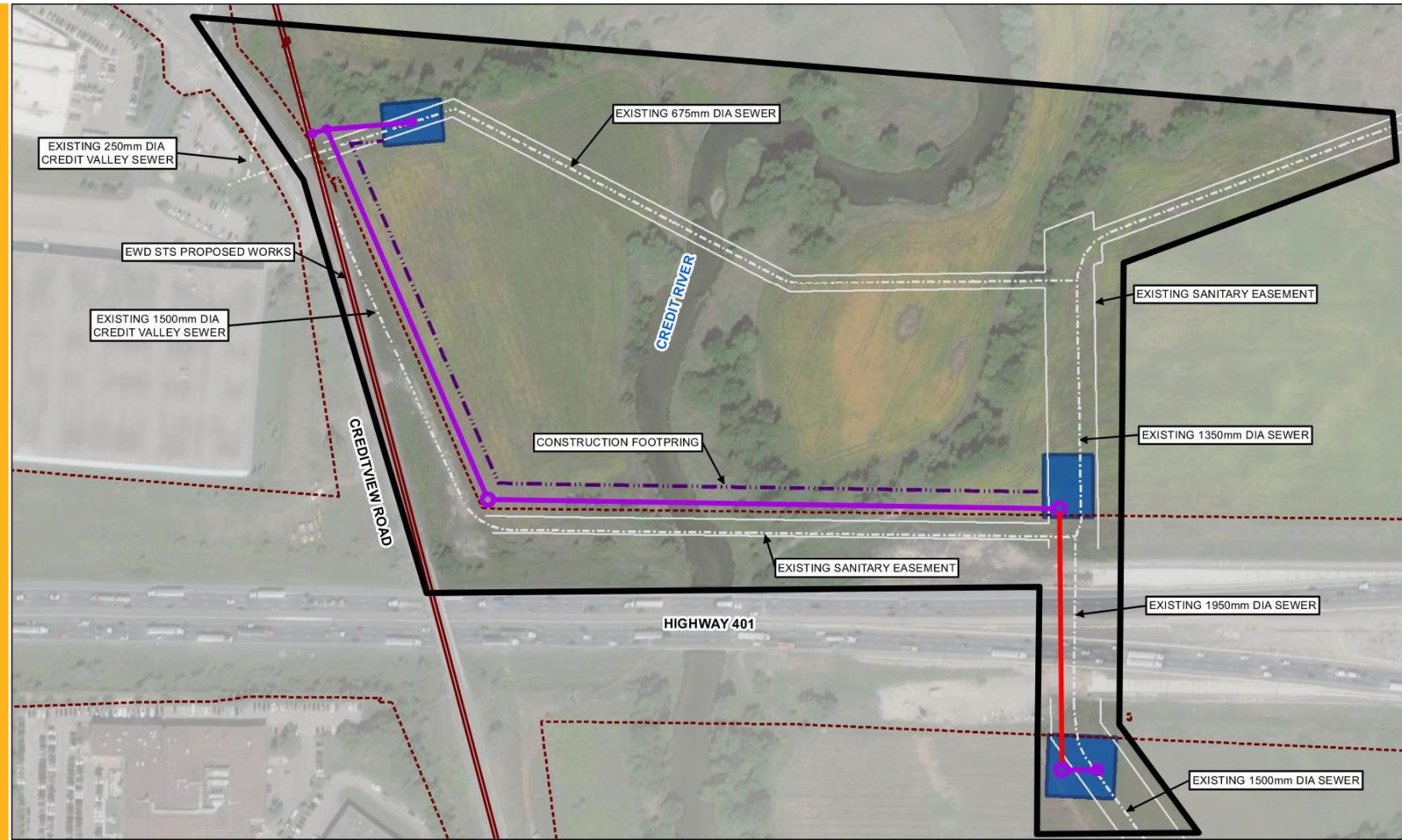
Alternative No. 2A: 530 m Open-Cut and 155 m Tunnel for Highway 401 Crossing

- Replace existing 1,500 mm sewer with a new sewer installed in a new easement south of the existing 675 mm sewer.
- New sewer to be installed in 530 m long open-cut trench with 155 m long tunnel for Highway 401 crossing.
- Requires a new permanent easement.
- Allows for open-cut crossing of Credit River to avoid technical challenges of tunneled crossing.
- Existing 675 mm sewer is left in place.



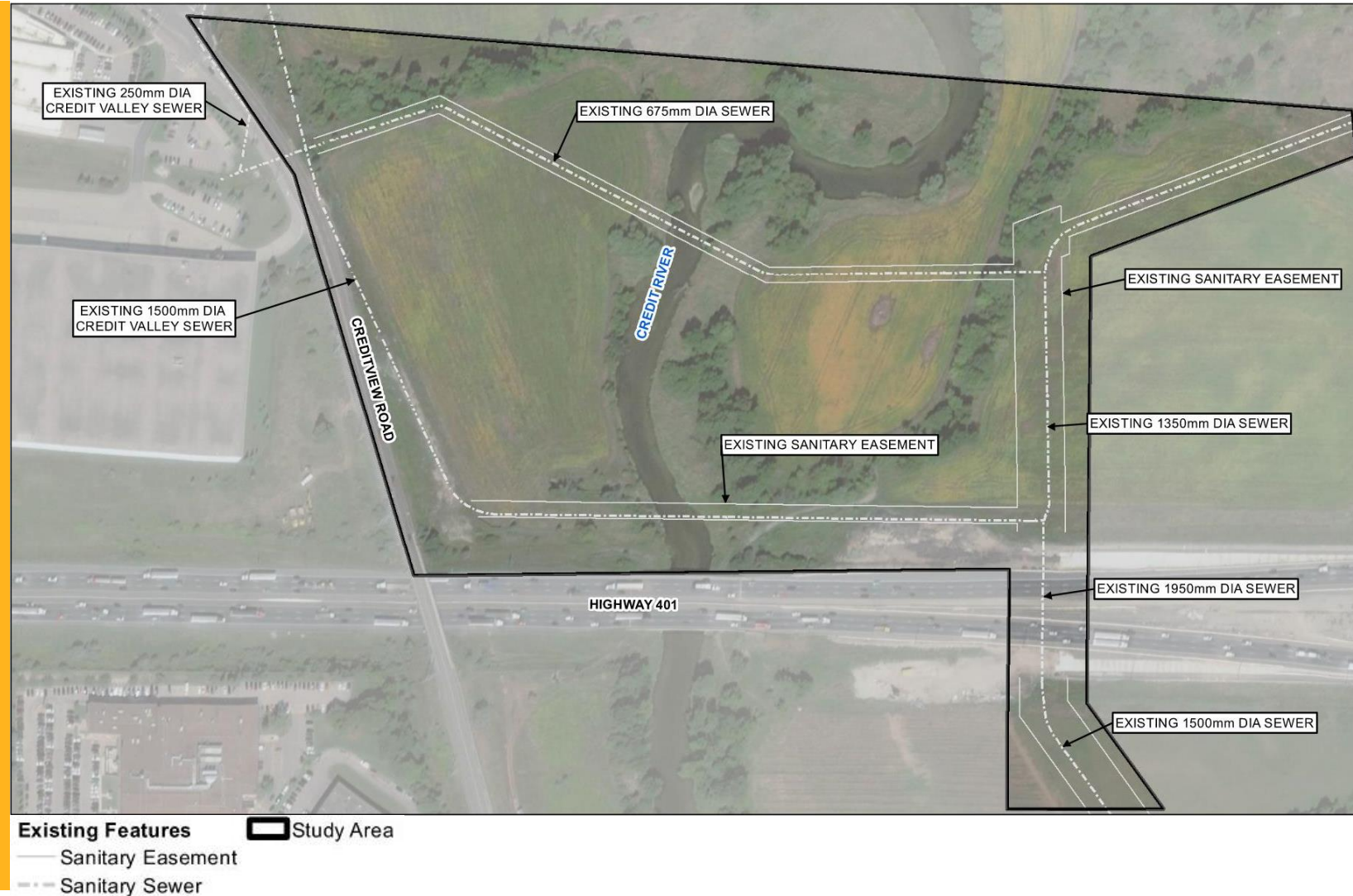
Alternative No. 3 600 m Open-Cut and 155 m Tunnel for Highway 401 Crossing

- Replace existing 1,500 mm sewer with a new sewer installed in new easement adjacent to Highway 401.
- New sewer to be installed in 600 m long open-cut trench with 155 m long tunnel for Highway 401 crossing.
- Requires a new permanent easement.
- Allows for open-cut crossing of Credit River to avoid technical challenges of tunneled crossing.
- Existing 675 mm sewer is left in place.



Alternative No. 4: Do Nothing Alternative

- The existing 1,500 mm sewer would be left in place, creating constructability issues during the Highway 401 Expansion project.
- Sewer maintenance activities will result in traffic flow restrictions during those periods.
- In the event of sewer failure, leakages could result in damage/ failure of highway embankment or retaining wall.
- Existing 675 mm sewer is left in place.








Evaluation of Alternatives

Evaluation of Alternatives

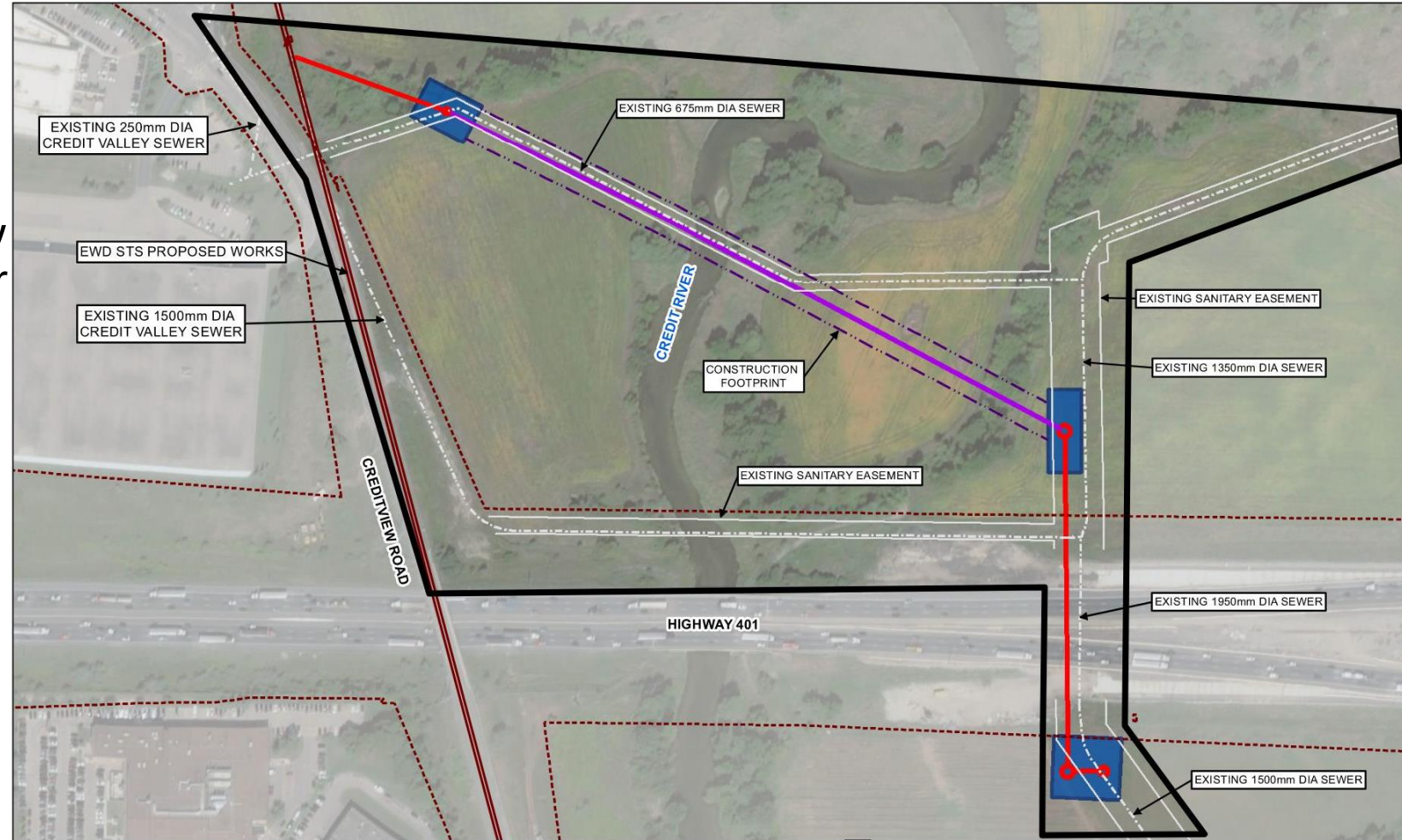
Category	Evaluation Criteria	Alternative No. 1	Alternative No. 2	Alternative No. 2A	Alternative No. 3	Alternative No. 4		
Technical Considerations	<ul style="list-style-type: none"> Ability to address problem/ opportunity statement Technical viability/constructability Impact to existing infrastructure and utilities Opportunity to coordinate other improvements Future operations and maintenance 							
Natural Environment	<ul style="list-style-type: none"> Disturbance of terrestrial species and features Disturbance of aquatic species and features Direct effects on terrestrial species at risk Direct effects on aquatic species at risk Effects on water quality or quantity 						Most Favourable	
								Moderately Favourable
								Least Favourable
Socio-Cultural Environment	<ul style="list-style-type: none"> Health and safety (H&S) Noise and vibration during construction Air and greenhouse gas emissions during construction Impacts to heritage or cultural resources Property acquisition and easement requirements Compliance with applicable planning policies, preferences and legislature Impacts to existing land use Impact to future land use or development 						Least Favourable	
Economic Factors	<ul style="list-style-type: none"> Construction costs Operation and maintenance (O&M) costs 							
Alternative Ranking		3	1	2	3	4		

Summary Score of Alternatives

Alternatives	Alternative No. 1	Alternative No. 2	Alternative No. 2A	Alternative No. 3	Alternative No. 4
Overall Score	Moderately Preferred 	Most Preferred 	Moderately Preferred 	Moderately Preferred 	Least Preferred 
Key Factors	<ul style="list-style-type: none"> • Trenchless construction results in potential for frac-out • Potential exposure of 675 mm sewer in the river due to erosion • A new, permanent easement is required; more property acquisition • More expensive: trenchless construction • No additional measures or time needed for O&M • Some disturbance to the environment 	<ul style="list-style-type: none"> • Open-cut construction is preferred and eliminates frac-out potential • Existing 675 mm sewer to be removed; no exposure in the river • Maximizes existing easement; minimal property acquisition • Less expensive: open-cut • No additional measures or time for O&M • More disturbance to the environment 	<ul style="list-style-type: none"> • Open-cut construction is preferred and eliminates frac-out potential • Potential exposure of 675 mm sewer in the river due to erosion • A new, permanent easement is required; more property acquisition • Less expensive: open-cut • No additional measures or time for O&M • More disturbance to the environment 	<ul style="list-style-type: none"> • Open-cut construction is preferred and eliminates frac-out potential • Potential exposure of 675 mm sewer in the river due to erosion • A new, permanent easement is required; more property acquisition • Less expensive: open-cut • Some additional measures or time for O&M • More disturbance to the environment 	<ul style="list-style-type: none"> • Impacts existing sewer infrastructure • Potential exposure of 675 mm sewer in the river due to erosion • No new easement required; no property acquisition • No construction costs • Significant additional measures or time for O&M • No disturbance to natural environment

Preliminary Preferred Alternative

- Alternative No. 2 (510 m Open-Cut and 200 m Tunnel for Highway 401 Crossing) is the preliminary preferred alternative
- Infrastructure is not within Highway 401's widened ROW; safe access for O&M.
- Allows Region to optimize the utilization of the existing easement for the 675 mm sanitary sewer.
- Open-cut installation will be more cost effective than tunnelling the entire length.
- Open-cut crossing will be engineered to mitigate environmental impacts to Credit River.



Next Steps

- Receive input from the public and stakeholders
- Finalize the preferred alternative
- Prepare and publish the Project File for review
- Issue Notice of Completion
- Complete the Class EA
- Implement the realignment of the Credit Valley Sanitary Sewer Relocation (Detailed Design and Construction)



How to Stay Connected and Involved?

Reach out to us anytime with comments and questions on this study.

Ajay Puri, P.Eng.

Project Manager

10 Peel Centre Drive, 4th
Floor, Suite B

Brampton, ON, L6T 4B9

905-791-7800 Ext. 5073

Ajay.Puri@peelregion.ca

- Feedback on this Online Public Engagement is open until March 3, 2021
- If you would like to be kept updated on this project:



<https://www.peelregion.ca/pw/water/assess/relocation-of-credit-valley-sanitary-trunk-sewer.asp>



<https://twitter.com/peelpublicworks?lang=en>



<https://www.facebook.com/regionofpeel>

Mailing List

Stakeholder Contact List

Category	Agency/Organization	Contact Name	Title/Department	Address	Email	Phone
Conservation Authority	Credit Valley Conservation	Jakub Kilis	Manager	1255 Old Derry Road Mississauga, ON L5N 6R4	jakub.kilis@cvc.ca	905-670-1615 x287
Conservation Authority	Credit Valley Conservation	Kerry Mulchansingh	Program Manager	1255 Old Derry Road Mississauga, ON L5N 6R4	kerry.mulchansingh@cvc.ca	905.670.1615 x383
Federal	Canadian Heritage	Brian MacKay	Ontario Regional Advisor	15 Rue Eddy Gatineau, QC K1A 0M5	brian.mackay@canada.ca	819-997-7788
Federal	Environment and Climate Change Canada	Wesley Plant	Manager, Environmental Assessment Section - Ontario	4905 Dufferin St Toronto, Ontario M3H 5T4 Canada	wesley.plant@ec.gc.ca	416-739-4272
Federal	Fisheries and Oceans Canada	Dave Gibson	Senior Biologist	P.O. Box 85060 3027 Harvester Road Suite 304 London, ON N6E 2V2	dave.gibson@dfo-mpo.gc.ca	905-336-4764
Federal	Impact Assessment Agency of Canada	Emilie St-Onge	Coordinator, CEAA Registry	Place Bell Canada 160 Elgin Street, 22nd Flr Ottawa, ON K1A 0H3	emilie.st-onge@canada.ca	343-961-1449
Federal	Indigenous and Northern Affairs Canada	Cleo Big Eagle	Senior Environmental Advisor	10 Wellington Street Gatineau, QC K1A 0H4	cleo.bigeagle@canada.ca	819-635-7332
First Nations	Credit River Metis Council	Robert Bell	President of MNO Credit River Metis Council	Unit 305, Plaza 2 350 Rutherford Road South Brampton, ON L6W 4N6	rbelljr@hotmail.com	613-798-1488
First Nations	Haudenosaunee Confederacy	Hohahes Leroy Hill	Chiefs Council Secretary	16 Sunrise Court, Suite 600 P.O. Box 777 Ohsweken, ON N0A 1M0	jocko@sixnationsns.com	519-717-7326
First Nations	Huron-Wendat Nation	Konrad H. Sioui	Grand Chief	255 Place Chef Michel Laveau Wendake, QC G0A 4V0	administration@cnhw.qc.ca	418-843-3767
First Nations	Mississauga's of Scugog Island First Nation	Kelly Larocca	Chief	22521 Island Road Port Perry, ON	info@scugogfirstnation.com	905-985-3337
First Nations	Mississaugas of the Credit First Nation	Stacey Laforme	Chief	2789 Mississauga Road, RR#6 Hagersville, ON N0A 1H0	office.clerk@mncfn.ca	905-768-1133
First Nations	Mississaugas of the Credit First Nation	Fawn Sault	Consultation Manager	4065 Hwy 6 Hagersville, ON N0A 1H0	Fawn.Sault@mncfn.ca	905-768-4260
First Nations	Six Nations of the Grand River	Mark Hill	Chief	1695 Chiefswood Rd PO Box 5000 Ohsweken, ON N0A 1M0	markhill@sixnations.ca	519-732-2905
First Nations	The Metis Nation of Ontario	Margaret Froh	President	Métis Nation of Ontario Suite 1100, 11th Floor 66 Slater Street Ottawa, ON K1P 5H1	mno@metisnation.org	613-798-1488
Local - Consultant	Altus Group	Sammy Lee	Cost Consulting & Project Manager	N/A	Sammy.Lee@altusgroup.com	N/A
Local - Consultant	West Corridor Constructors	David Ellis	N/A	N/A	daellis@aecon.com	N/A
Municipal	City of Mississauga	Bonnie Crombie	Mayor	Mississauga Civic Centre 300 City Centre Drive Mississauga, ON L5B 3C1	mayor@mississauga.ca	905-896-5555
Municipal	City of Mississauga	Chris Rouse	Manager, North Team	Mississauga Civic Centre 300 City Centre Drive Mississauga, ON L5B 3C1	chris.rouse@mississauga.ca	905-615-3200
Municipal	City of Mississauga	Darren Morita	Manager of Development Engineering	Mississauga Civic Centre 300 City Centre Drive Mississauga, ON L5B 3C1	darren.morita@mississauga.ca	905-615-3200
Municipal	City of Mississauga	Eniber Cabrera	Planner	Mississauga Civic Centre 300 City Centre Drive Mississauga, ON L5B 3C1	eniber.cabrera@mississauga.ca	905-615-3200
Municipal	City of Mississauga	George Carlson	Councillor - Ward 11	Mississauga Civic Centre 300 City Centre Drive Mississauga, ON L5B 3C1	george.carlson@mississauga.ca	905-896-5011
Municipal	City of Mississauga	Gino Dela Cruz	Project Manager	Mississauga Civic Centre 300 City Centre Drive Mississauga, ON L5B 3C1	gino.delacruz@mississauga.ca	905-615-3200
Municipal	City of Mississauga	John McDougall	Fire and Emergency Services Fire Chief	15 Fairview Road West Mississauga, ON L5B 1K7	john.mcdougall@mississauga.ca	N/A

Stakeholder Contact List

Category	Agency/Organization	Contact Name	Title/Department	Address	Email	Phone
Municipal	City of Mississauga	Leslie Green	Manager of Transportation Projects	Mississauga Civic Centre 300 City Centre Drive Mississauga, ON L5B 3C1	leslie.green@mississauga.ca	905-615-3200 x4197
Municipal	City of Mississauga	Scott Sorenson	Storm Drainage Technician	Mississauga Civic Centre 300 City Centre Drive Mississauga, ON L5B 3C1	scott.sorenson@mississauga.ca	905-615-3200
Municipal	City of Mississauga	Evelyn Krolicka	Storm Design Technologist	201 City Centre Drive, Suite 800 Mississauga, ON L5B 2T4	Evelyn.Krolicka@mississauga.ca	905-615-3200 x5921
Municipal	Region of Peel	Andrew Farr	Public Works Commissioner	11 Peel Centre Drive, Suite A, 5th Floor Brampton, ON L6T 4B9	andrew.farr@peelregion.ca	905-791-7800
Municipal	Region of Peel	Margie Chung	Principal Planner	10 Peel Centre Drive, 6th Floor Brampton, ON L6T 4B9	margie.chung@peelregion.ca	905-791-7800
Municipal	Region of Peel	Nando Iannicca	Regional Chair	10 Peel Centre Dr., Brampton, ON L6T 4B9	nando.iannicca@peelregion.ca	905-791-7800 ext. 4310
Municipal	Region of Peel	Paul Callanan	Director of Environmental Health	10 Peel Centre Drive Brampton, ON L6T 4B9	paul.callanan@peelregion.ca	905-791-7800 x2802
Municipal	Region of Peel	Peter Dundas	Region of Peel Ambulance and Emergency Services Chief and Director	5299 Maingate Drive Mississauga, ON L4W 1G6	peter.dundas@peelregion.ca	905-791-7800
Provincial	Infrastructure Ontario	Lisa Myslicki	Environmental Specialist	1 Dundas Street West, Suite 2000 Toronto, ON M5G 1Z3	lisa.myslicki@infrastructureontario.ca	416-557-3116
Provincial	Infrastructure Ontario	Kelvin Chu	N/A	N/A	Kelvin.Chu@infrastructureontario.ca	N/A
Provincial	Ministry of Heritage, Sport, Tourism and Culture Industries	Karla Barboza	Team Lead, Heritage	401 Bay Street Toronto, ON M7A 0A7	karla.barboza@ontario.ca	416-314 7120
Provincial	Ministry of Agriculture, Food and Rural Affairs	Michele Doncaster	Manager of Land Use Policy & Stewardship	1 Stone Road Guelph, ON N1G 4Y2	michele.doncaster@ontario.ca	226-979-1552
Provincial	Ministry of Environment, Conservation and Parks	Central Region			eanotification.cregion@ontario.ca	
Provincial	Ministry of Environment, Conservation and Parks	Trevor Bell	Environmental Resource Planner & EA Coordinator	5775 Yonge Street, 9th Floor, Place Nouveau Toronto, ON M2M 4J1	trevor.bell@ontario.ca	416-326-3577
Provincial	Ministry of Health	Irina Brailovski	Senior Strategy and Planning Advisor	Box 12, Toronto, ON M7A 1N3	irina.brailovski@ontario.ca	416-325-1787
Provincial	Ministry of Indigenous Affairs	Lise Chabot	Manager	Suite 400, 160 Bloor Street E Toronto, ON M7A 2E6	lise.chabot@ontario.ca	416-325-4044
Provincial	Ministry of Natural Resources and Forestry	Steven Strong	Resources Planner	50 Bloomington Road Aurora, ON L4G 0L8	steven.strong@ontario.ca	905-713-7369
Provincial	Ministry of Natural Resources and Forestry	Ruth Lindenburger	Regional Planning Coordinator	300 Water Street, Box 7000 4th Floor, South Tower Peterborough, ON K9J 8M5	ruth.lindenburger@ontario.ca	705-755-3215
Provincial	Ministry of Transportation	Dawn Irish	Manager, Environmental Policy Office - Transportation Planning Branch	Garden City Tower 2nd Flr 301 St. Paul Street St. Catharines, ON L2R 7R4	dawn.irish@ontario.ca	905-704-3179
Provincial	Ministry of Transportation	Wayne Bell	Head of Project Development & Delivery	N/A	Wayne.H.Bell@ontario.ca	N/A
Utilities	Alectra	Maxwell Watters	N/A	N/A	maxwell.watters@alecrautilities.com	N/A
Utilities	Bell Canada	John La Chappelle	Planner/Manager	100 Borough Drive, 5th Floor - Blue Scarborough, ON M1P 4E2	rowcentre@bell.ca	N/A
Utilities	Enbridge	Jacquelyn Scott	N/A	N/A	Jacquelyn.Scott@enbridge.com	N/A
Utilities	Enbridge	Mike MacEacheron	N/A	N/A	michael.maceacheron@enbridge.com	N/A
Utilities	Enbridge	Ian Moase	N/A	N/A	Ian.Moase@enbridge.com	N/A
Utilities	Enbridge Gas Distribution Inc.	Jim Arnott	Municipal Coordination Advisor/GTA Project Planner	500 Consumers Road North York, ON M2J 1P8	jim.arnott@enbridge.com	416-758-7901
Utilities	Enbridge Pipelines Inc.	Chris Pincombe	Lands & ROW Administrator	1086 Modeland Road, Building 1050, 1st Floor Sarnia, ON N7S 6L2	est.reg.crossing@enbridge.com	519-333-6753
Utilities	Enersource	Daniel J. Pastoric	President & Chief Executive Officer	3420 Mavis Road Mississauga, ON L5C 3K1	N/A	N/A
Utilities	Hydro One Networks	Brian McCormick	Manager of Environmental Services	483 Bay Street, North Tower, 13th Floor Toronto, ON M5G 2P5	N/A	N/A
Utilities	Rogers	Monica Lapointe	N/A	N/A	Monica.LaPointe@rci.rogers.com Rogers.MOC@telecon.ca	N/A
Utilities	Rogers Cable	Agatha La Donne	Planning Coordinator	3573 Wolfedale Road Mississauga, ON L5C 3T6	N/A	N/A

City of Mississauga

Newton, Dorin/TOR

From: Scott Sorensen <Scott.Sorensen@mississauga.ca>
Sent: Tuesday, March 16, 2021 1:19 PM
To: Thannickal, Jimmy/TOR
Cc: Puri, Ajay; Dhillon, Paramjit/TOR; Newton, Dorin/TOR
Subject: [EXTERNAL] RE: Notice of study commencement - Relocation of the 1500 mm Credit Valley Sanitary Trunk Sewer

Thanks very much, Jimmy.
Regards,
Scott

From: Thannickal, Jimmy/TOR <Jimmy.Thannickal@jacobs.com>
Sent: 2021/03/16 12:41 PM
To: Scott Sorensen <Scott.Sorensen@mississauga.ca>
Cc: Puri, Ajay <ajay.puri@peelregion.ca>; Dhillon, Paramjit/TOR <Paramjit.Dhillon@jacobs.com>; Newton, Dorin/TOR <Dorin.Newton@jacobs.com>
Subject: RE: Notice of study commencement - Relocation of the 1500 mm Credit Valley Sanitary Trunk Sewer

Hi Scott,

Thank you for your response regarding the EA study. We considered the City's existing 2400 storm sewer in our evaluation of alternatives. The preliminary preferred alternative is number two and will have no impact on the existing infrastructure.

Jimmy Thannickal, P.Eng. | Jacobs
647.382.5056 mobile
Jimmy.Thannickal@jacobs.com | www.jacobs.com

From: Scott Sorensen <Scott.Sorensen@mississauga.ca>
Sent: Wednesday, March 3, 2021 3:44 PM
To: Puri, Ajay
Cc: Evelyn Krolicka; Scott Perry
Subject: Notice of study commencement - Relocation of the 1500 mm Credit Valley Sanitary Trunk Sewer

CAUTION: EXTERNAL MAIL. DO NOT CLICK ON LINKS OR OPEN ATTACHMENTS YOU DO NOT TRUST.

Hi Ajay – hope you're doing well.

Regarding the Region's subject EA study and attached PIC boards, I am providing response on behalf of the City of Mississauga's Stormwater Assets staff, with particular focus on storm drainage infrastructure (linear):

The Region is asked to acknowledge the presence of a 2400 mm municipal storm trunk sewer within the project area and account for/accommodate this existing infrastructure during future design stages. Please refer to attached C26212, C26213 and C26214 for additional detail.

Further to comment #1, it appears that the open cut portion of proposed 'Alternative no. 3' is in direct conflict with the 2400 mm storm trunk sewer. For reasons relating to utility conflict avoidance, the City is not in support of Alternative No. 3. Please refer to attached Aerial for additional detail.

Alternatives 1, 2 and 2a all appear to be viable and pose limited impact on nearby storm sewer infrastructure. In the absence of further design details, please consider all three of these alternatives to be of equal preference.

Thanks and regards,



Scott Sorensen

Storm Drainage Coordinator

T 905-615-3200 ext.5942

scott.sorensen@mississauga.ca

[City of Mississauga](#) | Transportation & Works Department,
Transportation Infrastructure Planning Division

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Credit Valley Sanitary Trunk Sewer Relocation Schedule 'B' Municipal Class Environmental Assessment

Online Public Engagement

February 10, 2021



Jacobs

Challenging today.
Reinventing tomorrow.

Welcome!

The Purpose of this Online Public Engagement is to:

Project Overview



Provide a project overview and explain why the project is being undertaken.

Receive Feedback



Provide details and seek input on the alternative solutions developed

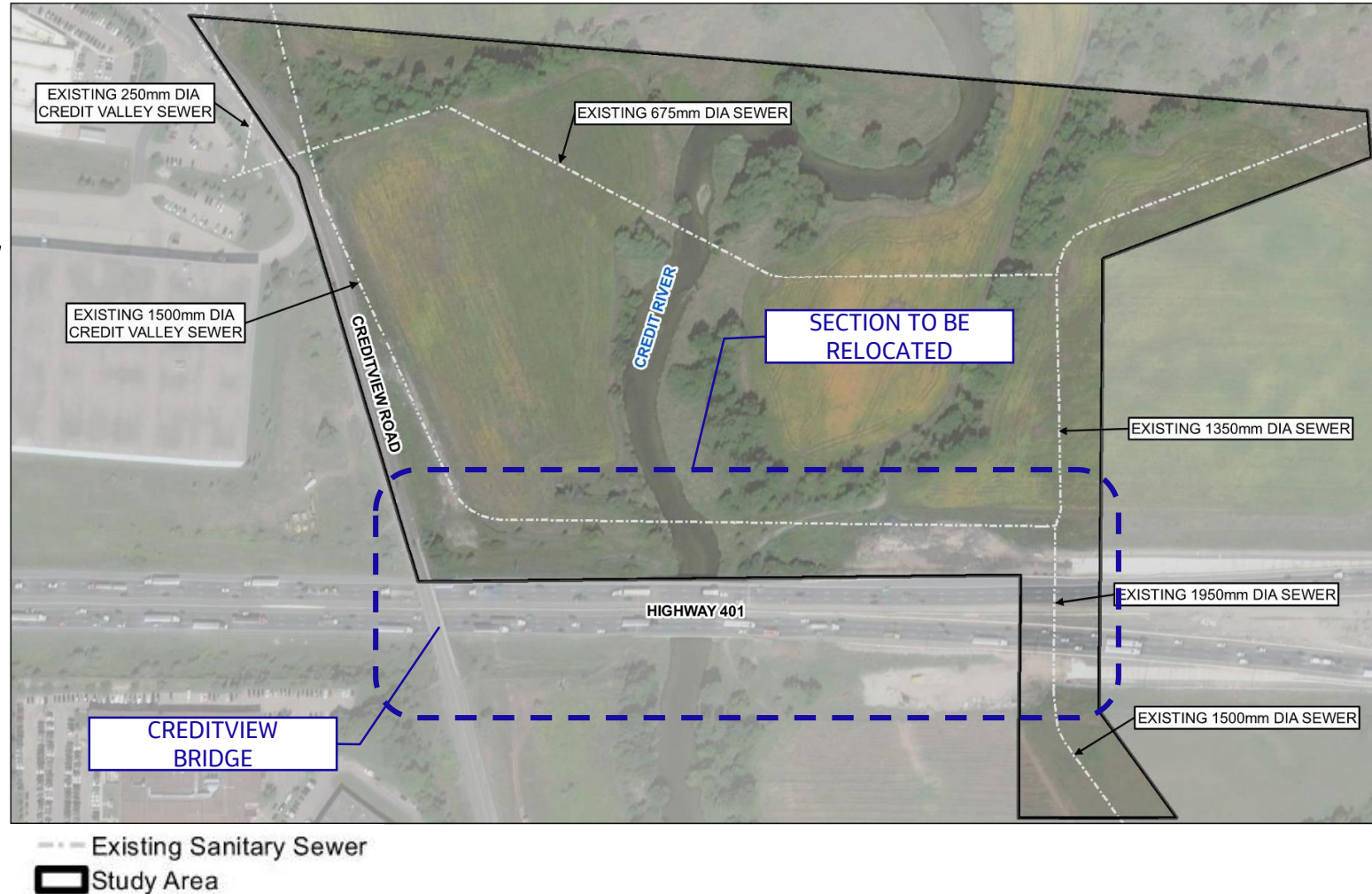
Next Steps



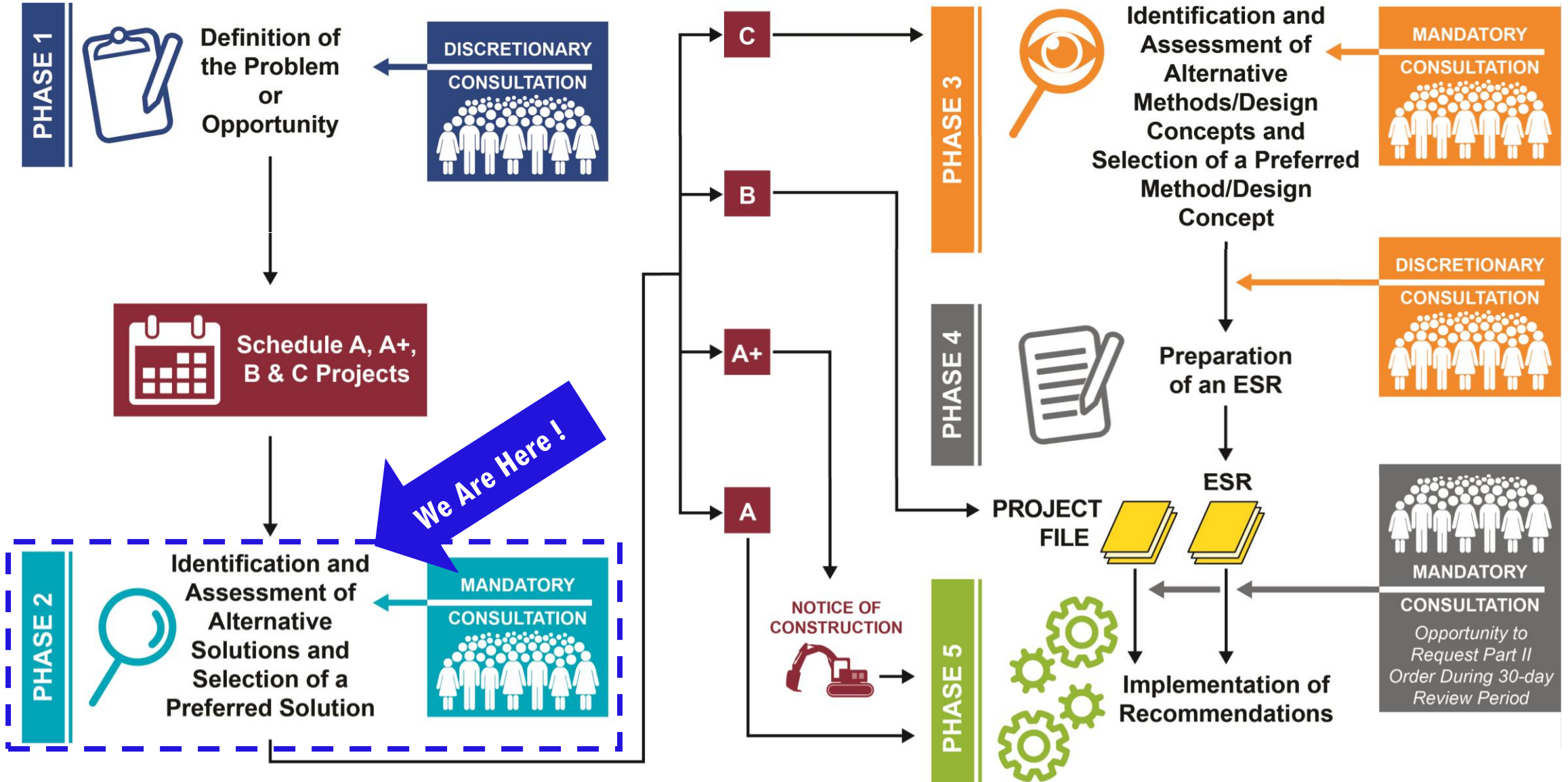
Provide information on the next stages of the project.

Project Overview: What, why and how?

- The Credit Valley Sanitary Trunk Sewer (CVSTS) is integral to the Region's wastewater collection system.
- A section of it from east of Creditview Road to south of Highway 401 in the City of Mississauga needs to be relocated due to the Province's widening of Highway 401 and reconstruction of the widened Creditview Bridge.
- A Schedule 'B' Municipal Class Environmental Assessment (EA) Study is being undertaken to identify the preferred alignment for the section to be relocated.



Class Environmental Assessment Process



Problem Statement: Why are we doing this?



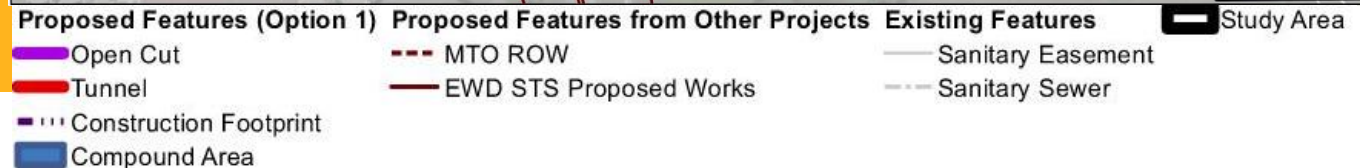
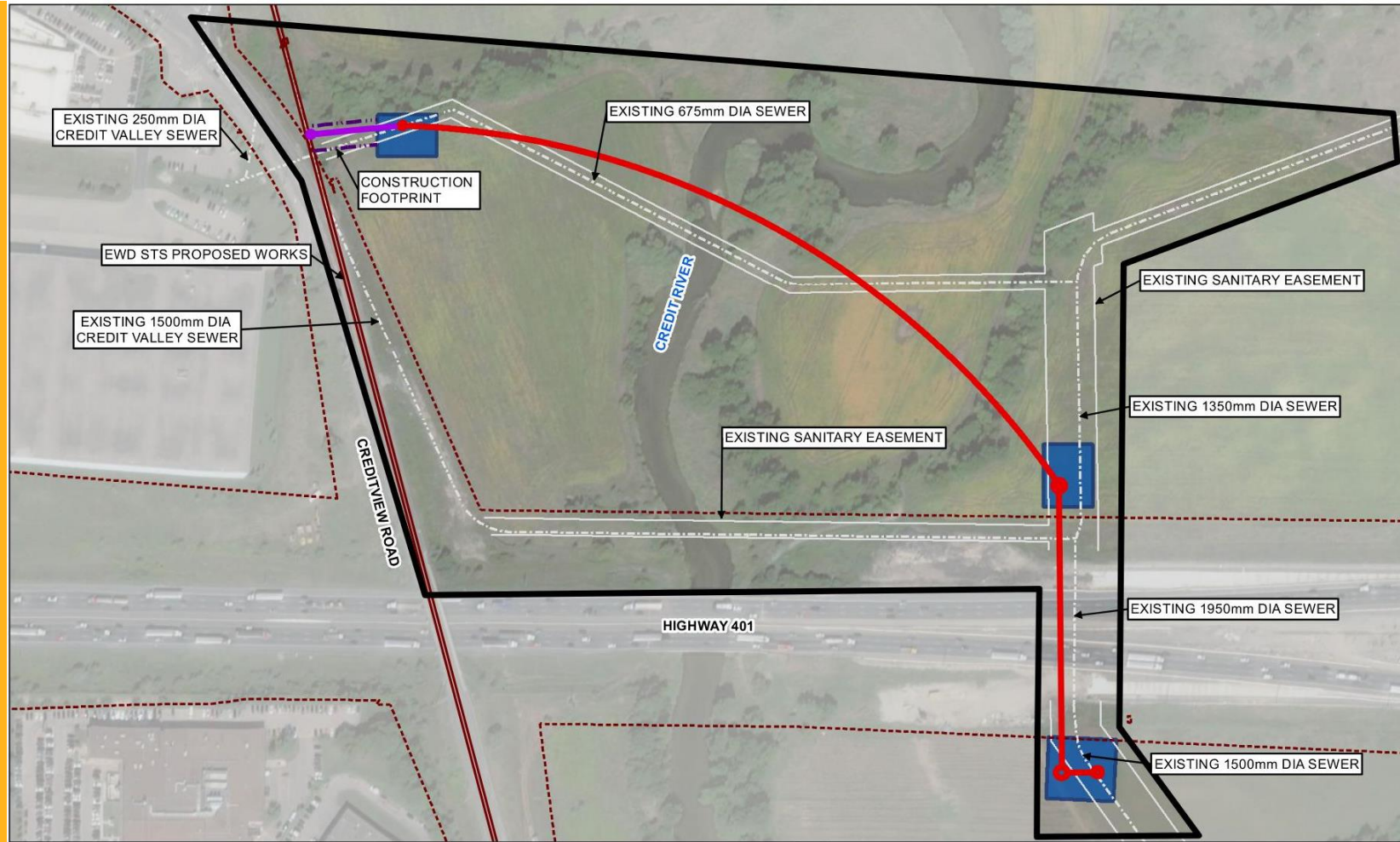
Due to the widening of Highway 401 and the reconstruction of the Creditview Bridge, accessibility for operation and maintenance of the existing CVSTS along the highway will be very difficult. The highway works could also impact the structural integrity of the existing CVSTS.

An existing 675 mm sewer that crosses the Credit River within the study area is at risk of being exposed by stream flow. An opportunity exists to remove this sewer and reroute flows into the new realigned 1500 mm sewer.

Identification of Alternatives

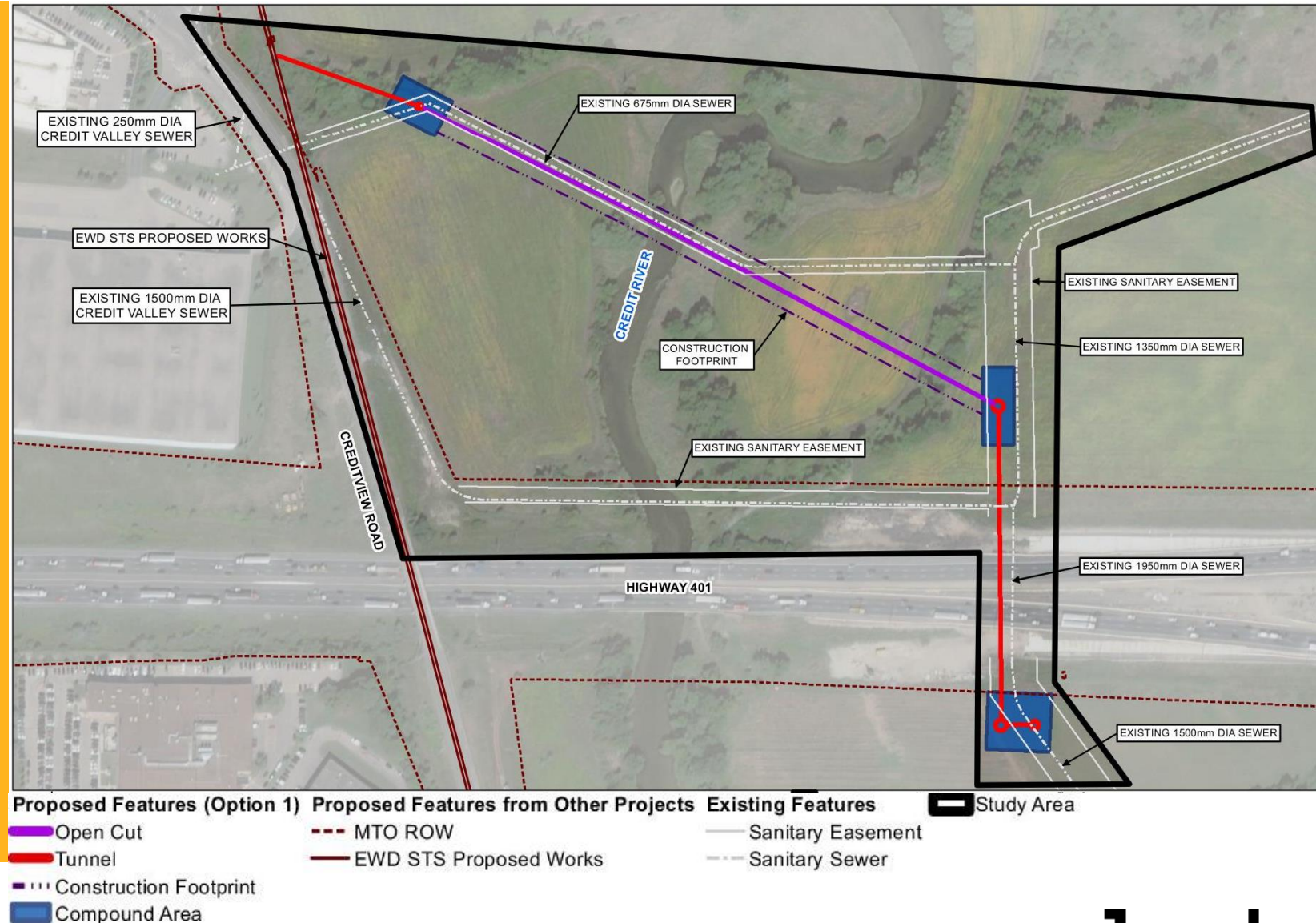
Alternative No. 1: 70 m Open-Cut and 640 m Tunnel

- Replace existing 1,500 mm sewer with a new sewer installed in a new easement for a 500 m radius tunnel.
- Consists of approximately 70 m open-cut section and 640 m of tunnelling.
- Requires a new permanent easement.
- Allows for tunneled crossing of the Credit River; however, there may be some construction challenges due to the shallow depth at the crossing.
- Existing 675 mm sewer is left in place.



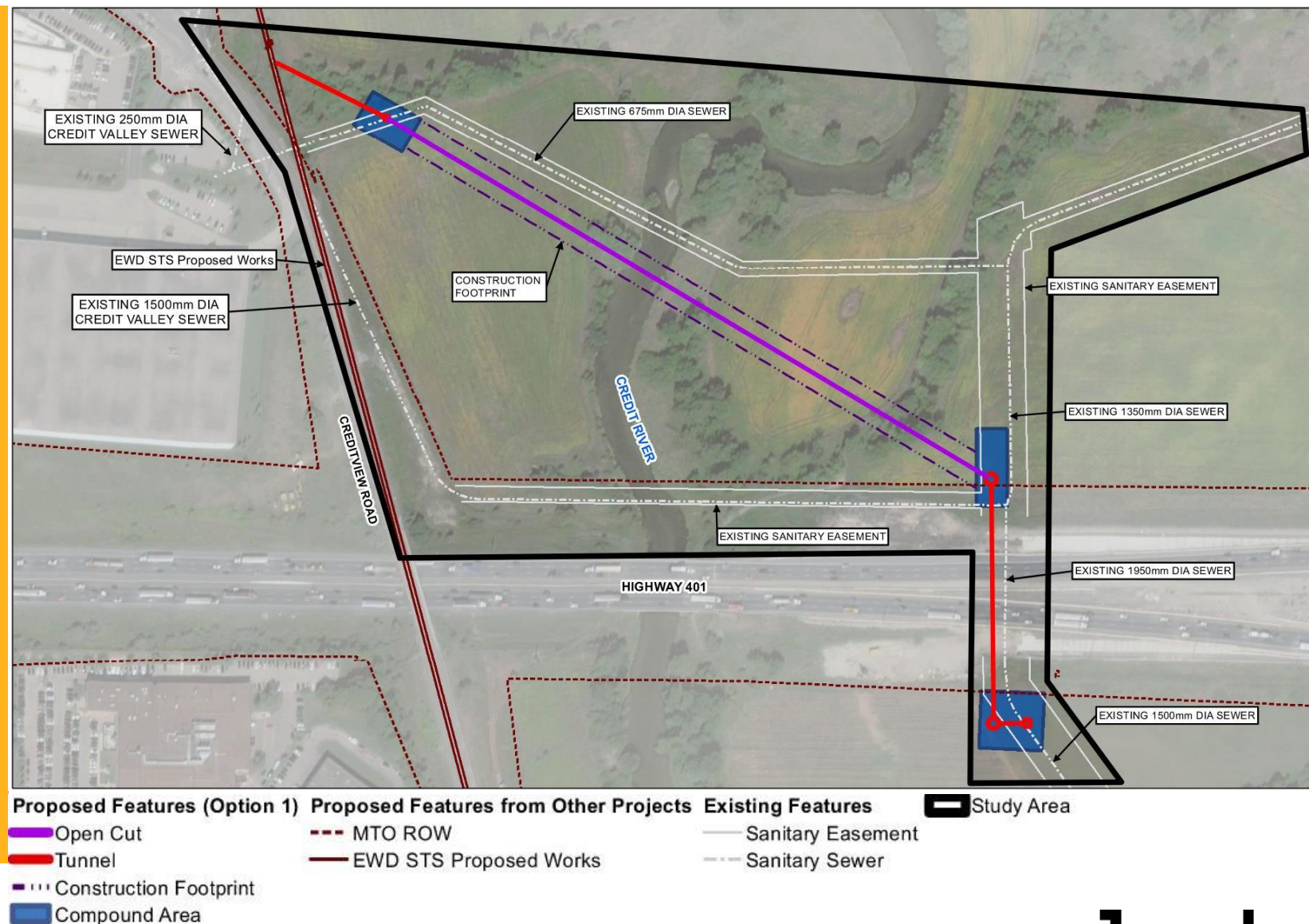
Alternative No. 2: 510 m Open-Cut and 200 m Tunnel for Highway 401 Crossing

- Replace existing 1,500 mm sewer with a new sewer installed in the easement for the existing 675 mm sewer.
- New sewer to be installed in 510 m long open-cut trench with 200 m long tunnel for Highway 401 crossing.
- Allows for open-cut crossing of Credit River to avoid technical challenges of tunneled crossing.
- Existing 675 mm sewer will be decommissioned and removed



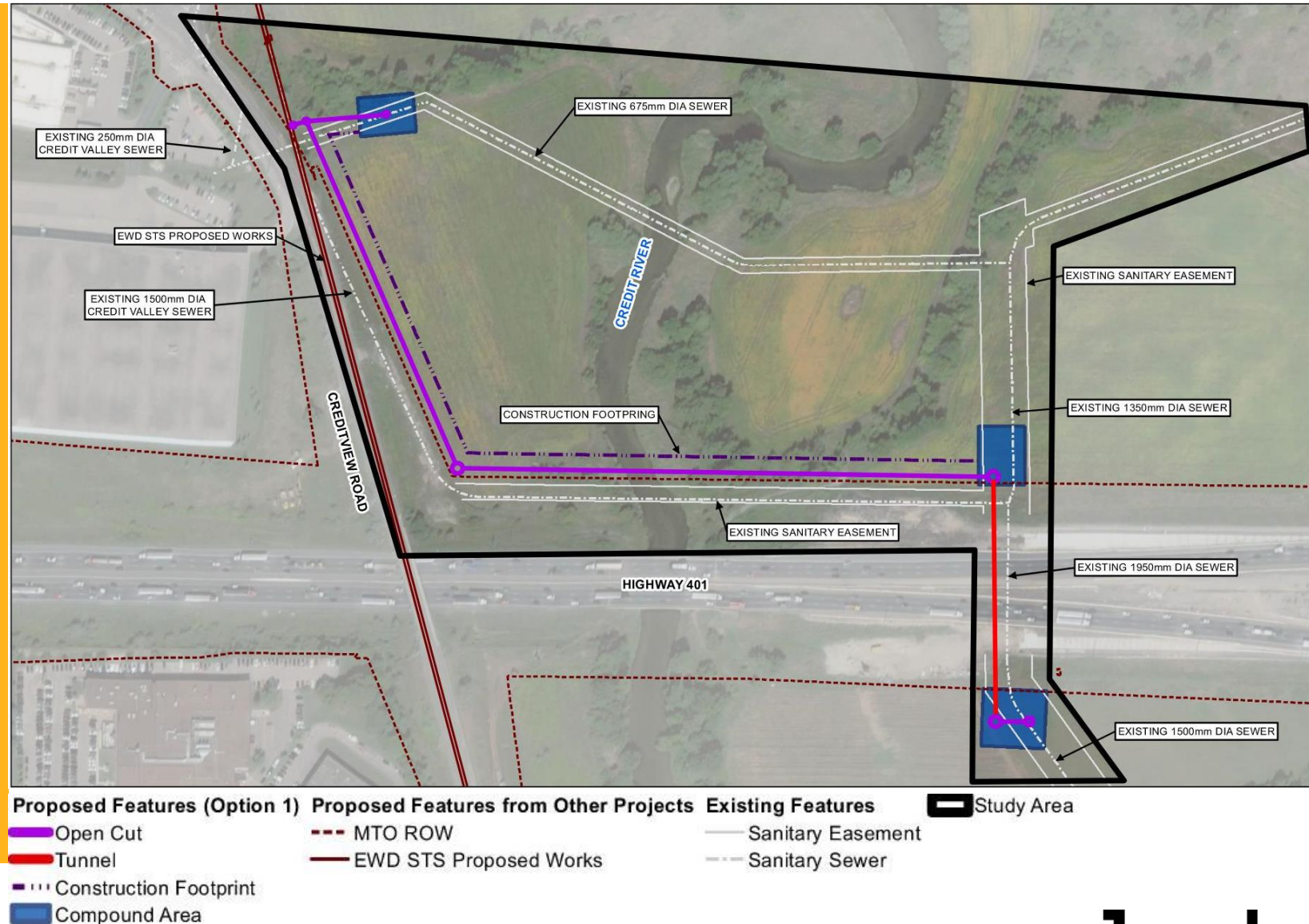
Alternative No. 2A: 530 m Open-Cut and 155 m Tunnel for Highway 401 Crossing

- Replace existing 1,500 mm sewer with a new sewer installed in a new easement south of the existing 675 mm sewer.
- New sewer to be installed in 530 m long open-cut trench with 155 m long tunnel for Highway 401 crossing.
- Requires a new permanent easement.
- Allows for open-cut crossing of Credit River to avoid technical challenges of tunneled crossing.
- Existing 675 mm sewer is left in place.



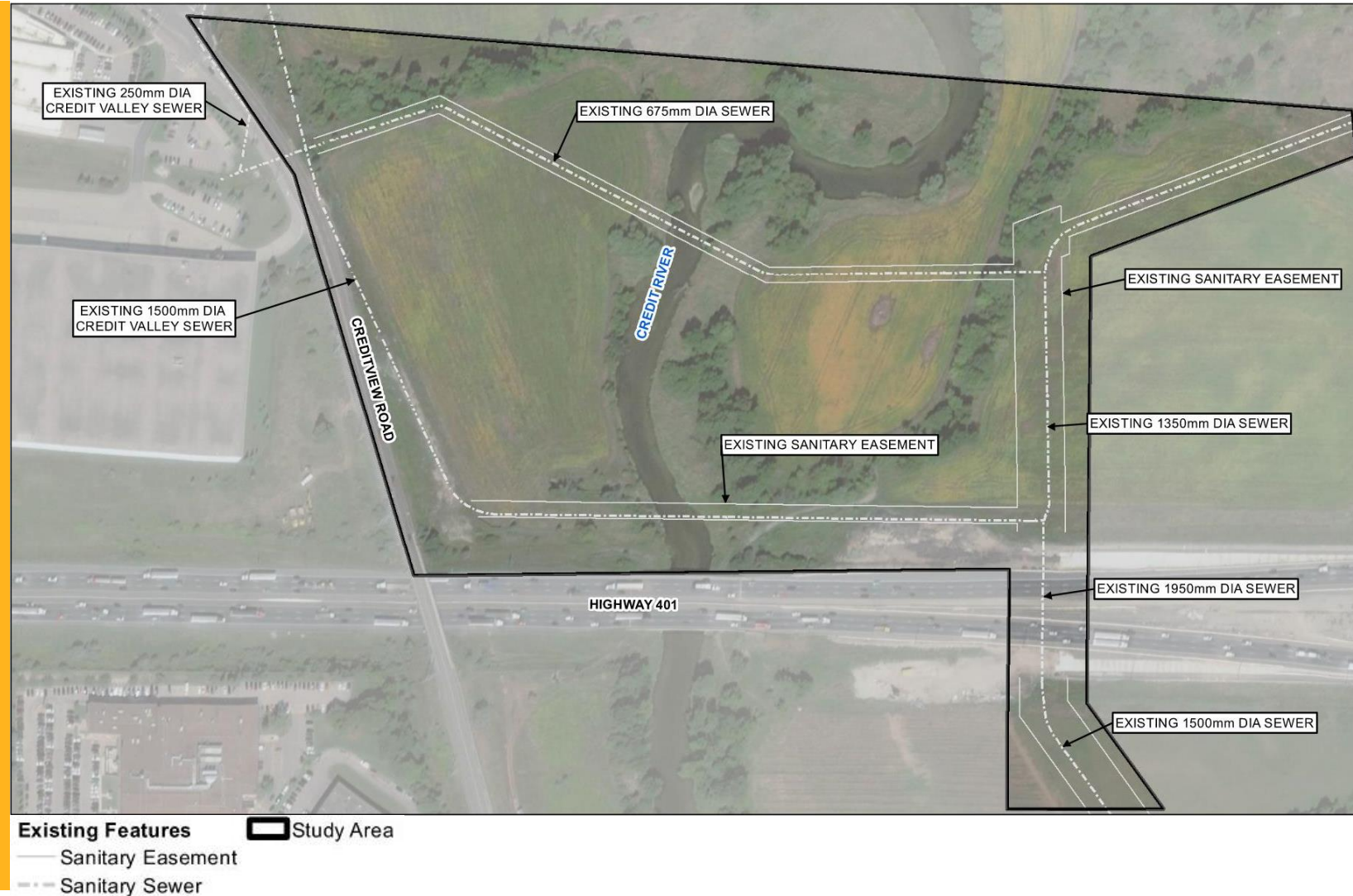
Alternative No. 3 600 m Open-Cut and 155 m Tunnel for Highway 401 Crossing

- Replace existing 1,500 mm sewer with a new sewer installed in new easement adjacent to Highway 401.
- New sewer to be installed in 600 m long open-cut trench with 155 m long tunnel for Highway 401 crossing.
- Requires a new permanent easement.
- Allows for open-cut crossing of Credit River to avoid technical challenges of tunneled crossing.
- Existing 675 mm sewer is left in place.



Alternative No. 4: Do Nothing Alternative

- The existing 1,500 mm sewer would be left in place, creating constructability issues during the Highway 401 Expansion project.
- Sewer maintenance activities will result in traffic flow restrictions during those periods.
- In the event of sewer failure, leakages could result in damage/ failure of highway embankment or retaining wall.
- Existing 675 mm sewer is left in place.








Evaluation of Alternatives

Evaluation of Alternatives

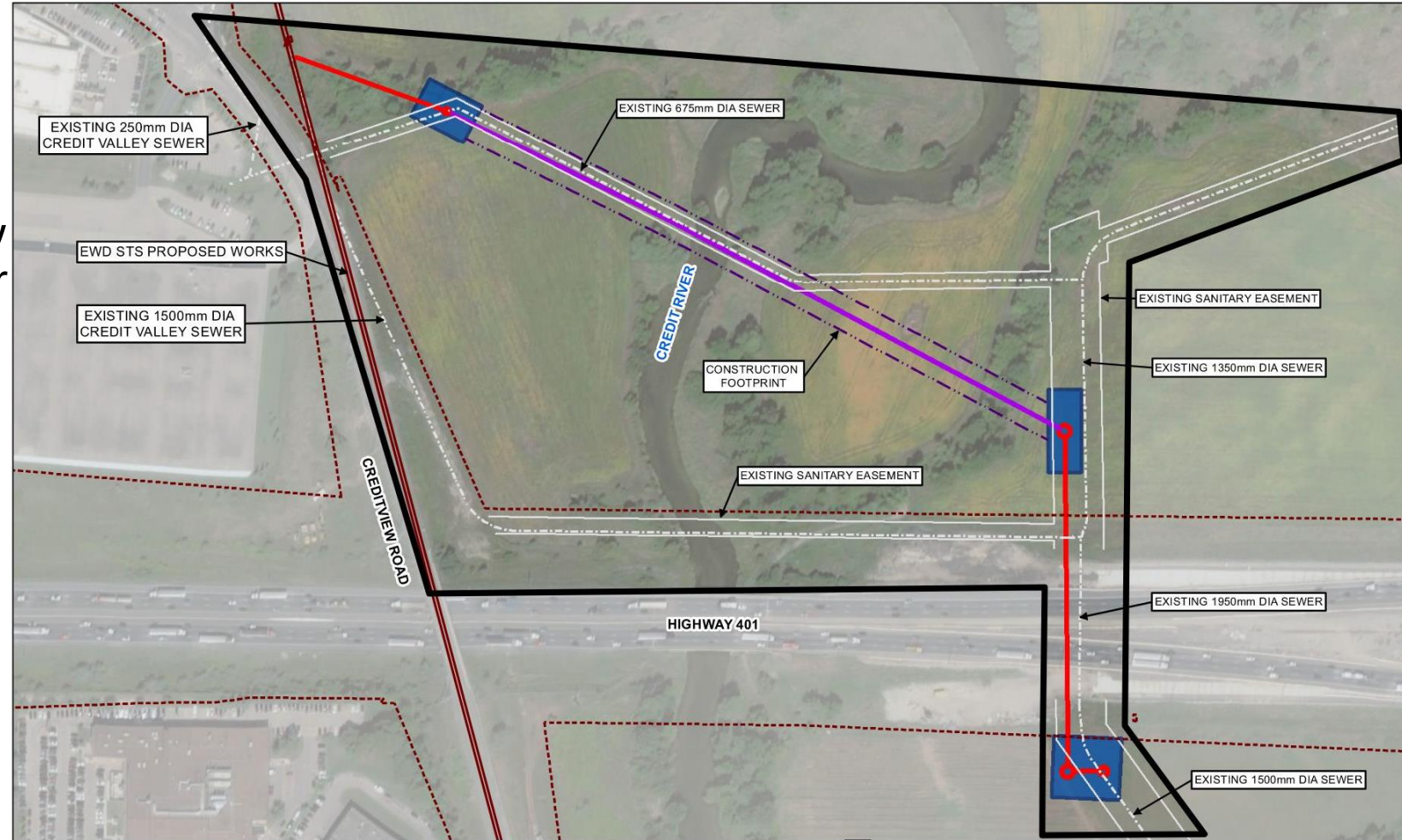
Category	Evaluation Criteria	Alternative No. 1	Alternative No. 2	Alternative No. 2A	Alternative No. 3	Alternative No. 4		
Technical Considerations	<ul style="list-style-type: none"> Ability to address problem/ opportunity statement Technical viability/constructability Impact to existing infrastructure and utilities Opportunity to coordinate other improvements Future operations and maintenance 							
Natural Environment	<ul style="list-style-type: none"> Disturbance of terrestrial species and features Disturbance of aquatic species and features Direct effects on terrestrial species at risk Direct effects on aquatic species at risk Effects on water quality or quantity 						Most Favourable	
								Moderately Favourable
								Least Favourable
Socio-Cultural Environment	<ul style="list-style-type: none"> Health and safety (H&S) Noise and vibration during construction Air and greenhouse gas emissions during construction Impacts to heritage or cultural resources Property acquisition and easement requirements Compliance with applicable planning policies, preferences and legislature Impacts to existing land use Impact to future land use or development 						Least Favourable	
Economic Factors	<ul style="list-style-type: none"> Construction costs Operation and maintenance (O&M) costs 							
Alternative Ranking		3	1	2	3	4		

Summary Score of Alternatives

Alternatives	Alternative No. 1	Alternative No. 2	Alternative No. 2A	Alternative No. 3	Alternative No. 4
Overall Score	Moderately Preferred 	Most Preferred 	Moderately Preferred 	Moderately Preferred 	Least Preferred 
Key Factors	<ul style="list-style-type: none"> Trenchless construction results in potential for frac-out Potential exposure of 675 mm sewer in the river due to erosion A new, permanent easement is required; more property acquisition More expensive: trenchless construction No additional measures or time needed for O&M Some disturbance to the environment 	<ul style="list-style-type: none"> Open-cut construction is preferred and eliminates frac-out potential Existing 675 mm sewer to be removed; no exposure in the river Maximizes existing easement; minimal property acquisition Less expensive: open-cut No additional measures or time for O&M More disturbance to the environment 	<ul style="list-style-type: none"> Open-cut construction is preferred and eliminates frac-out potential Potential exposure of 675 mm sewer in the river due to erosion A new, permanent easement is required; more property acquisition Less expensive: open-cut No additional measures or time for O&M More disturbance to the environment 	<ul style="list-style-type: none"> Open-cut construction is preferred and eliminates frac-out potential Potential exposure of 675 mm sewer in the river due to erosion A new, permanent easement is required; more property acquisition Less expensive: open-cut Some additional measures or time for O&M More disturbance to the environment 	<ul style="list-style-type: none"> Impacts existing sewer infrastructure Potential exposure of 675 mm sewer in the river due to erosion No new easement required; no property acquisition No construction costs Significant additional measures or time for O&M No disturbance to natural environment

Preliminary Preferred Alternative

- Alternative No. 2 (510 m Open-Cut and 200 m Tunnel for Highway 401 Crossing) is the preliminary preferred alternative
- Infrastructure is not within Highway 401's widened ROW; safe access for O&M.
- Allows Region to optimize the utilization of the existing easement for the 675 mm sanitary sewer.
- Open-cut installation will be more cost effective than tunnelling the entire length.
- Open-cut crossing will be engineered to mitigate environmental impacts to Credit River.



Next Steps

- Receive input from the public and stakeholders
- Finalize the preferred alternative
- Prepare and publish the Project File for review
- Issue Notice of Completion
- Complete the Class EA
- Implement the realignment of the Credit Valley Sanitary Sewer Relocation (Detailed Design and Construction)



How to Stay Connected and Involved?

Reach out to us anytime with comments and questions on this study.

Ajay Puri, P.Eng.

Project Manager

10 Peel Centre Drive, 4th
Floor, Suite B

Brampton, ON, L6T 4B9

905-791-7800 Ext. 5073

Ajay.Puri@peelregion.ca

- Feedback on this Online Public Engagement is open until March 3, 2021
- If you would like to be kept updated on this project:



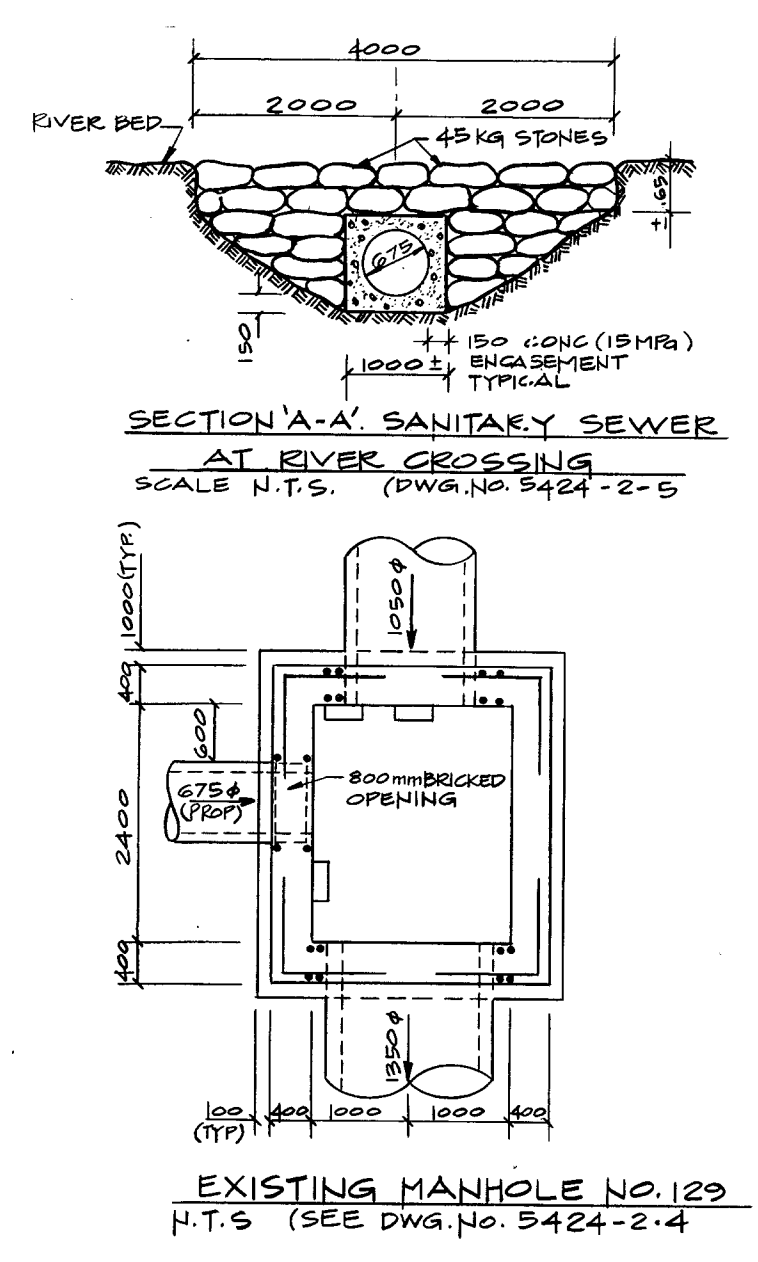
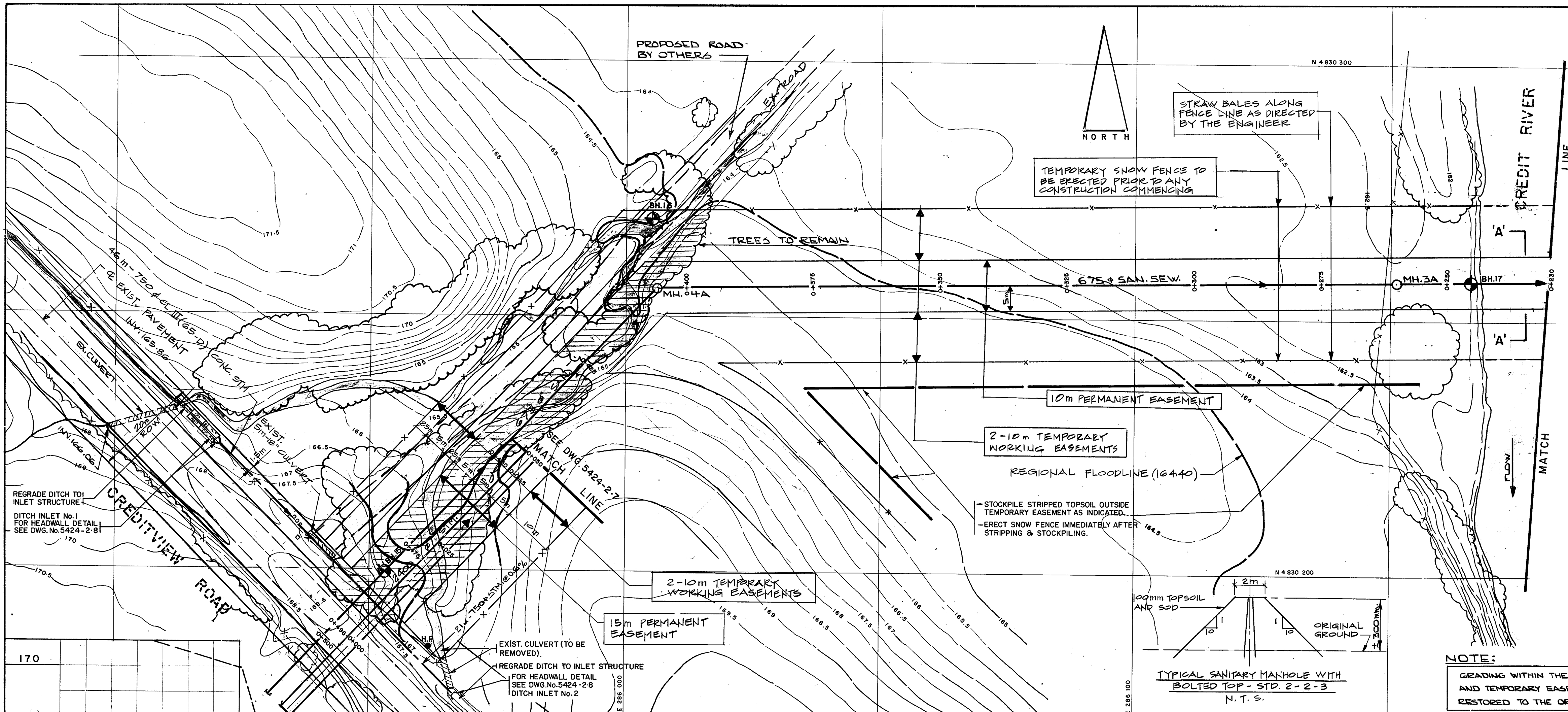
<https://www.peelregion.ca/pw/water/environ-assess/relocation-of-credit-valley-sanitary-trunk-sewer.asp>



<https://twitter.com/peelpublicworks?lang=en>



<https://www.facebook.com/regionofpeel>

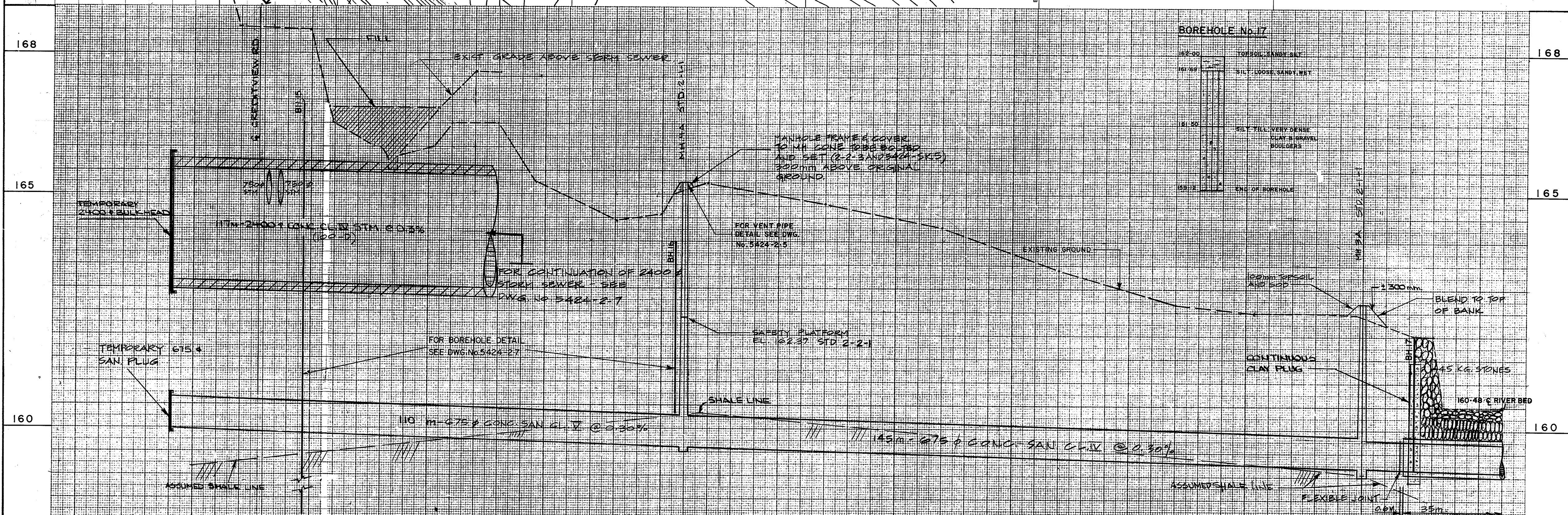
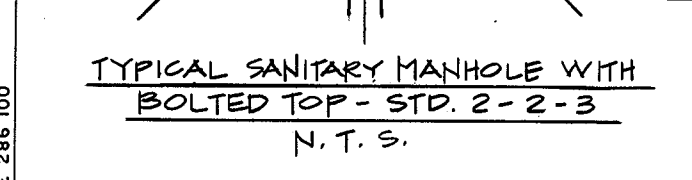


SEE DWG. No. 5424-2.5

NOTE:
SEWER BACKFILL: GRANULAR 'C' REQUIRED FOR BACKFILL ACROSS CREDITVIEW ROAD.

NOTE:
ALL SEWERS AND CONNECTIONS TO HAVE STANDARD TYPE 'B' BEDDING AS PER REGION OF PEEL STD. 2-3-1, UNLESS SHOWN OTHERWISE. (SANITARY SEWER).
SEE ALSO, NOTES ON DRAWING No. 5424-2.7.

NOTE:
GRADING WITHIN THE PERMANENT AND TEMPORARY EASEMENT TO BE RESTORED TO THE ORIGINAL CONDITION.



LEGEND:

EXISTING TREES TO BE REMOVED.

B.M. No. 613 ELEV. 161.773
DESCRIPTION: ON THE WEST FACE AT THE SOUTH END OF THE WEST MAIN WALL OF A BRIDGE ACROSS CREDITVIEW ROAD 600m. NORTH OF BRITANNIA ROAD.

ALL DIMENSIONS ARE IN mm. UNLESS OTHERWISE SHOWN.

No.	REVISION	DATE	BY	APP'D

Project Planning Limited
CONSULTING ENGINEERS
LANDSCAPE ARCHITECTS
PLANNERS
ONE YONGE STREET, TORONTO
ONTARIO, CANADA M5E 1E5

Meadowvale
MARKBOROUGH PROPERTIES LIMITED
90 EGLINTON AVENUE WEST
TORONTO, ONTARIO

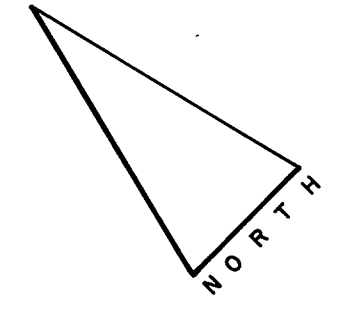
CITY OF MISSISSAUGA
REGION OF PEEL
ENGINEERING DEPARTMENT
87-0330

MEADOWVALE NORTH - PHASE III
SANITARY & STORM SEWER
PLAN AND PROFILE
STN. 0+230 TO STN. 0+510

STATION	SAN. CHAIN	STORM CHAIN	FINISHED GRADE OF ROAD	ORIGINAL GROUND	STORM SEWER INVERT ELEV.	SAN. SEWER INVERT ELEV.	NUMBERS
SAN. CHAIN 0+300	0+300	0+300	163.17	168.55	163.17	163.00	
SAN. CHAIN 0+310	0+310	0+310	163.11	168.20	163.11	163.00	
SAN. CHAIN 0+320	0+320	0+320	163.05	167.70	163.05	163.00	
SAN. CHAIN 0+330	0+330	0+330	162.99	167.20	162.99	163.00	
SAN. CHAIN 0+340	0+340	0+340	162.93	166.70	162.93	163.00	
SAN. CHAIN 0+350	0+350	0+350	162.87	166.20	162.87	163.00	
SAN. CHAIN 0+360	0+360	0+360	162.81	165.70	162.81	163.00	
SAN. CHAIN 0+370	0+370	0+370	162.75	165.20	162.75	163.00	
SAN. CHAIN 0+380	0+380	0+380	162.69	164.70	162.69	163.00	
SAN. CHAIN 0+390	0+390	0+390	162.63	164.20	162.63	163.00	
SAN. CHAIN 0+400	0+400	0+400	162.57	163.70	162.57	163.00	
SAN. CHAIN 0+410	0+410	0+410	162.51	163.20	162.51	163.00	
SAN. CHAIN 0+420	0+420	0+420	162.45	162.70	162.45	163.00	
SAN. CHAIN 0+430	0+430	0+430	162.39	162.20	162.39	163.00	
SAN. CHAIN 0+440	0+440	0+440	162.33	161.70	162.33	163.00	
SAN. CHAIN 0+450	0+450	0+450	162.27	161.20	162.27	163.00	
SAN. CHAIN 0+460	0+460	0+460	162.21	160.70	162.21	163.00	
SAN. CHAIN 0+470	0+470	0+470	162.15	160.20	162.15	163.00	
SAN. CHAIN 0+480	0+480	0+480	162.09	159.70	162.09	163.00	
SAN. CHAIN 0+490	0+490	0+490	162.03	159.20	162.03	163.00	
SAN. CHAIN 0+500	0+500	0+500	161.97	158.70	161.97	163.00	

DESIGN: M.S.
DRAWN: T.P.
CHECKED: W.O.B.
SCALE: HOR. 1:500 VERT. 1:50
DATE: JANUARY 1988
DWG. NO.: 5424-2.6

W. O. BILLING
REGISTERED PROFESSIONAL ENGINEER
PROVINCE OF ONTARIO



PLACE STRAW BALES ALONG SNOW FENCE LINE AS DIRECTED BY THE ENGINEERS

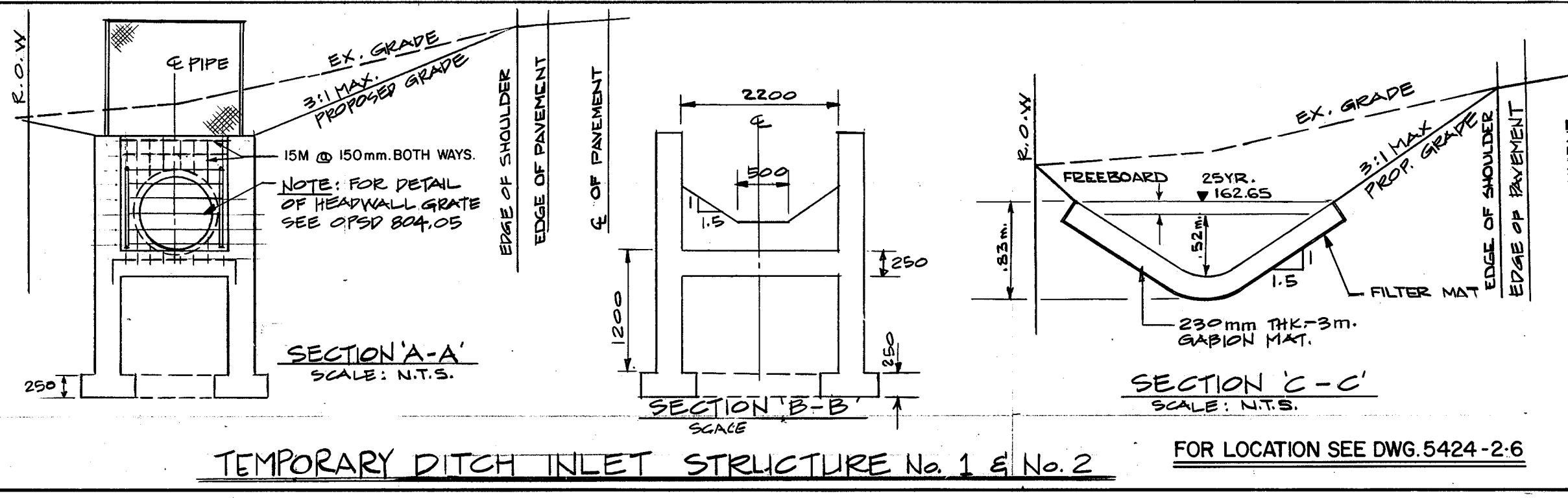
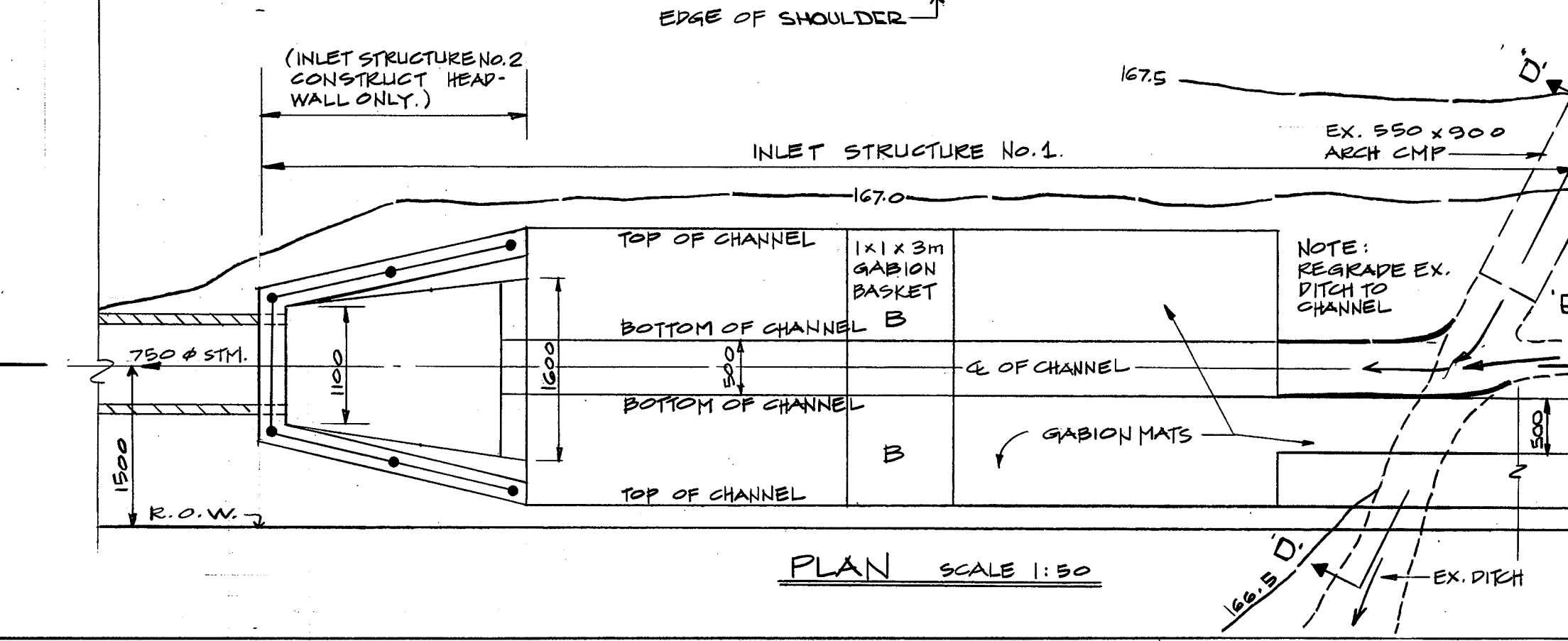
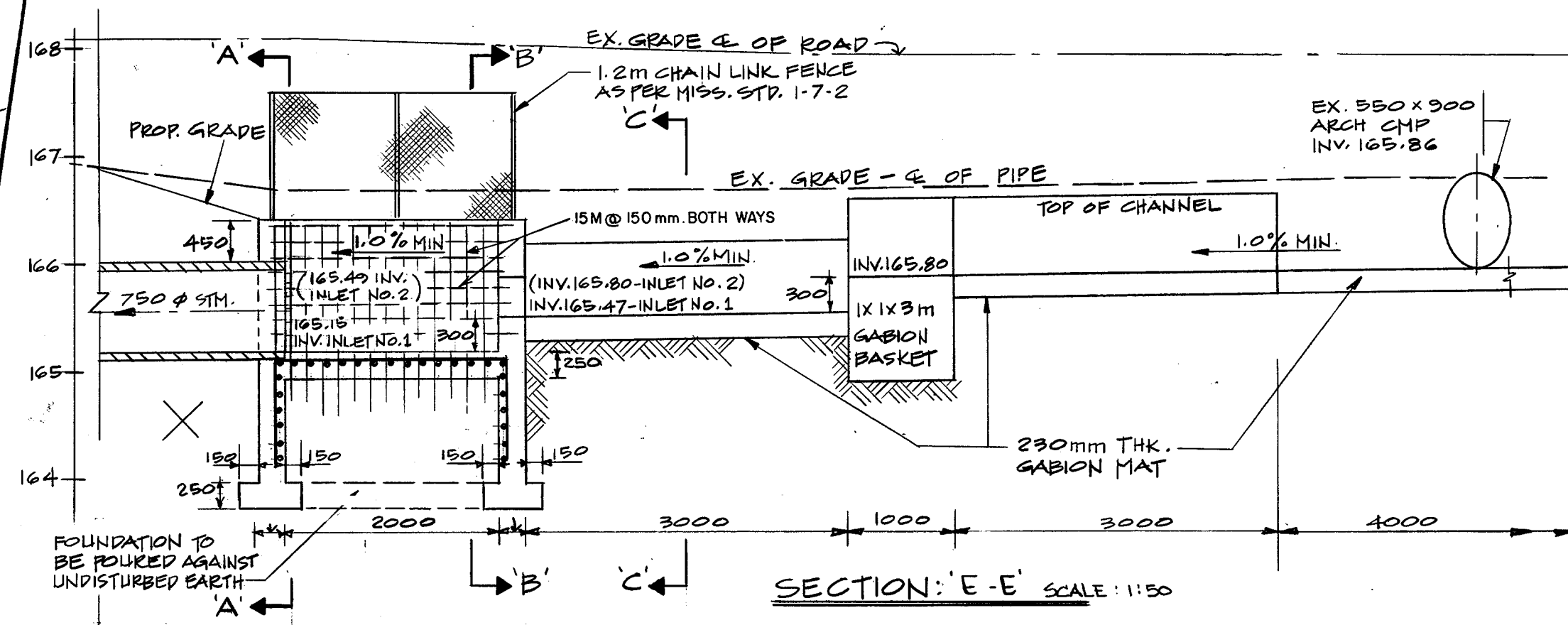
REGIONAL FLOODLINE (164.40)

Ø RADIUS PIPE

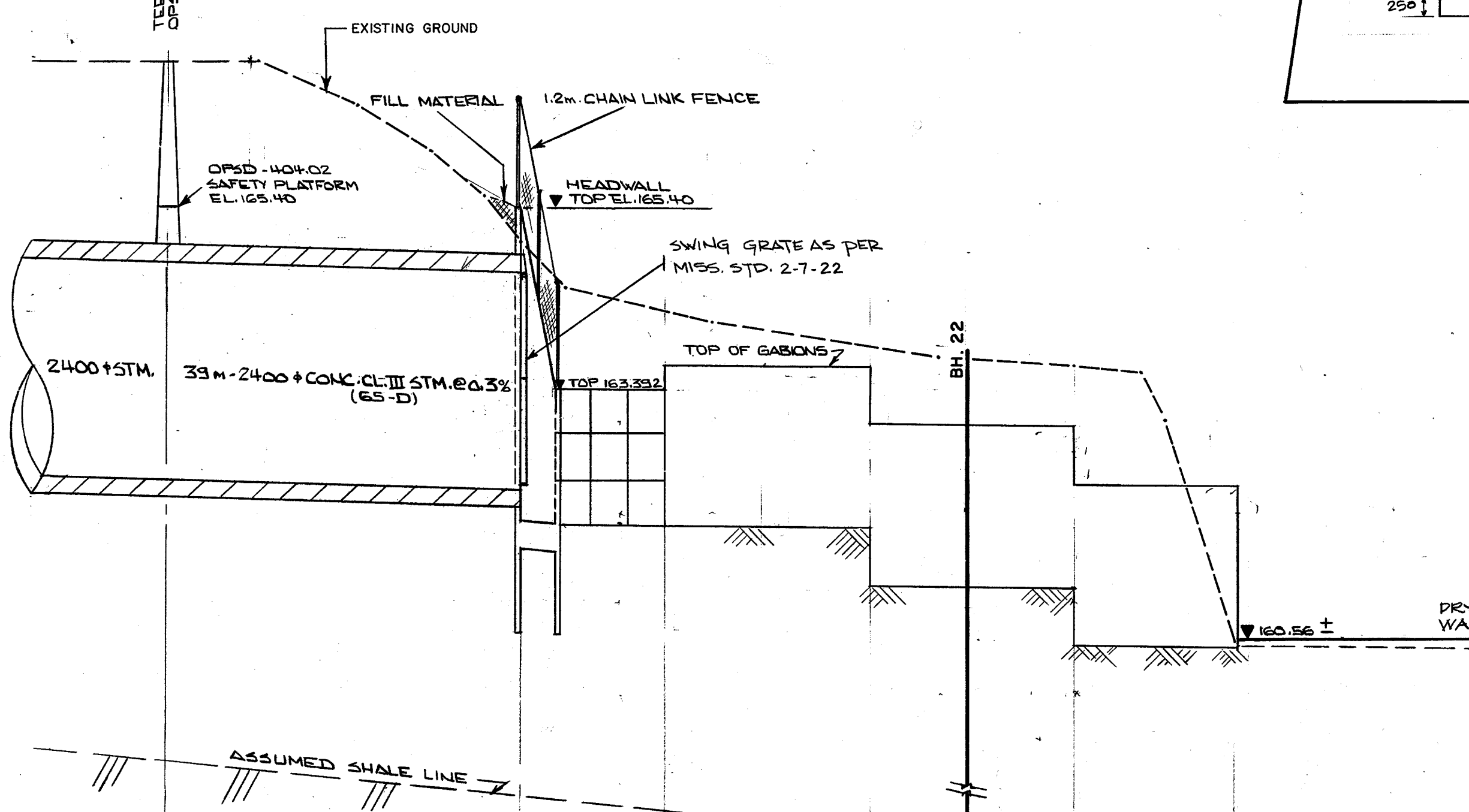
A = 56°
R = 31 m
T = 16 483 m
A = 30 299 m

STOCKPILE STRIPPED TOPSOIL OUTSIDE TEMPORARY EASEMENT AS INDICATED. X
ERECT SNOW FENCE IMMEDIATELY AFTER STRIPPING & STOCKPILING.

NOTE
FOR HEADWALL DETAILS & CHANNEL DETAIL SEE DWG. No. 5424-2-9



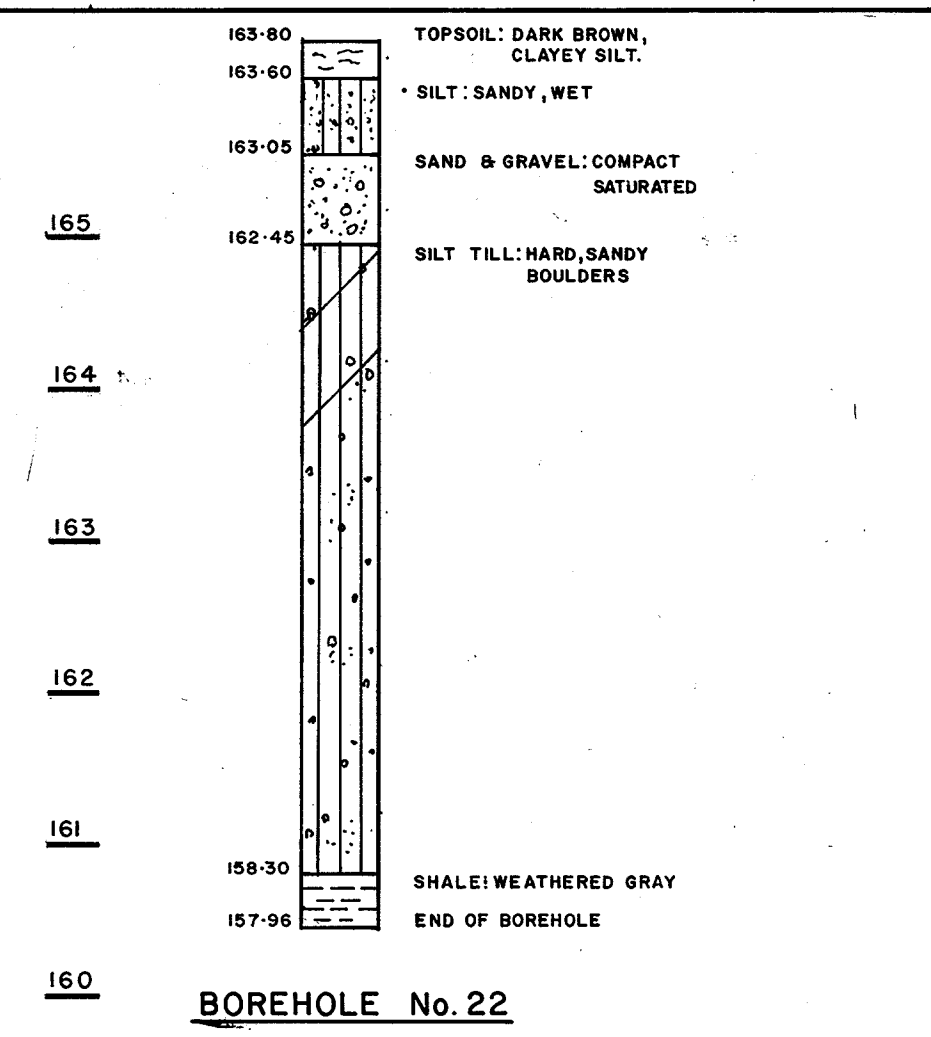
TEMPORARY DITCH INLET STRUCTURE No. 1 & No. 2 FOR LOCATION SEE DWG. 5424-2-6



CREDIT RIVER WATER LEVEL INFORMATION

(OBTAINED FROM SANFORD FARM HYDROLOGY REPORT DATE OCTOBER 1987, PREPARED BY M. M. DILLON LTD.)

164.40 (REGIONAL)
163.33 (100 YR.)
162.65 (25 YR.)
162.19 (10 YR.)
161.79 (5 YR.)



NOTES

- STORM AND SANITARY SEWERS**
- ALL SEWERS AND CONNECTIONS TO HAVE STANDARD TYPE 'B' BEDDING AS PER CITY OF MISSISSAUGA STD. 2-1-31, UNLESS SHOWN OTHERWISE. (STORM SEWER).
 - ALL SEWERS AND CONNECTIONS TO HAVE STANDARD TYPE 'B' BEDDING AS PER REGION OF PEEL STD. 2-3-1, UNLESS SHOWN OTHERWISE. (SANITARY SEWER).
 - THE CONTRACTOR SHALL SUPPLY AT HIS EXPENSE ANY ADDITIONAL BEDDING AND/OR STRONGER PIPE WHERE THE ACTUAL TRENCH WIDTH AT THE TOP OF THE PIPE EXCEEDS THE WIDTH SPECIFIED RESULTING IN OVERLOADING OF THE PIPE AND/OR REDUCTION OF THE BEDDING FACTOR.
- STORM SEWERS**
- TRENCH WIDTH (SEPARATE TRENCH) AT THE TOP OF THE PIPE SHALL BE AS PER CITY OF MISSISSAUGA STANDARD DWG. 2-1-31.
 - CONTRACTOR IS RESPONSIBLE FOR SUPPLYING ADDITIONAL BEDDING AND/OR STRONGER PIPE, IF ACTUAL TRENCH WIDTHS EXCEED DESIGN WIDTHS.
 - SEWERS TO HAVE CLASS 'B' BEDDING TO CITY OF MISSISSAUGA STANDARD 2-1-31 AND CITY OF MISSISSAUGA STD. DWG. 2-1-32 AND 300mm SAND COVER TO CITY OF MISSISSAUGA STD. 2-1-33.
 - CONCRETE SEWER PIPE TO HAVE RUBBER GASKET JOINTS.
 - CONCRETE SEWER PIPE TO BE ENCASED IN 20 MPa CONCRETE FROM EACH MANHOLE TO THE FIRST JOINT OUTSIDE MANHOLE. ENCASEMENT TO EXTEND FROM UNDISTURBED GROUND TO 300mm ABOVE TOP OF PIPE.
 - SURROUND ALL MANHOLES WITH A MINIMUM OF 1.0m COMPACTED GRANULAR BACKFILL.
 - ALL CATCHBASINS TO HAVE COMPLETE COMPACTED GRANULAR BACKFILL SURROUND.
- GENERAL**
- ALL STANDARD NUMBERS ARE NOW ONTARIO PROVINCIAL DRAWINGS (O.P.S.D.) EXCEPT AS NOTED, AND WILL BE SHOWN AS EXAMPLE: (C.T. 1-0-1). CITY OF MISSISSAUGA STANDARD DRAWING NUMBERS WILL BE PREFIXED BY THE LETTER 'C' AND WILL BE SHOWN AS EXAMPLE: (C.1-5-6). REGION OF PEEL STANDARD DRAWING NUMBERS WILL BE PREFIXED BY THE LETTER 'R' AND WILL BE SHOWN AS EXAMPLE: (R.2-1-2-1500mm).
 - ANY RELOCATION OF EXISTING UTILITIES, REQUIRED BY THE DEVELOPMENT OF THE SUBJECT LANDS, IS TO BE UNDERTAKEN AT THE DEVELOPER'S EXPENSE.
 - ALL FILL WITHIN ROAD ALLOWANCE AND EASEMENTS TO BE COMPACTED TO MINIMUM 95% STANDARD PROCTOR DENSITY AND SUITABILITY AND COMPACTION OF ALL FILL MATERIAL ARE TO BE CONFIRMED BY A SOIL CONSULTANT, TO THE CITY'S ENGINEER PRIOR TO THE INSTALLATION OF ANY ROAD BASE MATERIALS.
 - GRANULAR 'C' BACKFILL TO BE UTILIZED FOR ALL TRENCHES WITHIN EXISTING ROAD ALLOWANCES TO BE COMPACTED TO 95% STANDARD PROCTOR DENSITY.
 - ALL EXISTING SERVICE LOCATIONS SHOWN ARE APPROXIMATE AND MUST BE LOCATED ACCURATELY IN THE FIELD.

- NOTE:**
- ALL CONCRETE TO BE 20MPa @ 28 DAYS.
 - CONCRETE FOOTINGS TO BE POURED ON ALL SIDES OF HEADWALL.

BM. No. 613 ELEV. 161.773
DESCRIPTION: ON THE WEST FACE AT THE SOUTH END OF THE WEST MAIN WALL OF A BRIDGE ACROSS CREDITVIEW ROAD 600m. NORTH OF BRITANNIA ROAD.

ALL DIMENSIONS ARE IN mm, UNLESS OTHERWISE SHOWN.

No.	REVISION	DATE	BY	APP'D

Project Planning Limited
CONSULTING ENGINEERS
LANDSCAPE ARCHITECTS
PLANNERS
ONE YONGE STREET, TORONTO
ONTARIO, CANADA M5E 1E5

MARKBOROUGH PROPERTIES LIMITED
90 EGLINTON AVENUE WEST
TORONTO, ONTARIO

CITY OF MISSISSAUGA T-86065
REGION OF PEEL
ENGINEERING DEPARTMENT

**MEADOWVALE NORTH - PHASE III
STORM SEWER & OUTFALL
PLAN AND PROFILE
STN. 0+250 TO STN. 0+400**

DESIGN:	M. S.
DRAWN:	T. P.
CHECKED:	W. O. B.
SCALE:	HOR. 1:500 VER. 1:50
DATE:	JANUARY 1988
DWG. No.	5424-2-8 PN 88-202



STORM SEWER INVERT ELEV.	162.42			162.25 161.50	161.85	161.84 161.19	161.17 160.52	160.50 160.56												
SAN. SEWER INVERT ELEV.																				
FINISHED GRADE & OF ROAD																				
ORIGINAL GROUND	167.00	167.00	167.00	167.00	167.00	167.00	167.00	167.00	167.00	167.00	167.00	167.00	167.00	167.00	167.00	167.00	167.00	167.00	167.00	167.00
STATION	0+250	0+275	0+300	0+325	0+350	0+375	0+400													

From: [Evelyn Krolicka](#)
To: [Newton, Dorin/TOR](#)
Cc: [Puri, Ajay](#); [Dhillon, Paramjit/TOR](#); [Thannickal, Jimmy/TOR](#)
Subject: [EXTERNAL] RE: Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer - Schedule B Municipal Class EA
Date: Wednesday, June 30, 2021 4:46:20 PM
Attachments: [COM Comments- ROP Credit Valley Sewer Relocation- June Circulation.pdf](#)

Dorin,

Thank you for following up. See attached comments from the City of Mississauga.

Have a great weekend.

Thanks,

Evelyn Krolicka

905-615-3200 ext. 5921
evelyn.krolicka@mississauga.ca

From: Newton, Dorin/TOR <Dorin.Newton@jacobs.com>
Sent: Wednesday, June 30, 2021 12:34 PM
To: Evelyn Krolicka <Evelyn.Krolicka@mississauga.ca>
Cc: Puri, Ajay <ajay.puri@peelregion.ca>; Dhillon, Paramjit/TOR <Paramjit.Dhillon@jacobs.com>; Thannickal, Jimmy/TOR <Jimmy.Thannickal@jacobs.com>
Subject: RE: Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer - Schedule B Municipal Class EA

Good afternoon Evelyn,

Just wanted to follow-up on the draft Project File we had provided for the City's review. Have there been any comments that we can address as we move towards finalizing the Project File?

Thank you,

Dorin Newton, P.Eng., M.Eng. | [Jacobs](#) | Engineering
O:+00.416.499.0090 Ext. 73713 | M:+00.519.575.5585 | Dorin.Newton@jacobs.com
Upcoming PTO: July 2, 2021

From: Newton, Dorin/TOR
Sent: Wednesday, June 2, 2021 1:54 PM
To: Evelyn Krolicka <Evelyn.Krolicka@mississauga.ca>
Cc: Puri, Ajay <ajay.puri@peelregion.ca>; Dhillon, Paramjit/TOR <Paramjit.Dhillon@jacobs.com>; Thannickal, Jimmy/TOR <Jimmy.Thannickal@jacobs.com>
Subject: Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer - Schedule B Municipal Class EA

Good afternoon Evelyn,

Thank you for confirming that you are the point of contact at the City for the review of Region of Peel's EAs. Please find attached the draft Project File Report for the City's review. I will send a separate link via our File Transfer Tool to access the appendices. We are providing this in advance of the public review period so that any comments or concerns from the City can be appropriately addressed prior to that. As mentioned during our conversation, please note that the Project File will be updated once the Stage 2 Archaeological Assessment is complete; it is currently pending review by the Indigenous Communities. For additional context on the EA, please find here a link to the Region's webpage: <https://www.peelregion.ca/pw/water/environ-assess/relocation-of-credit-valley-sanitary-trunk-sewer.asp>

Please let me know if you have any questions on this. We look forward to receiving the City's review comments.

Thank you,

Dorin Newton, P.Eng., M.Eng. | [Jacobs](#) | Engineering
O:+00.416.499.0090 Ext. 73713 | M:+00.519.575.5585 | Dorin.Newton@jacobs.com
245 Consumers Road, Suite 400 | Toronto, ON M2J 1R3 | Canada

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Dorin Newton
JACOBS
72 Victoria Street South
Suite 300
Kitchener, ON N2G 4Y9

City of Mississauga
Transportation & Works
Suite 800 - 201 City Centre Drive
Mississauga ON L5B 4E4

June 30, 2021

Re: Region of Peel Relocation of 1,500-millimetre Credit Valley Trunk Sewer

Dear Dorin Newton,

Thank you for the opportunity to provide feedback on the subject project. The project provided had been circulated to staff at the City of Mississauga and the feedback received has been compiled below for your consideration.

Transportation & Works

1. It is noted that the following storm infrastructure are proposed as per the March, 2021 drawing package:
 - i. Double catch basin (1);
 - ii. 1500 mm Ø maintenance hole (1); and
 - iii. 450 mm storm sewer (~45 m)

Can the Region clarify which agency is the intended owner of this proposed infrastructure?

2. Further to comment #1 above, if the intended owner is the City, please provide the following:

Upon completion of the proposed works and with regards to all municipal storm sewer infrastructure constructed as part of the works – including any modifications that are made to existing municipal storm sewer infrastructure – the City requests all as-constructed plan & profile drawings, details sheets, as well as any other relevant records such as CCTV inspection data & reporting, construction inspection records and engineering construction certification letter(s) for all new storm sewer infrastructure that is to be maintained by the City. At a minimum, plan & profile drawings should include the following detail:

- i. General base plan detail including:
 - a. Street names
 - b. Pavement limits
 - c. Curb extents
 - d. Right-of-way limits
 - e. Roadway centerline incl. stationing
 - f. Property parcels
 - g. Building footprints
 - h. Line work showing all known existing storm drainage infrastructure
- ii. Drawing title block information including:
 - a. Name of organization responsible for the design
 - b. Seal, signature and date from registered Professional Engineer responsible for the design
 - c. Submission phase dated and indicated “as-constructed”
 - d. Geodetic datum used to establish elevations
 - e. North arrow
 - f. Drawing scale

iii. Pipe details for each constructed segment including:

- a. Size/cross-section dimension
- b. Length
- c. Grade
- d. Material
- e. Classification
- f. Direction of flow

iv. Details for each constructed maintenance hole including:

- a. Standard reference (e.g. OPSD ###.###); and
- b. Annotation indicating function (e.g. MH, CBMH, DICBMH etc.)
- c. Size of maintenance hole (diameter, dimension for non-circular chambers or detail drawing for custom structures)
- d. Invert elevations for all connecting storm sewer segments

v. Details for each Catch basin including:

- a. Type and location
- b. Invert elevations for CB rim and CB lead

Community Service

No comments received.

Corporate Services

No comments received.

Should you have any questions or require further information, please do not hesitate to contact the undersigned.

Sincerely,

Evelyn Krolicka
Storm Drainage Technologist
Environmental Services
City of Mississauga
T 905-615-3200 ext.5921
evelyn.krolicka@mississauga.ca

Newton, Dorin/TOR

From: Newton, Dorin/TOR
Sent: Thursday, September 9, 2021 1:58 PM
To: Evelyn Krolicka
Cc: Puri, Ajay; Dhillon, Paramjit/TOR; Thannickal, Jimmy/TOR
Subject: RE: Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer - Schedule B Municipal Class EA
Attachments: 20210909_ResponsetoComments_CoMFeedback.pdf

Good afternoon Evelyn,

Thank you for the comments provided on the draft Project File. Please find attached our response to the City's comments.

Thank you,

Dorin Newton, P.Eng., M.Eng. | Jacobs | Engineering
O:+00.416.499.0090 Ext. 73713 | M:+00.519.575.5585 | Dorin.Newton@jacobs.com
Upcoming PTO: October 22-26

From: Evelyn Krolicka <Evelyn.Krolicka@mississauga.ca>
Sent: Wednesday, June 30, 2021 4:46 PM
To: Newton, Dorin/TOR <Dorin.Newton@jacobs.com>
Cc: Puri, Ajay <ajay.puri@peelregion.ca>; Dhillon, Paramjit/TOR <Paramjit.Dhillon@jacobs.com>; Thannickal, Jimmy/TOR <Jimmy.Thannickal@jacobs.com>
Subject: [EXTERNAL] RE: Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer - Schedule B Municipal Class EA

Dorin,

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Have a great weekend.

Thanks,

Evelyn Krolicka
905-615-3200 ext. 5921
evelyn.krolicka@mississauga.ca

From: Newton, Dorin/TOR <Dorin.Newton@jacobs.com>
Sent: Wednesday, June 30, 2021 12:34 PM
To: Evelyn Krolicka <Evelyn.Krolicka@mississauga.ca>
Cc: Puri, Ajay <ajay.puri@peelregion.ca>; Dhillon, Paramjit/TOR <Paramjit.Dhillon@jacobs.com>; Thannickal, Jimmy/TOR <Jimmy.Thannickal@jacobs.com>
Subject: RE: Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer - Schedule B Municipal Class EA

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Thank you,

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O:+00.416.499.0090 Ext. 73713 | M:+00.519.575.5585 | Dorin.Newton@jacobs.com
Upcoming PTO: July 2, 2021

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To: Evelyn Krolicka <Evelyn.Krolicka@mississauga.ca>
Cc: Puri, Ajay <ajay.puri@peelregion.ca>; Dhillon, Paramjit/TOR <Paramjit.Dhillon@jacobs.com>; Thannickal, Jimmy/TOR <Jimmy.Thannickal@jacobs.com>
Subject: Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer - Schedule B Municipal Class EA

Good afternoon Evelyn,

Thank you for confirming that you are the point of contact at the City for the review of Region of Peel's EAs. Please find attached the draft Project File Report for the City's review. I will send a separate link via our File Transfer Tool to access the appendices. We are providing this in advance of the public review period so that any comments or concerns from the City can be appropriately addressed prior to that. As mentioned during our conversation, please note that the Project File will be updated once the Stage 2 Archaeological Assessment is complete; it is currently pending review by the Indigenous Communities. For additional context on the EA, please find here a link to the Region's webpage: <https://www.peelregion.ca/pw/water/envIRON-ASSess/relocation-of-credit-valley-sanitary-trunk-sewer.asp>

Please let me know if you have any questions on this. We look forward to receiving the City's review comments.

Thank you,

Dorin Newton, P.Eng., M.Eng. | [Jacobs](#) | Engineering
O:+00.416.499.0090 Ext. 73713 | M:+00.519.575.5585 | Dorin.Newton@jacobs.com
245 Consumers Road, Suite 400 | Toronto, ON M2J 1R3 | Canada

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City of Mississauga Feedback	Addressed in the Project File
<p>1. It is noted that the following storm infrastructure are proposed as per the March, 2021 drawing package:</p> <ul style="list-style-type: none"> i. Double catch basin (1); ii. 1500 mm Ø maintenance hole (1); and iii. 450 mm storm sewer (~45 m) <p>Can the Region clarify which agency is the intended owner of this proposed infrastructure?</p>	<p>The proposed CB, 450mm storm drainage lead and maintenance hole is being placed on private land owned by a developer. The CB, storm sewer and maintenance holes collect flows that were previously conveyed through the existing ditch which will be regraded and headwall. Either the Region of Peel or the developer will own this asset as it directs storm flow from the private property.</p>
<p>Further to comment #1 above, if the intended owner is the City, please provide the following:</p> <p>Upon completion of the proposed works and with regards to all municipal storm sewer infrastructure constructed as part of the works – including any modifications that are made to existing municipal storm sewer infrastructure – the City requests all as-constructed plan & profile drawings, details sheets, as well as any other relevant records such as CCTV inspection data & reporting, construction inspection records and engineering construction certification letter(s) for all new storm sewer infrastructure that is to be maintained by the City. At a minimum, plan & profile drawings should include the following detail:</p> <ul style="list-style-type: none"> i. General base plan detail including: <ul style="list-style-type: none"> a. Street names b. Pavement limits c. Curb extents d. Right-of-way limits e. Roadway centerline incl. stationing f. Property parcels g. Building footprints h. Line work showing all known existing storm drainage infrastructure ii. Drawing title block information including: <ul style="list-style-type: none"> a. Name of organization responsible for the design b. Seal, signature and date from registered Professional Engineer responsible for the design c. Submission phase dated and indicated “as-constructed” d. Geodetic datum used to establish elevations e. North arrow f. Drawing scale <p>City of Mississauga Transportation & Works Suite 800 - 201 City Centre Drive Mississauga ON L5B 4E4</p>	<p>Please see response above.</p>

City of Mississauga Feedback	Addressed in the Project File
<p>Region of Peel – Relocation of 1,500-millilitre Credit Valley Trunk Sewer</p> <p>iii. Pipe details for each constructed segment including:</p> <ul style="list-style-type: none"> a. Size/cross-section dimension b. Length c. Grade d. Material e. Classification f. Direction of flow <p>iv. Details for each constructed maintenance hole including:</p> <ul style="list-style-type: none"> a. Standard reference (e.g. OPSD ###.###); and b. Annotation indicating function (e.g. MH, CBMH, DICBMH etc.) c. Size of maintenance hole (diameter, dimension for non-circular chambers or detail drawing for custom structures) d. Invert elevations for all connecting storm sewer segments <p>v. Details for each Catch basin including:</p> <ul style="list-style-type: none"> a. Type and location b. Invert elevations for CB rim and CB lead 	

Credit Valley Conservation

Meeting Minutes



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Subject	CVC Pre-Consultation		
Project	Coordination of Water and Wastewater Infrastructure Works with the MTO's Highway 401 Expansion Project		
Project No.	D3113400	File	2019-03-27-401-CVC-Minutes
Prepared by	Rachelle Plourde	Phone No.	416.499.9000
Location	10 Peel Centre Drive, MR4-910	Date/Time	March 27, 2019 1:00pm
Participants	Frank Pugliese Camilo Quintero Rebecca Stewart	Pascal Pitre Jakub Kilis	Rachelle Plourde Sarah Labrie

Should no comments be received within 5 working days of date of issuance, please consider these minutes to be final.

Objectives

To update the CVC on field investigations and design status for the Regional utilities being located in support of the MTO 401 Widening.

	Notes	Action	Due Date
1	Project Update		
	Schedule of MTO works still to be confirmed, kick-off meeting between the Region and the MTO's successful proponent scheduled for April 5 th . Topographic survey, natural environment and geomorphological investigations have been completed. Geotechnical is on-going. SUE and archaeological to commence shortly.		
2	Crossing 4 – Mullet Creek Tributary		
	Crossing 4 compound is adjacent to CVC regulated area. Works to remain north of Argentia Road. A CVC permit is not anticipated for this crossing.		
3	Crossing 7&8 – Mullet Creek		
	MTO preference for closed channel culvert at this location, CVC preference for open bottom channel. Geomorphology has identified that this crossing is not recommended to be completed via open cut. The scour assessment of the creek has identified that the current tunnel alignment would not provide sufficient cover for the future creek bed.		

	<p>Jacobs is currently reviewing alternative alignments, including separating the watermain and sanitary sewer into two separate tunnels, deepening the watermain tunnel and crossing the creek at an alternative location with the sewer.</p> <p>CVC identified a preference for the shafts to be outside of the floodplain, and should the shafts need to be within the floodplain the storm frequency to be identified to determine the associated risk.</p>		
4	Crossing 6		
	Storm sewer at this location may need to be relocated, this was newly identified and the Region is currently investigating.		
5	Crossing 10&11		
	<p>Design of this crossing is currently on hold as the MTO is evaluating alternatives for maintaining the existing infrastructure.</p> <p>The geomorphology identified that the Credit River could be open cut, MNR pre-consultation noted they were permit an open cut crossing. The design intent would be to remove the existing 675mm and replace it with a 1500mm.</p> <p>CVC preference for the 1500mm to be installed trenchless and the 675mm to remain. A memo would be required to support open cut design and provide justification.</p>		
6	Natural Heritage Report		
	Natural heritage investigation has been completed.		
7	Geomorphological Investigation		
	Natural heritage investigation has been completed.		
8	Timing Windows		
	Works are permitted between July 1 st to March 31 st .		
9	Permit Application Documents		
	Jacobs to provide draft geomorphological and natural heritage reports for the CVC for review in advance of application.	Rachelle	15-Apr-19

Subject	East to West Diversion Sanitary Trunk Sewer TM 17 – Rationale for the Open-Cut Crossing of the Credit River for the Relocation of the Credit Valley Trunk Sewer
Attention	Jakub Kilis, Credit Valley Conservation
Copy	Frank Pugliese / Ajay Puri, Region of Peel
From	Pascal Pitre, Jacobs
Date	January 6, 2020
Project Number	703215
Revision No.	1

The purpose of this technical memorandum is to provide a brief outline of the rationale for the proposed open-cut crossing of the Credit River for the relocation of the existing 1500-mm Credit Valley Trunk Sewer (CVS) east of Creditview Road. The impetus for the relocation of this trunk sewer is the highway widening project being implemented by the Ontario Ministry of Transportation (MTO).

The 1500 mm diameter CVS conveys sewage flows towards the West Trunk, which in turn conveys flows to the Clarkson Wastewater Treatment Plant at Lake Ontario. The CVS crosses Highway 401 prior to its connection with the West Trunk.

The MTO is widening Highway 401 from the current termination of the previous widening project, westerly through the Region of Peel and into Halton Region. The road allowance for the highway was widened both to the north and south to accommodate the highway widening. Jacobs is working with the Region of Peel to replace several of their water and sewer crossings of Highway 401 that are impacted by the widening works. The existing CVS is located along the east side of Creditview Road and turns 90 degrees to follow the north side of Highway 401 some 400-m easterly prior to reaching the crossing. The highway widening and replacement of the Creditview Road overpass (which will shift towards the east) will both affect the CVS, which needs to be relocated.

The CVS is being relocated outside of the Hwy 401 road allowance north of the highway as illustrated on **Exhibit 1**, which displays the existing and proposed alignments. There is an existing 675 mm local sewer that crosses the Credit River at the location of the proposed realigned CVS. Thus, there are currently two sewer crossings of the Credit River north of Highway 401 (the CVS and the 675 mm sewer). The realigned CVS would have more cover under the river crossing than that of the existing CVS (as there is more cover further north from the highway), and the top of the proposed CVS pipe will be approximately 1.6 m lower than the top of the existing 675 mm sewer. The existing 675mm currently has a cover of 0.73m between the top of the pipe and the bottom of the river. However, based on the results of the scour assessment undertaken for the geomorphology of the Credit River, the scour depth is 2.05m. This scour depth would result in complete exposure of the existing 675mm pipe.

The risks associated with attempting a trenchless crossing of the Credit River are significant, including potential damaging of the existing 675 mm sewer and roof loss, and as such, this approach is not deemed practical. Furthermore, the CVS needs to be installed within the existing easement of the 675 mm sewer and below it, which implies the need to remove the 675 mm sewer. The two sewers will be combined into a single sewer in order to eliminate one river crossing. A sewer hydraulic analysis confirmed the viability of this approach. As the CVS will be installed below the elevation of the 675 mm sewer, and in the same alignment, allowing this existing sewer to be removed, installation of the CVS by open-cut is the only practical approach. A trenchless crossing attempt of the river would also result in a physical conflict with the existing 675 mm sewer.

It is also noted that the existing CVS crossing of the Credit River was installed by open-cut in the year 2006 in consultation with DFO and CVC.

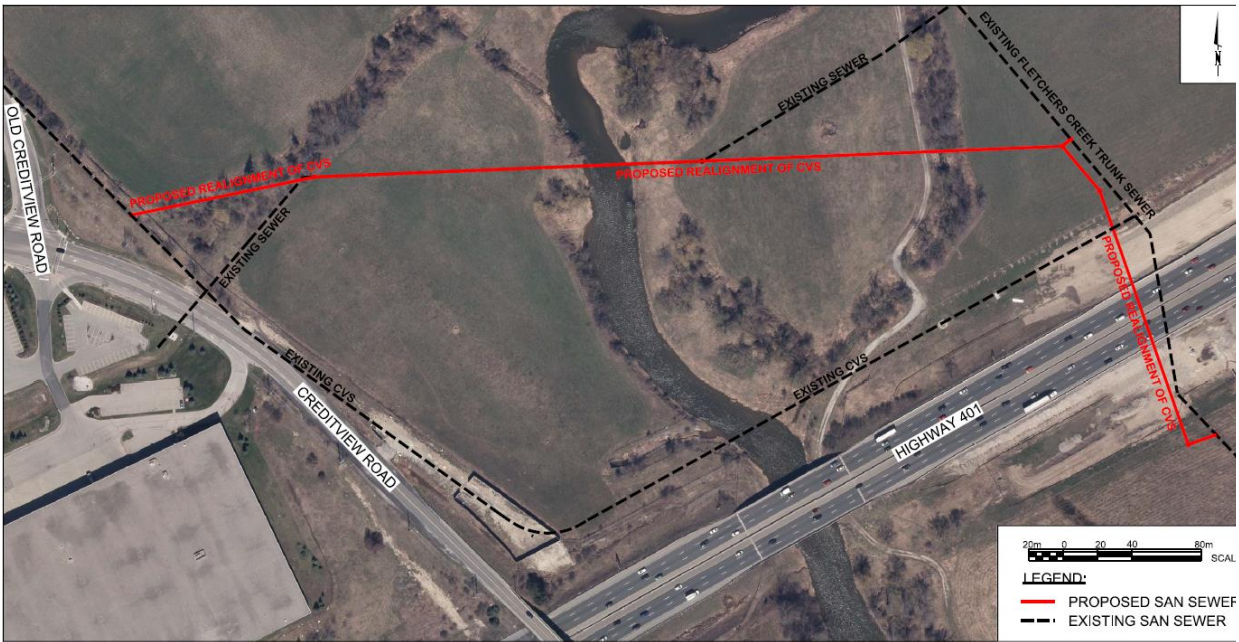


Exhibit 1 – Realignment of CVS and Location of New Credit River Crossing.

In accordance with the topographic survey recently completed, the existing 675 mm is close to being at the bottom of the riverbed. This is likely due to scour over the years. There is no question that this existing sewer needs to be removed since the CVS must be installed in its place along the existing easement crossing the private property.

The existing CVS river crossing is within the widened Highway 401 ROW. Consultation with the MTO and the design-build consortium (WCC) revealed that the existing CVS could be grouted and abandoned in place without affecting their work. However, it is suggested that removing the section of the sewer crossing the river may be the most prudent approach with respect to mitigating risks of future scour and riverbed protection concerns. However, the Region will proceed in accordance with the CVC's preference with respect to removing or abandoning in place the section of the existing CVS crossing of the river.

The purpose of this technical memo is to present the rationale for the proposed open-cut crossing of the Credit River to secure approval in principle from the CVC in order to enable development of the design. It is understood that the CVC will be presented with design and reinstatement details that will include considerations for protection of the infrastructure against scour effects and protection of the river bottom at the crossing location. This will be based on the geomorphology analysis completed in support of this crossing.

On behalf of the Region of Peel, we hereby request the following from the CVC:

1. Approval in principle of the proposed open-cut crossing of the Credit River for installation of the new CVS, removal of the existing shallow 675 mm sewer, and protection of the river bottom over the new CVS. This will enable development of the design of the protection and reinstatement details.
2. Instruction as to whether the section of the existing CVS that crosses the Credit River should be removed or grouted and abandoned in place.

From: Kilis, Jakub <Jakub.Kilis@cvc.ca>

Sent: Thursday, November 26, 2020 10:54 AM

To: Thannickal, Jimmy/TOR <Jimmy.Thannickal@jacobs.com>

Cc: Puri, Ajay <ajay.puri@peelregion.ca>; Dhillon, Paramjit/TOR <Paramjit.Dhillon@jacobs.com>;

Newton, Dorin/TOR <Dorin.Newton@jacobs.com>

Subject: [EXTERNAL] CVC Comments - Draft NHR - EW Diversion Sewer - Contract 2

Hi Jimmy,

CVC staff has had a chance to review the Draft NHR for the EW Diversion Sewer Contract 2 and offer the following comments for your consideration:

1. CVC Planning Ecology staff has concerns about the proposed open cut sections across the Credit River. Further, the report was found to be a bit vague regarding its description of the trenching applications selected across the project. CVC understands that an EA has recently started for the proposed crossing of the Credit River. As this report is pre-dating the EA, and as the EA process unfolds, and other technical info is added to the evaluation of the project, the report and findings may need to be updated to reflect the alternatives evaluated/preferred alternative, including providing more detailed information on the proposed crossing methodology. Finalized figures should show the proposed footprint of the crossings as well as any proposed access roads and staging areas.
2. Once the open cut approach is confirmed through the EA process, please provide an indication of the timing and duration of open cut water crossings. Please note that the warm water construction timing window applies for this reach of the Credit: July 1st to March 31st (wherein work can be conducted).
3. There is an agricultural drain flowing through the eastern FOD4 community at the Credit River crossing site. Please discuss potential impacts to this feature.
4. It is unclear why no amphibian studies were completed as it is likely that they occur in Credit River crossing site and possibly Willow Lane site. It is recommended that amphibian surveys be conducted given the habitat characteristics of the projects within the vicinity of the Credit River. Please discuss.
5. Given the extent of proposed tree removals, please conduct a Breeding Bird survey at the Willow Lane site.
6. Field surveys were only conducted once and the Willow Lane and Credit River crossing sites had their field surveys conducted in the Fall, outside of the primary active season for most species. Please confirm if these were surveys or incidental spottings.
7. CVC Planning Ecology staff is concerned about the extent of vegetation removals proposed in FOD communities. Additional effort should be taken to seek opportunities to reduce the proposed impact footprint. Further, at detailed design, a comprehensive vegetation removals and protection plan will be required as well as overall comprehensive site stabilization/restoration/enhancement plans. Any vegetation removals should abide by the vegetation removals timing window with no removals from April 1st to August 31st in order to avoid sensitive breeding birds and bats (pursuant to Migratory Birds Convention Act and Endangered Species Act).

8. Once the EA process confirms the preferred alternative, an impact assessment should quantify impacts for each site and recommend appropriate actions for detailed design.

Comments for detailed design

9. Please Provide detailed fish and wildlife rescue/salvage plan and consult the MECP and MNRF for any necessary permits. Please provide documentation.
10. Please provide a detailed construction plan with staging areas, access points, storage areas, and notes for timing windows.
11. Provide documentation of correspondence with DFO.
12. Please provide comprehensive ESC, dewatering plan, and exclusionary fencing plans.
13. Please provide Tree Preservation Plan.
14. Please provide a detailed restoration, enhancement, and stabilization plans, including use of appropriate CVC seed mixes, regionally appropriate plant species from CVC's Plant Selection Guidelines (<https://cvc.ca/wp-content/uploads/2018/04/Plant-Selection-Guideline-FINAL-APRIL-24th-2018.pdf>), and habitat compensation i.e. bat roosting boxes, raptor poles, etc. as may be required. An appropriate nurse crop should also be selected from the above document. This plan should also contain details on the restoration of the temporary road. CVC staff is happy to discuss further as the project designs are completed.

Drawing specific comments

15. Two unknown tree species are flagged for removal (44cm DBH and 47cm DBH, tags 4984 and 398) at Site 6 as per DWG 6-SP-001. Please update/provide the species of these proposed removals. Removal of significant species can impact restoration/compensation requirements.
16. DWG 7-SP1-001 flags 5 Black Walnuts for removal. CVC recommends that consideration be given for these in the restoration plans.

Please do not hesitate to contact me if you have any questions,
Jakub

Jakub Kilis, RPP

Manager, Infrastructure and Regulations | Credit Valley Conservation
905-670-1615 ext 287 | C: 647-212-6554 | 1-800-668-5557
jakub.kilis@cvc.ca | cvc.ca

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Subject CVC Consultation for Source Water Protection

Project Credit Valley Sanitary Trunk Sewer Relocation
Schedule 'B' Municipal Class Environmental Assessment (EA)

Project No. 703215CH

Prepared by Bryden Eby **Email** Bryden.eby@jacobs.com

Location MS Teams **Date/Time** Thursday, December 10, 9:00 AM – 9:30 AM

Participants Region of Peel: Ajay Puri (AP)
CVC: Jakub Kilis (JK), Kerry Mulchansingh (KM), Rebecca Stewart (RS)
Jacobs: Emma Henderson (EH), Paramjit Dhillon (PD), Dorin Newton (DN) Bryden Eby (BE)

Copies to Jimmy Thannickal (JT)

1. Introductions

- Introduction to meeting purpose/culture of caring moment.

2. Purpose/Background

- Region of Peel is completing an EA for the realignment of the 1,500-mm Credit Valley Sanitary Trunk Sewer (CVS).
- CVS must be relocated for continued operation and maintenance; a number of realignment options are being considered.
- Three other projects are influencing the need for relocation, as well as the design options: Highway 401 Expansion, East-to-West Diversion Strategy, and Creditview Bridge replacement.
- The Study Area is within the City of Mississauga and generally east of Creditview Road. This area has been specifically defined to incorporate the area which may be directly or indirectly affected by the Project activities.
- The Credit River is currently experiencing bank erosion and there is an existing sanitary sewer crossing. The preferred alignment alternative will be buried below the maximum scour depth to prevent exposure.
- The existing drinking water threats include possible agricultural drain.
- Alternatives for alignment are examining a combination of open-cut and tunneling. Open-cut was previously determined as the preferred method from the MNRF and CVC due to existing conditions and risk of frac out.
- Standard mitigation measures have been proposed during implementation to protect water quality.

3. Discussion

- KH: From a source protection perspective, CVC will send Jacobs relevant policies to ensure that the Project complies as it is in a significant groundwater recharge area. Towards the east side, outside of the Study Area, there are some isolated highly vulnerable aquifers (HVAs) which the policies will apply to as well (if needed).
- EH: Are there any further mitigation measures that should be considered?
 - KH: It appears that the mitigation measures in the slideshow cover what is needed. They can be compared further to the policies and information that will be sent to Jacobs.
- Paramjit: As a note to Jacobs and CVC, scour analysis was done and a report was prepared which indicated a couple meters depth for the scour protection; however, we will likely not be able to go deeper than 2m due to constraints from existing inverts. Mitigation measures such as concrete encasement will be considered to compensate for the constraints.”
- Jakub: It will be important in the EA to document these things and ensure that the preferred alternative speaks to the technical challenges associated with the decision-making as a way to address any problems with scour protection and how it cannot be met due to upstream and downstream connections. Ensure that technical reports, geomorphology studies, etc. are used for decision-making during the process of alternative evaluation in the EA.
- Paramjit: Confirmed and acknowledged that these will be incorporated into the EA development.
- No further questions or concerns were noted.

4. Summary

Action Item	Assigned to	Follow up?
Source Water Protection policies will be sent to Jacobs to ensure project compliance. Policies will apply to HVA's as well.	CVC (KM)	Information provided (Dec 10, 2020) will be incorporated into the EA
Ensure the EA speaks to the technical challenges encountered during alternative evaluation (i.e. scour protection issues).	Jacobs (All)	N/A

From: Mulchansingh, Kerry <Kerry.Mulchansingh@cvc.ca>
Sent: Thursday, December 10, 2020 10:35 AM
To: Eby, Bryden <Bryden.Eby@jacobs.com>
Cc: Henderson, Emma/KWO <Emma.Henderson@jacobs.com>; Thannickal, Jimmy/TOR <Jimmy.Thannickal@jacobs.com>; Kilis, Jakub <Jakub.Kilis@cvc.ca>
Subject: [EXTERNAL] 1,500-mm Credit Valley Trunk Sewer - Source Water Protection Consultation

Hi Bryden,

The *Clean Water Act, 2006* ensures communities protect their drinking water supplies through prevention – by developing collaborative, watershed-based source protection plans that are locally driven and based on science.

This correspondence confirms that the proposed project is located in the CTC Source Protection Region in the **Credit Valley Source Protection Area**.

VULNERABLE AREAS UNDER THE *CLEAN WATER ACT, 2006*

Upon review of the applicable assessment reports, the study area for the proposed Credit Valley Trunk Sewer project transects the following vulnerable areas identified under the *Clean Water Act, 2006*:

- Highly Vulnerable Aquifers (HVA)
- Significant Groundwater Recharge Area (SGRA)

Significant Groundwater Recharge Area (SGRA) is an area that supplies a community or private residence with drinking water and is characterized by porous soils, which allow water to seep easily into the ground and flow to an aquifer.

Highly Vulnerable Aquifer (HVA) can be easily changed or affected by contamination from both human activities and human process as a result of its intrinsic susceptibility (as a function of the thickness and permeability of overlaying layers), or by preferential pathways to the aquifer.

PRESCRIBED THREATS

Under the *Clean Water Act, 2006*, a “prescribed threat” (hereafter referred to as “threat”) is defined as “an activity or condition that adversely affects or has the potential to adversely affect the quality or quantity of any water that is or may be used as a source of drinking water, and includes an activity or condition that is prescribed by source protection regulation as a drinking water threat”. The Province has identified 22 activities (see below) that, if they are present in vulnerable areas, now or in the future, could pose a threat (listed in Section 1.1 of O. Reg. 287/07). Twenty of these activities are relevant to drinking water quality threats, while two are relevant to drinking water quantity threats. It is possible that activities related to the project may pose threats to the vulnerable area(s) identified.

- The establishment, operation, or maintenance of a waste disposal site within the meaning of Part V of the *Environmental Protection Act (EPA)*;
- The establishment, operation, or maintenance of a system that collects, stores, transmits, treats, or disposes of sewage;
- The application of agricultural source material to land;
- The storage of agricultural source material;
- The management of agricultural source material;
- The application of non-agricultural source material (NASM) to land;
- The handling and storage of non-agricultural source material (NASM);
- The application of commercial fertilizer to land;
- The handling and storage of commercial fertilizer;
- The application of pesticide to land;
- The handling and storage of pesticide;
- The application of road salt;
- The handling and storage of road salt;
- The storage of snow;
- The handling and storage of fuel;
- The handling and storage of a dense non-aqueous phase liquid;
- The handling and storage of an organic solvent;
- The management of runoff that contains chemicals used in the de-icing of aircraft;
- An activity that takes water from an aquifer or a surface water body without returning the water taken the same aquifer or surface water body;
- An activity that reduces the recharge of an aquifer;
- The use of land as livestock grazing or pasturing land, an outdoor confinement area, or a farm-animal yard; and
- The establishment and operation of a liquid hydrocarbon pipeline.

In addition to the prescribed threats listed above, a source protection committee (SPC) may determine that there are other activities in their source protection region, which pose a risk to drinking water. The CTC SPC received approval for the addition of two local drinking water threats in the CTC Source Protection Region:

- Pipelines transporting petroleum products (containing benzene) crossing tributaries of Lake Ontario; and
- Spill of tritium from a nuclear generating station.

CTC SOURCE PROTECTION PLAN POLICIES

The CTC Source Protection Plan contains policies, developed by residents, businesses, and municipalities to protect the vulnerable areas described above. The CTC Source Protection Plan became effective on December 31, 2015 and the complete document is available on the CTC Source Protection Region (<https://ctcswp.ca/protecting-our-water/the-ctc-source-protection-plan/>) for reference. Policies that apply to HVAs and SGRAs include *SAL 10-12*, *DNAP-3*, and *OS-3*.

Where an activity associated with a proposed project poses a risk to drinking water, the proponent must document and discuss in the report how the project adheres to or has regard to applicable policies in the CTC Source Protection Plan. The Province has created a Source Protection Information Atlas (<https://www.gisapplication.lrc.gov.on.ca/SourceWaterProtection/Index.html?site=SourceWaterProtection&viewer=SWPViewer&locale=en-US>) to assist in determining where policies apply in vulnerable areas across the province.

I trust that this information will assist you in the design for your project. I strongly recommend that you liaise with Therese Estephan, Advisor – Source Water Protection, Peel Region (1-905-791-7800 ext. 4339; Therese.Estephan@peelregion.ca), should you have any questions when designing your project to ensure the protection of sources of drinking water. In the event that you have any questions with respect to this correspondence, please contact me at your convenience.

Best Regards,

Kerry

Kerry Mulchansingh, P.Geo.

Program Manager - Hydrogeology | Credit Valley Conservation

905.670.1615 ext 383 | 1.800.668.5557

NEW kerry.mulchansingh@cvc.ca | cvc.ca

From: Eby, Bryden <Bryden.Eby@jacobs.com>

Sent: Tuesday, November 17, 2020 11:42 AM

To: Mulchansingh, Kerry <Kerry.Mulchansingh@cvc.ca>

Cc: Henderson, Emma/KWO <Emma.Henderson@jacobs.com>; Thannickal, Jimmy/TOR <Jimmy.Thannickal@jacobs.com>

Subject: [External] 1,500-mm Credit Valley Trunk Sewer - Source Water Protection Consultation

[CAUTION] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe. If in doubt contact help211@cvc.ca

Hello Kerry,

My name is Bryden Eby and I am an Environmental Planner with Jacobs Engineering. We are currently working with the Region of Peel to prepare an environmental assessment study for the realignment of a section of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer in the City of Mississauga. A number of realignment options are being evaluated and the potential solution will be developed and carried out in coordination with the MTO and in consultation with stakeholders. Please see the attached Notice of Commencement for further information.

The project is located in a significant groundwater recharge area and as such, we have been advised by the MECP that consultation with the local source protection authority should occur in order to discuss potential impacts on drinking water.

Would you be available to discuss drinking water impacts through either email or a phone/web meeting at some point in the next couple weeks? Please let me know what works best for you. As well, if you have any other questions or concerns in the meantime, please let me know and I will do my best to provide as much information as possible.

Thank you very much.

Bryden Eby, BBA, MES, LEED AP ND

Jacobs

Environmental Planner | Global Environmental Solutions

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bryden.eby@jacobs.com

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Quality Review Form (QRF)



QUALITY REVIEW FORM													
Project:	East to West STS Diversion Project						1 (H)	Requires response and/or action before acceptance (cause of rejection until resolved)				Agree - will make suggested changes	1
Deliverable:	Contract 2 Natural Heritage Report							2 (M)	Requires response during next phase (accepted as noted)				Agree - will provide alternate solution
Deliverable Date:	9/2/2020						3 (L)		Editorial Comment - does not require change				Disagree - no action required
Log Date:	4/12/2021											Additional Information Required	4
Reviewer to fill in these columns							Consultant's Response				Reviewer's Acceptance/Rejection		
Comment No.	Page No.	Section	Drg/Fig/ Table No.	Review Comment	Comment Type Code (1 to 3)	Reviewer Name	Organization	Responder Name	Response Date	Response Type Code (1 to 4)	Response Comment	Reviewer originating the comment enters either: Accept: I accept the designer's response or Reject: I do not accept the designer's response (provide reason).	Open/Closed
Comments													
1				CVC Planning Ecology staff has concerns about the proposed open cut sections across the Credit River. Further, the report was found to be a bit vague regarding its description of the trenching applications selected across the project. CVC understands that an EA has recently started for the proposed crossing of the Credit River. As this report is pre-dating the EA, and as the EA process unfolds, and other technical info is added to the evaluation of the project, the report and findings may need to be updated to reflect the alternatives evaluated/preferred alternative, including providing more detailed information on the proposed crossing methodology. Finalized figures should show the proposed footprint of the crossings as well as any proposed access roads and staging areas.		JK	CVC	Jacobs					
2				Once the open cut approach is confirmed through the EA process, please provide an indication of the timing and duration of open cut water crossings. Please note that the warm water construction timing window applies for this reach of the Credit: July 1 st to March 31 st (wherein work can be conducted).		JK	CVC	Matrix	12/4/2020	4	Report currently states that it is warm water and construction should abide the July 1 to March 31 window. Timing and duration can be added once it is known.		
3				There is an agricultural drain flowing through the eastern FOD4 community at the Credit River crossing site. Please discuss potential impacts to this feature.		JK	CVC	Matrix	12/4/2020	1	Matrix can add text to discuss impacts to the drain.		

4				1. It is unclear why no amphibian studies were completed as it is likely that they occur in Credit River crossing site and possibly Willow Lane site. It is recommended that amphibian surveys be conducted given the habitat characteristics of the projects within the vicinity of the Credit River. Please discuss.		JK	CVC	Matrix	12/4/2020	2	The Unnamed Tributary at Willow Lane will not be impacted as the pipe is being installed in the existing road footprint, therefore an amphibian survey was not deemed necessary as potential habitat will remain. At the Credit River it is agreed that there is in-water habitat for amphibians, however the adjacent area is dominated by agricultural field which wouldn't be deemed amphibian habitat. If the construction occurs between July and March 31 it is avoiding critical amphibian life cycles if they are present. Additionally, part of the mitigation measures would be to search for wildlife before construction begins daily.		
5				Given the extent of proposed tree removals, please conduct a Breeding Bird survey at the Willow Lane site.		JK	CVC	Matrix	12/4/2020	3	A BBS was not conducted at Willow Lane because only 1 tree is being removed, and it is stipulated that any removals/pruning needs to be conducted outside of the breeding bird window.		
6				Field surveys were only conducted once and the Willow Lane and Credit River crossing sites had their field surveys conducted in the Fall, outside of the primary active season for most species. Please confirm if these were surveys or incidental spottings.		JK	CVC	Matrix	12/4/2020	1	Species specific wildlife surveys were done for birds and bats (at appropriate sites) in the appropriate seasons and protocol windows. All other wildlife discussed in the report comes from either background review or was an incidental field observation. Field work around the Credit was conducted in the fall because at the time the schedule presented was tight and field work needed to be conducted before winter.		
7				CVC Planning Ecology staff is concerned about the extent of vegetation removals proposed in FOD communities. Additional effort should be taken to seek opportunities to reduce the proposed impact footprint. Further, at detailed design, a comprehensive vegetation removals and protection plan will be required as well as overall comprehensive site stabilization/restoration/enhancement plans. Any vegetation removals should abide by the vegetation removals timing window with no removals from April 1 st to August 31 st in order to avoid sensitive breeding birds and bats (pursuant to Migratory Birds Convention Act and Endangered Species Act).		JK	CVC	Jacobs					
8				Once the EA process confirms the preferred alternative, an impact assessment should quantify impacts for each site and recommend appropriate actions for detailed design.		JK	CVC	Jacobs					

Newton, Dorin/TOR

From: Kilis, Jakub <Jakub.Kilis@cvc.ca>
Sent: Monday, July 12, 2021 1:44 PM
To: Newton, Dorin/TOR
Cc: Puri, Ajay; Dhillon, Paramjit/TOR; Thannickal, Jimmy/TOR
Subject: [EXTERNAL] CVC Comments - Draft Project File - Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer - Schedule B Municipal Class EA (CVC File No EA 20/016)

Hi Dorin,

CVC staff has finalized our review of the Draft Project File and technical appendices and offer the following comments for your consideration

General

1. Under the 'Compliance with applicable planning policies, preferences, and legislature' in the evaluation table it states that the open cut methodology is preferred by CVC. That is not the case. As noted in meeting between CVC and your team CVC's preference is for trenchless crossings of natural features/watercourses. CVC reviews the list of alternatives and confirms if we can support a specific alternative based on the review of technical information and associated risks. This is the case for this project, however, it does not imply that open cut is preferred by CVC. Please reword this statement, or remove CVC from the note completely.

Engineering

2. CVC manages land containing flood hazards within CVC's jurisdiction based on the greater of the regional storm event as identified by the Province (Hurricane Hazel) or the 100-year flood. The flood determined through this calculation is the Regulatory Flood and defines the extent of the riverine flood hazard.

The preferred design alternative must not have any off-site flooding impacts during all design storms from 2-year to 100-year and Regional events, this includes during construction. The EA should state this commitment. Details of the design of any required isolation for the completion of open cut works will be confirmed during detailed design.

3. The erosion hazard limit for riverine systems is determined using the 100-year erosion rate (the average annual rate of recession extended over a hundred year time span) including allowances for toe erosion and slope stability as well as consideration for access during emergencies or for maintenance. The erosion hazard component of river and stream systems is intended to address both, erosion potential of the actual river and stream banks, as well as erosion or potential slope stability issues related to valley walls through which rivers and streams flow.

Each alternative (and ultimately sewer alignment and location) must be evaluated based on the potential impact to the erosion hazard in the ultimate condition of the sewer. This should be included in the technical evaluation criteria.

4. Scour assessment is defined as the technical and professional evaluation of the long-term risks due to potential vertical erosion and/or degradation of stream and river channels. Additional studies and work may be required to determine the potential impact to the bed of the Credit River pending the installation approach. There are risks to both methods of installation that should be considered and incorporated into the evaluation. Each alternative provides additional considerations including the opportunities to decommission the existing sewer, the risk of exposure of the existing sewer if not removed, and the potential need for in-channel works considering natural channel design principles.

Please incorporate the above into the evaluation matrix as appropriate in order to address CVC's concerns on natural hazards due to the proposed alternative solutions.

Ecology

Significant Woodlands

5. By reasoning that the open-cut alternative is proposed to disturb Significant Woodlands, an evaluation of the extent of impact for each proposed alternative should be provided as part of the terrestrial ecosystem impacts, if applicable.
6. Avoidance, minimization, and mitigation measures should be laid out for impacts to Significant Woodlands, potentially as future reference for detailed design.

Please let me know if you'd like to discuss any of the above,
Jakub

I'm working remotely. The best way to reach me is by email, mobile phone or Microsoft Teams.

Jakub Kilis | RPP

Senior Manager, Infrastructure and Regulations | Credit Valley Conservation

905-670-1615 ext 287 | M: 647-212-6554

jakub.kilis@cvc.ca | cvc.ca



[View our privacy statement](#)

Newton, Dorin/TOR

From: Newton, Dorin/TOR
Sent: Thursday, August 26, 2021 1:42 PM
To: Kilis, Jakub
Cc: Puri, Ajay; Dhillon, Paramjit/TOR; Thannickal, Jimmy/TOR
Subject: RE: CVC Comments - Draft Project File - Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer - Schedule B Municipal Class EA (CVC File No EA 20/016)
Attachments: CVCFeedback.docx; PFR_Criteria_Evaluation_Tables.docx; 27896-504 Geomorph EA Alternatives 2021-08-17 final V1.0.pdf

Good afternoon Jakub,

Thank you for the comments provided on the draft Project File. We have taken them into consideration and have revised our evaluation to address the comments. Please find attached our responses to the comments, the revised criteria table and evaluation table (sections 3.21 and 3.22 from the Project File with revisions shown in purple text), and Matrix's TM to support the two additional criteria that have been added and scored. Please let us know if the comments have been appropriately addressed so that we can finalize our Project File for public review.

Thank you,

Dorin Newton, P.Eng., M.Eng. | [Jacobs](#) | Engineering
O:+00.416.499.0090 Ext. 73713 | M:+00.519.575.5585 | Dorin.Newton@jacobs.com

From: Kilis, Jakub <Jakub.Kilis@cvc.ca>
Sent: Monday, July 12, 2021 1:44 PM
To: Newton, Dorin/TOR <Dorin.Newton@jacobs.com>
Cc: Puri, Ajay <ajay.puri@peelregion.ca>; Dhillon, Paramjit/TOR <Paramjit.Dhillon@jacobs.com>; Thannickal, Jimmy/TOR <Jimmy.Thannickal@jacobs.com>
Subject: [EXTERNAL] CVC Comments - Draft Project File - Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer - Schedule B Municipal Class EA (CVC File No EA 20/016)

Hi Dorin,

CVC staff has finalized our review of the Draft Project File and technical appendices and offer the following comments for your consideration

General

1. Under the 'Compliance with applicable planning policies, preferences, and legislature' in the evaluation table it states that the open cut methodology is preferred by CVC. That is not the case. As noted in meeting between CVC and your team CVC's preference is for trenchless crossings of natural features/watercourses. CVC reviews the list of alternatives and confirms if we can support a specific alternative based on the review of technical information and associated risks. This is the case for this project, however, it does not imply that open cut is preferred by CVC. Please reword this statement, or remove CVC from the note completely.

Engineering

2. CVC manages land containing flood hazards within CVC's jurisdiction based on the greater of the regional storm event as identified by the Province (Hurricane Hazel) or the 100-year flood. The flood determined through this calculation is the Regulatory Flood and defines the extent of the riverine flood hazard.

The preferred design alternative must not have any off-site flooding impacts during all design storms from 2-year to 100-year and Regional events, this includes during construction. The EA should state this commitment. Details of the design of any required isolation for the completion of open cut works will be confirmed during detailed design.

3. The erosion hazard limit for riverine systems is determined using the 100-year erosion rate (the average annual rate of recession extended over a hundred year time span) including allowances for toe erosion and slope stability as well as consideration for access during emergencies or for maintenance. The erosion hazard component of river and stream systems is intended to address both, erosion potential of the actual river and stream banks, as well as erosion or potential slope stability issues related to valley walls through which rivers and streams flow.

Each alternative (and ultimately sewer alignment and location) must be evaluated based on the potential impact to the erosion hazard in the ultimate condition of the sewer. This should be included in the technical evaluation criteria.

4. Scour assessment is defined as the technical and professional evaluation of the long-term risks due to potential vertical erosion and/or degradation of stream and river channels. Additional studies and work may be required to determine the potential impact to the bed of the Credit River pending the installation approach. There are risks to both methods of installation that should be considered and incorporated into the evaluation. Each alternative provides additional considerations including the opportunities to decommission the existing sewer, the risk of exposure of the existing sewer if not removed, and the potential need for in-channel works considering natural channel design principles.

Please incorporate the above into the evaluation matrix as appropriate in order to address CVC's concerns on natural hazards due to the proposed alternative solutions.

Ecology

Significant Woodlands

5. By reasoning that the open-cut alternative is proposed to disturb Significant Woodlands, an evaluation of the extent of impact for each proposed alternative should be provided as part of the terrestrial ecosystem impacts, if applicable.
6. Avoidance, minimization, and mitigation measures should be laid out for impacts to Significant Woodlands, potentially as future reference for detailed design.

Please let me know if you'd like to discuss any of the above,
Jakub

I'm working remotely. The best way to reach me is by email, mobile phone or Microsoft Teams.

Jakub Kilis | RPP

Senior Manager, Infrastructure and Regulations | Credit Valley Conservation

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jakub.kilis@cvc.ca | cvc.ca



[View our privacy statement](#)

CVC Feedback	Addressed in the Project File
General	
<p>1. Under the 'Compliance with applicable planning policies, preferences, and legislature' in the evaluation table it states that the open cut methodology is preferred by CVC. That is not the case. As noted in meeting between CVC and your team CVC's preference is for trenchless crossings of natural features/watercourses. CVC reviews the list of alternatives and confirms if we can support a specific alternative based on the review of technical information and associated risks. This is the case for this project, however, it does not imply that open cut is preferred by CVC. Please reword this statement, or remove CVC from the note completely.</p>	<p>Statement has been reworded in the evaluation Table under "Compliance with applicable planning policies, preferences, and legislature" to clarify that open-cut crossing is preferred to avoid high probability for a frac-out under the river.</p>
Engineering	
<p>2. CVC manages land containing flood hazards within CVC's jurisdiction based on the greater of the regional storm event as identified by the Province (Hurricane Hazel) or the 100-year flood. The flood determined through this calculation is the Regulatory Flood and defines the extent of the riverine flood hazard.</p>	<p>Acknowledged.</p>
<p>3. The erosion hazard limit for riverine systems is determined using the 100-year erosion rate (the average annual rate of recession extended over a hundred year time span) including allowances for toe erosion and slope stability as well as consideration for access during emergencies or for maintenance. The erosion hazard component of river and stream systems is intended to address both, erosion potential of the actual river and stream banks, as well as erosion or potential slope stability issues related to valley walls through which rivers and streams flow.</p> <p>Each alternative (and ultimately sewer alignment and location) must be evaluated based on the potential impact to the erosion hazard in the ultimate condition of</p>	<p>A separate criteria "Erosion hazard" has been added under Natural Environment. A new tech memo, by Matrix Solutions Inc., provides recommendations which was used to score the criteria. The tech memo has been attached for your reference.</p>

CVC Feedback	Addressed in the Project File
<p>the sewer. This should be included in the technical evaluation criteria.</p>	
<p>4. Scour assessment is defined as the technical and professional evaluation of the long-term risks due to potential vertical erosion and/or degradation of stream and river channels. Additional studies and work may be required to determine the potential impact to the bed of the Credit River pending the installation approach. There are risks to both methods of installation that should be considered and incorporated into the evaluation. Each alternative provides additional considerations including the opportunities to decommission the existing sewer, the risk of exposure of the existing sewer if not removed, and the potential need for in-channel works considering natural channel design principles.</p> <p>Please incorporate the above into the evaluation matrix as appropriate in order to address CVC's concerns on natural hazards due to the proposed alternative solutions.</p>	<p>A separate criteria "Scour hazard" has been added under Natural Environment. A new tech memo, by Matrix Solutions Inc., provides recommendations which was used to score the criteria. The tech memo has been attached for your reference. Impact of installation methodology and opportunities to decommission the existing 675 mm CSTS are captured in other criteria.</p>
<p>Ecology – Significant Woodlands</p>	
<p>5. By reasoning that the open-cut alternative is proposed to disturb Significant Woodlands, an evaluation of the extent of impact for each proposed alternative should be provided as part of the terrestrial ecosystem impacts, if applicable.</p>	<p>Added Significant Woodlands to the evaluation Table under "Disturbance of terrestrial species and features (e.g., vegetation clearing)"</p> <p>Alternative 1: This alternative will be installed by using a trenchless method and will require the least amount of temporary work space, reducing or avoiding impacts to terrestrial features such as potential Significant Woodlands.</p> <p>Alternative 2: The new sewer will require 510 m of open-cut construction, disturbing an open agricultural, dry-fresh upland deciduous forest and mineral cultural meadow. Impacts to Significant Woodlands could occur and should be assessed at the detailed design stage.</p> <p>Alternative 2A: The new sewer will require 530 m of open-cut construction, disturbing open agricultural, dry-fresh upland</p>

CVC Feedback	Addressed in the Project File
	<p>deciduous forest and mineral cultural meadow. Impacts to Significant Woodlands could occur and should be assessed at the detailed design stage.</p> <p>Alternative 3: The new sewer will require 600 m of open-cut construction, disturbing open agricultural, dry-fresh upland deciduous forest and mineral cultural meadow. Impacts to Significant Woodlands could occur and should be assessed at the detailed design stage.</p> <p>Alternative 4: No disturbance to terrestrial species including Significant Woodlands or their habitats as there is no construction; however, because of increased complexity to access the sewer for routine maintenance and inspection, there is a risk of failure and overflow into the natural environment.</p>
<p>6. Avoidance, minimization, and mitigation measures should be laid out for impacts to Significant Woodlands, potentially as future reference for detailed design.</p>	<p>Provided mitigation in Section 4.2.1 Natural Environment (Implementation):</p> <p>At the detailed design stage, provide mapping of Significant Woodlands or potential Significant Woodlands. Construction should avoid these areas if possible. If not, habitat compensation and mitigation will be required.</p>

August 17, 2021

Version 1.0
Matrix 27896-504

Dorin Newton
JACOBS ENGINEERING GROUP INC.
Suite 400, 245 Consumers Rd.
Toronto, ON M2H 1R3

**Subject: Region of Peel Highway 401 Watermain and Sanitary Trunk Sewer Project - Fluvial
Geomorphology Recommendations for Environmental Assessment Alternatives**

Dear Dorin Newton:

The purpose of this technical memorandum by Matrix Solutions Inc. is to provide recommendations regarding environmental assessment (EA) alternatives for the Regional Municipality of Peel proposed sanitary trunk sewer (STS) crossing of the Credit River upstream of Highway 401. This memo follows our discussion of this topic on August 6, 2021, and your email request on August 9, 2021, to provide a relative ranking of five (5) alternative STS alignments proposed to cross under the Credit River in terms of their relative favourability from a fluvial geomorphology perspective. More specifically, these recommendations are to assist Jacobs Engineering Group Inc. in addressing the following two comments from Credit Valley Conservation (CVC) supplied in an email from CVC dated July 12, 2021:

- 1. The erosion hazard limit for riverine systems is determined using the 100-year erosion rate (the average annual rate of recession extended over a hundred year time span) including allowances for toe erosion and slope stability as well as consideration for access during emergencies or for maintenance. The erosion hazard component of river and stream systems is intended to address both, erosion potential of the actual river and stream banks, as well as erosion or potential slope stability issues related to valley walls through which rivers and streams flow. Each alternative (and ultimately sewer alignment and location) must be evaluated based on the potential impact to the erosion hazard in the ultimate condition of the sewer. This should be included in the technical evaluation criteria.*
- 2. Scour assessment is defined as the technical and professional evaluation of the long-term risks due to potential vertical erosion and/or degradation of stream and river channels. Additional studies and work may be required to determine the potential impact to the bed of the Credit River pending the installation approach. There are risks to both methods of installation that should be considered and incorporated into the evaluation. Each alternative provides additional considerations including the opportunities to decommission the existing sewer, the risk of exposure of the existing sewer if not removed, and the potential need for in-channel works considering natural channel design principles. Please incorporate the above into the evaluation matrix as appropriate in order to address CVC's concerns on natural hazards due to the proposed alternative solutions.*

Matrix is pleased to provide the following recommendations for the favourability of the STS EA alternatives with respect to the two fluvial geomorphology criteria noted by CVC’s comments—the lateral erosion hazard and the vertical scour hazard. The following recommendations are based on analyses already completed and documented in the fluvial geomorphology assessment report by Matrix (2021).

1 EA ALTERNATIVES FOR THE STS CROSSING OF CREDIT RIVER

The following five (5) EA alternatives were provided by Jacobs and have been included with this memo in Appendix A:

- Alternative 1: arched alignment of proposed 1,500 mm STS upstream of existing 675 mm STS crossing
- Alternative 2: straight alignment of proposed 1,500 mm STS at existing 675 mm STS crossing
- Alternative 2a: straight alignment of proposed 1,500 mm downstream of existing 675 mm STS crossing
- Alternative 3: straight alignment of proposed 1,500 mm downstream of existing 675 mm STS crossing, upstream of Highway 401
- Alternative 4: do nothing, leaving existing 675 mm STS crossing at higher elevation compared to proposed

2 FLUVIAL GEOMORPHOLOGY RECOMMENDATIONS FOR EA ALTERNATIVES

2.1 Erosion Hazard

The relative favourability of the EA alternatives has been ranked with reference to the previously reported erosion hazard assessment by Matrix (2021). Specifically, the erosion hazard ranking based on the lateral proximity of the proposed STS alignment compared with the existing alignment and predicted future locations of the Credit River channel. The proximity comparison does not specifically include the location of the proposed sewer crossing itself, but of the STS sections within the floodplain beyond the channel crossing that are not expected to benefit from erosion or scour mitigation measures. Higher ranked, and more favourable, alternatives are further from actively migrating channel bends and are at lower risk from lateral erosion in the future. Lower ranked, and less favourable, alternatives are closer to actively migrating channel bends and are at higher risk from lateral erosion in the future. Recommendations for the relative favourability of the alternatives are provided in Table 1.

TABLE 1 Recommended Favourability of Environmental Assessment Alternatives Based on Erosion Hazard Criteria

Rank	Favourability	Alternative	Rationale
1	Most favourable	Alternative 3	Downstream; most alignment would be adjacent to Highway 401 bridge where minimal channel migration is expected based on span and maintenance of the bridge in its current and proposed locations.
2	Moderately favourable (more)	Alternative 2a	Downstream alignment would not be close to actively migrating channel bends upstream and crosses at a straight section of the channel
3	Moderately favourable	Alternative 2	Middle alignment would be moderately close to actively migrating channel bends upstream.
4	Moderately favourable (less)	Alternative 1	Upstream most alignment would be in closest proximity to actively migrating channel bends upstream.
5	Least favourable	Alternative 4	The existing sanitary trunk sewer at a higher elevation is at greatest risk from erosion and scour hazards.

2.2 Scour Hazard

The relative favourability of the EA alternatives has been ranked with reference to the previously reported scour hazard assessment by Matrix (2021). Specifically, the scour hazard ranking is based on the vertical proximity of the proposed STS alignment compared with the existing bed elevation of the Credit River channel (i.e., depth of cover) and the upstream proximity of scour pools. Higher ranked, and more favourable, alternatives have a larger depth of cover and are at lower risk from vertical scour and migrating scour pools in the future. Lower ranked, and less favourable, alternatives have a smaller depth of cover and are at higher risk from vertical scour and migrating scour pools in the future. The depth of cover for the alternatives has been approximated based on the proposed top of the sewer elevations as provided by Jacobs (158.54 ±0.01 m above sea level) and channel bed profile elevations as presented in Matrix (2021). The depth over cover for the existing 675 mm sewer crossing was estimated to be less than 0.5 m. Recommendations for the relative favourability of the alternatives are provided in Table 2.

TABLE 2 Recommended Favourability of Environmental Assessment Alternatives Based on Scour Hazard Criteria

Rank	Favourability	Alternative	Rationale
1	Most favourable	Alternative 2a	Depth of cover would be greater than 1.5 m over proposed sanitary trunk sewer (STS) and crossing would be greater than 50 m downstream of nearest migrating scour pool.
2	Moderately favourable (more)	Alternative 2	Depth of cover would be greater than 1.5 m over proposed STS and crossing would be less than 50 m downstream of nearest migrating scour pool.
3	Moderately favourable	Alternative 3	Depth of cover would be less than 1.5 m over proposed STS and crossing would be less than 50 m downstream of nearest migrating scour pool.
4	Moderately favourable (less)	Alternative 1	Depth of cover would be less than 1.5 m over proposed STS and crossing is less than 20 m downstream of nearest migrating scour pool.

Rank	Favourability	Alternative	Rationale
5	Least favourable	Alternative 4	Depth of cover is less than 0.5 m over existing STS at channel crossing and less than 50 m downstream of the nearest migrating scour pool. As such, the existing STS is at greatest risk from erosion and scour hazards.

3 SUMMARY AND LIMITATIONS

This technical memorandum provides recommendations for the favourability of the EA alternative STS alignments based on erosion and scour hazard criteria—including rationale for the rankings—but does not document further detailed analyses to support the ranking beyond what was previously submitted in fluvial geomorphology assessment report by Matrix (2021). Should further details be required to support development and ranking of the EA alternatives, additional study and analyses would be required.

The erosion hazard ranking has identified Alternative 3 as the most favourable alternative because it is closest to the Highway 401 bridge, furthest from actively migrating channel bends, and thus, is considered to be at the lowest relative risk from future lateral erosion. Alternatives 2a and 2 are considered to be more and moderately favourable, respectively, based on lateral distances between the proposed STS alignments compared to the existing and future alignments of the Credit River channel.

The scour hazard ranking has identified Alternative 2a as the most favourable alternative because the estimated depth of cover would be greater than 1.5 m over the proposed STS sewer pipe and the crossing would be greater than 50 m downstream of the nearest migrating scour pool, and thus is considered to be at the lowest relative risk from future vertical scour. Alternatives 2 and 3 are considered to be more and moderately favourable, respectively, based on relative depth of cover and distances from the nearest migrating scour pool upstream of the proposed sewer crossing location. With reference to the second comment from CVC, the above recommended ranking of scour hazard criteria does not include consideration of construction method or the advantage of Alternative 2 to with respect to removal of the existing 675 mm sewer pipe. It is expected that other criteria, including construction methods and removal of the existing sewer pipe, will be addressed by Jacobs.

4 CLOSING

We trust that this submission meets your expectations. If you have any questions or comments, please call either of the undersigned at 647.220.4846.


Yours truly,

MATRIX SOLUTIONS INC.



Roger Phillips, Ph.D., P.Geol.
Senior Geomorphologist

Reviewed by



Natasha Cyples, M.Sc., G.I.T.
Fluvial Geomorphology GIT

RP/vc
Attachment

Copy: Jimmy Thannickal, Jacobs Engineering Group Inc.

VERSION CONTROL

Version	Date	Issue Type	Filename	Description
V1.0	17-Aug-2021	Final	27896-504 Geomorph EA Alternatives 2021-08-17 final V1.0.docx	Issued to client

REFERENCES

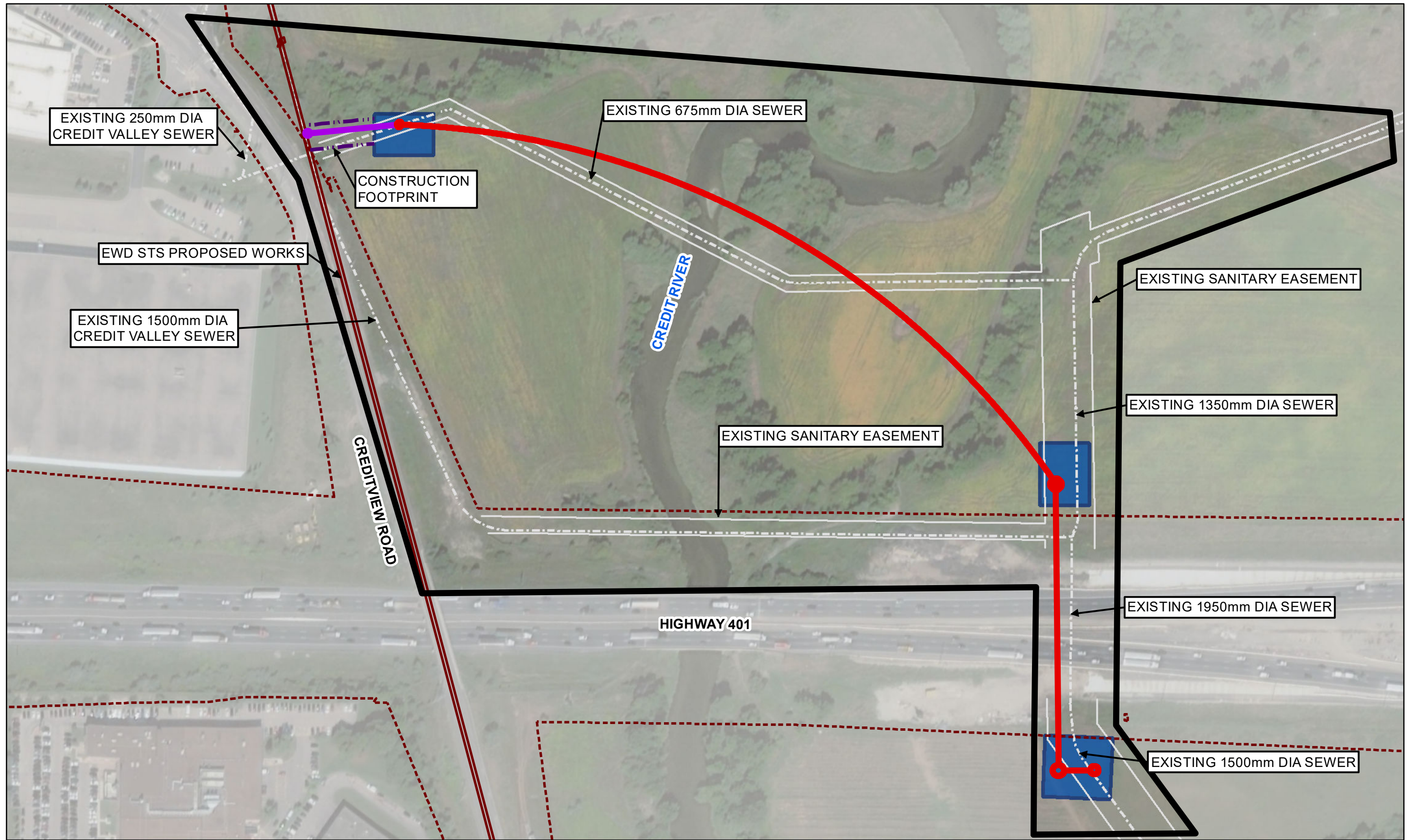
Matrix Solutions Inc. (Matrix). 2021. *Fluvial Geomorphic Assessment, Highway 401 Watermain and Sanitary Trunk Sewer Project, Region of Peel*. Version 1.0. Prepared for Jacobs Engineering Group Inc. Mississauga, Ontario. July 2021.

DISCLAIMER

Matrix Solutions Inc. certifies that this report is accurate and complete and accords with the information available during the project. Information obtained during the project or provided by third parties is believed to be accurate but is not guaranteed. Matrix Solutions Inc. has exercised reasonable skill, care, and diligence in assessing the information obtained during the preparation of this report.

This report was prepared for Jacobs Engineering Group Inc. The report may not be relied upon by any other person or entity without the written consent of Matrix Solutions Inc. and of Jacobs Engineering Group Inc. Any uses of this report by a third party, or any reliance on decisions made based on it, are the responsibility of that party. Matrix Solutions Inc. is not responsible for damages or injuries incurred by any third party, as a result of decisions made or actions taken based on this report.

APPENDIX A
Alternative Schematics

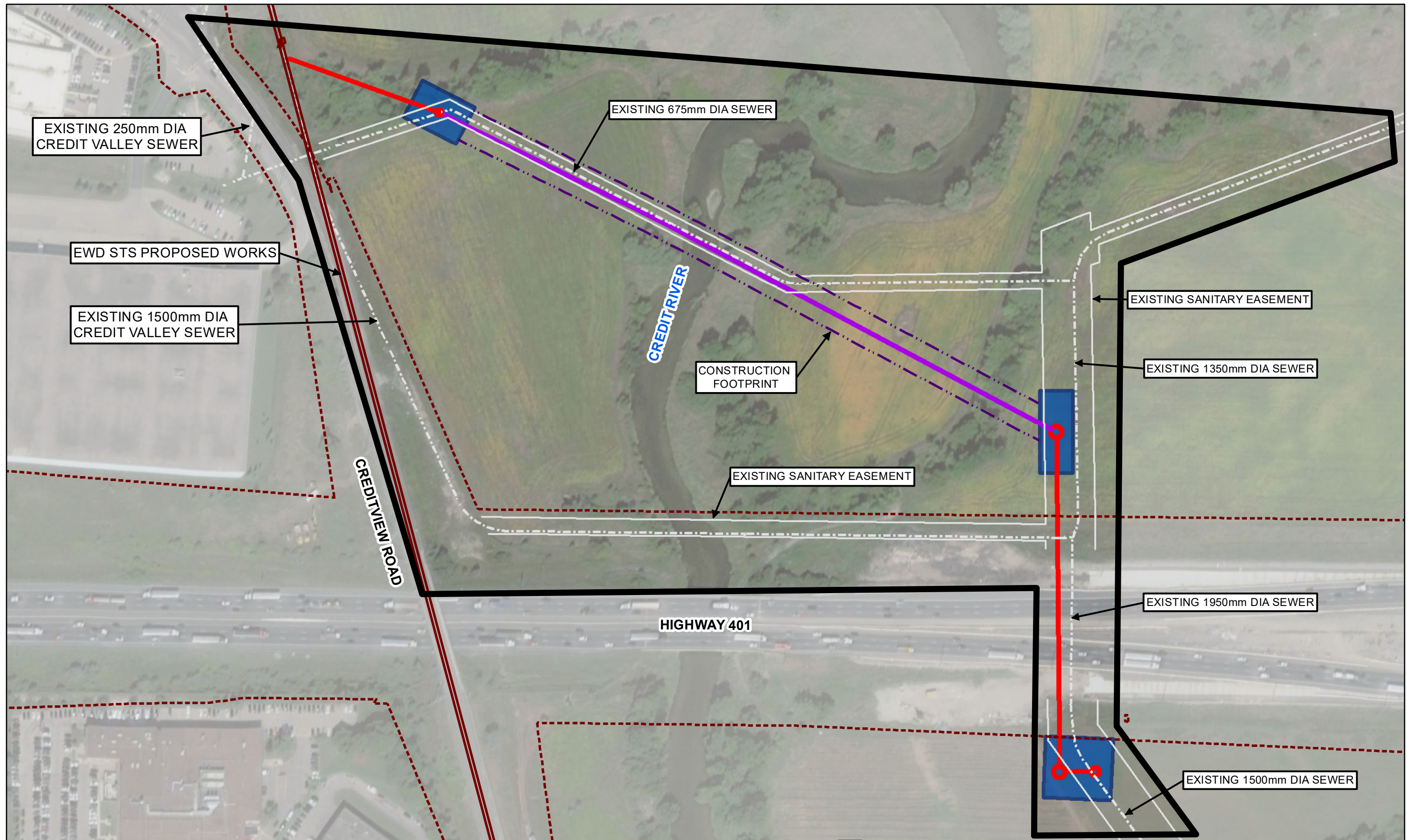


Proposed Features (Option 1)	Proposed Features from Other Projects	Existing Features	Study Area
— Open Cut	- - - MTO ROW	— Sanitary Easement	▭ Study Area
— Tunnel	— EWD STS Proposed Works	- - - Sanitary Sewer	
- - - Construction Footprint			
▭ Compound Area			

Notes:
 1. Aerial Imagery - Metro, 2018.
 2. Proposed features are approximate.

DRAFT

Figure 1
 Alternative 1 Schematic for 1500mm Trunk Sewer Realignment
 Environmental Study Report
 Region of Peel
 Mississauga, Ontario



Proposed Features (Option 2)

- Open Cut
- Tunnel
- - - Construction Footprint
- Compound Area

Proposed Features from Other Projects

- - - MTO ROW
- EWD STS Proposed Works

Existing Features

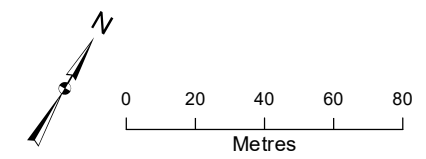
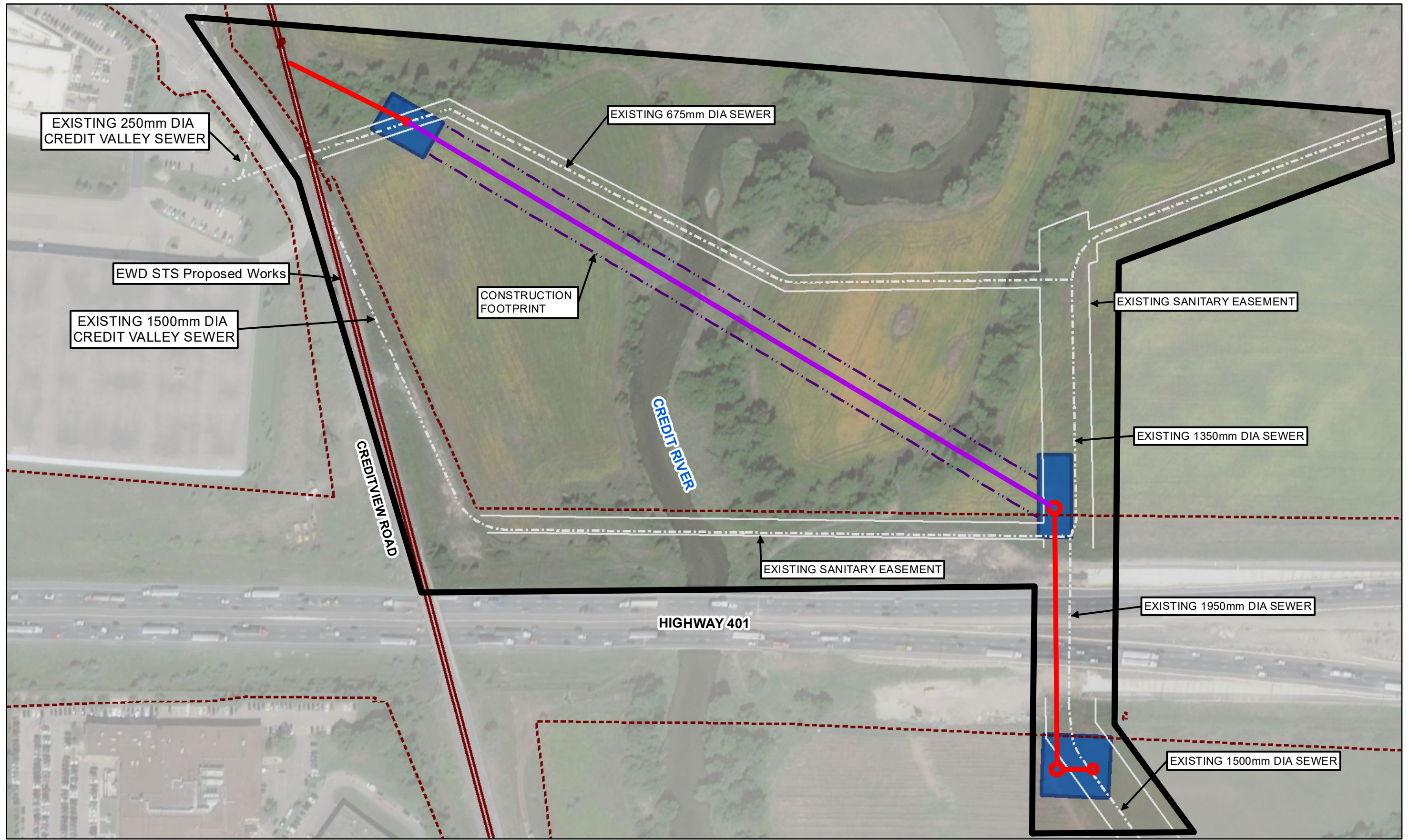
- Sanitary Easement
- - - Sanitary Sewer

Study Area

Notes:
 1. Aerial Imagery - Metro, 2018.
 2. Proposed features are approximate.

Figure 2
 Alternative 2 Schematic for 1500mm Trunk Sewer Realignment
 Environmental Study Report
 Region of Peel
 Mississauga, Ontario

DRAFT

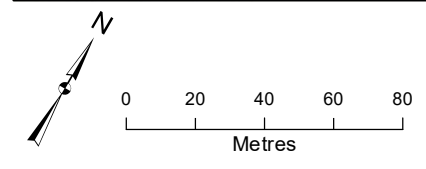
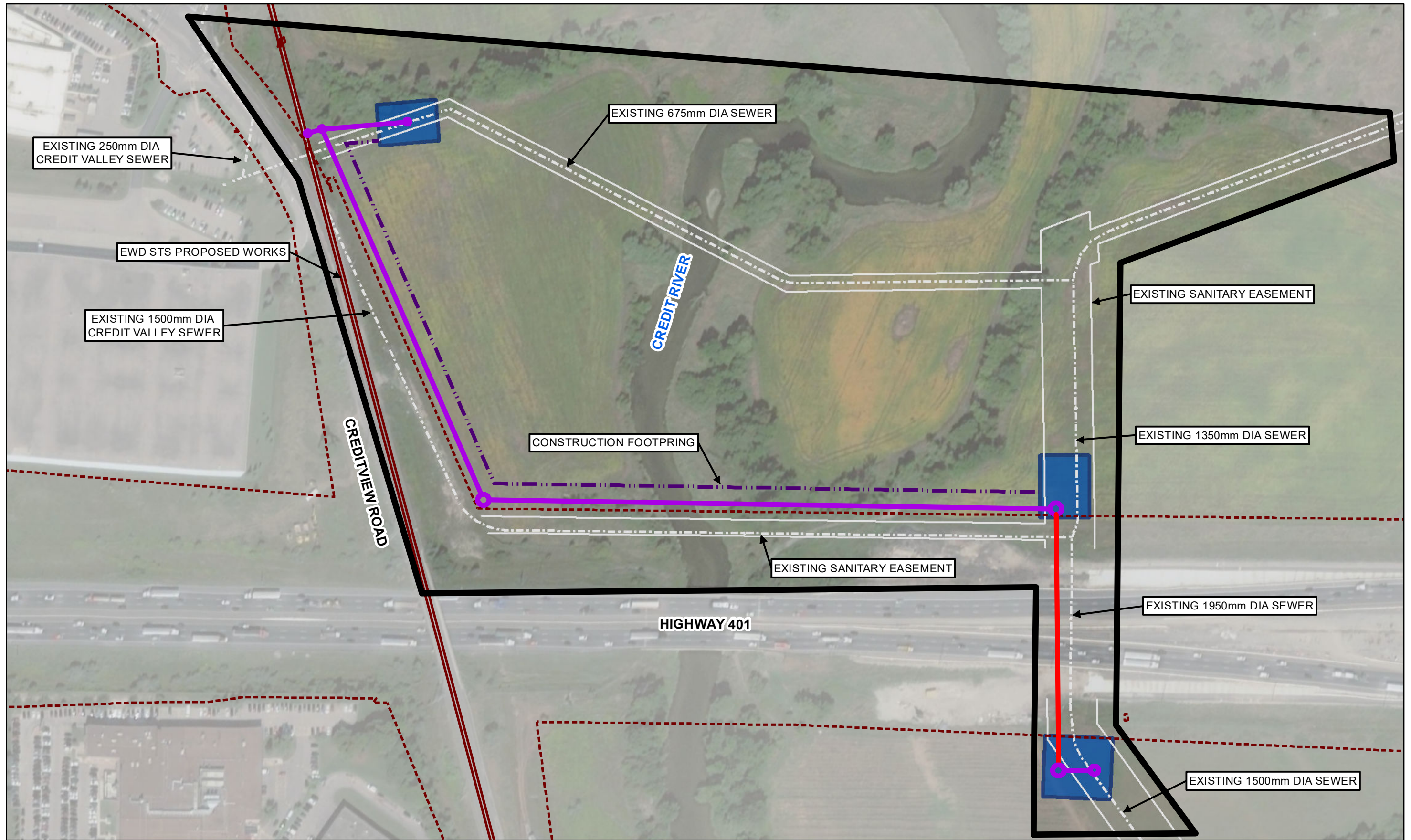


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|--|---|---|--|
| <p>Proposed Features (Option 2a)</p> <ul style="list-style-type: none"> — Open Cut — Tunnel - - - Construction Footprint ■ Compound Area | <p>Proposed Features from Other Projects</p> <ul style="list-style-type: none"> - - - MTO ROW — EWD STS Proposed Works | <p>Existing Features</p> <ul style="list-style-type: none"> — Sanitary Easement - - - Sanitary Sewer | <p> Study Area</p> |
|--|---|---|--|

Notes:
 1. Aerial Imagery - Metro, 2018.
 2. Proposed features are approximate.

DRAFT

Figure 3
 Alternative 2a Schematic for 1500mm Trunk Sewer Realignment
 Environmental Study Report
 Region of Peel
 Mississauga, Ontario

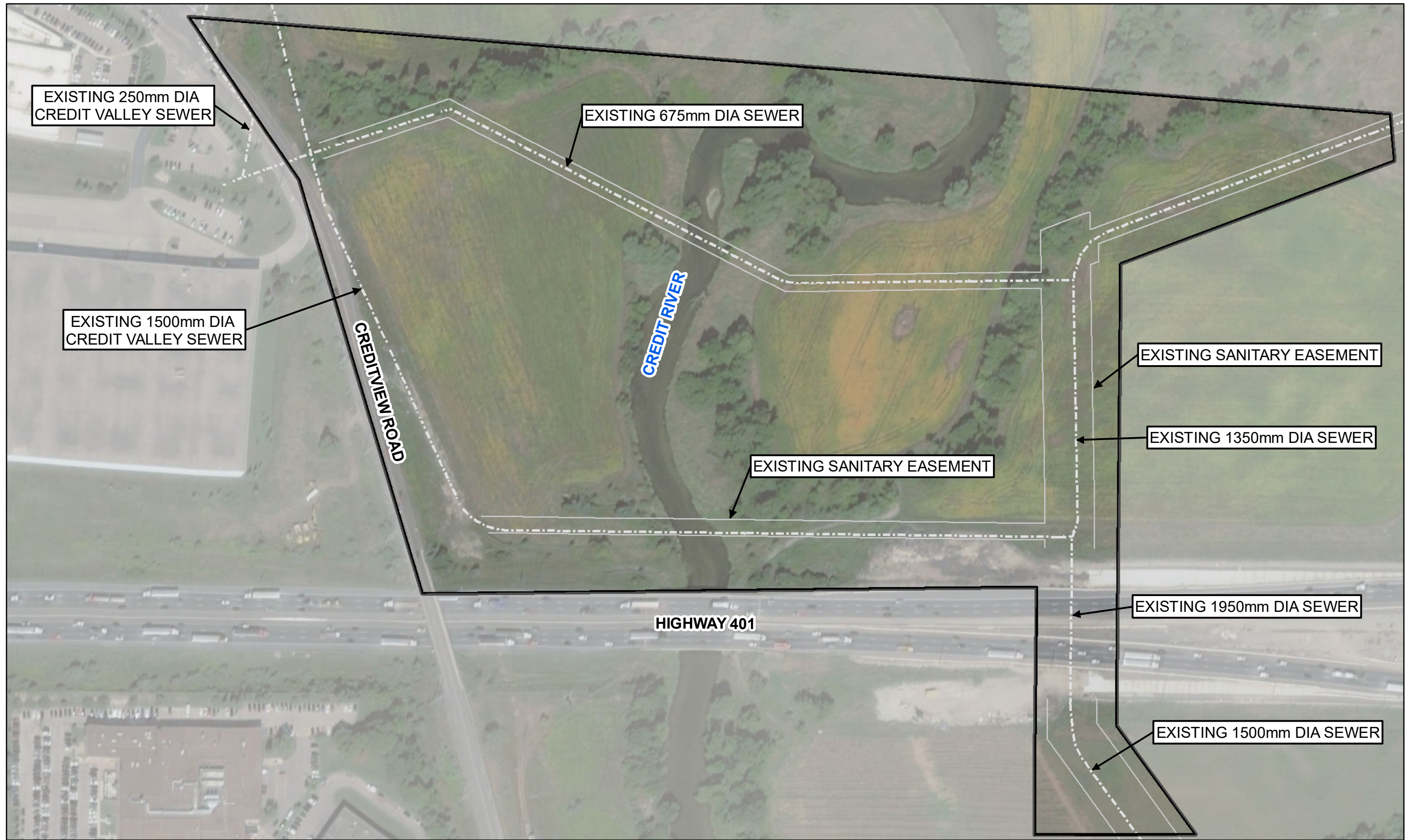


- | | | | |
|-------------------------------------|--|--------------------------|-------------------|
| Proposed Features (Option 3) | Proposed Features from Other Projects | Existing Features | Study Area |
| — Tunnel | - - - MTO ROW | — Sanitary Easement | ▭ Study Area |
| — Open Cut | — EWD STS Proposed Works | - - - Sanitary Sewer | |
| - - - Construction Footprint | | | |
| ■ Compound Area | | | |

Notes:
 1. Aerial Imagery - Metro, 2018.
 2. Proposed features are approximate.

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Figure 4
 Alternative 3 Schematic for 1500mm Trunk Sewer Realignment
 Environmental Study Report
 Region of Peel
 Mississauga, Ontario



Notes:
1. Aerial Imagery - Metro, 2018.

Figure 5
Alternative 4 Schematic for 1500mm Trunk Sewer Realignment
Environmental Study Report
Region of Peel
Mississauga, Ontario

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Criteria Development

Category-specific criteria were developed to reflect Project-specific components. A description of each criterion is presented along with the predicted measure (high, moderate, and low) that will be used to evaluate the alternatives relative to each criterion in **Table 1**.

Table 1. Evaluation Criteria







Criteria	Most Favourable 	Moderately Favourable 	Least Favourable 
Technical Environment			
Ability to address problem/opportunity statement	The alternative addresses the problem statement and introduces opportunities to enhance the solution.	The alternative addresses the problem statement.	The alternative does not address the problem statement.
Technical viability/constructability	The alternative is viable and includes preferable construction methods.	The alternative is viable but does not include preferable construction methods.	The alternative is not considered viable.
Impact on existing infrastructure and utilities	The alternative does not affect existing infrastructure or utilities during construction.	The alternative may affect existing infrastructure or utilities during construction.	The alternative will or is anticipated to affect existing infrastructure or utilities during construction.
Opportunity to coordinate other improvements	The alternative presents an opportunity to coordinate with other improvements required in the study area.	The alternative does not present an opportunity to coordinate with other improvements required in the study area.	The alternative creates additional need for improvements in the study area.
Future operations and maintenance	The alternative is easy to operate and will facilitate easy maintenance throughout operations.	The alternative will be operational standards; however, maintenance involves a higher level of planning throughout operations.	The alternative does not meet operational standards or may be difficult to maintain throughout operations.
Natural Environment			
Disturbance of terrestrial species and features (e.g., vegetation clearing)	The alternative does not affect terrestrial features, or site reclamation has a high probability of occurrence.	The alternative is considered to have minor, temporary impacts on terrestrial features where reclamation is possible.	The alternative has major impacts (i.e., high magnitude) to terrestrial features (e.g., tree clearing) or irreversible impacts (e.g., paving, permanent structures).
Disturbance to aquatic species and features	The alternative will not disturb aquatic features.	The alternative may introduce minor or temporary disturbances to aquatic features.	The alternative will have major impacts (i.e., high magnitude) on aquatic features.

Table 1. Evaluation Criteria

Criteria	Most Favourable 	Moderately Favourable 	Least Favourable 
Direct effects on terrestrial species at risk	The alternative will not have direct effects, including sensory disturbance, on terrestrial SAR.	The alternative may have minor or temporary effects on terrestrial SAR.	The alternative will have major effects (i.e., high magnitude) on SAR, or present the potential for destruction of their habitat.
Direct effects on aquatic species at risk	The alternative will not have direct effects on aquatic SAR, or effects that are routinely mitigated.	The alternative may have direct effects on aquatic habitat; however, mitigation measures and regulatory approvals are anticipated to reduce these effects.	The alternative will have major impacts (i.e., high magnitude) on aquatic SAR (e.g., death of fish, destruction of habitat), and there are no mitigation measures available to reduce these effects.
Effects on water quality or quantity (e.g., drinking water, groundwater recharge)	The alternative or its construction method are not anticipated to have effects on water quality, aside from an accident or anticipated malfunction. The alternative will not alter water quantity.	The alternative or its construction method may introduce effects to water quality or quantity.	The alternative or its construction method are known to have effects on water quality and/or quantity.
Erosion hazard	The alternative is further from actively migrating channel bends and is at lower risk from lateral erosion in the future.	The alternative is moderately far enough from actively migrating channel bends and is at moderate risk from lateral erosion in the future.	The alternative is closer to actively migrating channel bends and is at higher risk from lateral erosion in the future.
Scour hazard	The alternative has a larger depth of cover and is at a lower risk from vertical scour and migrating scour pools in the future.	The alternative has a moderate depth of cover and is at a moderate risk from vertical scour and migrating scour pools in the future.	The alternative has a smaller depth of cover and is at a higher risk from vertical scour and migrating scour pools in the future.
Socio-Cultural Environment			
Health and Safety	The alternative does not introduce health and safety issues during ongoing operations.	The alternative may introduce health and safety issues during ongoing operations.	The alternative will present health and safety issues during ongoing operations.
Noise and vibration during construction	The alternative does not generate noise during construction above existing noise sources in the area (e.g., traffic).	The alternative is moderately noisy for public receptors in the Project area.	The alternative is considered to be extremely noisy, with noise occurring 24 hours.
Air and GHG emissions during construction	The alternative does not generate or generates minimal emissions during construction.	The alternative generates air or GHG emissions within applicable standards.	The alternative generates high levels of air or GHG emissions.

Table 1. Evaluation Criteria

Criteria	Most Favourable 	Moderately Favourable 	Least Favourable 
Impacts on heritage or cultural resources	The alternative will avoid disturbance to heritage or cultural resources (known or potential).	The alternative may have minor impacts or disturbance to potential heritage or cultural resources.	The alternative will have impacts on existing and potential heritage or cultural resources.
Property acquisition and easement requirements	The alternative does not require the permanent acquisition of property; assets are placed into an existing, shared easement.	The alternative requires the acquisition of minimal property and has moderate easement requirements.	The alternative requires a large amount of property to acquire and will require a larger surface area.
Compliance with applicable planning policies, preferences, and legislature	The alternative complies with applicable planning policies and legislature and conforms to the requests of regulatory agencies.	The alternative complies with applicable planning policies and legislature.	The alternative does not comply with applicable planning policies and legislature.
Impacts on existing land use	The alternative will not have impacts on existing land use during construction or operation.	The alternative may have temporary or short-term impacts on existing land use.	The alternative will likely have impacts on existing land use.
Impacts on future land use or development	The alternative does not have any impacts on future land use or development opportunities (known or potential).	The alternative has minor impacts on future land use or development opportunities.	The alternative will restrict future land use or development opportunities.
<i>Economic Environment</i>			
Construction costs (methods and land acquisition, where applicable)	The alternative is considered economically feasible.	The alternative is more expensive compared with other feasible alternatives.	The alternative is comparably most expensive compared with other feasible alternatives.
Operation and Maintenance Costs	The alternative is considered to have relatively low O&M costs during operations.	The alternative has moderate O&M costs during operations compared to other, feasible alternatives.	The alternative will require high costs to ensure ongoing, safe maintenance during operations.

Evaluation

The results of the evaluation with the criteria from **Table 1** were applied to each of the five alternatives identified for the study. The results of the evaluation process are included in **Table 2**.

Table 2. Evaluation of Alternatives
















Evaluation Criteria	Alternative No. 1: 70 m open-cut and 640 m tunnel (500 m radius)	Alternative No. 2: 510 m open-cut and 200 m tunnel for Highway 401 crossing	Alternative No. 2A: 530 m open-cut and 155 m tunnel for Highway 401 crossing	Alternative No. 3: 600 m open-cut and 155 m tunnel for Highway 401 crossing	Alternative No. 4: Do-Nothing
<i>Technical Considerations</i>					
Ability to address problem/opportunity statement	 <p>Relocates sewer from Highway 401 road allowance, allowing for safe access to maintenance holes to support ongoing, safe operation of the CVSTS. However, 675 mm CSTS will only be decommissioned and not removed.</p>	 <p>Relocates sewer from Highway 401 road allowance, allowing for safe access to maintenance holes to support ongoing, safe operation of the CVSTS. Section of 675 mm CSTS will be removed.</p>	 <p>Relocates sewer from Highway 401 road allowance, allowing for safe access to maintenance holes to support ongoing, safe operation of the CVSTS. However, 675 mm CSTS will only be decommissioned and not removed.</p>	 <p>Relocates sewer from Highway 401 road allowance, allowing for safe access to maintenance holes to support ongoing, safe operation of the CVSTS. However, 675 mm CSTS will only be decommissioned and not removed.</p>	 <p>Sewer remains within Highway 401 road allowance, increasing complexity of accessing maintenance holes. Additionally, 675 mm CSTS will not be decommissioned or removed.</p>
Technical viability/constructability	 <p>MNRF consultation indicates that the shallow, trenchless crossing of the Credit River increases the potential for frac-outs.</p>	 <p>Open-cut construction is technically viable and is considered to be the preferable construction method at this location by the MNRF.</p>	 <p>Open-cut construction is technically viable and is considered to be the preferable construction method at this location by the MNRF.</p>	 <p>Open-cut construction is technically viable and is considered to be the preferable construction method at this location by the MNRF.</p>	 <p>This alternative is not considered viable from a technical perspective, as the sewer remains within the Highway 401 road allowance, creating complex access challenges.</p>
Impact on existing infrastructure and utilities	 <p>The radial alignment presents a potential impact to the operating 675 mm CSTS during construction due to minimal available clearance.</p>	 <p>This alternative will be placed in the existing 675 mm CSTS easement, to the extent possible, and will allow that sewer to be decommissioned and removed.</p>	 <p>This alternative is anticipated to have minimal interference with the existing 675 mm operating CSTS during construction. The existing 675 mm CSTS that will be decommissioned and left in</p>	 <p>This alternative may present a potential impact to the new Creditview Road bridge embankment. It presents a direct conflict to the 2400 mm storm trunk sewer.</p>	 <p>Proximity of sewer to Highway 401 and Creditview Bridge increases potential of damage to embankment, retaining wall, or</p>

Table 2. Evaluation of Alternatives

Evaluation Criteria	Alternative No. 1: 70 m open-cut and 640 m tunnel (500 m radius)	Alternative No. 2: 510 m open-cut and 200 m tunnel for Highway 401 crossing	Alternative No. 2A: 530 m open-cut and 155 m tunnel for Highway 401 crossing	Alternative No. 3: 600 m open-cut and 155 m tunnel for Highway 401 crossing	Alternative No. 4: Do-Nothing
			place following the CVSTS installation poses a risk.		travelled portion in the event of sewer failure.
Opportunity to coordinate other improvements	◐ Does not present an opportunity to address potential sewer exposure in the river.	● Supports removal of section of existing 675 mm CSTS that has the high potential for exposure.	◐ Does not present an opportunity to address potential sewer exposure in the river.	◐ Does not present an opportunity to address potential sewer exposure in the river.	○ Does not present an opportunity to address potential sewer exposure in the river.
Future operations and maintenance	● Supports access to sewer through location of new maintenance hole.	● Supports access to sewer through new location of new maintenance hole.	● Supports access to sewer through location of new maintenance hole.	○ Difficulty accessing the new maintenance hole near the interchange of Creditview Road and Highway 401 in the future.	○ MTO will need to restrict traffic flow along the highway for safe access to the maintenance hole.
Average Score	◐	●	◐	◐	○
Natural Environment					
Disturbance of terrestrial species and features (e.g., vegetation clearing)	● This alternative will be installed by using a trenchless method and will require the least amount of temporary work space, reducing or avoiding impacts to terrestrial features such as potential Significant Woodlands.	◐ The new sewer will require 510 m of open-cut construction, disturbing an open agricultural, dry-fresh upland deciduous forest and mineral cultural meadow. Impacts to Significant Woodlands could occur and should be assessed at the detailed design stage.	◐ The new sewer will require 530 m of open-cut construction, disturbing open agricultural, dry-fresh upland deciduous forest and mineral cultural meadow. Impacts to Significant Woodlands could occur and should be assessed at the detailed design stage.	○ The new sewer will require 600 m of open-cut construction, disturbing open agricultural, dry-fresh upland deciduous forest and mineral cultural meadow. Impacts to Significant Woodlands could occur and should be assessed at the detailed design stage.	◐ No disturbance to terrestrial species including Significant Woodlands or their habitats as there is no construction; however, because of increased complexity to access the sewer for routine maintenance and inspection, there is a risk of failure and overflow

Table 2. Evaluation of Alternatives

Evaluation Criteria	Alternative No. 1: 70 m open-cut and 640 m tunnel (500 m radius)	Alternative No. 2: 510 m open-cut and 200 m tunnel for Highway 401 crossing	Alternative No. 2A: 530 m open-cut and 155 m tunnel for Highway 401 crossing	Alternative No. 3: 600 m open-cut and 155 m tunnel for Highway 401 crossing	Alternative No. 4: Do-Nothing
Disturbance of aquatic species and features	<p style="text-align: center;">○</p> <p>Although this alternative employs trenchless construction, the shallow depth of the Credit River crossing increases the potential for frac-out and release of slurry/sediment into the river.</p>	<p style="text-align: center;">●</p> <p>Will require open-cut crossing of the Credit River and unnamed tributary; however, impact to aquatic features can be mitigated and avoids the impact of contamination from frac-out. The removal of the 675 mm CSTS avoids the potential of future exposure and resulting impact of subsequent sewer deterioration.</p>	<p style="text-align: center;">◐</p> <p>Will require open-cut crossing of the Credit River and unnamed tributary; however, impact on aquatic features can be mitigated and avoids the impact of contamination from frac-out. Potential for exposure of the 675 mm CSTS remains with the risk of impact of subsequent sewer deterioration.</p>	<p style="text-align: center;">◑</p> <p>Will require open-cut crossing of the Credit River and unnamed tributary; however, impact on aquatic features can be mitigated and avoids the impact of contamination from frac-out. Potential for exposure of the 675 mm CSTS remains with the risk of impact of subsequent sewer deterioration.</p>	<p style="text-align: center;">◑</p> <p>This alternative does not result in physical disturbance to the aquatic environment, although the potential for exposure of the 675 mm CSTS remains with the risk of impact of subsequent sewer deterioration. Further complexity to access the sewer for routine maintenance and inspection adds to the risk of failure and overflow into the natural environment.</p>
Direct effects on terrestrial species at risk	<p style="text-align: center;">◐</p> <p>Trenchless construction will minimize impact on habitats of identified terrestrial SAR; however, Project activities may be constrained during the restricted activity period for migratory birds.</p>	<p style="text-align: center;">◐</p> <p>Open-cut construction may affect habitats of terrestrial SAR; however, with appropriate mitigation, impacts are anticipated to be low magnitude and temporary. Project activities may be constrained during the restricted activity period for migratory birds.</p>	<p style="text-align: center;">◐</p> <p>Open-cut construction may affect habitats of terrestrial SAR; however, with appropriate mitigation, impacts are anticipated to be low magnitude and temporary. Project activities may be constrained during the restricted activity period for migratory birds.</p>	<p style="text-align: center;">◐</p> <p>Open-cut construction may affect habitats of terrestrial SAR; however, with appropriate mitigation, impacts are anticipated to be low magnitude and temporary. Project activities may be constrained during the</p>	<p style="text-align: center;">◑</p> <p>No disturbance to terrestrial species or their habitats, as there is no construction; however, because of increased complexity to access the sewer for routine maintenance and inspection, there is a risk of failure and overflow</p>

Table 2. Evaluation of Alternatives

Evaluation Criteria	Alternative No. 1: 70 m open-cut and 640 m tunnel (500 m radius)	Alternative No. 2: 510 m open-cut and 200 m tunnel for Highway 401 crossing	Alternative No. 2A: 530 m open-cut and 155 m tunnel for Highway 401 crossing	Alternative No. 3: 600 m open-cut and 155 m tunnel for Highway 401 crossing	Alternative No. 4: Do-Nothing
				restricted activity period for migratory birds.	into the natural environment.
Direct effects on aquatic species at risk	<p style="text-align: center;">●</p> Habitat for aquatic SAR may be affected because of the high probability of frac-out and release of slurry/sediment into the river.	<p style="text-align: center;">○</p> Habitat for aquatic SAR would be affected because of open-cut crossing of the Credit River.	<p style="text-align: center;">○</p> Habitat for aquatic SAR would be affected because of open-cut crossing of the Credit River.	<p style="text-align: center;">○</p> Habitat for aquatic SAR would be affected because of open-cut crossing of the Credit River.	<p style="text-align: center;">●</p> No disturbance to aquatic species or their habitat, as there is no construction; however, because of increased complexity to access the sewer for routine maintenance and inspection, there is a risk of failure and overflow into the natural environment.

Table 2. Evaluation of Alternatives











Evaluation Criteria	Alternative No. 1: 70 m open-cut and 640 m tunnel (500 m radius)	Alternative No. 2: 510 m open-cut and 200 m tunnel for Highway 401 crossing	Alternative No. 2A: 530 m open-cut and 155 m tunnel for Highway 401 crossing	Alternative No. 3: 600 m open-cut and 155 m tunnel for Highway 401 crossing	Alternative No. 4: Do-Nothing
Effects on water quality or quantity (e.g., groundwater recharge)	 Minimal impacts to water quality, provided that tunnelling does not result in frac-out	 Water quality may be affected during construction activities; however, it is anticipated that water flow will be isolated during construction, and water quality will be monitored for potential sedimentation impacts.	 Water quality may be affected during construction activities; however, it is anticipated that water flow will be isolated during construction, and water quality will be monitored for potential sedimentation impacts.	 Water quality may be affected during construction activities; however, it is anticipated that water flow will be isolated during construction, and water quality will be monitored for potential sedimentation impacts.	 No disturbance to natural environment, as there is no construction; however, because of increased complexity to access the sewer for routine maintenance and inspection, there is a risk of failure and overflow into the natural environment, which is a Source Water Protection area.
Erosion hazard	 Upstream most alignment would be in closest proximity to actively migrating channel bends upstream.	 Middle alignment would be moderately close to actively migrating channel bends upstream.	 Downstream alignment would not be close to actively migrating channel bends upstream and crosses at a straight section of the channel.	 Downstream; most alignment would be adjacent to Highway 401 bridge where minimal channel migration is expected based on span and maintenance of the bridge in its current and proposed locations.	 The existing sanitary trunk sewer at a higher elevation is at greatest risk from erosion and scour hazards.

Table 2. Evaluation of Alternatives
















Evaluation Criteria	Alternative No. 1: 70 m open-cut and 640 m tunnel (500 m radius)	Alternative No. 2: 510 m open-cut and 200 m tunnel for Highway 401 crossing	Alternative No. 2A: 530 m open-cut and 155 m tunnel for Highway 401 crossing	Alternative No. 3: 600 m open-cut and 155 m tunnel for Highway 401 crossing	Alternative No. 4: Do-Nothing
Scour hazard	 Depth of cover would be less than 1.5 m over proposed STS and crossing is less than 20 m downstream of nearest migrating scour pool.	 Depth of cover would be greater than 1.5 m over proposed STS and crossing would be less than 50 m downstream of nearest migrating scour pool.	 Depth of cover would be greater than 1.5 m over proposed sanitary trunk sewer (STS) and crossing could be greater than 50 m downstream of nearest migrating scour pool.	 Depth of cover would be less than 1.5 m over proposed STS and crossing would be less than 50 m downstream of nearest migrating scour pool.	 Depth of cover is less than 0.5 m over existing STS at channel crossing and less than 50 m downstream of the nearest migrating scour pool. As such, the existing STS is at greatest risk from erosion and scour hazards.
Average Score					
Socio-Cultural Environment					
Health and Safety	 Relocation of maintenance holes reduces risk of health and safety issues during ongoing operations.	 Relocation of maintenance holes reduces risk of health and safety issues during ongoing operations.	 Relocation of maintenance holes reduces risk of health and safety issues during ongoing operations.	 Risk of health and safety issues as a result of difficulty accessing the maintenance hole near the interchange of Creditview Road and Highway 401.	 Risk of health and safety issues as a result of difficulty accessing maintenance holes for ongoing operation.

Table 2. Evaluation of Alternatives

Evaluation Criteria	Alternative No. 1: 70 m open-cut and 640 m tunnel (500 m radius)	Alternative No. 2: 510 m open-cut and 200 m tunnel for Highway 401 crossing	Alternative No. 2A: 530 m open-cut and 155 m tunnel for Highway 401 crossing	Alternative No. 3: 600 m open-cut and 155 m tunnel for Highway 401 crossing	Alternative No. 4: Do-Nothing
Noise and vibration during construction	<p style="text-align: center;">○</p> <p>Trenchless construction methods (e.g., microtunnelling) will increase vibrations during construction, which may run 24 hours per day; however, there are few nearby neighbours to be affected.</p>	<p style="text-align: center;">◐</p> <p>Open-cut construction will increase noise and vibrations during regular work hours; however, there are few nearby neighbours to be affected.</p>	<p style="text-align: center;">◐</p> <p>Open-cut construction will increase noise and vibrations during regular work hours; however, there are few nearby neighbours to be affected.</p>	<p style="text-align: center;">◐</p> <p>Open-cut construction will increase noise and vibrations during regular work hours; however, there are few nearby neighbours to be affected.</p>	<p style="text-align: center;">●</p> <p>This alternative will not create noise or vibrations during construction.</p>
Air and GHG emissions during construction	<p style="text-align: center;">◐</p> <p>Trenchless construction produces few air and GHG emissions compared with open-cut construction.</p>	<p style="text-align: center;">○</p> <p>Open-cut construction produces more air and GHG emissions during construction compared with trenchless construction.</p>	<p style="text-align: center;">○</p> <p>Open-cut construction produces more air and GHG emissions during construction compared with trenchless construction.</p>	<p style="text-align: center;">○</p> <p>Open-cut construction produces more air and GHG emissions during construction compared with trenchless construction.</p>	<p style="text-align: center;">●</p> <p>There are no air or GHG emissions associated with this alternative, because there will be no construction activities.</p>

Table 2. Evaluation of Alternatives

Evaluation Criteria	Alternative No. 1: 70 m open-cut and 640 m tunnel (500 m radius)	Alternative No. 2: 510 m open-cut and 200 m tunnel for Highway 401 crossing	Alternative No. 2A: 530 m open-cut and 155 m tunnel for Highway 401 crossing	Alternative No. 3: 600 m open-cut and 155 m tunnel for Highway 401 crossing	Alternative No. 4: Do-Nothing
Impacts to heritage or cultural resources	<p>●</p> <p>The small open-cut sections are next to identified resources; mitigation will be needed. However, trenchless construction in a majority of the alignment avoids need to further assess land or disturb any unidentified resources.</p>	<p>◐</p> <p>Some open-cut sections are next to identified resources; mitigation will be needed. Partial use of the existing easement assumes any buried heritage resources would have been uncovered during original construction of that section. Remaining section outside of existing easement will need further assessment and could affect unidentified resources.</p>	<p>○</p> <p>Some open-cut sections are next to identified resources; mitigation will be needed. Remaining open-cut construction of an area previously undisturbed will require further assessment and increases the chances of uncovering buried resources.</p>	<p>○</p> <p>Some open-cut sections are next to identified resources; mitigation will be needed. Open-cut construction of an area previously undisturbed require further assessment and increases the chances of uncovering buried resources.</p>	<p>●</p> <p>This alternative does not require ground disturbance; therefore, discovering or disturbing heritage resources is unlikely.</p>
Property acquisition and easement requirements	<p>○</p> <p>A new permanent easement is required.</p>	<p>●</p> <p>This alternative will use the existing easement to the greatest extent.</p>	<p>○</p> <p>A new permanent easement is required.</p>	<p>○</p> <p>A new permanent easement is required.</p>	<p>●</p> <p>No new easement or property acquisition is required.</p>
Compliance with applicable planning policies, preferences, and legislature	<p>◐</p> <p>Preferred and acceptable option for MTO. The trenchless crossing option is not as favourable to MNRF or CVC compared with other alternatives, because there is a high probability for a frac-out.</p>	<p>●</p> <p>Preferred and acceptable option for MTO. The open-cut crossing method is preferred by MNRF and CVC to avoid high probability for a frac-out during trenchless crossing under the river.</p>	<p>●</p> <p>Preferred and acceptable option for MTO. The open-cut crossing method is preferred by MNRF and CVC to avoid high probability for a frac-out during trenchless crossing under the river.</p>	<p>◐</p> <p>Preferred and acceptable option for MTO; however, this alternative includes the maintenance hole located near the MTO right-of-way, which is not preferable for the MTO. The open-cut crossing method is preferred by MNRF and CVC to avoid high probability for a frac-</p>	<p>○</p> <p>Not acceptable by the MTO.</p>

Table 2. Evaluation of Alternatives
















Evaluation Criteria	Alternative No. 1: 70 m open-cut and 640 m tunnel (500 m radius)	Alternative No. 2: 510 m open-cut and 200 m tunnel for Highway 401 crossing	Alternative No. 2A: 530 m open-cut and 155 m tunnel for Highway 401 crossing	Alternative No. 3: 600 m open-cut and 155 m tunnel for Highway 401 crossing <i>out during trenchless crossing under the river.</i>	Alternative No. 4: Do-Nothing
Impacts to existing land use	 <p>This alternative may have impacts to agricultural activities where the compound areas are located for the duration of construction.</p>	 <p>This alternative may have impacts for the duration of construction to agricultural activities where the compound areas are located and during open-cut construction.</p>	 <p>This alternative may have impacts for the duration of construction to agricultural activities where the compound areas are located and during open-cut construction.</p>	 <p>This alternative may have impacts for the duration of construction to agricultural activities where the compound areas are located and during open-cut construction.</p>	 <p>This alternative will not have impacts on existing land use.</p>
Impacts to future land use or development	 <p>The existing 675 mm CSTS will remain in place; therefore, the existing easement will not be returned to the owner, which could affect the property's future development.</p>	 <p>Portions of the existing easement that will not be used will be returned to the owner for potential redevelopment.</p>	 <p>The existing 675 mm CSTS will remain in place; therefore, the existing easement will not be returned to the owner, which could affect the property's future development.</p>	 <p>The existing 675 mm CSTS will remain in place; therefore, the existing easement will not be returned to the owner, which could affect the property's future development.</p>	 <p>The existing 675 mm CSTS will remain in place; therefore, the existing easement will not be returned to the owner, which could affect the property's future development.</p>
Average Score					

Table 2. Evaluation of Alternatives

Evaluation Criteria	Alternative No. 1: 70 m open-cut and 640 m tunnel (500 m radius)	Alternative No. 2: 510 m open-cut and 200 m tunnel for Highway 401 crossing	Alternative No. 2A: 530 m open-cut and 155 m tunnel for Highway 401 crossing	Alternative No. 3: 600 m open-cut and 155 m tunnel for Highway 401 crossing	Alternative No. 4: Do-Nothing
<i>Economic Factors</i>					
Construction costs	○ Trenchless construction methods are generally more expensive.	● Open-cut methods are considered less expensive than trenchless methods, reducing overall construction costs.	● Open-cut methods are considered less expensive than trenchless, reducing overall construction costs.	◐ Open-cut methods are considered less expensive than trenchless methods; however, this alternative will require a longer route, which is more expensive compared with other alternatives.	● There are no construction costs associated with this alternative.
Operation and Maintenance Costs	● O&M costs are minimal, as this alternative will not require any additional measures or time to safely execute the maintenance activities.	● O&M costs are minimal, as this alternative will not require any additional measures or time to safely execute the maintenance activities.	● O&M costs are minimal, as this alternative will not require any additional measures or time to safely execute the maintenance activities.	◐ This alternative leaves the maintenance hole close to the bridge embankment, making access more difficult, resulting in higher O&M costs.	○ O&M will be significantly higher because of restricted access and the need for additional measures (e.g., safety) and time required.
Average Score	◐	●	●	◐	◐
Alternative Ranking	3	1	2	3	4

Notes:

- = Most favourable
- ◐ = Moderately favourable
- = Least favourable

DRAFT

Newton, Dorin/TOR

From: Kilis, Jakub <Jakub.Kilis@cvc.ca>
Sent: Tuesday, September 7, 2021 4:20 PM
To: Newton, Dorin/TOR
Cc: Puri, Ajay; Dhillon, Paramjit/TOR; Thannickal, Jimmy/TOR
Subject: RE: [External] RE: CVC Comments - Draft Project File - Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer - Schedule B Municipal Class EA (CVC File No EA 20/016)

Hi Dorin,

CVC staff have reviewed your responses to comments, revisions to the wording and evaluation tables, and the additional technical memo prepared for the EA stage and find these satisfactory. We have no further comments at this time.

Jakub

I'm working remotely. The best way to reach me is by email, mobile phone or Microsoft Teams.

Jakub Kilis | RPP

Senior Manager, Infrastructure and Regulations | Credit Valley Conservation

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[View our privacy statement](#)

From: Newton, Dorin/TOR <Dorin.Newton@jacobs.com>
Sent: Thursday, August 26, 2021 1:42 PM
To: Kilis, Jakub <Jakub.Kilis@cvc.ca>
Cc: Puri, Ajay <ajay.puri@peelregion.ca>; Dhillon, Paramjit/TOR <Paramjit.Dhillon@jacobs.com>; Thannickal, Jimmy/TOR <Jimmy.Thannickal@jacobs.com>
Subject: [External] RE: CVC Comments - Draft Project File - Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer - Schedule B Municipal Class EA (CVC File No EA 20/016)

[CAUTION] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe. If in doubt contact help211@cvc.ca

Good afternoon Jakub,

Thank you for the comments provided on the draft Project File. We have taken them into consideration and have revised our evaluation to address the comments. Please find attached our responses to the comments, the revised

criteria table and evaluation table (sections 3.21 and 3.22 from the Project File with revisions shown in purple text), and Matrix's TM to support the two additional criteria that have been added and scored. Please let us know if the comments have been appropriately addressed so that we can finalize our Project File for public review.

Thank you,

Dorin Newton, P.Eng., M.Eng. | [Jacobs](#) | Engineering
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From: Kilis, Jakub <Jakub.Kilis@cvc.ca>

Sent: Monday, July 12, 2021 1:44 PM

To: Newton, Dorin/TOR <Dorin.Newton@jacobs.com>

Cc: Puri, Ajay <ajay.puri@peelregion.ca>; Dhillon, Paramjit/TOR <Paramjit.Dhillon@jacobs.com>; Thannickal, Jimmy/TOR <Jimmy.Thannickal@jacobs.com>

Subject: [EXTERNAL] CVC Comments - Draft Project File - Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer - Schedule B Municipal Class EA (CVC File No EA 20/016)

Hi Dorin,

CVC staff has finalized our review of the Draft Project File and technical appendices and offer the following comments for your consideration

General

1. Under the 'Compliance with applicable planning policies, preferences, and legislature' in the evaluation table it states that the open cut methodology is preferred by CVC. That is not the case. As noted in meeting between CVC and your team CVC's preference is for trenchless crossings of natural features/watercourses. CVC reviews the list of alternatives and confirms if we can support a specific alternative based on the review of technical information and associated risks. This is the case for this project, however, it does not imply that open cut is preferred by CVC. Please reword this statement, or remove CVC from the note completely.

Engineering

2. CVC manages land containing flood hazards within CVC's jurisdiction based on the greater of the regional storm event as identified by the Province (Hurricane Hazel) or the 100-year flood. The flood determined through this calculation is the Regulatory Flood and defines the extent of the riverine flood hazard.

The preferred design alternative must not have any off-site flooding impacts during all design storms from 2-year to 100-year and Regional events, this includes during construction. The EA should state this commitment. Details of the design of any required isolation for the completion of open cut works will be confirmed during detailed design.

3. The erosion hazard limit for riverine systems is determined using the 100-year erosion rate (the average annual rate of recession extended over a hundred year time span) including allowances for toe erosion and slope stability as well as consideration for access during emergencies or for maintenance. The erosion hazard component of river and stream systems is intended to address both, erosion potential of the actual river and stream banks, as well as erosion or potential slope stability issues related to valley walls through which rivers and streams flow.

Each alternative (and ultimately sewer alignment and location) must be evaluated based on the potential impact to the erosion hazard in the ultimate condition of the sewer. This should be included in the technical evaluation criteria.

4. Scour assessment is defined as the technical and professional evaluation of the long-term risks due to potential vertical erosion and/or degradation of stream and river channels. Additional studies and work may be required to determine the potential impact to the bed of the Credit River pending the

installation approach. There are risks to both methods of installation that should be considered and incorporated into the evaluation. Each alternative provides additional considerations including the opportunities to decommission the existing sewer, the risk of exposure of the existing sewer if not removed, and the potential need for in-channel works considering natural channel design principles.

Please incorporate the above into the evaluation matrix as appropriate in order to address CVC's concerns on natural hazards due to the proposed alternative solutions.

Ecology

Significant Woodlands

5. By reasoning that the open-cut alternative is proposed to disturb Significant Woodlands, an evaluation of the extent of impact for each proposed alternative should be provided as part of the terrestrial ecosystem impacts, if applicable.
6. Avoidance, minimization, and mitigation measures should be laid out for impacts to Significant Woodlands, potentially as future reference for detailed design.

Please let me know if you'd like to discuss any of the above,
Jakub

I'm working remotely. The best way to reach me is by email, mobile phone or Microsoft Teams.

Jakub Kilis | RPP

Senior Manager, Infrastructure and Regulations | Credit Valley Conservation

905-670-1615 ext 287 | M: 647-212-6554

jakub.kilis@cvc.ca | cvc.ca



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Mississaugas of the Credit First Nation

From: Fawn Sault <Fawn.Sault@mncfn.ca>

Sent: February 17, 2021 1:32 PM

To: Puri, Ajay <ajay.puri@peelregion.ca>

Cc: Mark LaForme <Mark.LaForme@mncfn.ca>; Megan DeVries <Megan.DeVries@mncfn.ca>;
Christopher Lefebvre <CLefebvre@mncbc.ca>

Subject: 2021-0145 MCFN Response to the Class EA for the Relocation of the 1500mm Credit Valley Trunk Sewer

CAUTION: EXTERNAL MAIL. DO NOT CLICK ON LINKS OR OPEN ATTACHMENTS YOU DO NOT TRUST.

Dear Ajay,

Please see the attached letter as our response to your Class EA for the relocation of the 1500mm Credit Valley Trunk Sewer.

Miigwech,

Fawn Sault
Consultation Coordinator
Department of Consultation and Accommodation
Mississaugas of the Credit First Nation
Cell – 289-527-6580

February 17,2021

VIA EMAIL

Ajay Puri, M.E., P. Eng.
Project Manager, Capital Works
Region of Peel
Ajay.Puri@peelregion.ca

Dear Ajay,

RE: MCFN Response to the Public Notice Environmental Assessment Study
Relocation of the 1500 millimetre Credit Valley Sanitary Trunk Sewer

Confirmation of Receipt

I am writing on behalf of the Mississaugas of the Credit First Nation (“MCFN”) to acknowledge that we have received your above named communication, dated February 2,2021 .

Outline of MCFN Rights and Territory

In 1818 , the Crown and MCFN entered into Ajetance Treaty, No. 19 (1818) regarding the lands in which your project is situated.

The Mississaugas of the Credit First Nation are the descendants of the “River Credit” Mississaugas. The undisputed Territory of the MCFN is defined as a Territory commencing at Long Point on Lake Erie thence eastward along the shore of the Lake to the Niagara River. Then down the River to Lake Ontario, northward along the shore of the Lake to the River Rouge east of Toronto then up that river to the dividing ridges to the head waters of the River Thames then southward to Long Point, the place of the beginning. Our Territory encompasses the lands and waters that were used and occupied by our Ancestors. Territories are usually large tracts of land that reflect the breadth required for seasonal activities and habitation and changes in those movement patterns through time. Through Treaties with the Crown, MCFN agreed to share our Territory with newcomers. However, not all of MCFN’s Territory has been dealt with through a Treaty.



With the exception of a small part of the Credit River, our Treaties with the Crown did not deal with the water parts of our Territory. We have not agreed to share any part of our waters with settlers. We formally gave notice to the Crown of this claim in 2016. We note that any lands that have been artificially created on our waters have also not been dealt with by any Treaty.

Like our ancestors before us, we continue to use the lands, waters, and watershed ecosystems within our Territory for a variety of livelihood, harvesting, ceremonial and spiritual purposes. We have always exercised governance functions and stewardship in order to protect our Territory, conserve the fish and wildlife that depend upon it, and ensure its ongoing ability to sustain our people. We assert that our Aboriginal and treaty rights fundamentally entitle us to continue to act as stewards of our Territory, to be involved in decisions that affect it, and to participate in the ongoing, responsible management of the resources it provides.

Duty to Consult and Accommodate

As you will know, the Crown has a constitutional duty to consult and accommodate MCFN in respect of any decisions that might affect its asserted or proven Aboriginal and/or Treaty Rights. We expect that, consistent with the Crown's constitutional duty, no approval should be issued to this project until MCFN has been sufficiently consulted and accommodated. Nothing in this letter shall be construed as to affect our Aboriginal and/or Treaty Rights and hence shall not limit any consultation and accommodation owed to MCFN by the Crown or any proponent, as recognized by section 35 of the Constitution Act, 1982.

MCFN has the right to free and informed consent prior to the approval of any project or any planning decision adversely impacting its Territory and to benefit economically from resource development within its Territory.

MCFN has formed the Department of Consultation and Accommodation ("DOCA") to represent its interests in consultation and accommodation matters. It is DOCA's mandate to ensure that we are directly involved in all planning and development that impacts the integrity of our Territory. In this regard, DOCA will assess and help alleviate impacts on our rights, land claims, and ways of life by building relationships with governments and private sector proponents. We share a mutual interest in ensuring that projects in the Territory are planned, reviewed, and developed in a manner which ensures healthy communities, ecological protection, and sustainable development for present and future generations in the Territory.

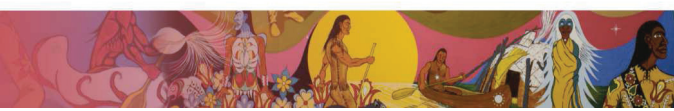


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Mississaugas of the Credit First Nation
4065 Hwy #6, Hagersville, Ontario NOA 1H0



Phone: (905) 768-4260



MCFN is not opposed to development, but MCFN must to be involved in development decision making. MCFN has a deep connection to its Territory and we have a stewardship responsibility for our land. By engaging with us, a project proponent can learn our perspective on how to care for this land and we can work together to shape the project to mitigate damaging effects to our land and perhaps even work to improve our environment. MCFN is the only party who shall determine whether there are impacts to our Aboriginal and treaty rights.

One of the ways we require proponents to engage with us is in providing transparency during the environmental survey and archaeological assessment process. The best way to accomplish this is by having Field Liaison Representatives (“FLRs”) on location while fieldwork is occurring, who can ensure that the Nation’s special interests and concerns are respected and considered during fieldwork. The cultural and natural resources in question are part of MCFN’s territory and heritage and it is our responsibility to ensure their protection, on behalf of the Nation. MCFN’s stewardship of its territory extends through the life of any development project and beyond.

DOCA Project Registration

DOCA has completed an initial intake review of the project communication you have provided. This file has been assigned DOCA Project 2021-0145 ; please use this number in all future communications.

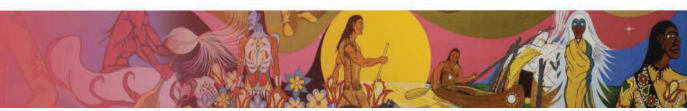
We respectfully ask you to immediately notify us if there are any changes to the project.

Referral to DOCA Units

Following DOCA’s initial intake review of the project communication, the file has been referred to the following DOCA Units for additional follow-up.

	Unit Identification	Primary Contact	Email Address
✓	Archaeology	Megan DeVries	megan.devries@mncfn.ca
✓	Cultural/Historical	Darin Wybenga	darin.wybenga@mncfn.ca
✓	Environment	Fawn Sault (Temp)	fawn.sault@mncfn.ca
✓	FLR Participation	Megan DeVries	megan.devries@mncfn.ca
	Governance	Mark LaForme	mark.laforme@mncfn.ca
	Economic Development	Director	SED.Director@mncfn.ca

If you have not been contacted by the indicated DOCA Units within fourteen days following receipt of this letter, please let me know.



Request for Missing Information

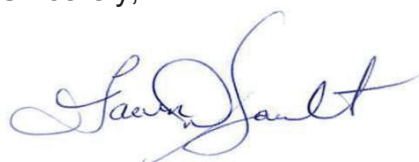
In order to proceed with our follow-up review, we ask you to ensure that all available information relating to the project has been transmitted to us. We have identified the following general information as missing from your initial project communication:

Outstanding Project Information	
✓	Name of person or body undertaking the action or decision.
✓	Contact information for the person or body undertaking the action or decision.
✓	List of documents pertaining to the proposed action/decision that are available for MCFN to review.
✓	Description of what other information is expected to become available before the proposed action/decision is undertaken.
✓	Deadlines or filing dates pertaining to the action/decision.
✓	The Crown or Municipal review/ approval that is required for the project.
✓	How the proposed action or decision may affect and/or benefit MCFN, its rights and territory.

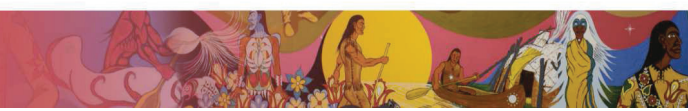
Closing

We ask that you respond with the above requested information within fourteen days following receipt of this letter. We thank you in advance for your attention to our requirements and we look forward to working with you further to shape the planning for development in our Territory.

Sincerely,



Fawn Sault
Consultation Coordinator
fawn.sault@mncfn.ca



From: Megan DeVries <Megan.DeVries@mncfn.ca>
Sent: February 23, 2021 9:00 AM
To: Fawn Sault <Fawn.Sault@mncfn.ca>; Puri, Ajay <ajay.puri@peelregion.ca>
Cc: Mark LaForme <Mark.LaForme@mncfn.ca>; Christopher Lefebvre <CLefebvre@mncbc.ca>
Subject: RE: 2021-0145 MCFN Response to the Class EA for the Relocation of the 1500mm Credit Valley Trunk Sewer

CAUTION: EXTERNAL MAIL. DO NOT CLICK ON LINKS OR OPEN ATTACHMENTS YOU DO NOT TRUST.

Good morning,

Please find attached a letter from the Mississaugas of the Credit First Nation ("MCFN") regarding the upcoming assessment for the Relocation of the Credit Valley Trunk Sewer, as identified below.

Please note that, in order to continue maintaining DOCA capacity for fulsome project participation, DOCA charges for technical review of project information. In the exercise of its stewardship responsibility, DOCA seeks to work together with project proponents and their archaeological consultants to ensure that archaeological work is done properly and respectfully. DOCA has retained technical advisers with expertise in the field of archaeology. These experts will review the technical aspects and cultural appropriateness of the archaeological assessments and strategies associated with your project. Upon completion of these reviews, MCFN will identify, if necessary, mitigation measures to address any project impacts upon MCFN rights. For cultural materials and human remains, DOCA may advise that this includes ceremonies required by Anishinaabe law, as well as request adjustments to the proposed fieldwork strategy.

The proponent is expected to pay the costs for MCFN to engage in a technical review of the project. DOCA anticipates at this time that all archaeological review will be undertaken by in-house technical experts, but will advise the proponent if an outside peer-review is required. Please find attached the agreement that covers MCFN's inhouse technical review of the archaeological assessments and strategies associated with your project(s). If you could please fill in the additional required information, highlighted in yellow, and return to us a signed copy, that would be greatly appreciated. After we have received it, we can execute the contract on our end and return the completed contract to you. Afterwards, I can arrange scheduling and other related matters directly with the consultant if you prefer.

Sincerely,
Megan.

Megan DeVries, M.A. (she/her)
Archaeological Operations Supervisor



Department of Consultation and Accommodation (DOCA)

Mississaugas of the Credit First Nation (MCFN)

4065 Highway 6 North, Hagersville, ON N0A 1H0

P: 905-768-4260 | M: 289-527-2763

<http://www.mncfn.ca>

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From: Fawn Sault

Sent: Wednesday, February 17, 2021 1:32 PM

To: Puri, Ajay <ajay.puri@peelregion.ca>

Cc: Mark LaForme <Mark.LaForme@mncfn.ca>; Megan DeVries <Megan.DeVries@mncfn.ca>;
Christopher Lefebvre <CLefebvre@mncbc.ca>

Subject: 2021-0145 MCFN Response to the Class EA for the Relocation of the 1500mm Credit Valley Trunk Sewer

Dear Ajay,

Please see the attached letter as our response to your Class EA for the relocation of the 1500mm Credit Valley Trunk Sewer.

Miigwech,

Fawn Sault
Consultation Coordinator
Department of Consultation and Accommodation
Mississaugas of the Credit First Nation
Cell – 289-527-6580

February 23,2021

VIA EMAIL

Ajay Puri, M.E., P. Eng.
Project Manager, Capital Works
Region of Peel

Dear Ajay Puri,

RE: MCFN Archaeological Review for

Relocation of the 1500 millimetre Credit Valley Sanitary Trunk Sewer

Confirmation of Receipt

I am writing in follow up to the letter of response dated February 17,2021 by Fawn Sault, Consultation Coordinator, from the Department of Consultation and Accommodation (“DOCA”) on behalf of the Mississaugas of the Credit First Nation (“MCFN”) to acknowledge that we have received your above named communication, dated February 2,2021.

Outline of MCFN Rights and Territory

In 1818, the Crown and MCFN entered into Ajetance Treaty, No. 19 (1818) regarding the lands in which your project is situated.

MCFN has formed the Department of Consultation and Accommodation (“DOCA”) to represent its interests in consultation and accommodation matters. In this regard, it is DOCA’s mandate to ensure that we are directly involved in all planning and development that impacts the integrity of our Territory. DOCA will assess and help alleviate impacts on our rights, land claims, and ways of life by building relationships with governments and private sector proponents. We share a mutual interest in ensuring that projects in the Territory are planned, reviewed, and developed in a manner which ensures healthy communities, ecological protection, and sustainable development for present and future generations in the Territory.

MCFN has a stewardship responsibility over its Territory and asserts that our Aboriginal and treaty rights fundamentally entitle us to preserve our culture and heritage, including

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Mississaugas of the Credit First Nation
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archaeological materials and human burials. Our Territory is the source of our identity as a First Nation and the basis for many cultural activities and spiritual ceremonies. It is home to sacred sites, burial grounds, traditional teachings and meeting places, and sites of profound archaeological and historical significance. We assert that our Aboriginal and treaty rights fundamentally entitle us to preserve our cultural and heritage.

Too much of our cultural objects and the remains of our ancestors have been lost already through development of the most intensely urbanized lands in Canada and we have a strong interest in ensuring that no more of it becomes bulldozed and desecrated.

MCFN Standards and Guidelines for Archaeology

In April 2018, MCFN Chief and Council adopted the *MCFN Standards and Guidelines for Archaeology*, a document aimed to provide guidance to consultant archaeologists, proponents, governments, etc. who are conducting archaeological assessment activities within MCFN's Territory. It sets out, in MCFN's own words, what engagement with our Nation should entail for archaeology as well as technical expectations for fieldwork, in relation to the provincial regulations which were created without our input and feedback. It is important to note that MCFN holds all archaeological resources present within its Territory as of interest to the Nation as part of their cultural patrimony. Resources, regardless of size, frequency, condition, etc., should not be interpreted by non-MCFN representatives in such a way as to remove the requirement for engagement with our Nation.

We are attaching a copy for your reference. We expect compliance with these *Standards and Guidelines* as any fieldwork you will be conducting will have the potential of disturbing MCFN's cultural artifacts or its ancestors' remains.

MCFN Expectations Regarding Ancestors' Remains

MCFN has obligations under Anishinaabe law to protect burials within its Territory and MCFN maintains its right to do so. Our ancestors buried their loved ones in our Territory with the understanding that they would not be disturbed.

We would also like to draw your attention to our expectation that at any time that ancestral remains are encountered during fieldwork, we expect all activities on site to stop and that MCFN be contacted immediately to determine a proper course of action.

Technical Review

In the exercise of its stewardship responsibility, DOCA seeks to work together with project proponents and their archaeological consultants to ensure that archaeological work is done properly and respectfully. DOCA has retained technical advisers with expertise in the field of archaeology. These experts will review the technical aspects and cultural appropriateness of the archaeological assessments and strategies associated with your project. Upon completion of these reviews, MCFN will identify, if



DEPARTMENT OF CONSULTATION AND ACCOMMODATION

Mississaugas of the Credit First Nation
4065 Hwy #6, Hagersville, Ontario NOA 1H0



Phone: (905) 768-4260



necessary, mitigation measures to address any project impacts upon MCFN rights. For cultural materials and human remains, DOCA may advise that this includes ceremonies required by Anishinaabe law, as well as request adjustments to the proposed fieldwork strategy.

The proponent is expected to pay the costs for MCFN to engage in a technical review of the project. DOCA anticipates at this time that all archaeological review will be undertaken by in-house technical experts, but will advise the proponent if an outside peer-review is required. Please find attached the agreement that covers MCFN's in-house technical review of the archaeological assessments and strategies associated with your project. Please fill in the additional required information, highlighted in yellow, and return to us a signed copy.

Please note that capacity at DOCA is limited. We maintain the right to review all material that comes to our office as part of our consultation process. If you have specific filing deadlines, please advise us as soon as possible. However, it is MCFN's assertion that part of the process of meaningful engagement is allowing our Nation a reasonable amount of time to review, reflect upon, and respond to reports and recommendations. On average, this process can be accomplished in 4-6 weeks. It is our position that no archaeological assessment – but especially Stage 4 mitigation – should begin until DOCA has completed our review and is in agreement that with the proposed strategy for fieldwork.

Request for Missing Information

In order to complete our project record, we ask that you provide the following information:

1. Is an archaeological assessment required for this project? If no, why not?
2. Have any archaeological assessments already been completed for this project and/or its study area? If yes, please provide all documentation including reports, supplementary documentation, etc.
3. Has the MHSTCI issued a letter of entry into register for some or all of the study area? If yes, please provide all documentation, including letter, communications to and from MHSTCI, etc.
4. Is there any archaeological activity (e.g. assessment, excavation, monitoring) that has not yet been completed for the project?
5. If the answer to #4 is yes, please provide the following:
 - a. A description of the outstanding archaeological activity/activities.
 - b. Anticipated date of the activity/activities.
 - c. The appropriate contact person overseeing the archaeological activity/activities.



Closing

The review of project-related archaeological assessments is only one part of the consultation process that may be required for your development. Please contact DOCA's Consultation Coordinator, Fawn Sault, if you have any questions about the process.

We ask that you respond with the above requested information and executed agreement within fourteen days following receipt of this letter. We thank you in advance for your attention to our requirements and we look forward to working with you further to shape the planning for development in our Territory.

Sincerely,



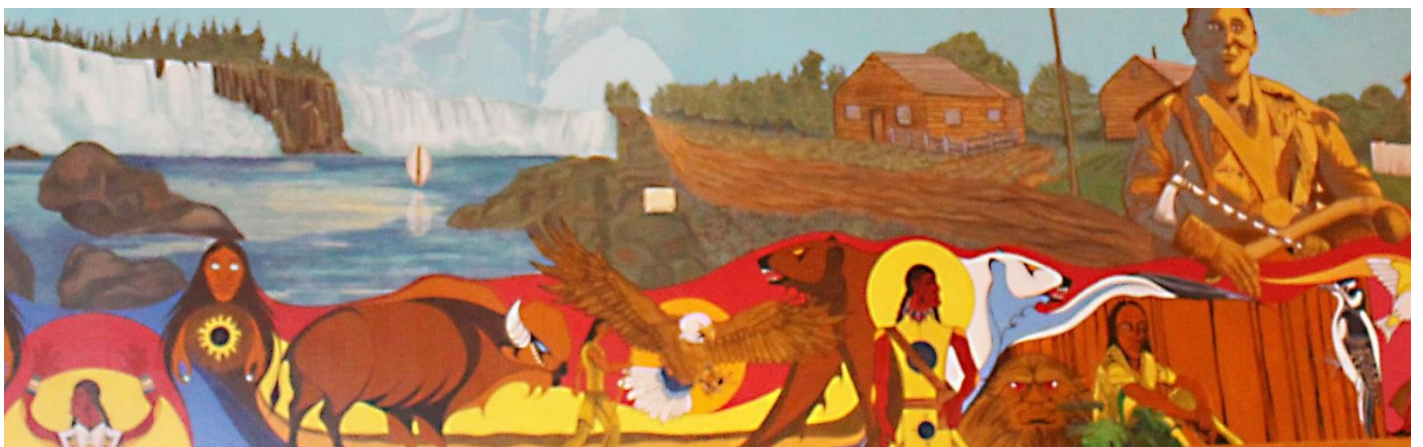
Megan DeVries
Archaeological Operations Supervisor
megan.devries@mncfn.ca

Attachment(s)	MCFN <i>Standards and Guidelines for Archaeology</i> [2018] DOCA Archaeological Review Agreement [2020]
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STANDARDS AND GUIDELINES FOR ARCHAEOLOGY



Revised February 27, 2020

MISSISSAUGAS OF THE CREDIT FIRST NATION
STANDARDS AND GUIDELINES FOR ARCHAEOLOGY

*Direction to archaeologists working on the
Treaty Lands and Traditional Territory of the
Mississaugas of the Credit First Nation.*

Prepared by the

DEPARTMENT OF CONSULTATION AND ACCOMMODATION

MISSISSAUGAS OF THE CREDIT FIRST NATION

2018

MCFN Standards and Guidelines for Archaeology

Respect for the Treaty relationship must be expressed through engagement in archaeological assessment and collaboration in the responsible stewardship of archaeological resources and cultural heritage values.

Mississaugas of the Credit First Nation (MCFN) are the traditional stewards of the land, waters and resources within the Treaty Lands and Territory. Confirmed under Treaty, this stewardship role extends to cultural and archaeological resources. This Aboriginal and Treaty right must be respected by planners, developers and archaeologists practicing in the Treaty area. Respect for the traditional stewardship role should embrace two precepts:

MCFN have the right to be consulted on archaeological practice that affects our cultural patrimony, including the interpretation of archaeological resources and recommendations for the disposition of archaeological artifacts and sites within the Treaty area, and;

Archaeological practice must include thoughtful and respectful consideration of how archaeological techniques can be used to reveal not only the data traditionally surfaced by archaeologists, but also culturally important data valued by MCFN.

Acting with respect will initiate change within contemporary archaeological assessment practice. However, the direction of this change is already embodied in existing policy direction. Restructuring the relationship between MCFN and archaeology begins with a renewed emphasis on engagement between MCFN and archaeologists, and compliance with the Standards and Guidelines that direct contemporary archaeological practice.

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1.0 Introduction

This document seeks to reinforce a number of important objectives in the emerging relationship between archaeologists and Indigenous peoples worldwide. These objectives can be achieved within the Mississaugas of the Credit First Nation (MCFN) Treaty Lands and Territory when there is a commitment by archaeologists to communicate with the First Nation, support MCFN participation in fieldwork and analysis, and to be open to opportunities for mutual education. Communication, participation and education are all rooted in the principle of respect. There must be respect for the Treaties and the rights and duties that flow from them. Respect for the Mississauga people to determine the value of their archaeological and cultural heritage, and the appropriate treatment of this heritage in archaeological assessment. Respect also extends to the existing legislation, policy, and professional standards governing archaeological practice. Respect will support the necessary growth of all Treaty partners toward a future archaeological practice that is more inclusive and expressive of the interests of the Mississauga people.

The MCFN Standards and Guidelines require that there is an ongoing and timely flow of information among everyone participating in archaeological assessment. MCFN expect the Ministry of Heritage, Sport, Tourism, and Culture Industries (MHSTCI), consultant archaeologists, development proponents, and approval authorities to be forthcoming with early notification of new projects, and to maintain open communication as work progresses, becomes stalled or where problems that do or may affect the archaeology arise. As capacity allows, MCFN will provide information, raise or address concerns, and express support for specific practices or recommendations that support our interest in the archaeological site or development property. The Department of Consultation and Accommodation (DOCA) will lead on this engagement, through the work of department staff and Field Liaison Representatives (FLRs).

MCFN must be actively engaged in archaeological assessments within the Treaty Lands and Territory area to the extent we determine is necessary. The requirements for engagement are described in the MHSTCI S&Gs, and expanded in this document to better articulate MCFN's stewardship obligations. FLRs, who are deployed to observe fieldwork, provide cultural advice, and assist with compliance in archaeological assessment, are key partners in engagement. As engagement is a requirement of the S&Gs, DOCA will reserve the option of intervening in report review if consultant archaeologists fail to fully engage MCFN during assessment.

There is a widespread belief expressed by consultant archaeologists that First Nation 'monitors' should not question the professional judgment of project archaeologists or field directors; however, this belief is based in a misunderstanding of the FLR's role. The FLR is present to represent MCFN's stewardship interest in the archaeological resources and cultural heritage values present on a property, and this role cannot be devolved to an archaeologist on the basis of academic qualification. In the field, stewardship of the archaeological resource is expressed in interaction. FLRs should be invited to participate in some aspects of fieldwork and provided with specific information on the project status, fieldwork strategies and objectives through ongoing interaction and exchange. FLRs may monitor adherence to the quantitative standards set out in MTCS direction and advice on the

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qualitative assessment of resources to provide meaningful cultural context for analysis and interpretation. On-site exchanges provide valuable opportunities for learning on diverse topics such as sampling and cultural awareness. To be clear, continuous learning is envisioned for both archaeologists and FLRs.

1.1 MCFN Standards and Guidelines for Archaeology

This document sets out the MCFN standards and guidelines for archaeology. The standards provide guidance to consultant archaeologists carrying out archaeological assessments within the MCFN Treaty Lands and Territory. They build on existing direction in the MHSTCI *Standards and Guidelines for Consultant Archaeologists (S&Gs)*, clarifying and expanding areas where the existing direction does not direct archaeologists to the levels of care required by MCFN as stewards of the resource. While primarily directed at archaeologists, they also include direction for development proponents, and provincial and municipal government agencies as participants in the archaeological assessment process.

Frequent reference is made to the MHSTCI S&Gs. The S&Gs should be read together with the guidance in this document to gain a more complete understanding of an archaeologist's obligations when practicing on the MCFN Treaty Lands and Territory.

These standards provide clarification where the S&Gs are incomplete on issues that archaeologists may encounter in their work, but are of great concern to MCFN. The principal changes include expanded direction on engagement, and a renewed focus on compliance with professional standards. The standards also discuss human remains, intangible values, and sacred and spiritual sites.

The MCFN S&Gs introduce the following clarifications:

- Human remains – the current MHSTCI S&Gs are silent on treatment of human remains, beyond referring consultants to the *Coroners Act*, and the *Funeral, Burial and Cremation Services Act* protocols. MCFN S&Gs introduce clear expectations for the treatment of all remains, including burials and isolated elements. All human remains, regardless of their nature or association with a visible evidence of a burial site, must be treated with the same high level of care. The presence of human remains on a property indicates a high likelihood of burials on the property, even if the traces of the burial have been obscured. Burials must be treated in the same manner as the legislation requires, but the discovery of any human remains should initiate these actions. FLRs will direct the disposition of remains at each site.
- Intangible values – the current S&Gs are silent on intangible values associated with archaeological sites and how they overlap with cultural heritage places. MCFN S&Gs introduce expectations that archaeological landscapes, site context, and intangible values are considered in analysis, reporting, and making recommendations for archaeological resources. This direction applies to all stages of assessment.
- Sacred and Spiritual sites – the current S&Gs require engagement to identify sacred, secret, and spiritual sites, and provide for their use in evaluating archaeological potential. The S&Gs also provide for the

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protection of these values; however, they are largely silent on how to proceed where these values are identified. As this document describes, engagement is the basis for identifying these values, defining the necessary protocols and procedures for analyzing archaeological data to identify sacred or spiritual dimensions to an archaeological site, and for developing appropriate mitigation strategies when sites of cultural importance are identified by FLRs or other band members.

One theme of these guidelines is that consultant archaeologists are asked to *do more*. This is an invitation to move beyond basic compliance to producing value-added outcomes to archaeological assessment work. When the S&Gs are simply viewed as a series of targets to hit in assessment, the potential contribution of any one assessment to increasing our understanding of the archaeology and culture history of the Treaty lands and traditional territory is diminished.

This document is organized in three sections which discuss the policy context of archaeological practice, engagement, and compliance with the S&Gs. The section on engagement discusses when and how MCFN, as stewards of the archaeological resource, should be engaged. Currently, the S&Gs identify engagement as largely optional, even at points in the process where archaeologists, proponents or approval authorities are making decisions that may infringe on Aboriginal or Treaty rights. In the guidance provided here, engagement is required at each assessment stage. Engagement is expressed as an active participation by DOCA and FLRs in property evaluations, fieldwork and analysis, and in developing recommendations on the disposition of archaeological resources.

Compliance with the S&Gs is overseen by MHSTCI through the review of archaeological assessment reports. Reports that address all relevant standards are deemed compliant. The standards – requirements that consultant archaeologists *must* follow, are “the basic technical, process and reporting requirements for conducting archaeological fieldwork”. They are the minimum acceptable levels of effort required to recover data and stabilize archaeological resources as they are lost to development pressures. MCFN’s call for better compliance with the existing standards, and the identification of new standards of practice in fieldwork and engagement, will ensure that archaeological assessment is not simply an exercise in hitting regulatory targets, but actively supports MCFN’s stewardship of the archaeological resource.

MCFN is committed to monitoring the implementation experience with these standards, and they will be updated and revised periodically as required.

1.2 Territorial Acknowledgement

Archaeological assessment reports for fieldwork within the Mississaugas of the Credit First Nation Treaty Lands and Territory should include a territorial acknowledgement, such as:

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The archaeological assessment reported here was undertaken on the Treaty Lands and Territory of the Mississaugas of the Credit.¹

Greater detail may be included in the acknowledgement, although the wording may require approval from MCFN. For example, a statement such as the following extends the acknowledgement to underscore the stewardship role of MNFN on our Treaty Lands and Territory:

We acknowledge that the archaeological fieldwork reported here was undertaken within the Treaty Lands and Territory of the Mississaugas of the Credit First Nation. The Mississaugas of the Credit First Nation are the stewards of the lands, waters and resources of their territory, including archaeological resources and cultural heritage values.

Recognition of other descendant groups who show a connection to archaeological resources within the Treaty area may also be presented following the MCFN territorial acknowledgment.

1.3 An Archaeological Perspective

Anishinabek culture resides in the land and water. It resides in people, stories, songs, memories and traditions. It resides in objects, books, reports and records. Places on the landscape hold cultural knowledge. Culture and heritage resides in, and is expressed by, the interaction of people with the land through their traditional practice.

The majority of archaeological sites in Ontario are 'pre-contact', meaning that these resources represent traditional Indigenous culture, land use and occupation exclusively. These resources mark places that are, or can be associated with traditional narratives or cultural practices. The narratives or practices may relate to specific locations, more generally to resource use, traditional work, ceremonies and cultural observance, or simply to the basic business of everyday life. Archaeological sites are places where archaeological resources – the material traces of past occupations – are located. But they are also traditional and cultural places. Archaeological resources cannot be separated from the place where they are deposited without severing the intangible connections between culture and the land. Cultural places root contemporary Mississauga culture in the land. As such, they should be viewed as still being 'in use' or 'occupied'. Working to remove the resources from the land is a significant action and must be undertaken with integrity and attention to the actual costs and consequences of this work.

Archaeological resources are finite. While it is true that new archaeological sites – the sites of the future – are being created through ongoing human use and occupation of the land, this use overwrites earlier occupations, distorting or destroying them. Ongoing use of a landscape does not restore or renew archaeological sites. Ongoing use of the landscape erases cultural and traditional places where Indigenous culture is embedded.

Archaeological practice can also distort or destroy archaeological sites. While the inventory, assessment and excavation of the resource preserve valuable archaeological data for future use and study, it can also be said that

¹ Mississaugas of the Credit Treaty Lands and Territory Recognition Statement and Logo Usage Policy, April, 2017. <http://mcfn.ca/wp-content/uploads/2017/05/treaty-lands-and-territory-statement-December-2017-a.pdf>

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archaeological practice creates a new resource that displaces the original cultural and traditional place. Archaeological resources are the raw material from which sites, artifacts and archaeological narratives are manufactured. Archaeological collections, when combined with documentation of engagement, fieldwork and analysis, represent the resource in an archaeological narrative about the site, how it was identified, excavated and interpreted. But the site is gone, and the collections and documentation provide only an incomplete picture of the cultural values that once existed in that place.

Archaeologists must remain aware that the actual resource – archaeological resources *in situ*, is diminishing and growing smaller with each excavation. One more collection means one less site in the ground. Each new site identified must be considered in this context: it is an increasingly rare thing. In the minds of many experienced archaeologists it may seem that new *archaeological* insight will be difficult to achieve from more excavation and collection at sites of a certain type. More broadly, however, new, meaningful and important *cultural* knowledge is available. Cultural knowledge can be obtained by asking new questions of the resource, although it may not be within the archaeologist's existing skill set to ask – or to answer – these questions at present.

Archaeology maintains a tight focus on material remains, and may not venture to address traditional land use or cultural patterns that are not visible in artifacts and features. But cultural and traditional insights are recoverable through alternative techniques and approaches to site investigation. These include community engagement and adopting diverse perspectives on archaeological resources, including seeking understanding of the intangible values of a place, and the consideration of sites in their wider landscape context. These insights cannot be gained by simply tacking Indigenous knowledge and narratives onto archaeological sites after the archaeological work is complete. Indigenous perspectives must be integrated into assessment and research designs from the outset.

Recognizing and holding space for MCFN's stewardship role in archaeological assessment is a critical first step in the work of reconciling the archaeologist's and the Anishinaabe perspectives on archaeology.

1.4 Policy context

The protection and conservation of archaeological resources is enacted through a range of law and policy in Ontario. Principal among these is the Ontario Heritage Act, which regulates archaeological practice and archaeological resource protection. Additional protection is provided under a range of other legislation and policy that governs specific areas of development planning, such as the Planning Act and the Environmental Assessment Act.

Archaeology law is primarily directed to the material aspects of archaeology, such as archaeological sites and artifacts. Guided by applicable statute and policy, the assessment, protection and excavation of archaeological sites impact real property, and generate collections of material objects that are held, in trust, for future generations of scholars and citizens. However, when viewed as property, archaeological site protection can reduce the nature, contents and meaning of archaeological sites to the material remains alone. To many descendant groups

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archaeological and cultural heritage sites contain much more than material resources, including traditional, cultural, sacred, and spiritual values that are difficult, if not impossible to capture using standard archaeological techniques. In this way, statute and policy governing interaction with archaeological resources are deficient to the extent that they do not recognize and protect the full array of cultural heritage values that reside in the sites, artifacts, and places that mark past occupation of the land. It is notable that there is no comparable statute or policy – apart from policy direction concerning human remains, that addresses Indigenous interests in archaeological resources and cultural heritage values.

1.4.1 Ontario Heritage Act

Under the Ontario Heritage Act, archaeological resources are all of the material traces of past human occupation or use of a place, while archaeological sites and artifacts are a subset of these resources, specifically those which hold cultural heritage value or interest (CHVI). Criteria for determining CHVI of archaeological resources are presented in the *Standards and Guidelines for Consulting Archaeologists (S&Gs)*.

The Ontario Heritage Act (OHA)² defines and sets out the measures required conserving the heritage resources of Ontario. Archaeological practice and access to archaeological resources is regulated under the terms of the Act, regulations to the Act, terms and conditions of licensing, and standards and guidelines developed by MHSTCI. Achieving the conservation objectives of the Act is a shared responsibility between the ministry and other regulatory agencies. Archaeological practice is regulated directly by MHSTCI, while regulatory review of development proposals by other agencies to ‘trigger’ archaeological assessments is directed by policy created under the authority of other statute, such as the Environmental Assessment Act, Planning Act, and Aggregates Resources Act, among others.

The conservation of resources of archaeological value³ is described in Part VI (Sections 47 to 66) of the Act, and concerns two categories of activity: archaeological practice, and archaeological site alteration. The OHA views these two categories as linked: a licence is required to alter a site, and alteration without a license is a violation of the Act. Thus, the regulatory mechanism for achieving archaeological resource conservation is through the regulation of practice.

Preparing and submitting reports of archaeological fieldwork is a key condition of licensing. Apart from the preservation of artifacts, the primary public benefit arising from archaeology is the creation of archaeological reports and data. Section 65.1(1) of the Act stipulates that reports prepared under license are entered into the Ontario Public Register of Archaeological Reports (the Register). In Section 66, the Act states that the minister may

² RSO 1990, c. O18

³ Resources of archaeological value are described in Regulations to the Act. However, Part VI defines “property” as “real property, but does not include buildings or structures other than ruins, burial mounds, petroglyphs and earthworks” (R.S.O. 1990, c. O.18, s. 47.). In this definition two site types which include intangible cultural value, (petroglyphs [a representational form created using an arrangement of stones on the ground] and burial mounds), are identified as archaeological sites.

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direct archaeological collections to a public institution, “held in trust for the people of Ontario”. While the Act identifies the province as stewards of the archaeological resource, it is silent on the question of ownership.

Archaeological resources are generally considered objects that can be transported (easily) from one location to another. The resource is not directly defined in the text of the Act; however, in Section 47 a distinction is drawn between types of heritage property, real properties exclusive of “buildings or structures other than ruins, burial mounds, petroglyphs and earthworks”. Since structures and buildings are the concern of Part IV and V of the Act, ruins, burial mounds, petroglyphs and earthworks remain behind as archaeological resources. Ontario Regulation 170/04 defines an archaeological site as “any property that contains an artifact or any other physical evidence of past human use or activity that is of cultural heritage value or interest”. Artifacts are defined as “any object, material or substance that is made, modified, used, deposited or affected by human action and is of cultural heritage value or interest” (O. Reg. 170/04, s. 1). The inclusion of burial mounds and petroglyphs as archaeological sites signals that the boundaries between archaeology and cultural, sacred or spiritual places are less distinct than the Act presents. For this reason, this document refers to both archaeological resources and cultural heritage values, which includes all of the material and intangible values present at archaeological sites and other places of cultural significance.

1.4.2 Other legislation

Human remains are to be expected in a range of archaeological contexts, including habitation sites and as isolated graves. Laws pertaining to human remains include the Coroners Act,⁴ the Funeral, Burial and Cremation Services Act,⁵ and the Ontario Heritage Act. Buried human remains are within the jurisdiction of the Registrar of Cemeteries, authorized under the Funeral, Burial and Cremation Services Act. By locating concern for human remains outside of the Ontario Heritage Act the law acknowledges that human remains are not archaeological resources and require special treatment and handling upon discovery.

The Funeral, Burial and Cremation Services Act requires any person who uncovers a burial containing human remains to immediately stop work and contact the appropriate authorities, such as the police or Coroner. The Coroner, authorized under the Coroners Act, will determine whether the person whose remains were discovered died under any of the circumstances set out in Section 10 of the Coroners Act. If the remains or burial is determined to be of no forensic interest, control of the process returns to the Registrar of Cemeteries, who then determines the origin of the burial site, and declares the site to be an aboriginal people’s burial ground, a burial ground, or an irregular burial site.⁶ Upon making the declaration, a site disposition agreement is negotiated among representatives of the landowner and the deceased. MCFN, as stewards of the archaeological resources and cultural heritage values of the Treaty area, would be party to the disposition agreement as a representative of

⁴ R.S.O. 1990, c. C.37

⁵ S.O. 2002, Chapter 33

⁶ S.O. 2002, Chapter 33, c. 34

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the deceased. Disinterment of human remains under the terms of a site disposition agreement must be completed by a licensed archaeologist.

Development planning is addressed in a number of provincial laws. The Planning Act ⁷ directs the development of land by ensuring, among other things, that land use planning is led by provincial policy, and that matters of provincial interest are considered in planning. The Act directs that planning will be conducted with “regard to, among other things... the conservation of features of significant architectural, cultural, historical, archaeological or scientific interest” (Section 2(d)). Cultural, historical and archaeological features extend the range of elements that approval authorities and developers must have regard to, including a range of cultural heritage values of interest to MCFN. The Act also empowers local authorities to make by-laws prohibiting development on properties containing significant archaeological resources (Section 34), allowing for avoidance and long term protection.

The Planning Act seeks to ensure that ‘various interests’ are considered in planning, and devolves the responsibility for planning decisions to accountable municipal authorities, although the overall authority of the Minister remains intact. Under regulations to the Planning Act, a complete application for subdivision must include information on the archaeological potential of the property, and a determination of whether any restrictions on development related to archaeological resources exist. Where development is permitted, properties with archaeological potential also require a completed archaeological assessment, and a conservation plan for any archaeological resources identified in the assessment (O.Reg. 544/06, Sched. 1). Generally, a draft plan is initially submitted, and archaeological assessment is completed prior to final plan submission. The timing of the archaeological work is not defined in the Act or Regulation, nor is the excavation and removal of the site from the property part of this direction. It is reasonable to assume that the evaluation of archaeological potential, archaeological assessment, and decisions concerning the disposition of archaeological resources on a development property should actively involve MCFN.

The Environmental Assessment Act (R.S.O. 1990 Chapter E.18) provides for the wise management of the environment in Ontario. It is the principle legislative process for major development that does not primarily involve the subdivision of land or extraction of a specific resource. Under the Act, the environment includes the social environment, including “social, economic and cultural conditions”, and “any building, structure, machine or other device or thing made by humans” (R.S.O. 1990 Chapter E.18, s. 1(1)). Class environmental assessments may be declared where development of a number of projects are planned or anticipated, and where the planning and anticipated effects are generally similar. Each environmental assessment or project under a class environmental assessment must address terms and conditions to approval, which include requirements to complete an archaeological assessment, and identify conservation measures for any archaeological resources identified within the project area. The Act also requires that the proponent consult “with such persons as may be interested” in the undertaking when preparing the Terms of Reference.

⁷ R.S.O. 1990, c. P.13

2.0 Engagement

The MCFN *Consultation and Accommodation Protocol*⁸ sets out expectations for engagement in archaeological assessment. The Protocol describes the MCFN stewardship of archaeological resources and cultural heritage values, and unequivocally asserts “that our Aboriginal and Treaty rights fundamentally entitle us to preserve our culture and heritage”. The Protocol further clarifies that DOCA is the body that leads all engagement, and that “MCFN expects to be engaged with the Crown and/or Proponents early in the project development and assessment process”. The Protocol also states that “MCFN is the only party who shall determine whether there are impacts on out Aboriginal or Treaty rights”. The last point is especially important in relation to evaluating archaeological potential, determining cultural heritage value or interest, and formulating Stage 4 mitigation strategies. Neither licensing nor the technical work of archaeological assessment grants to a consultant archaeologist the privilege of speaking on behalf of the First Nation regarding actual or potential development impacts to archaeological or cultural resources.

Engagement is the key to successful archaeological assessment. For archaeological assessment projects on the Treaty Lands and Territory, early and ongoing engagement is expected. Engagement is necessary at all stages of archaeological assessment, and extends to the period before and after an assessment is formally constituted. The requirement to engage is not limited to the consultant archaeologist, but includes approval authorities, proponents and others who may make decisions that hold the potential to infringe on the Aboriginal or Treaty rights of MCFN. Engagement in archaeological assessment may be viewed as an aspect of consultation, but does not relieve the Crown of its duty to consult and accommodate MCFN on the development project.

In conformance with the MHSTCI Bulletin, *Engaging Aboriginal Communities in Archaeology*, MCFN will determine the form for engagement.

Positive, collaborative engagement is more than a data exchange or transfer of information from MCFN to the archaeologist. Rather, it is a means of developing relations of trust among all parties to the development project that continue throughout the span of an assessment, and may carry over into subsequent projects. In this document, engagement requirements exceed the standards described in the MHSTCI S&Gs. Some consultant archaeologists may wish to engage only at Stage 3, as required by the S&Gs; however, as set out in the following section, engagement is a cumulative process and allowing engagement responsibilities to accumulate until Stage 3 may lead to unanticipated delays in project timelines. Late engagement may oblige DOCA to schedule extra time to review earlier fieldwork results and recommendations to ensure that MCFN stewardship concerns have been addressed before moving to engagement on Stage 3 questions.

The S&Gs require that the engagement process and outcomes must be summarized in an Aboriginal engagement report, a required part of each assessment report. These reports may be audited by DOCA to ensure that they

⁸ Department of Consultation and Accommodation. n.d. *Consultation and Accommodation Protocol*. Mississaugas of the Credit First Nation, Hagersville.

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conform to DOCA's records of engagement. Serious shortcomings in engagement or inaccuracies in the Aboriginal engagement report may be referred to MHSTCI with a request that the report be flagged for detailed review or revision.

2.1 Engagement in Archaeological Assessment

Archaeological assessment proceeds from the review of the original development proposal, through to the final decisions on the mitigation of development impacts and the long term curation of collections. Engagement will ensure that important cultural considerations are incorporated into fieldwork and analysis, and the recommendations that are offered for development properties and archaeological sites.

The format of this section follows the general sequence of actions undertaken for a typical development project, including the four formal stages of archaeological assessment. The timing and nature of engagement through this sequence is highlighted and discussed. Note that MCFN expect engagement throughout this planning and assessment process.

2.1.1 Project concept and planning stage

This task primarily involves the proponent and the approval authority.

Most land-use planning and development processes in Ontario identify the conservation of archaeological resources as a provincial interest. A completed archaeological assessment, including a compliance review by MHSTCI, is a common condition of project approval and is rarely a 'late addition' to the list of required studies. Since archaeological assessment can be anticipated as a requirement of approval, DOCA notification should be an essential and automatic early phase activity for approval authorities and proponents.

Proponents should engage with DOCA to introduce the project, and identify the proposed schedule for background studies, archaeological assessment, site preparation and their anticipated start of construction. DOCA review of the project concept will allow approval authorities and development proponent's time to evaluate the anticipated impacts of the project relative to Aboriginal and Treaty rights. Project redesign, where necessary, will also be simpler at this early stage. Notification to DOCA should, at a minimum, include basic information on the proposed development, including the type of development and the associated regulatory process, project location, proponent identity and contact information, and any key milestones in the project plan. Early and ongoing contact with DOCA will aid in building positive working relationships that will benefit the proponent going forward.

Approval authorities can facilitate positive engagement by including DOCA notification as standard practice, and advising proponents to communicate with DOCA early in the process.

Of equal importance, the MHSTCI S&Gs reference the MHSTCI "Criteria for Evaluating Archaeological Potential" checklist, which was developed for non-specialists such as approval authority staff. A completed checklist is meant to provide planners with a basic tool for evaluating archaeological potential of a development property. The checklist includes a number of considerations that cannot be addressed using only cartographic information,

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registered archaeological site data or knowledge of local history. Approval authority staff responsible for completing the checklist must engage DOCA for input concerning points 5, 6, 7, 9 and 11 of the checklist, at a minimum, to ensure that the checklist is completed comprehensively.

2.1.2 Project award / Filing a PIF

This task primarily involves the consultant archaeologist and MHSTCI.

Project Information Forms (PIF) is required by MHSTCI to track archaeological fieldwork. A PIF must be submitted at least 5 days, but no more than 15 business days before the start of fieldwork, as stated on the form. All PIFs are processed, and a file number assigned, within 5 business days of receipt.

Filing a PIF with the ministry is a term and condition of licensing. The PIF file number is used by the ministry to track archaeological fieldwork, and sets the dates for report submission. A completed PIF includes the project location, and identifies the approval authority and proponent. The S&Gs note that the PIF must be received by the ministry, and a PIF number assigned before fieldwork begins (S&Gs 7.1, s.1).

At the time that a PIF is submitted, notice should also be made to DOCA, providing the information contained in the PIF application, including the proposed start date for fieldwork, location of the subject property, and the name and contact information of the proponent and approval authority staff. This information will allow DOCA to open a file on the project, and assist in managing engagement, workflow and FLR deployment.

DOCA will work toward an agreement with MHSTCI to ensure that accurate PIF information for archaeological assessment projects proposed for the Treaty area is transmitted to DOCA in a timely manner. DOCA may advise MHSTCI of PIFs that have or appear to have been incorrectly filed in advance of the 15 day window, or where engagement has not been initiated by a licensee.

DOCA staff will determine whether the potential impact of the proposed development will be high or low. For low impact projects, information sharing may be sufficient. For high impact projects, high impact undertakings, DOCA work directly with the proponent to determine the requirement for FLRs during the fieldwork portion of the archaeological assessment, and identify accommodation requirements to protect Aboriginal and Treaty rights relating to archaeological resources and cultural heritage values.

2.1.3 Stage 1 Background study and evaluation of potential

This task primarily involves the consultant archaeologist and the proponent.

Engagement at Stage 1 is required. The guidelines (Section 1.1, guideline 1, bullet 3, and Section 1.4.1, guideline 1), should be treated as standards for the purposes of Stage 1 assessment within MCFN Treaty Lands and Territory. The basis for this is the requirement for engagement at Stage 3, as described in Section 3.4, s. 2 of the S&Gs, which states:

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Aboriginal communities must be engaged when assessing the cultural heritage value or interest of an Aboriginal archaeological site that is known or appears to have sacred or spiritual importance, or is associated with traditional land uses or geographic features of cultural heritage interest, or is the subject of Aboriginal oral histories. This will have been determined through background research in Stage 1, detailed documentary research on the land use and occupation history early in Stage 3, and/or analysis of artifacts and other information recovered through archaeological field work.

In this standard, information on a range of traditional and cultural concerns is identified as the basis for decision-making, and this information is noted as having "...been determined through background research in Stage 1". MCFN is the only party who can determine if a property holds cultural heritage value or interest based on the criteria expressed in the standard. The Stage 3 standard refers to actions taken and information gathered during Stage 1. From this, it is clear that the process of evaluating the CHVI of an archaeological site is an ongoing process that begins in Stage 1. This process must actively engage MCFN participation.

For properties with archaeological potential, Stage 2 property assessment is required (Section 1.3, s. 1). In some cases, the consultant may recommend reducing the Stage 2 fieldwork requirements based on the evaluation of low potential on parts of the development property (Section 1.4.1, guideline 1). A guideline to this section recommends engagement "to ensure that there are no unaddressed Aboriginal cultural heritage interests", which would necessarily require engagement. The results of engagement may also lead to the expansion of the area of Stage 2 fieldwork. The MHSTCI Aboriginal Engagement Bulletin suggests that one method of addressing community interest in a development property is to "extend a Stage 2 survey to include lands that have been identified as of interest to the Aboriginal community, even though those lands may have low potential".⁹ For this to happen, engagement must be undertaken, and a clear understanding of the nature of the interest, and appropriate techniques to address them must be achieved prior to fieldwork.

A copy of the Stage 1 assessment report, including the Aboriginal engagement report, must be provided to DOCA at the time it is submitted to MHSTCI for review. DOCA may review the report for accuracy, and transmit the result of this review to MHSTCI.

2.1.4 Stage 2 Property Assessment

This task primarily involves the consultant archaeologist and proponent.

Stage 2 is directed towards identifying all of the archaeological resources present on the development property. Engagement at Stage 2 includes the participation of FLRs in fieldwork. DOCA, and FLRs funded by the proponent, will work with the consultant archaeologist to represent MCFN's stewardship interest, to support compliance with the S&Gs Section 2.1, and to provide advice and information on cultural heritage values.

⁹ MHSTCI. 2011. Engaging Aboriginal Communities in Archaeology: A draft technical Bulletin for consultant archaeologists in Ontario. Ministry of Tourism and Culture, Toronto.

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Engagement must include providing a daily briefing to FLRs ('tailgate talk') outlining the work schedule for the day in the context of the overall assessment, and a summary review at the end of each work day. Allowance for FLRs to record finds, unusual or diagnostic artifacts, and related information should be made throughout the workday. Information sharing builds relations of trust, and demonstrates respect for the FLR's role in the assessment.

For sites with human remains (Section 2.2, s. 2(e)), engagement will be a required part of the on-site interaction with the FLRs. FLRs will provide direction regarding the handling and disposition of the remains.

In Section 2.2, the S&Gs recommend that consultant archaeologists engage on two questions: if the Aboriginal interest in archaeological resources found during Stage 2 is correctly determined and if there are no other Aboriginal archaeological interests in the subject property. The engagement described in Section 2.2, guideline 1 of the S&Gs must be treated as a standard. DOCA must be engaged regarding the analysis of the Stage 2 fieldwork results.

It is also important to remember that the fieldwork and analysis at Stage 2 leads to the separation of 'artifacts' and 'archaeological sites' from among the archaeological resources identified on the subject property. Stage 3 assessment is only required for sites holding CHVI, and all other resources may be considered sufficiently assessed and documented.

It is important that at MCFN interests are addressed before making final decisions concerning the CHVI of archaeological resources. DOCA must be engaged when determining Stage 3 requirements for archaeological resources identified in Stage 2 fieldwork. Section 2.2, guideline 1 must be treated as a *standard* within the Treaty Area. The guideline states, in part, that "the consultant archaeologist may engage ... Aboriginal communities to determine their interest (general or site specific) in the ... archaeological resources found during Stage 2 and to ensure there are no unaddressed ... archaeological interests connected with the land surveyed or sites identified". Engagement when determining CHVI and the requirement for further assessment at Stage 3 will ensure that the results of the assessment and the observations of the FLRs correctly reflect MCFN's role in archaeological resource stewardship.

Generally, the quantitative targets found in Section 2.2, s. 1 do not override MCFN interests regarding resources.

The outcome of Stage 2 property assessment includes the identification of all archaeological resources on the subject lands and a preliminary determination of CHVI for some archaeological sites. Reports, which should detail the basis for the conclusions and recommendations, must be provided to DOCA for review and comment. DOCA may choose to review the report, and it may be necessary to revise reports based on the review. The results of the DOCA review may also be transmitted to MHSTCI.

2.1.5 Stage 3 Site-specific assessment

Stage 3 involves the consultant archaeologist and proponent.

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Stage 3 site-specific assessment establishes the size and complexity, and CHVI of archaeological sites identified at Stage 2. The Stage 3 report includes detailed recommendations for Stage 4 mitigation of development impacts.

The S&Gs require engagement at Stage 3. Specifically, the historical documentation research required in Section 3.1, s. 1(a), 1(b) and 1(e), cannot be completed without engagement. MCFN is the only party who can determine whether an archaeological site is sacred to the Nation, and must be engaged. The limitation to engagement included in the text of the standard (research sources “when available”), should be viewed as direction to engage DOCA to confirm the availability of the information necessary to comply with Section 3.1, s. 1(b) and 1(e). Note that engagement is in addition to diligent archival, historical and online research by the consultant archaeologist.

For compliance with Section 3.4, including the application of the criteria and indicators listed in Table 3.2, engagement is required. Note that Section 3.4, s. 1(a), concerning human remains, engagement in the field at the time of discovery is required through the FLRs on-site. Section 3.4, s. 2 requires engagement in the analysis of archaeological sites, and indicates that this engagement must be the culmination of an ongoing practice between the consultant archaeologist and DOCA. Engagement throughout Stage 3 is required, and consultant archaeologists entering into a Stage 3 assessment must engage DOCA for the subject lands overall. Preferably, this engagement starts at Stage 1.

Engagement at Stage 3 also includes the participation of FLRs in fieldwork. DOCA, and FLRs funded by the proponent will work with the consultant archaeologist to represent MCFN’s stewardship interest, to support compliance with the S&Gs Sections 3.2 and 3.3, and to provide advice and information on cultural heritage values. Engagement must include providing a daily briefing to FLRs (‘tailgate talk’) outlining the day’s work objectives, progress of the assignment, and a review at the end of each work day. Allowance for recording finds, features, unusual or diagnostic artifacts, and related information should be made throughout the work day. Information sharing builds relations of trust, and demonstrates respect for the FLR’s role in the assessment.

Determining Stage 3 strategies based on direction found in Section 3.3 requires engagement with FLRs who will observe and report on compliance with the technical standards and the agreed strategy. In support of this, it is expected that the consultant archaeologists will review the Stage 2 data, and the rationale for the site being assigned to a particular Table 3.1 category with the FLRs. It is not appropriate to assume that DOCA or individual FLRs have reviewed earlier reports, or additional unreported facts that may be available to the consultant.

MCFN asserts an interest in the disposition of all archaeological sites on the Treaty Lands and Territory. Determining whether an archaeological site requires Stage 4 mitigation, and the form this mitigation will take has significant consequences for archaeological resources and cultural heritage values. For this reason, DOCA must be actively engaged in the deliberations leading to Stage 3 recommendations.

Section 3.5, s. 1 sets out the requirements for engagement when formulating Stage 4 mitigation strategies. Section 3.5, s. 1(f) requires engagement for all “sites previously identified as being of interest to an Aboriginal community”. MCFN have asserted the Aboriginal and Treaty right of stewardship of all archaeological resources and cultural

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heritage values on the Treaty Lands and Territory of MCFN, whether or not these sites are known prior to assessment. This requirement is not limited by Section 3.5, guideline 1 which suggests that engagement in planning Stage 4 mitigation strategies is discretionary. Engagement is required in developing all Stage 3 recommendations, including recommendations that a site is considered completely documented at the end of Stage 3.

The preamble to Section 3.5 notes that:

The avoidance and protection of sites is always the preferred approach to the Stage 4 mitigation of impacts to archaeological sites. Where Stage 4 is recommended, the consultant archaeologist will need to review the viability of Stage 4 protection options with the client.

While this text is not a standard under the S&Gs, it is important to note that these discussions hold the potential to infringe on the asserted Aboriginal and Treaty right of MCFN to act as stewards of the archaeological resources of the traditional and Treaty area. Therefore, DOCA must be provided the opportunity to participate in these discussions to ensure that the evaluation of the opportunities for site avoidance and protection were evaluated correctly, and to clarify the Stage 4 requirements alternatives. Where it is deemed necessary, the approval authority or relevant Crown agency should also be included in these discussions.

The outcomes of Stage 3 site-specific assessment include a determination of CHVI for all archaeological sites on the subject lands, and detailed recommendations for Stage 4 mitigation of development impacts, or that the site is fully documented and no further work is required (Section 7.9.4). Note that MCFN is the only party who can determine whether an archaeological site holds cultural heritage value beyond the archaeological value determined through Stage 3 assessment, and this recommendation must be subject to engagement. Reports, including the analysis and supporting data leading to the conclusions and recommendations, must be provided to DOCA for review. DOCA may choose to review the report, and it may be necessary to revise reports based on the review.

2.1.6 Stage 4 Mitigation of development impacts

Stage 4 involves the consultant archaeologist, proponent and the approval authority.

Stage 4 mitigation of development impacts may include either avoidance and protection (Section 4.1), or excavation and documentation (Section 4.2) of the archaeological site. In some cases a combination of avoidance and excavation (partial long term protection) is possible (Section 4.1.6).

During fieldwork, FLRs should be briefed daily on the work schedule for the day and overall progress of the assessment relative to expectations. A daily summary review at the end of each work day should be provided as well. Field directors should also advise FLRs when significant changes in fieldwork strategies are impending (such as decisions to begin mechanical topsoil stripping of a site) with as much lead time as possible. FLR work recording finds, features, and related information should be supported.

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In avoidance and protection, FLRs will attend fieldwork for setting buffers and monitoring activity near the sites as required ensuring compliance with the S&Gs and site specific agreements. In Stage 4 excavation, engagement includes the work of FLRs who will observe and report on compliance with the technical standards found in Section 4.2 during fieldwork, and any additional requirements set out in the Stage 4 recommendations. This includes specific recommendations regarding undisturbed archaeological sites (Section 4.2.9), and rare archaeological sites (Section 4.2.10). If it was not completed at Stage 3, FLRs will advise on the necessary requirements for determining the extent of excavation. FLRs will also advise on specific practices, such as handling human remains and managing artifacts in back dirt when mechanical site stripping is employed.

The S&Gs state that the outcome of Stage 4 avoidance and protection, or excavation and documentation is a final report including a detailed account of the fieldwork, artifacts and features recovered and analyzed and a statement that the archaeological site “has no further cultural heritage value or interest” (Section 7.11.4, s. 1). It is necessary to stress that MCFN is the only party who can determine whether an archaeological site holds cultural heritage value beyond the archaeological value addressed through Stage 4 excavation.

Stage 4 excavation reports must be provided to DOCA at the time it is submitted to MHSTCI for review. Based on FLR reports or other factors, DOCA may choose to review the report for accuracy or to determine if remaining cultural heritage value is correctly identified in the recommendations to the report. Where necessary, DOCA may request that the report is revised, or communicate directly with MHSTCI and the approval authority regarding a continued interest in the property or site.

2.1.7 Long Term Protection

MCFN stewardship of archaeological resources and cultural heritage values does not end with at the conclusion of the archaeological assessment. DOCA must be engaged at Stage 4 for planning and fieldwork relating to avoidance and protection. Providing the option of participating in planning long term protection strategies, will ensure that these strategies meet MCFN’s stewardship obligations and cultural expectations for the treatment of the site. This concern must be included in the long-term protection agreement / mechanism formulated under Section 4.1.4. The agreement mechanism should address access to the site for cultural purposes, and require DOCA engagement in the future whenever changes to the agreement or removal of archaeological restrictions are considered in the future.

2.1.8 Report submission and review

This task involves the consultant archaeologist, MHSTCI and approval authorities.

Reports are required for each stage of archaeological fieldwork, although Stages 1 to 3 may be combined in a single report. Archaeological assessment reports are due 12 months from the date that the PIF number was assigned. For Stage 4 reports, the report are due 18 months from the date of the PIF number was assigned. Each report submitted is screened for completeness before being accepted for review. This screening required up to 10 business days to complete, and is included within the 12 or 18 month submission period. Incomplete reports are

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returned to allow the missing information to be included. MHSTCI customer service standards allow up to 60 business days for report review. Reports that have been revised and resubmitted are reviewed within 15 days. In some circumstances, a consultant archaeologist may request expedited review of specific reports on the basis of external time pressures. Where a report is submitted and an expedited review granted, the timeline for screening is 5 business days, and review is within 20 business days of clearing screening.

The ministry does not commit to reviewing all reports received. Once report packages are screened for completeness, reports are considered 'filed' with the ministry. These reports are then either entered into the Register directly, or sent for technical review by an Archaeology Review Officer (ARO). Report review triage is based on the perceived risks that may arise to the archaeological resource by deferring review. Where higher risks of adverse impact exist, the ministry undertakes a full technical review. Filed reports may also be subject to technical review at a later date, if required.¹⁰ Regardless of review status, "mandatory standards for Aboriginal engagement remain unchanged, and [remains]... subject to ministry review. *This review includes a look at whether community feedback was considered when engagement informs the development of a mitigation strategy*" [emphasis added].¹¹

Based on the foregoing, archaeological assessment reports may be submitted and MHSTCI reviews completed more than a year after the completion of fieldwork. In cases where consultant archaeologists do not engage FLRs during fieldwork, and fail to provide information on fieldwork and copies of their reports to DOCA, this delay creates an infringement on MCFN's stewardship of the archaeological resources within the Treaty Lands and Territory by limiting our ability to participate in the disposition of archaeological resources. While engagement is not a requirement of report submission and review, it is important that MHSTCI and consultant archaeologists recognize their obligation to provide this information to MCFN, through DOCA in a timely manner. It is also important that approval authorities recognize that final decisions regarding land dispositions may fall short of the Crown's duty to consult and accommodate when the submission and review process is used to conceal information about the assessment from the First Nation.

Further, DOCA reserves the right to intercede in ministry review where DOCA believes it holds information of value to the review. This information will be communicated to MHSTCI at DOCA's discretion. This is most likely to occur where DOCA believe that critical aspects of fieldwork were non-compliant with the S&Gs, where the report does not adequately reflect MCFN's stewardship objectives, or that engagement with DOCA was inadequate or misrepresented in the report. In particular, the Aboriginal Engagement Report, required in Section 7.6.2, may be reviewed to ensure that it accurately represents the engagement completed and any agreed outcomes.

¹⁰ Additional detail is available on the MTCS website:

http://www.mtc.gov.on.ca/en/archaeology/archaeology_report_requir.shtml#developmentproponents

¹¹ http://www.mtc.gov.on.ca/en/archaeology/archaeology_report_requir.shtml#addresses

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Table 1, below, summarizes when, who and how engagement should occur in a typical archaeological assessment.

Timing	Engagement by	Form of engagement
Draft plan review	Approval authority Proponent	Information sharing Engage DOCA when applying the Criteria for Evaluating Archaeological Potential Advise DOCA of development application and project details Agreement on FLR participation in assessment
PIF	Consultant archaeologist MHSTCI	Information sharing Engage DOCA to advise on award of contact, identification of regulatory trigger, project location, proponent information, scheduled dates for fieldwork
Stage 1	Consultant archaeologist Proponent	Information sharing Engage DOCA on background study (Section 1.1, g. 1, bullet 3; Sec. 1.3.1, bullets 5 – 8; Sec. 1.4.1, g. 1) FLRs may attend Stage 1 property inspection
Stage 2	Consultant archaeologist Proponent	Facilitate FLR engagement and field review of S&G compliance, cultural inputs. Engage DOCA in review of analysis leading to proposed recommendations (Sec. 2.2, s. 1(b)(e); Section 2.2, g. 1)
Stage 3	Consultant archaeologist Proponent Approval Authority	Engage DOCA on historical documentation (Sec. 3.1, s. 1(a), 1(b) and 1(e)) Facilitate FLR engagement and field review of compliance with standards in Sections 3.2 and 3.3 Engage DOCA on Section 3.3 decisions, and analysis (Sec. 3.4, s. 1(a), s. 2, and Sec. 3.4.1, g. 1) Engage DOCA on application of criteria and indicators in Section 3.4.3, Table 3.2 Work with DOCA when formulating Stage 4 strategies (Sec. 3.5, s. 1(f), g. 1) Include DOCA in the Section 3.5 “viability review” of Stage 4 avoidance and protection options with proponent
Stage 4	Consultant archaeologist Approval Authority Proponent	Facilitate FLR engagement and field review of compliance with standards Engage DOCA on long term protection strategies, protection and cultural access considerations
Report review	MHSTCI	DOCA may advise MHSTCI of any concerns with fieldwork, engagement, reporting or recommendations DOCA may advise MHSTCI of concerns with Aboriginal engagement report.

3.0 Compliance

Stewardship of archaeological resources and cultural heritage values within the Treaty Lands and Territory includes support for the technical guidance provided in the S&Gs. In this section, existing direction in the S&Gs is presented in relation to MCFN's archaeological resource stewardship objectives. In most cases, the direction is for compliance with existing standards. In others, additional detail or new direction is offered where increased effort in archaeological assessment will benefit the archaeological resource and address MCFN concerns.

It is important to note that MCFN's stewardship of resources extends to *all* archaeological resources and cultural heritage values within the Treaty Lands and Territory, regardless of CHVI or whether or not these sites are known to archaeologists or the ministry prior to assessment. Compliance with the S&Gs requires that MCFN is engaged and afforded the opportunity to consider the cultural heritage value or interest of all archaeological resources encountered during assessment, prior to defining a subset of these resources as 'artifacts' and 'archaeological sites'.

It is also important to note that the rules set out by the Funeral, Burial and Cremation Services Act regarding human remains should not be seen as overriding MCFN's assertion that all human remains are important and sacred, and must be subject to special consideration and treatment. All remains, including those not immediately identifiable as being associated with a burial or grave location should be considered to mark interments until archaeological evidence demonstrates otherwise.

3.1 MHSTCI Standards and Guidelines Stage 1

The S&Gs state that the purpose of the Stage 1 background study and property inspection is to gather and analyze information about the geography, history and current condition of a property, and to obtain information on prior archaeological fieldwork on or adjacent to the property. This data, including field observations of current conditions, is used to evaluate archaeological potential. This evaluation provides support for recommendations requiring Stage 2 assessment of all or parts of the property, including appropriate fieldwork strategies.

A thorough understanding of the full range of potential archaeological resources and cultural heritage values that may be present on a property is impossible without engagement.

3.1.1 Section 1.1¹²

Within the Treaty area, MCFN must be engaged as part of the Stage 1 background study for all archaeological assessment projects carried out within the Treaty Area. This requires that S&Gs Section 1.1, guideline 1, bullet 3 is

¹² The subsection headings are in reference to the section of the MTCS S&Gs that are being discussed.

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treated as a *standard* within the Treaty Area. The guideline states, in part, that the background study “may also include research information from ... Aboriginal communities for information on possible traditional use areas and sacred and other sites on or around the property...” For the purpose of Stage 1 engagement, it is important to note that DOCA is not simply a source of research information, but should be viewed as a partner to the development of a comprehensive background study for the archaeological assessment.

In order to develop this partnership, consultants conducting background research on a property should conduct thorough documentary research at Stage 1. This may result in research products that not only address the requirements of the S&Gs, but also make a positive contribution to archaeological and cultural heritage research within the Treaty Area. This contribution may be in various forms, including new insight into archaeological research, historical occupations, or Anishinaabe place names on or near the subject lands.

For the purpose of developing a reasonable perspective on cultural practices and traditional use overlying the subject property it may be necessary to take a broader view of the surrounding landscape for context. For example, areas where numerous small archaeological sites have been recorded may need to be evaluated in aggregate within the wider landscape to determine if they are arrayed along a travel route. Similarly, areas of low site density within wider landscapes of generally high densities should be evaluated to determine whether the distribution is based on the quality of effort in past archaeological assessments that may have skewed available site data, or earlier cultural phenomena. Review of archaeological reports from areas beyond the recommended 50m radius is encouraged (Section 1.1, s. 1, bullet 2).

Notwithstanding the limiting nature of the language used in Section 1.1, guideline 1, bullet 3, MCFN assert that Stage 1 engagement should address all archaeological resources and cultural heritage values that may be present on the property. This approach better reflects the understanding that archaeological sites do coexist with places of sacred or spiritual importance, traditional use, or that are referenced in oral histories. Data relevant to Section 1.1, guideline 1, bullets 8 – 12 require engagement, and the results incorporated into the assessment report.

The timing and integrity of the approach to DOCA for background information will be recorded in the project file.

3.1.2 Section 1.2

The direction in this section applies as written.

3.1.3 Section 1.3 Analysis and Recommendations: Evaluating archaeological potential

S&Gs Section 1.3.1 provides general direction on evaluating archaeological potential. Features of archaeological potential are presented as a bullet point list, with no ranking of features. Bullets 1 – 4 are physical landscape characteristics that can be evaluated using maps or field observation. Bullet 9 concerns municipal or provincial designation and this can also be determined using available documentation.

Bullets 5 – 8 and 10 include information that will be available only through engagement. Specifically, “special or spiritual places” (bullet 5), or “resource areas” of value to the Nation (bullet 6) cannot be determined solely on the

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basis of physical indicators. Further, historical settlement features described in bullets 7, 8 and 10 should not be construed as automatically describing European settler landscape elements, given the continuous and ongoing occupation of the Treaty area by Anishinaabe people.

In some areas, archaeological potential models or archaeological master plans are the basis for determining the requirement for assessment. As these models / plans are renewed, DOCA will seek engagement to ensure that the datasets considered in the development of the model / plan, and the output produced is a reasonable representation of archaeological site distributions and MCFN traditional use within the Treaty Lands and Territory.

3.1.4 Section 1.4.1

Section 1.4.1 describes the process for reducing the area that will be subject to Stage 2 test pit survey.

For areas that will be test pitted, reporting on Section 1.4.1, s. 1(c) (iii) and (iv), and Section 1.4.1, s. 1(e) (iii) and (iv), must clearly articulate how MCFN input was gathered and considered in the evaluation of potential.

DOCA must be engaged in the evaluation that leads to a reduction in areas to be subject to test pit survey. This requires treating S&Gs Section 1.4.1, guideline 1 as a *standard*. The guideline states, in part, that “the consultant archaeologist may wish to engage with Aboriginal communities to ensure there are no unaddressed cultural heritage interests”.

In other cases, the area to be examined at Stage 2 may be increased to incorporate MCFN input, as described in the MHSTCI Bulletin on Engaging Aboriginal Communities, Section 3.3.

3.1.5 Stage 1 reporting

For Stage 1 assessment reports, the direction found in Sections 7.5.1 to 7.5.12, and 7.7.1 to 7.7.6 applies as written, with the following exceptions, additions or clarifications.

The results of the research conducted for the background study must be reported in the Stage 1 assessment report. Section 7.7.1, s. 1 states that the research must be clearly described and information sources documented. The report content must also clearly demonstrate that the standards for background research were met.

In addition to the Aboriginal engagement documentation required by Section 7.6.2, it will be necessary to provide a clear and accurate report of the information obtained through engagement, and how it was applied to the assessment functions required by Sections 1.1, 1.3 and 1.4.1.

3.2 MHSTCI Standards and Guidelines Stage 2

The S&Gs state that the purpose of the Stage 2 property assessment is to inventory the archaeological resources on a property, and to determine “whether any of the resources might be artifacts and archaeological sites with cultural heritage value or interest”. The distinction between archaeological resources, on the one hand, and artifacts and archaeological sites on the other derives from the definitions found in O.Reg. 170/04.

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Section 2 of the S&G set out the *minimum* standards for fieldwork at Stage 2. The standards form the basis for professional practice in archaeological assessment. As such, MCFN expect strict compliance with the standards for assessments undertaken within the Treaty Area. As most of the standards are quantitative targets, FLRs will assist consultant archaeologists in meeting compliance expectations, and can collect data on the conditions that led to the exercise of professional judgment to deviate from the standards. Planned deviation from the standards, based on professional judgment and permitted by the S&Gs should be discussed as part of the ongoing engagement with DOCA, and described clearly in resulting reports.

3.2.1 Section 2.1

Section 2.1 sets out the technical requirements for Stage 2 property survey, including pedestrian survey (Section 2.1.1), test pit survey (Section 2.1.2), intensification when archaeological resources are identified (Section 2.1.3), and fieldwork under special conditions (Sections 2.1.4 to 2.1.9).

The direction in Section 2.1 sets out the general and specific *minimum* requirements for Stage 2 fieldwork and analysis. The direction in this section applies as written. DOCA will work with proponents to ensure that FLRs participate in fieldwork to assist in meeting compliance with the standards.

3.2.2 Section 2.2

Section 2.2 sets out the process for determining whether archaeological resources hold cultural heritage value or interest and require further assessment at Stage 3. Notwithstanding the limiting nature of the language used in the Section 2.2 preamble (box text), Stage 2 analysis must address all archaeological resources present on the property. Engagement must address MCFN's stewardship interest in the archaeological resources and cultural heritage values on the property before final recommendations are formulated.

The fieldwork requirements of Stage 2, including intensification when resources are identified must be completed prior to analyzing the results of fieldwork and determining the CHVI of the resources. This determination should not be made 'on the fly' in the field, especially as MCFN have asserted an interest in all archaeological resources within the Treaty area. DOCA may choose to review FLR reports compiled during Stage 2 fieldwork to ensure that the data used in addressing Section 2.2, s. 1, and guidelines 1 to 4 was compliant with the S&Gs and supports the conclusions drawn.

It is important that the direction in Section 2.2, s. 1 is carried out in the context of the local or regional archaeological record. The report of the analysis must include a review of typical or expected artifact densities for sites of different time period or ascribed function regionally.

To clarify Section 2.2, s. 1(b), Stage 3 assessment is required when human remains are identified on a property. For the purposes of compliance with this direction, all human remains, regardless of element or quantity (including fragments, teeth, phalanges, etc.) must be recommended for Stage 3. This direction should not be construed as conflicting with, or limiting the requirement to comply with the Funeral, Burial and Cremation Services Act (SO 2002, c. 33). FLRs will advise on the treatment of the remains.

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In Section 2.2 there are a number of considerations that must be taken into account when evaluating the cultural heritage value or interest of an archaeological site, such as the representativeness of the sample obtained through Stage 2 fieldwork. For example, a single artifact recovered from an average test pit may represent an artifact count equal to or higher than the 'cut-off' proposed for excavation in Stage 3 and 4 directions. Similarly, CSPs conducted under sub-optimal conditions will present a reduced certainty that the sample collected is representative. Reports maintained by FLRs during fieldwork can assist in ensuring that places where additional data, or corrected conclusions may be required.

In the discussion of Stage 1 guidance, it was noted that MCFN hold the view that archaeological potential needs to consider factors beyond the simple presence or absence of artifacts to include landscape considerations and the understanding of how ancestral populations used the land and the resources available. Similarly, in determining cultural heritage value or interest of archaeological resources, it is important to move beyond artifact counts. Highly mobile populations would not necessarily leave extensive and artifact rich sites behind. Analysis of archaeological resources should include the consideration of all archaeological resources as potentially informing the reconstruction of Anishinaabe history, with individual small sites analyzed in aggregate to reflect use of the broader landscape. To clarify, this direction directs the exercise of professional judgment as described in Section 2.2, guidelines 2 and 3 to recommend Stage 3 for low artifact count sites.

3.2.3 Stage 2 reporting

For Stage 2 assessment reports, the direction found in Sections 7.5.1 to 7.5.12 and 7.8.1 to 7.8.7 applies as written, with the following exceptions, additions or clarifications.

Section 7.8.1, s. 1 sets out the documentation requirements for areas *not* surveyed at Stage 2. For areas determined to be of no or low potential at Stage 1, a summary of the engagement on this evaluation must be included. For areas determined during Stage 2 fieldwork to hold low potential, a statement must be provided confirming that the decisions were taken in consultation with DOCA. Specifically, the statement should address the information and reasoning used in the field to satisfy the direction in Section 2.1, s. 2 (a), (b) or (c), confirm that FLRs were advised, and that their input was considered, as part of the decision making.

Section 7.8.1, s. 2 sets out the documentation requirements for Stage 2 property assessment generally. It is recommended that any available DOCA file reference for the project is included in the documentation. Any difference in opinion on fieldwork practices between the consultant archaeologist and FLRs that relate to standards set out in Sections 2.1, 2.1.1 and 2.1.2 should be summarized, including decisions to reduce the area surveyed (Section 7.8.1, s. 2 (c) and (d)).

Section 7.8.3 requires a summary of Stage 2 findings, including a clear statement concerning the assessment of the entire property and each archaeological site. The summary required in Section 7.8.3, s. 1 must include a discussion of all archaeological resources, including those which were determined to hold low CHVI and were not recommended for further assessment. In addition, the analysis and conclusions required in Section 7.8.3, s. 2 must

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include a summary of DOCA engagement or FLR input as applicable. This should summarize the nature and timing of the engagement, the data provided in support of the discussions, and the input received from DOCA.

Section 7.8.2 requires that non-archaeological cultural heritage features, including cultural landscapes should not be documented. As noted in comments made in reference to Section 1.3 and Section 2.2, archaeological sites must be considered in their broader landscape context. The direction in Section 7.8.2 must not be seen as limiting the inclusion of landscape or cultural heritage considerations used in building a complete and accurate understanding of the development property or archaeological resources requiring additional assessment. For example, the discussion of archaeological sites identified at Stage 2, Section 7.8.2, s. 1(b) requires a description of the “area within which artifacts and features were identified”, which may extend to wider landscapes as necessary.

Notwithstanding the direction of Section 7.8.4, s. 2, recommendations for Stage 3 assessment must include a requirement to consider the landscape context of archaeological sites, as appropriate.

Recommendations made in the Stage 2 report set out how all archaeological resources identified on the subject property will be addressed. Stage 3 strategies for sites with CHVI (Section 7.8.4, s. 1(c)), must include recommendations for engagement and FLR participation in fieldwork among the “appropriate Stage 3 assessment strategies”.

Section 7.8.5, s. 1 recommendations for partial clearance must include requirements for engagement and including FLRs in excavation and monitoring.

3.3 MHSTCI Standards and Guidelines Stage 3

The purpose of Stage 3 site-specific assessment is to assess the cultural heritage value or interest of archaeological sites identified at Stage 2 in order to determine the need for mitigation of development impacts. The two key components to Stage 3 site specific assessment are historical research and archaeological site assessment. The outcome of Stage 3 is a clear understanding of whether each site has been sufficiently documented, or if further work is required to protect or fully document the site.

The direction in Section 3 of the S&Gs set out the *minimum* standards for additional background research and for fieldwork at Stage 3. While efforts in excess of the S&Gs are supported, strict compliance with the standards will be expected. DOCA will work with proponents to ensure that FLRs participate in fieldwork to assist in meeting compliance.

Stage 3 also includes a significant engagement component, and DOCA will serve as the primary contact for archaeologists and proponents. Engagement is specifically required as a standard in compiling additional historical documentation (Section 3.1, s. 1(a) and 1(b)), in the evaluation of CHVI (Section 3.4, s. 2), and in formulating Stage 4 strategies (Section 3.5, s. 1). As noted previously, MFCN assert that all archaeological sites should be considered as being of interest to the Nation (Section 3.5, s. 1(f)).

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3.3.1 Section 3.1 Historical documentation

Section 3.1 sets out the requirements for additional research to supplement and expand the research carried out in Stage 1. The additional documentary information must be considered in Stage 3 and Stage 4 fieldwork and analysis. Documentary research should be sufficient to ensure that the consulting archaeologist has a good understanding of the recent occupation history, as well as clear knowledge of the landscape and traditional occupation of the local landscape surrounding the site.

Section 3.1, s. 1(a) requires that, "when available", research regarding "features or information identifying an archaeological site as sacred to Aboriginal communities" is completed. Further, Section 3.1, s. 1(b) requires research relating to "individuals or communities with oral or written information about the archaeological site". To meet the requirements of this direction, MCFN expect that research will be commenced as part of the Stage 1 background study, will require engagement, and in reporting should reflect a serious effort to identify information relating to the local area, property, or site especially as it pertains to past occupation by Mississauga or other Indigenous peoples. As part of the background research, Section 3.2, s. 1 requires that the consultant archaeologist review "all relevant reports of previous fieldwork" prior to commencing fieldwork. If a new licensee assumes responsibility for the archaeological assessment at Stage 3, this review must include contacting DOCA for a summary of engagement and FLR reports on Stage 1 and 2.

3.3.2 Section 3.2

Section 3.2 sets out the standards for Stage 3 site-specific assessment fieldwork, including controlled surface pickup (Section 3.2.1) and test unit excavation (Section 3.2.2). Section 3.2. 3 and Table 3.1 describe the how the number and distribution of test units is determined.

The direction in this section applies as written, with the exceptions, additions or clarifications noted below. In all instances, DOCA will work with proponent to ensure that FLRs are available to support compliance during fieldwork.

The identification and treatment of features encountered at Stage 3 is discussed in Section 3.2.2, s. 6. Feature identification should be conservative, as it is preferable to overestimate the number of features at Stage 3, rather than lose data or create complications for fieldwork at Stage 4. On sites where a high proportion of the features appear equivocal as to cultural origin (forest fire or hearth?), these features must be preserved, and a sample excavated and reported at Stage 4 to create a record for the benefit of future archaeological fieldwork. Alternately, this sampling can be completed under the direction in Section 3.2.2, g. 3.

Selecting screen aperture during Stage 3 fieldwork (Section 3.2.2, guideline 1), should also take a conservative approach. The consultant archaeologist should exercise professional judgment and move to screening with 3mm mesh whenever small artifacts (seed beads, retouch flakes) are anticipated or noted.

Section 3.2.3 and Table 3.1 set out the technical requirements for placement and number of test units. Critical to the success of Stage 3 fieldwork is establishing site boundaries. Site boundaries must be set beyond the edge of

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the artifact concentration, plus a reasonable buffer within which solitary artifacts separated from the main site by post-depositional disturbance may be anticipated. While the guideline (Section 3.2.3, guideline 1) allows for discretion in determining site boundaries, determining boundaries on the basis of low artifact frequency (guideline 1(b)), or typical site characteristics (guidelines 1(c) and 1(d)), must be supported by both data and a clear rationale. For example, determining that a site boundary can be set based on “repetitive low yields” requires additional testing beyond this boundary to ensure that additional concentrations not identified at Stage 2 are recorded. Low yields at the periphery of a site may indicate a weakly defined boundary, but may also represent a much larger, diffuse site marking a low intensity, repeated occupation of a place.

Sterile units mark the boundary of archaeological sites, clearly demonstrating that no further archaeological resources occur within a reasonable distance from the site boundary. It is recommended that sterile units to *at least* ten meters from the site area (i.e. two consecutive sterile test units on the five meter grid), are recorded. This will ensure that isolated sterile units marking a low-count region within a site are misattributed as marking the site boundary. In reporting, the decisions made regarding site boundaries, including the rationale and supporting data should be clearly documented. This summary should note the input received from FLRs.

3.3.3 Section 3.3

Section 3.3.1 describes alternative strategies for determining the extent and complexity of large (Section 3.3.1 and 3.3.2) or deeply buried archaeological sites (Section 3.3.3).

The direction in this section applies as written, with the following exceptions, additions or clarifications. DOCA will work with proponent to ensure that FLRs are available to assist with compliance during fieldwork.

Section 3.3.2 outlines an optional strategy of using topsoil stripping to determine site boundaries, and is not the preferred approach to excavation by MCFN. It is necessary to note that mechanical topsoil removal is not intended to be applied within the site area. Mechanical excavation must begin outside the archaeological site boundary working in toward the centre (Section 3.3.2, s. 3), and must be suspended once cultural features or the previously mapped extent of surface artifacts is encountered (Section 3.3.2, s. 4).

Prior to scheduling mechanical stripping, the consultant archaeologist must establish an on-site protocol for the proposed mechanical stripping with FLRs. The protocol must confirm the extent of the site as determined by artifact distributions and test unit results to establish where trenching will commence and be suspended. The protocol must also cover terminating or suspending trenching when artifacts or features are identified, and for treating cultural features in subsoil, and artifacts from disturbed soil or back dirt, including how back dirt will be processed to recover artifacts from excavated soil.

3.3.4 Section 3.4

Section 3.4 provides direction on how the information gathered in the archaeological assessment up to the end of Stage 3 fieldwork is used to assess the CHVI of each archaeological site. In turn, CHVI will determine whether the site is sufficiently documented, or if Stage 4 mitigation of development impacts is required.

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To comply with the requirements of Section 3.4, consultant archaeologists must work with DOCA to determine CHVI and Stage 4 mitigation strategies for each site. This requires that concise documentation demonstrating that the site has been assessed to the level of care set out in the S&Gs is provided in a timely manner, and that any concerns previously expressed by DOCA or individual FLRs were addressed. The documentation should include the historical background research conducted in Stage 1 and Stage 3, a record of engagement with DOCA, and a summary of the artifact and site analysis. DOCA may also review FLR reports on fieldwork, or determine if band members hold specific or general knowledge of the site or development property. In the absence of earlier engagement, it may be necessary to provide additional resources to support the DOCA review.

The S&Gs state that Stage 4 mitigation is required for specific classes of site, including "...sites identified as sacred or as containing burials" (Section 3.4, s. 1(a)). Sites of sacred or spiritual importance may include places on the landscape that do not contain archaeological resources in sufficient quantity to allow a clear determination of the site's CHVI. Alternately, ceremonial space may be clearly expressed through the features and objects recovered archaeologically. Burial sites, graves and human remains (including isolated elements) must also be considered sacred. As reflected in Section 3.5, s. 1(b), all human remains require special treatment. They are culturally important as they may represent interments or signal a sacred or spiritual value at the site. Ultimately, MCFN is the only party who can determine whether an archaeological site is sacred to the Nation, and as such, DOCA must be engaged.

The description of 'sacred' sites in the S&Gs is limiting. Sacred sites may include sites of cultural or historical importance, places associated with traditional land use or activities, or places features in traditional narratives (Section 3.4, s. 2). In most cases, 'sacred' sites will be those identified by the Nation, and FLRs will be the source of much of this information. Where specific knowledge of an individual archaeological site does not exist in the Nation's current knowledge base, the CHVI of the site may be co-determined by the Nation and consultant archaeologist.

Note that the underlying cultural interest in a site or development property, or the basis of the identification of sacred or spiritual places will not be disclosed in all cases. The Nation will not assume the position of research subject.

Small or diffuse lithic scatters must not be automatically determined to hold low CHVI (Section 3.4.1). Anishinabeg traveled extensively throughout the Treaty area and beyond, and one aspect of this lifestyle was traveling light, with individuals and groups carrying only a small amount of material goods. As a result, loss rates were low and the archaeological sites associated with this cultural pattern will be smaller, low artifact count sites. Therefore, small sites with low artifact frequencies may hold a higher cultural significance than would be determined on the basis of artifact count. The analysis of small sites requires consideration of the wider landscape setting of the site and relationship to other local sites. For many of these smaller sites it is recommended that the consultant archaeologist exercise professional judgment, and follow the direction in Section 3.4.1, guideline 1(c).

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Section 3.4.3 provides additional criteria for determining CHVI of individual archaeological sites. For archaeological sites in the Treaty area, the criteria in Table 3.2 must be reviewed by the consultant archaeologist to determine CHVI and formulating Stage 4 strategies. The consulting archaeologist must clarify in reporting how each of the criteria is or is not met for the archaeological site.

In terms of the 'information value' of a site, consideration of the related indicators must look beyond the concept of archaeological information, to include consideration of how the information contained in the site can contribute to building a more complete history of cultural and traditional land use patterns within the Treaty area.

3.3.5 Section 3.5

Developing Stage 4 mitigation strategies requires engagement at Stage 3 (Section 3.5, s. 1). This engagement should be the culmination of an ongoing engagement that began at Stage 1 (or earlier). Engagement will include contributing to the "careful consideration" leading to a decision to excavate, as required in Section 3.5, s. 2, and to document any "unusual circumstances" indicated in Section 3.5, s.3.

Contrary to the presentation in the S&Gs, the recommended Stage 4 strategies *must* reflect MCFN input. For compliance with Section 3.5, s. 2, documentation must include records of all communications, meetings, presentation materials, and resolutions arrived at between the consultant archaeologist and DOCA, and between the consultant and the proponent where mitigation was discussed. Where the recommended strategy is at variance with MCFN's position, the basis for the decision must be clearly articulated in the final report of Stage 3 fieldwork.

Some sites, where Indigenous occupation is not indicated by Stage 1 to 3 assessments, may be excluded from engagement by mutual agreement.

The formulation of Stage 4 strategies must anticipate operational decisions that may be made during Stage 4. Section 4.2.1, g. 1, allows for sampling strategies to reduce the "degree or intensity of the archaeological fieldwork". Incomplete excavation of an archaeological site promotes archaeological interests over the stewardship interest of MCFN. Sampling must only be considered after a detailed review of the sampling strategy and potential consequences for information recovery from the site is completed. Details of the proposed sampling strategies must be described in detail in the recommendations to the Stage 3 report, and the justification and research supporting the recommendations should be clearly articulated in the analysis and conclusion sections. Stage 4 recommendations should also provide a specific commitment to engage DOCA when sampling decisions are made in the field, including a time allowance to consider the decision, and a process for incorporating DOCA input into the decision making.

3.3.6 Stage 3 reporting

For Stage 3 assessment reports, the direction found in Sections 7.5.1 to 7.5.12 and 7.9.1 to 7.9.7 applies as written, with the following exceptions, additions or clarifications.

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The description of the field methods required in Section 7.9.1, may be supplemented by reference to the FLR reporting on the fieldwork, as applicable.

Section 7.9.3, s. 3 requires that the analysis and conclusions of the report are compared to current archaeological knowledge. This must include current research, and not simply rely on other consulting reports and standards references. In addition, this research must consider the direction set out in this document, and the results of engagement. Section 7.9.4, s. 1(a) requires that reporting on Section 3.5 include a discussion and summary of engagement. A clear and detailed discussion of engagement is required in Section 7.9.4, s. 2, and this discussion must include the rationale for proposing any actions that is contrary to the stated position of DOCA. For example, decisions made to excavate or terminate an assessment (Sec. 7.9.4, s. 3 or s. 5), where that differs from the DOCA position, then a clear statement of this difference, including the dissenting position, must be provided in the report.

3.4 MHSTCI Standards and Guidelines Stage 4

Archaeological sites holding cultural heritage value or interest require Stage 4 mitigation of development impacts. Impacts may be mitigated by either avoidance and protection, or excavation and documentation. Avoidance and long term protection is the preferred approach to mitigation. Avoidance allows the archaeological site to be preserved intact for future use as an archaeological resource and cultural heritage value in addition to preserving a range of material and intangible values not directly recoverable through the application of archaeological techniques.

The S&Gs articulate that avoidance and protection are “most viable when the cultural heritage value or interest of the archaeological site is determined early in the planning stages of the development”. This supports the position taken in this document that early engagement with DOCA is beneficial for all parties to the assessment, and to the archaeological resource.

3.4.1 Section 4.1 Avoidance and Protection

The direction in Section 4 sets out the general and specific *minimum* requirements for Stage 4 fieldwork and analysis. The direction in this section applies as written, with the following exceptions, additions and clarifications. DOCA will work with proponents to ensure that FLRs participate in fieldwork to assist in meeting compliance.

Section 4.1, s. 1 requires that protection must follow completion of Stages 2 and 3. Where DOCA has not been engaged previously on the assessment, the process permitted under Section 4.1 is considered premature and must not proceed. This also applies in cases where the Stage 3 engagement is ongoing, or if a response to a concern raised by DOCA to MHSTCI or some other party to the development process has not been received.

The buffers signified in Section 4.1, s. 2 are minimums. Larger buffers based on local topographic or development conditions must be identified where they will enhance long-term protection. Elements of the surrounding landscape beyond the minimum buffers should be adapted into the protection area to ensure that the site

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remains in a naturalistic setting. This requires working with the proponent and the approval authority early in the process to build agreement in principle with the idea, and to facilitate moving to a satisfactory outcome. In a similar manner, where a number of sites are present in close proximity, protection strategies that include protection of a larger area enclosing all of the sites should be considered.

Section 4.1.3 concerns temporary avoidance. The standard requires that the commitment from the proponent that “the archaeological site will not be impacted in the short term, and a plan to carry out full excavation in the future” is included in the report package. The avoidance and protection strategy requires approval authority agreement. DOCA must be provided with notice of the temporary avoidance and protection strategy and excavation timeline, and provided an opportunity to comment.

Section 4.1.4 concerns the mechanisms required to ensure effective long term protection of the archaeological site. The avoidance and protection strategy must include DOCA engagement, and an opportunity to participate in the long term protection. MCFN has the capacity to provide stewardship and oversight to the long term protection of archaeological sites beyond that provided by other corporate bodies and municipalities; therefore DOCA must be included in the drafting of long term protection mechanisms.

Section 4.1.4, s. 1 directs that the protection mechanism “sets out how protection of the archaeological site is to be addressed as a prerequisite to any proposed removal of the archaeological restrictions on the land in the future”. The mechanism must recognize the Treaty rights and the stewardship role of MCFN, and require engagement regarding any future review of the protected status of the archaeological site for development or excavation. This recognition must form part of the long-term protection mechanism, and should not be part of a sub-agreement or other agreement that may not continue in force over time.

The identified restrictions on uses of the archaeological site (Section 4.1.4, s. 2) must not prohibit or infringe the right of MCFN to carry out any cultural or ceremonial activities that may be required. MCFN stewardship and DOCA participation in any future work at the site must be referenced in the “document confirming... awareness of” obligations for the archaeological site required in Section 4.1.4, s. 3.

3.4.2 Section 4.2 Excavation

Section 4.2 sets out the requirements for excavation and documentation. As the introduction to Section 4.2 states, “protection in an intact state is always the preferred option” for archaeological sites with CHVI. The S&Gs confirm that conversion of archaeological sites into archaeological data results in the “loss of contextual information”. As noted previously, archaeological techniques are insufficient to capture the range of cultural heritage values the archaeological site may contain, including intangible values such as the sacred or spiritual elements that are referenced throughout the S&Gs. Nevertheless, conflict between contemporary development pressures and archaeological sites inevitably leads to a large proportion of archaeological sites being scheduled for destruction.

The direction in Section 4.2 sets out the general and specific requirements for Stage 4 fieldwork and analysis. The direction in this section applies as written, with the following exceptions, additions and clarifications. Within the

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Treaty Lands and Territory, FLRs must participate in fieldwork, and will assist in meeting compliance. Stewardship of the archaeological resources and cultural heritage values require that archaeological sites will be completely excavated by hand (i.e. no mechanical topsoil stripping) and artifact recovery will be maximized, when excavation and documentation is considered the only mitigation alternative.

Before commencing fieldwork, the consultant archaeologist is required to review "all relevant reports of previous fieldwork" (Section 4.2.1, s. 2). If a new licensee assumes responsibility for the archaeological assessment at Stage 4, this review must include a review of engagement from the preceding stages. This review should also include reports of fieldwork on adjacent properties or the local area for context.

Section 4.2.1, g. 1 allows for sampling of archaeological sites "as a means of reduc[ing] the degree or intensity of archaeological fieldwork while still accomplishing the objectives for Stage 4 excavation". Sampling must be pursued with caution, in limited instances and following a detailed review of the strategy and potential consequences to archaeological and cultural data recovery. Sampling is generally only acceptable where it has been recommended in the Stage 3 report, and had been a focus of engagement.

Section 4.2.2 concerns excavation by hand. The preamble to Section 4.2 states, "All archaeological sites for which Stage 4 excavation is carried out...must be excavated partly or completely by hand. Hand excavation is the preferred method for removing topsoil because topsoil stripping destroys any evidence of later site formation processes and leaves behind displaced artifacts". This clarifies that hand excavation is preferred, and signals a concern that stripping may lead to archaeological data and features being overlooked or artifacts left behind at the site. The section continues, stating that on completing Stage 4 excavations "the site no longer exists in the ground [and] archaeological concerns under land use planning and development processes can be considered addressed". This creates the uncomfortable outcome that archaeological data, artifacts and other cultural heritage objects may remain at the location after the site has been declared to no longer exist. This loss of site context and artifacts compound the cumulative impact to cultural heritage values of importance to MCFN and other indigenous communities.

Mechanical topsoil stripping is discussed in Section 4.2.3. As the S&Gs note, "the rationale for topsoil stripping is that the careful documentation of intact archaeological resources...offsets the loss of fragmentary information in the topsoil layer". Mechanical stripping presents considerable risk to archaeological resources and must be considered an exceptional practice in the absence of a compelling rationale. Any proposal to mechanically strip a site must be a key topic of discussion during engagement at Stage 3. FLRs will be available to advise in the field on compliance with the S&Gs and any agreements reached in engagement.

As set out in the S&Gs, mechanical topsoil stripping is only acceptable under specific circumstances (Section 4.2.3). The archaeological site must have been subject to ploughing for many years, be a single component site, be "large", be a Woodland period site or later, and there must be a representative artifact collection from Stage 2 and Stage 3 surface collection and test unit excavation. Analysis of earlier fieldwork must be completed to the point where the site can be demonstrated to be a single component.

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The judgment on the size of the site and adequacy of the artifact collection, and whether the site represents a single component, must be discussed in the Stage 3 report and raised during engagement. During fieldwork, stripping must not extend below the topsoil/subsoil interface (Section 4.2.3, s. 3), and only the area that can be cleared and examined at the time of stripping should be exposed (Section 4.2.3, s. 4). It is critical that the Stage 4 recommendations and on-site protocols support the role of FLRs in identifying compliance shortfalls during mechanical topsoil stripping. Work at variance with the S&Gs must be stopped as soon after being identified to the project archaeologist or field director as possible.

Section 4.2.4 provides direction on the excavation of Woodland period archaeological sites. This direction notes that Woodland sites are 'usually' excavated using a combination of hand and mechanical excavation. As mechanical topsoil stripping increases the risks to archaeological sites, use of the technique must be limited and justified on a site by site basis. It is strongly recommended that the area mechanically excavated is minimized, with hand excavation expanded beyond the limits set out in the S&Gs (Section 4.2.4, s.1, and 4.2.4, s. 5, augmented by guidelines 1 to 3). In all instances of mechanical topsoil stripping, provision for recovering any artifacts displaced to back dirt piles must be made. It is preferred that back dirt is screened to facilitate full artifact recovery.

For large lithic scatters and lithic quarry sites, compliance with Sections 4.2.5 and 4.2.6 will require that Stage 3 analysis is complete prior to engagement, and that the results of analysis are provided during engagement with DOCA. When finalizing the Stage 4 recommendations and strategies for Stage 4, (specifically Sec. 4.2.5, s. 1(b) and Sec. 4.2.6, s. 2), this analysis must be available, meaning that the Stage 3 results must have been analyzed from this perspective.

Requirements for the treatment of undisturbed archaeological sites are described in Section 4.2.9. The preamble of the section states that "every effort must be made to ensure" that undisturbed sites are avoided and protected. Further, "any recommendation to excavate must have been made in consideration of feedback from engagement...and a careful review of the viability of preservation options". MCFN support avoidance and long term protection of archaeological sites, and are emphatic that consultant archaeologists advocate strenuously that undisturbed sites are protected from adverse impact, including excavation. All undisturbed sites must be brought to the attention of DOCA as early in the assessment process as possible, and engagement on the Stage 4 recommendations for the site is required. FLR reports concerning earlier stages of fieldwork, and specifically indications of past disturbance, may be reviewed to ensure that undisturbed sites are appropriately represented in Stage 3 deliberations.

Undisturbed sites that cannot be avoided and protected must be completely excavated by hand. FLRs will be available to support compliance with the direction on excavating undisturbed sites. This will include ensuring that the additional units indicated in Section 4.2.9, s. 4 are sterile, and that features are investigated as directed in Section 4.2.9, s. 5. While not specified in the S&Gs, recording and collecting non-diagnostic artifacts and informal tools, collection must be to 0.25m² quadrant and level at a minimum. As with the direction on undisturbed sites, developing a mitigation plan for rare archaeological sites (Section 4.2.10) will require engagement and FLR participation in fieldwork.

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3.4.3 Section 4.3

The goal of excavation and documentation is complete recovery of the archaeological information contained within the site. Sampling suggests that the contents of sites are generally consistent between sites, and that the information potential of any given site is predictable. However, this gives the impression that the site being assessed is of a lesser value than those that have been excavated previously. Cumulative effects to the overall archaeological record will accrue under this process, and shortcomings of historical research amplified. This perspective may also lead to acceleration in the rate of site loss over time, and excavated collections are increasingly viewed as additional and redundant data. For these reasons, sampling or reducing the extent of excavation at Stage 4 should only be pursued under exceptional circumstances, and then only after detailed research to support the decision to sample has been completed and presented in engagement. In all cases, excavation must include units within a 10m buffer (at Stage 3 or Stage 4) surrounding the site to ensure that site boundaries are accurately located and unit-yield counts do not increase in adjacent areas.

Table 4.1 in Section 4.3 of the S&Gs provides direction on determining the extent of Stage 4 excavations. In hand excavation, the unit-yield serves as an indicator of when the limits of a site have been reached. Units with fewer than 10 artifacts per unit mark the boundary of the site. Excavation must continue where at least two formal or diagnostic artifacts, fire cracked rock, bone or burnt artifacts are present. In the interest of complete recovery and correct boundary placement, it is recommended that excavation continue for at least two contiguous units at low counts (<5) before the site boundary or limits to excavation are declared.

Table 4.1 also provides direction for undisturbed site excavation limits, indicating that counts of ten or fewer artifacts mark the limit of excavations. However, undisturbed sites provide an opportunity to gather information on site formation processes as well as a "complete" inventory of materials and features. For this reason, 100% excavation and artifact recovery is required for these sites. Two consecutive units with zero artifacts must be excavated at the periphery of the site to ensure that excavation has captured the entire site.

For large, dense lithic scatters where individual unit counts are high, Table 4.1 allows that excavation can be terminated where unit counts drop to 10% of the highest yield at the core of the site. This guidance must be applied with caution, and excavations must continue where the nature of the artifact recoveries at the proposed boundary differ from those in the core of the site. For example, where a high count area comprised of smaller pressure flakes is used to define the centre of the site, and a lower count area comprised of larger early stage block reduction is positioned on the 'periphery', this may indicate the overlap of two different functional areas, and not the site boundary. This reinforces the direction in Table 4.1 that areas of lower concentration adjacent to the areas of higher density must be examined to ensure that they do not mark discrete components, habitation or activity areas. Lithic quarry sites require complete excavation of all discrete areas. There are no unit-yield measures for determining limits to excavation.

Table 4.1 also provides direction that for sites subject to mechanical topsoil stripping, excavation is considered complete when all cultural features have been exposed and excavated. The stripping must extend at least 10m

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beyond all cultural features. Unit yields are not applicable as the artifacts from the plough zone are in the back dirt. As noted previously, measures must be taken to recover artifacts from the stripped topsoil to approach complete artifact recovery.

3.4.4 Stage 4 reporting

For Stage 4 excavation reports, the direction found in Sections 7.5.1 to 7.5.12 and 7.11.1 to 7.11.6 applies as written, with the following exceptions, additions or clarifications. Stage 4 avoidance reports follow the direction found in Sections 7.10.1 to 7.10.3.

Section 7.11.1, s. 1(c) requires that decisions made in the field regarding unit placement is documented. For compliance with this standard, the engagement, including in-field discussions with FLRs and any divergent opinions on how to proceed must be reported. Section 7.11.4, s. 1 requires that a recommendation of “no further cultural heritage value or interest” remains for the site. This recommendation should not be made if disputes regarding the completeness of the excavation have been raised by DOCA and are unresolved. Recommendations should also note that the outcome of the archaeological assessment may not remove a cultural heritage place, defined on the basis of cultural or intangible values at the site by MCFN, regardless of the archaeological assessment status.

3.5 Aboriginal Engagement Reporting (Section 7.6.2)

The Aboriginal engagement report supplements the information provided in the body of the report. As the guidance in this document sets out, MCFN expect to be engaged at all stages of archaeological assessment. Therefore, Aboriginal engagement reports should be prepared for all stages of assessment. Engagement includes timely notification of all assessment-related fieldwork to be undertaken on MCFN Treaty Lands and Territory, the participation of FLRs, clear communication regarding fieldwork decisions and recommendations, and acknowledgement of MCFN’s role as stewards of archaeological resources within the Treaty Lands and Territory.

Section 7.6.2 provides direction on the required contents of the Aboriginal engagement report. Each report must include the identification of who was engaged, and how the engagement was carried out. For assessments on MCFN Treaty Lands and Territory, engagement will be with DOCA and the FLRs participating in the fieldwork (Section 7.6.2, s. 1(a)). This document will represent the protocol for engagement (Section 7.6.2, s. 1(b)). To compile a complete record of engagement, the report must also include information on the timing of engagement and, for Stage 2 to 4 assessments, whether engagement had been carried out in earlier stages. DOCA, as part of their administration and coordination of the engagement response, will provide a reference number for each engagement. The report should note this reference and the dates of engagement (Section 7.6.2, s. 1(c)). This will assist DOCA in tracking the assessment, and provide MHSTCI reviewers with assurance that the documentation reflects the approach, process and outcome clearly and accurately.

Documentation for the engagement process must also outline and give reasons for the strategies used to incorporate input from DOCA and FLRs into fieldwork decisions, and how the results of the assessment were

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reported back to the Nation. The outline required by Section 7.2, s. 1(d) must include a description of how DOCA was approached for input to the assessment, including background information at Stage 1 and Stage 3, field direction from FLRs at Stages 2 through 4, and DOCA participation in preparing or reviewing recommendations made at Stage 1 through 4. Acknowledging that points of difference may occur, it is important that the report clearly articulate where DOCA direction varied from S&Gs direction, where the consultant archaeologist chose not to implement direction from DOCA or FLRs, or where recommendations made were at variance with the position taken by DOCA or FLRs. Finally, a statement on when and how the final report of each stage of assessment was transmitted to DOCA must be included (Section 7.6.2, s. 1(e)). Reporting back must include providing a copy of the final report of the assessment to DOCA in a timely manner, including the completed Aboriginal engagement report.

The direction provided in Section 7.6.2, s. 2, applies as written; however, it is important to note places or values holding cultural sensitivity may be identified on any property. In these cases, DOCA will work with the consultant archaeologist to identify boundaries, restrictions, or fieldwork practices that will address the cultural concern, even if detailed information on the underlying value is not provided. This will be the practice when, in the view of DOCA, providing MHSTCI or the consultant archaeologist details of the exact nature of the underlying cultural value is not required to achieve protection.

In reference to Section 7.6.2, g. 1, it is important to note that MCFN hold that all archaeological resources present within the Treaty Lands and Territory are of interest to the Nation as part of their cultural patrimony. Resources, regardless of size, frequency or condition should not be interpreted in such a way as to remove the requirement for engagement.

3.5.1 Supplementary Documentation

Section 7.3.4 notes that supplementary documentation is required to improve the clarity of archaeological assessment reports... "For the purposes of review, the ministry may require supplementary documentation to verify that fieldwork was conducted according to [the MHSTCI] standards and guidelines."

Section 7.6.2 provides standards and guidelines for Aboriginal engagement and is applicable to all stages of archaeological assessment reporting. The section clarifies that "critical information arising from Aboriginal engagement that affected fieldwork decisions, documentation, recommendations or the licensee's ability to comply with the conditions of the license" should be documented and included in the body of the report. Additional details and data resulting from engagement should be provided in supplementary documentation to the report. This includes "copies of any documentation arising from the process of engagement".

DOCA administrative processes and FLR reports do not constitute additional documentation to be included in the supplementary documentation to an archaeological report. The documentation will not be provided, as the licensee's own records should provide sufficient detail regarding engagement. These records may be made available to and approval authorities if required to address an unresolved disagreement between MCFN, the consultant, proponent, or approval authority. MCFN expect that a complete record of engagement will be

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maintained for any work within the Treaty Lands and Territory, and that MHSTCI and approval authorities will consider the substance and outcome of engagement when reviewing assessment reports or development proposals.

4.0 Additional Direction

4.1 Collections management

The disposition of archaeological collections remains of interest to MCFN. All disposition agreements entered into at the end of an archaeological assessment must recognize MCFN's role as stewards of the resource, and provide explicit direction that MCFN may assume control over collections under the following circumstances:

- When the curatorial facility is derelict in its responsibility to care for the collections, including providing for appropriate cultural protocols, or,
- When MCFN develop a curatorial facility for the purpose of long term curation of archaeological collections.

When the license holder fails to make arrangements for the long term care of archaeological collections within a reasonable period of time after the conclusion of an archaeological assessment, MCFN may intervene with MHSTCI to require that the collection is transferred to an appropriate facility with the costs of the transfer being assumed by the ministry or archaeologist.

Note: We recognize that MHSTCI will be developing collections management direction in the near future. MCFN will be actively engaged in the deliberations leading to this policy as it progresses.

4.1.1 Costs

Archaeological fieldwork is directed to the identification and recovery of archaeological resources, primarily material objects indicating past cultural activity. Through excavation and documentation the cultural legacy contained in archaeological sites is imperfectly translated from the material remains into collections and documents that represent the site as data.

At the early stages of archaeological assessment, artifact collections may be relatively modest; however, excavation of archaeological sites can lead to sizeable collections, including artifacts and documentary records. Excavated collections must be cared for. The Ontario Heritage Act is clear that the initial cost to curate collections falls to the licensed archaeologist responsible for the fieldwork. These costs include cleaning, cataloguing, analysis, packing and storage. The OHA also provides for collections to be transferred to a public institution or repository, which may also involve a cost. The cost for maintaining collections remains with the licensee until alternate arrangements are made. If provisions for the long term curation are not addressed during the assessment, the license holder may be liable for the cost of long term curation as well, unless the collection is abandoned or a public or private institution is willing to assume responsibility.

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It is important that costs relating to short and long term curation are identified to the proponent early in the assessment process. This will reinforce that archaeological site excavation is a serious undertaking. If excavation is carried out, proposals for the work must include costs for packing and transferring the collections to a repository, and a timeline for this transfer to be effected. A commitment to complete the transfer must be included in the final report.

Another significant concern arising from the creation of archaeological collections is the cultural cost of reducing the rich cultural legacy that can reside in an archaeological site to collections and data formulated in a way that privileges standard archaeological practice and view of the past. The OHA and S&Gs provide little direction and do not compel any licensee to address First Nations' concerns with investigation, collection or excavation at archaeological sites.

Additional costs may be encountered when curating an archaeological collection to culturally specific standards, including additional cultural requirements for artifact handling, storage and treatment. Storage conditions may require that collections are made available from time to time for traditional observance or cultural ceremony, or the collections and facility itself may require ongoing cultural maintenance. This will increase costs above the basic cost of 'dead storage' space, and must be anticipated in funding.

A hidden cost in curation is the cumulative impact of archaeological practice on the remaining archaeological sites. Collections currently managed for long term use as research and educational material far exceed the capacity for new research to address. However, the value of archaeological collections to communities has not been thoroughly explored. Given that MCFN stewardship over the archaeological resource does not end with excavation and reporting, the potential for long term community management of archaeological collections should be identified. A provision that MCFN retain the right to transfer collections or specific artifacts from archaeological sites Treaty Lands and territory to MCFN designated or operated facilities at some time in the future should be included in the final report of the assessment.

For this, and a variety of other reasons, it is vitally important to MCFN that the archaeological collections that are removed from the ground are treated in a manner that conforms to the OHA, and allows MCFN to exercise our inherent right to act as stewards of our cultural patrimony.

4.2 Human remains and burials

Human remains are not archaeological resources. They are the remains of ancestors who were interred, or died without burial, at or near the location where they are discovered. All human remains identified during archaeological fieldwork are of interest to MCFN, and appropriate treatment of human remains is of considerable importance to the Nation.

The Funeral, Burial and Cremation Services Act and the Coroners Act direct the treatment of human remains upon discovery. While there is variation in the language used in the legislation and the S&Gs (burials, graves, human remains), it is preferred that a uniform approach is followed. When human remains are identified in the field first contact should be to the Coroner or police. Protocol should also dictate that DOCA or the FLR on site, and the Registrar of Cemeteries area also advised of the discovery. Once the police determine that the remains have no forensic interest, the Registrar, the proponent or landowner, MCFN and others representing the deceased will negotiate a site disposition agreement. MCFN prefer that the remains are re-interred as close as possible to the location where they were found. Depending on the quantity of human remains, the nature of the development, and the local availability of undisturbed lands that will not be impacted by development, re-interment may occur on the development property. If this is not possible, then interment at another location suitable to the purpose and acceptable to MCFN (and others) should be pursued.

The nature of this document is to put into practice pre-emptive engagement with DOCA and the ongoing presence of FLRs on location during archaeological assessments. For this reason, there should be no circumstances in which decision-making around the current and future treatment of human remains should bypass MCFN. However, if the protocols within this document have not been respected and a discovery of human remains is made without FLR presence on site, it is the responsibility of the consultant archaeologist or other party responsible for this discovery to immediately notify DOCA.

Human remains that were interred at an archaeological site signify that cultural practice was carried out at that location. The practice imbues the location with intangible values that must be protected. Isolated elements, such as teeth or smaller bones or fragments of bone, may not be immediately associated with an archaeological feature, such as a grave shaft; however, this does not diminish the cultural importance of the remains, or signal that the burial and associated cultural practice were absent. A variety of post-depositional effects may lead to the erasure of the grave site, and loss of skeletal material and it is important that archaeological fieldwork includes investigating the original position of the remains. Where human remains are identified, but no grave location is evident, it is incumbent on the archaeologist to make a reasoned argument about why this may be the case. If post-depositional disturbance from, for example, ploughing and soil erosion caused the remains to be displaced, then this would be a consideration for the analysis of the entire site. If, on the other hand, there is a belief that the body originally lay on or near the ground surface, then this also has an influence on the analysis of the sites, and should be the focus of additional engagement and documentary research.

MCFN Standards and Guidelines for Archaeology

It is important to note that scientific research on human remains, apart from the collection of the data necessary to satisfy the information requirements of the Coroner, must not be undertaken without the express consent of the representatives of the deceased. It is also important to note that the discovery of human remains on an archaeological site or development property signal the presence of intangible cultural heritage values which cannot be captured by standard archaeological techniques. Additional engagement on the analysis of the site, the conclusions reached and the final recommendations regarding the disposition of the site at the end of the archaeological assessment will require additional engagement with MCFN.

In addition to the directives provided herein, all applicable parties including the consultant archaeologist, the Registrar, and/or the proponent/landowner will be expected to follow MCFN's protocol for the discovery of human remains, which is available as a stand-alone document.

5.0 Glossary¹³

approval authority

In the land use and development context, this includes any public body (e.g., municipality, conservation authority, provincial agency, ministry) that has the authority to regulate and approve development projects that fall under its mandate and jurisdiction (e.g., *Planning Act*, *Environmental Assessment Act*, *Aggregate Resources Act*).

archaeological assessment

For the defined project area or property, a survey undertaken by a licensed archaeologist within those areas determined to have *archaeological potential* in order to identify archaeological sites, followed by evaluation of their *cultural heritage value or interest*, and determination of their characteristics. Based on this information, recommendations are made regarding the need for mitigation of impacts and the appropriate means for mitigating those impacts.

archaeological potential

The likelihood that a property contains archaeological resources.

archaeological resources

In the context of the Standards and Guidelines, objects, materials and physical features identified by licensed archaeologists during a Stage 2 archaeological assessment as possibly possessing *cultural heritage value or interest*.

archaeological site

Defined in Ontario regulation as “any property that contains an *artifact* or any other physical evidence of past human use or activity that is of cultural heritage value or interest”.

artifact

Defined in Ontario regulation as “any object, material or substance that is made, modified, used, deposited or affected by human action and is of *cultural heritage value or interest*”.

cultural feature

The physical remains of human alteration at a given location that cannot be removed intact and are not portable in the way that artifacts can be removed and are portable. Typically, a cultural feature must be documented in the field, although samples can be taken. Examples include post molds, pits, living floors, middens, earthworks, and various historic structural remains and ruins.

cultural heritage value or interest

For the purposes of the *Ontario Heritage Act* and its regulations, archaeological resources that possess cultural heritage value or interest are protected as archaeological sites under Section 48 of the act. Where

¹³ Definitions as found in: MHSTCI 2011. Standards and Guidelines for Consultant Archaeologists. Ministry of Heritage, Sport, Tourism and Culture Industries.

MCFN Standards and Guidelines for Archaeology

analysis of documented artifacts and physical features at a given location meets the criteria stated in the Standards and Guidelines, that location is protected as an archaeological site and further archaeological assessment may be required.

community

For the purpose of these Standards and Guidelines, the use of "Aboriginal community" is used only in the context of citing such use by the Ontario Ministry of Heritage, Sport, Tourism and Culture Industries in their Standards and Guidelines

diagnostic artifact

An artifact that indicates by its markings, design or material the time period it was made, the cultural group that made it, or other data that can identify its original context.

formal tool

Most often a stone artifact with a form or design that indicates the reason it was made, like a stone spearpoint or hide scraper. Contrasted with an informal tool, like a chert flake used for cutting.

lithic scatter

A loose or tight concentration of stone flakes and tools resulting from the manufacture and sometimes the use of one or more stone tools.

nation

Refers to the Mississaugas of the Credit First Nation.

project area

The lands to be impacted by the project, e.g.: the area of a development application under the *Planning Act*; the area to be licensed under the *Aggregate Resources Act*; the area subject to physical alteration as a result of the activities associated with the project. This may comprise one or several properties, and these properties may or may not be adjoining. However, all properties must be part of one project that is being undertaken by one proponent.

Project Information Form (PIF)

The form archaeological license-holders must submit to the Ministry of Heritage, Sport, Tourism and Culture Industries upon decided to carry out fieldwork.

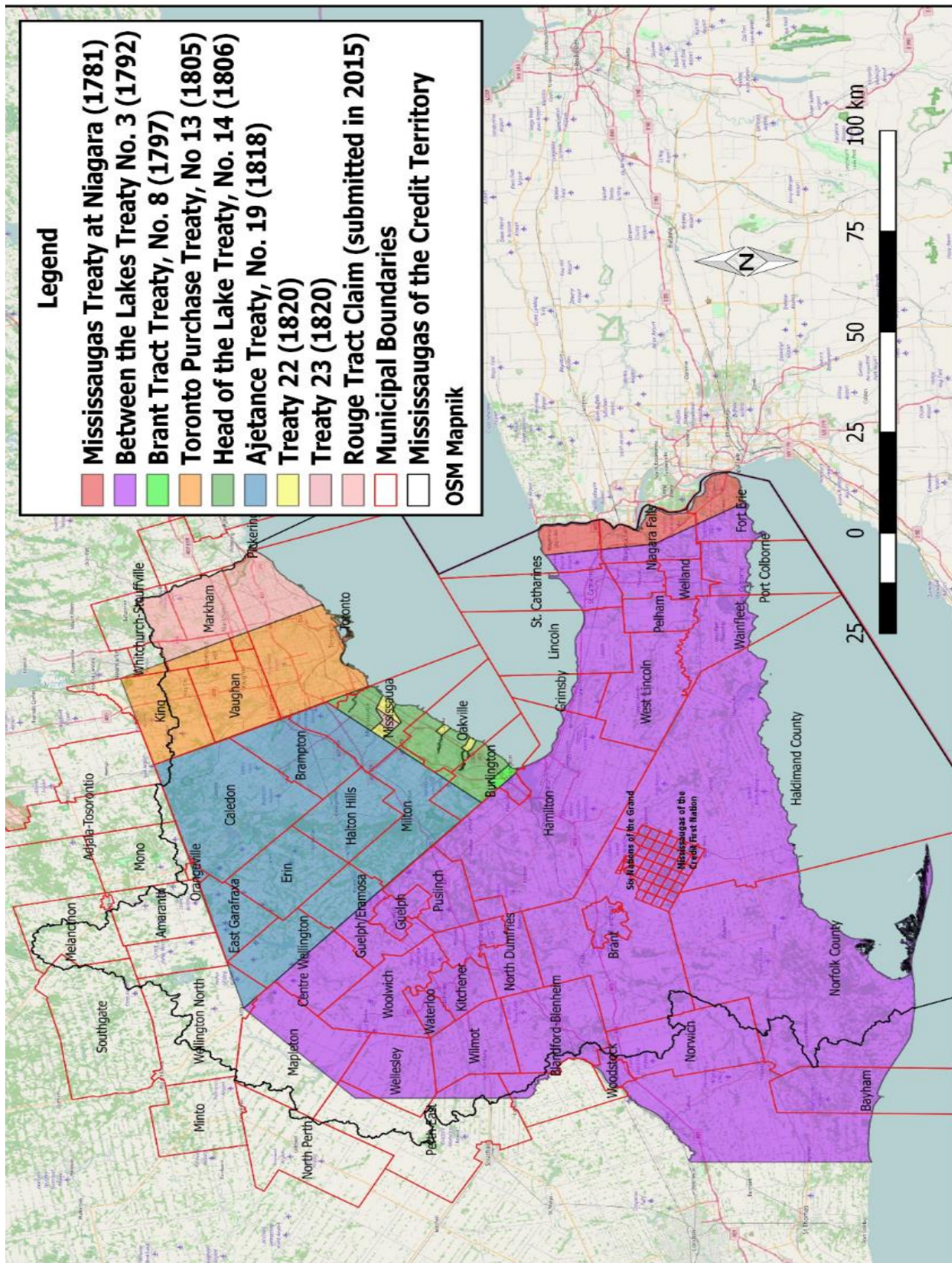
protection

Measures put in place to ensure that alterations to an archaeological site will be prevented over the long-term period following the completion of a development project.

traditional

The word "traditional" refers mainly to use of land, e.g. "traditional lifeways" while all references to MCFN's land are to be construed as the MCFN Treaty Lands".

6.0 Map of the Treaty Lands and Territory



MCFN Standards and Guidelines for Archaeology

Front page artwork is from the MCFN Lloyd S. King Elementary School Art Mural.

Artists include:



MCFN Standards and Guidelines for Archaeology



Mississaugas of the Credit First Nation

Department of Consultation & Accommodation

4065 Hwy 6

Hagersville, ON N0A 1H0

Tel: 905-768-4260

<http://mncfn.ca/doca-2/>

MCFN Looks To Our Anishinaabe Roots To Guide Our Vision For The Future As A Strong, Caring, Connected Community Who Respects The Earth's Gifts And Protects The Environment For Future Generations. MCFN Identity And Heritage Includes Our History, Language, Culture, Beliefs And Traditions.

**Archaeological Review Agreement between:
The Mississaugas of the Credit First Nation (“MCFN”)
and
[name of the proponent]**

A - Background

1. The purpose of this agreement is to provide the Mississaugas of the Credit First Nation (hereinafter, “MCFN”) with capacity assistance to review reports and other materials in connection with all archaeological assessments required for the [name of project] (hereinafter, “the Project”) located at [address], in [town/city], Ontario, owned by [name of the proponent], (hereinafter, “the Proponent”).
2. The Proponent understands that MCFN wishes its designated representatives at the Department of Consultation and Accommodation (hereinafter, “DOCA”) to provide timely and meaningful comment on the Project via its established review process.
3. The Proponent, or their consultant(s), will therefore provide all reports in draft form to MCFN (via DOCA) for review and comment prior to their submission to other approval or regulatory authorities. The Proponent and their consultant(s) agree to provide reasonable and adequate time for MCFN to complete its review and provide comments on draft reports. MCFN is unable to review of any material in less than one week.
4. For archaeological assessments, the Proponent agrees that their consultant(s) will provide, if applicable, both the Supplementary Documentation and the Indigenous Engagement report alongside the draft archaeological report. The Indigenous Engagement report must contain the consultant’s full account of MCFN’s participation in and comments on the archaeological assessment.
5. For archaeological assessments, the Proponent agrees that no new fieldwork will commence until MCFN has completed its review and has provided comments on the previous Stage of assessment.
6. MCFN agrees that MCFN representatives will have appropriate qualifications for the work required – for example, education in environmental and/or archaeological assessments – and experience in bridging Indigenous perspectives with Western approaches, as reasonably determined by MCFN.

B – Fees and Cost Structure

7. The Proponent will provide capacity funding for the designated DOCA staff representative in the amount of \$150.00 per hour for all activities relating to review of Project materials. An estimate of costs is provided in Schedule B.
8. If MCFN is of the view, that designated DOCA staff are unable to complete a comprehensive technical review of Project materials, the Proponent agrees to pay costs incurred by MCFN to retain an external expert in the appropriate field to be chosen at MCFN's sole discretion. The Parties agree that a review by an external expert will commence following mutual acceptance by both Parties of an estimate of work provided by the expert.

C – Additional Conditions

9. All archaeological work in connection with any Project in the Territory will be carried out in accordance with the *Ontario Heritage Act* and its Regulations. The Archaeological work will meet or exceed the Ontario Ministry of Heritage, Sport, Tourism, and Culture Industries (hereinafter, "MHSTCI") standards and guidelines for consultant archaeologists as amended, including the *Terms and Conditions for Archaeological Licences, Standards and Guidelines for Consultant Archaeologists (2011)* and the *Draft Engaging Aboriginal Communities in Archaeology Technical Bulletin (2011)*, (hereinafter collectively, "MHSTCI Standards 2011").
10. The Proponent agrees that all archaeological work conducted for the Project will comply with the *MCFN Standards and Guidelines for Archaeology* (published April 2, 2018), (hereinafter, "MCFN Standards") as long as the MCFN Standards do not fall below MHSTCI Standards 2011. The MHSTCI Standards 2011 will be paramount in the event of a direct conflict between MCFN Standards and the MHSTCI Standards 2011.
11. The Proponent shall make best efforts to avoid and protect archaeological sites, artifacts, and/or features. The Parties agree that the preferred option for human remains that may be of Aboriginal ancestry is that they remain where they are found with appropriate protections.
12. If archaeological resources are encountered at any time during construction or other Project-related activity, all excavation or other activity that could disturb the site shall immediately cease, and the Proponent shall immediately notify MCFN's duly appointed Archaeological Operations Supervisor or designate. The Parties shall work

collaboratively to minimize impacts and ensure respectful treatment of any archaeological resources in accordance with the practices and values of MCFN as identified by MCFN.

13. If human remains are encountered at any time during construction or other Project-related activity, the following steps shall be taken:
 - a. All excavation or other activity that could disturb the site shall immediately cease, and the area shall be secured in a manner which protects the site location and prevents public access and trespass; and
 - b. In addition to any notifications required under the *Funeral, Burial and Cremation Services Act, 2002*, SO 2002, C 33, the Proponent shall immediately contact MCFN's duly appointed Archaeological Operations Supervisor or designate; and
 - c. MCFN shall be permitted to conduct any ceremonies on site in relation to the human remains that may be of Aboriginal ancestry; and
 - d. MCFN shall be consulted about all steps in the investigation and any decisions or agreements to be made regarding human remains that may be of Aboriginal ancestry.

14. Nothing in this Agreement shall be interpreted or implemented so as to derogate or abrogate from any MCFN Aboriginal or Treaty right or claim, or to indicate consent to the Project.

D - Method of Payment

15. The Parties agree that the Proponent will pay the capacity funding as agreed to above by cheque or bank transfer and upon receipt of an invoice from MCFN. All invoices will be addressed directly to the Proponent, the Project will be noted in the text of each invoice, and all invoices will be prepared as per MCFN-DOCA's standard invoicing format.

Invoices should be submitted electronically to the following address:

Email address: [insert email address here]

Attention: [insert name here]

[name of the proponent]

[phone number of proponent]

[full address of proponent]

16. All payment should be made to the MCFN Department of Consultation and Accommodation to the following address. For additional information, please call the office at 905-768-4260.

Email address: nicole.laforme-hess@mncfn.ca

Attention: MCFN-DOCA

4065 Highway 6
Hagersville, Ontario
N0A 1H0

17. After thirty [30] days, a 5% monthly compounded interest rate will be charged on outstanding invoices. After six [6] months of non-payment, a 20% monthly compounded interest rate will be charged on outstanding invoices.

F – Disclaimer

18. The Parties agree that the capacity funding payments for the FLRs will be used only for the purposes described in this Agreement and will not be paid for the improper personal gain of any individual or for any other purpose that might violate any Canadian anti-corruption law.
19. This agreement may be executed in counterparts.
20. This agreement is legally binding on MCFN and the Proponent. This agreement is legally binding on MCFN and the Proponent. This agreement is signed by authorized representatives of the Parties on the date set out in this agreement below.
21. The term of this agreement expires on April 1, 2022. In the event that Project-related activities continue past this termination date, a new agreement will be executed between Parties.

[The remainder of this page is intentionally left blank.]

Signed this _____ day of _____, 2021,

Authorized Signatory on behalf of
The Proponent

[printed name of signatory]
[job title]
[department]
[name of the proponent]

Authorized Signatory on behalf of
Mississaugas of the Credit First Nation

Mark LaForme
Director
Dept. of Consultation and Accommodation
Mississaugas of the Credit First Nation

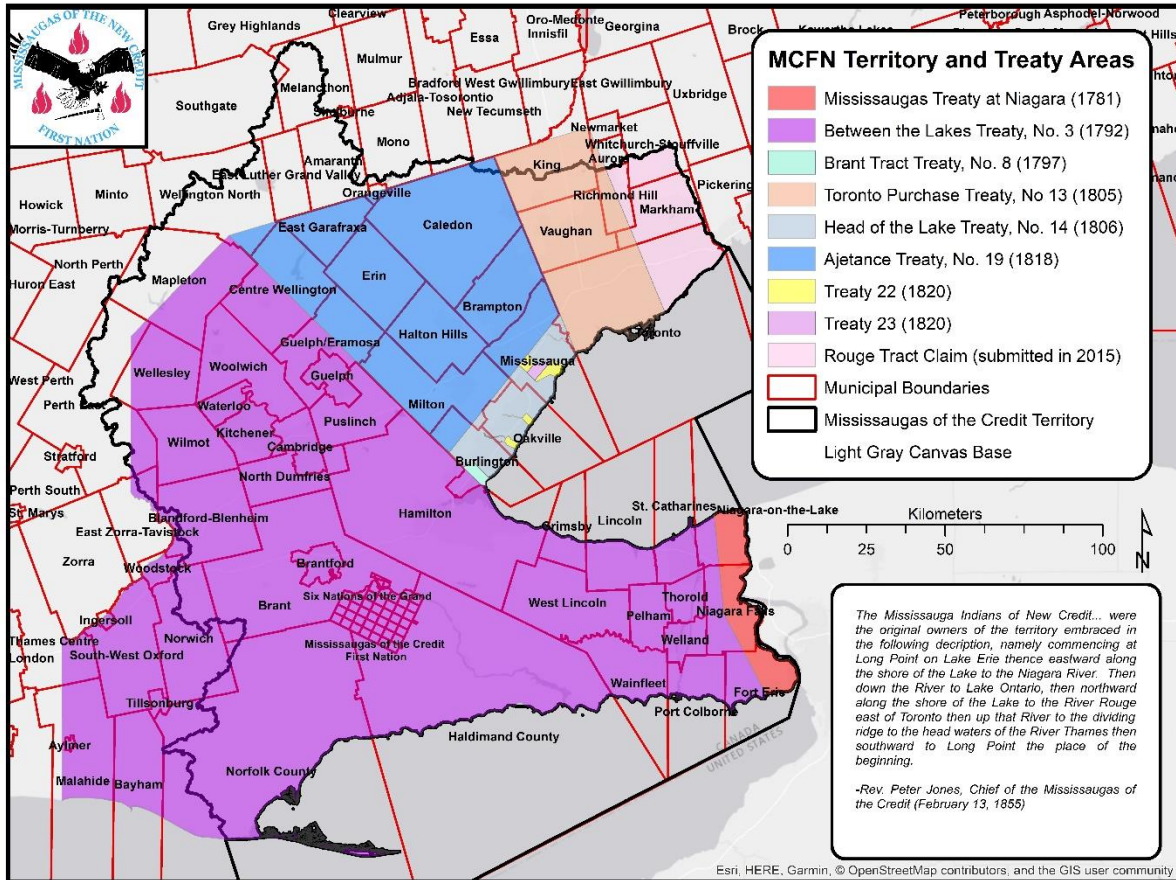
Witness

[printed name of witness]
[job title]
[department]
[name of the proponent]

Witness

Megan DeVries
Archaeological Operations Supervisor
Dept. of Consultation and Accommodation
Mississaugas of the Credit First Nation

Schedule A



Municipalities within Mississaugas of the Credit Treaty Lands and Territory

Schedule B

Approx. Quote for Technical Review (Reference Only)

For review of materials and communications associated with Stage 1 AAs.

	<i>Number</i>		<i>Rate</i>		<i>Total</i>
review hours	4.0	\$	150.00	\$	600.00
contingency (@ 20%)				\$	120.00
Total				\$	720.00

For review of materials and communications associated with Stage 2 AAs.

	<i>Number</i>		<i>Rate</i>		<i>Total</i>
review hours	4.0	\$	150.00	\$	600.00
contingency (@ 20%)				\$	120.00
Total				\$	720.00

For review of materials and communications associated with Stage 3 AAs.

	<i>Number</i>		<i>Rate</i>		<i>Total</i>
review hours	8.0	\$	150.00	\$	1,200.00
contingency (@ 20%)				\$	240.00
Total				\$	1,440.00

For review of materials and communications associated with Stage 4 AAs.

	<i>Number</i>		<i>Rate</i>		<i>Total</i>
review hours	8.0	\$	150.00	\$	1,200.00
contingency (@ 20%)				\$	240.00
Total				\$	1,440.00

February 23,2021

VIA EMAIL

Ajay Puri, M.E., P. Eng.
Project Manager, Capital Works
Region of Peel

Dear Ajay Puri,

RE: MCFN FLR Participation for

Relocation of the 1500 millimetre Credit Valley Sanitary Trunk Sewer

Confirmation of Receipt

I am writing in follow up to the letter of response dated February 17,2021 sent by Fawn Sault, Consultation Coordinator, from the Department of Consultation and Accommodation (“DOCA”) on behalf of the Mississaugas of the Credit First Nation (“MCFN”) to acknowledge that we have received your above named communication, dated February 2,2021 .

Outline of MCFN Rights and Territory

In 1818 , the Crown and MCFN entered into Ajetance Treaty, No. 19 (1818) regarding the lands in which your project is situated.

MCFN has formed the Department of Consultation and Accommodation (“DOCA”) to represent its interests in consultation and accommodation matters. In this regard, it is DOCA’s mandate to ensure that we are directly involved in all planning and development that impacts the integrity of our Territory. DOCA will assess and help alleviate impacts on our rights, land claims, and ways of life by building relationships with governments and private sector proponents. We share a mutual interest in ensuring that projects in the Territory are planned, reviewed, and developed in a manner which ensures healthy communities, ecological protection, and sustainable development for present and future generations in the Territory.

One of the ways we require proponents to engage with us is in providing transparency during the environmental survey and archaeological assessment process. The best way

DEPARTMENT OF CONSULTATION AND ACCOMMODATION

Mississaugas of the Credit First Nation
4065 Hwy #6, Hagersville, Ontario NOA 1H0

Phone: (905) 768-4260



to accomplish this is by having Field Liaison Representatives (“FLRs”) on location while fieldwork is occurring, who can ensure that the Nation’s special interests and concerns are respected and considered during fieldwork. The cultural and natural resources in question are part of MCFN’s territory and heritage and it is our responsibility to ensure their protection, on behalf of the Nation. MCFN’s stewardship of its territory extends through the life of any development project and beyond.

It is our expectation that no project-related fieldwork will take place without the participation of our FLRs. MCFN considers it disrespectful of our rights as Indigenous peoples if our natural and cultural heritage is interfered with without our involvement.

FLR Participation

DOCA deploys FLRs to be boots on the ground so that fieldwork by a proponent and their consultants/contractors is carried out with appropriate care, thoroughness, and respect. In the context of MCFN’s Territory, where so much natural and cultural heritage has already been lost or destroyed, MCFN’s monitoring of fieldwork is of utmost importance to ensure that the trail of desecration stops. FLRs are deployed to observe fieldwork, provide cultural advice, act as a direct link back to DOCA and MCFN, and assist with compliance.

FLRs are MCFN band members who have received training in environmental and archaeological assessments, traditional medicine identification and use, Anishinaabe burial practices, and more throughout their employment with DOCA.

DOCA requires, at minimum, FLR participation during the following project-related studies and/or activities:

- ecological and natural heritage technical studies
- archaeological assessments (Stages 2 through 4) and site visits
- monitoring of activities within 50m of areas of special concern (e.g. waterways and wetlands, archaeological sites, species at risk)
- post-construction remediation activities and follow-up impact monitoring

Agreement for FLR Participation

The cost for the participation of our FLRs is covered by the proponent, not the consultant, whom we view as having the ultimate responsibility to consult with, and accommodate, the Nation. Therefore, please find attached the agreement that covers MCFN’s participation in the upcoming fieldwork. The costs associated with this involvement reflect a number of expenses not visible at first glance: payment for the FLRs themselves, operational costs for DOCA, and efforts to engage the community to garner feedback on development projects. If you could please fill in the additional required information, highlighted in yellow, and return to us a signed copy so that we may arrange for FLR participation on your project, that would be greatly appreciated.



Once a signed agreement is in place, DOCA generally arranges scheduling and other related matters directly with the consultant conducting the fieldwork, unless you prefer otherwise.

Please note that MCFN requires two of its FLRs to be on location whenever fieldwork is taking place within its territory. The reason for this is so that FLRs can provide support and security for each other in the field. This has become a requirement in light of uncommon, but unfortunate, occurrences when FLRs have felt pressured or intimidated from external persons while at work locations. We ask that you would respect this request.

Request for Missing Information

In order to complete our project record, we ask that you provide the following information:

1. Please provide a list of all completed technical studies for the project, their date of completion, and the contact information of the consultant who completed each study.
2. Please provide a list of all incomplete and/or upcoming technical studies for the project, the anticipated date of fieldwork for each, and the contact information for the consultant who will complete them.
3. Are there any short-term and/or long-term avoidance and protection strategies currently in place for the natural and/or cultural resources in the study area for this project? If yes, what are they?

Closing

The participation of FLRs in project fieldwork is only one part of the consultation process that may be required for your development. Please contact DOCA's Consultation Coordinator, Fawn Sault, if you have any questions about the process.

We ask that you respond with the above requested information and executed agreement within fourteen days following receipt of this letter. We thank you in advance for your attention to our requirements and we look forward to working with you further to shape the planning for development in our Territory.

Sincerely,



Megan DeVries
Archaeological Operations Supervisor
megan.devries@mncfn.ca



DEPARTMENT OF CONSULTATION AND ACCOMMODATION

Mississaugas of the Credit First Nation
4065 Hwy #6, Hagersville, Ontario N0A 1H0



Phone: (905) 768-4260



Attachment(s)

MCFN Standards and Guidelines for Archaeology [2018]
FLR Participation Agreement [2020]



DEPARTMENT OF CONSULTATION AND ACCOMMODATION

Mississaugas of the Credit First Nation
4065 Hwy #6, Hagersville, Ontario NOA 1H0



Phone: (905) 768-4260



Field Liaison Representative Participation Agreement
between:
The Mississaugas of the Credit First Nation
and
[name of the proponent]

A - Background

1. The purpose of this agreement is to provide the Mississaugas of the Credit First Nation (hereinafter, “MCFN”) with capacity assistance to its Field Liaison Representatives (hereinafter, “FLRs”) in connection with all environmental and/or archaeological assessments required for the [name of project] (hereinafter, “the Project”) located at [address], in [town/city], Ontario, owned by [name of the proponent], (hereinafter, “the Proponent”).
2. The Proponent understands that MCFN wishes to send its FLRs to participate in and monitor the assessments associated with the Project, and that the FLRs’ mandate will be to ensure that MCFN’s perspectives and priorities are considered and to enable MCFN to provide timely and meaningful comment on the Project.
3. All archaeological work in connection with any Project in the Territory will be carried out in accordance with the *Ontario Heritage Act* and its Regulations. The archaeological work will meet or exceed the Ontario Ministry of Heritage, Sport, Tourism, and Culture Industries (hereinafter, “MHSTCI”) standards and guidelines for consultant archaeologists as amended, including the *Terms and Conditions for Archaeological Licences, Standards and Guidelines for Consultant Archaeologists (2011)* and the *Draft Engaging Aboriginal Communities in Archaeology Technical Bulletin (2011)*, (hereinafter collectively, “MHSTCI Standards 2011”).
4. The Proponent agrees that all archaeological work conducted for the Project will comply with the *MCFN Standards and Guidelines for Archaeology* (published April 2, 2018), (hereinafter, “MCFN Standards”) as long as the MCFN Standards do not fall below MHSTCI Standards 2011. The MHSTCI Standards 2011 will be paramount in the event of a direct conflict between MCFN Standards and the MHSTCI Standards 2011.
5. Nothing in this Agreement shall be interpreted or implemented so as to derogate or abrogate from any MCFN Aboriginal or Treaty right or claim, or to indicate consent to the Project.

B – Fees and Cost Structure

6. The Proponent will provide capacity funding for each FLR in the amount of \$85.00 per hour for all activities relating to the Project. Activities relating to the Project include, but are not limited to:
 - a. Time spent on site monitoring assessment or predetermined construction-related activities;
 - b. Time spent completing data or artifact processing, identification, analysis, and interpretation activities alongside their consultant(s);
 - c. Actual travel time at the beginning of, during, and/or end of each day;
 - d. Time completing daily notes relating to the Project;
 - e. Time spent on standby at the request of the Proponent or their consultant(s); and
 - f. Time completing mandatory training at the request of the Proponent or their consultant(s).
7. The Proponent will pay a supervisory fee of 3.5%, based on the number of hours charged to the Proponent, to provide MCFN with the capacity to facilitate in-field technical support for the FLRs via the Field Archaeologist.
8. The Proponent will reimburse the FLRs for reasonable mileage and meals in accordance with current Federal Canada Treasury Board guidelines, over and above the hourly rate [see Schedule B]. Mileage rates are determined using the MCFN Department of Consultation and Accommodation as the place of departure.
9. The Proponent will provide capacity funding for each FLR in the amount of \$125.00 per hour for any work exceeding eight hours per day and/or forty hours per week. The above noted mileage and meal allowance remains in effect.
10. The Proponent will provide capacity funding for each FLR in the amount of \$125.00 per hour for any work occurring on the following holidays: New Year's Day, Family Day, Good Friday, Victoria Day, Indigenous Solidarity Day (June 21), Canada Day, Civic Holiday, Labour Day, Thanksgiving Day, Remembrance Day, Christmas Day, and Boxing Day. The above noted mileage and meal allowance rates remain in effect.
11. The Proponent agrees that the FLRs will be paid for a minimum of three hours, plus actual travel time, mileage, and meal allowance rates as noted above, on any day when work is cancelled by the Proponent or their consultant(s) while FLRs are en route to the work site or after the FLRs have already arrived.

12. If its use is deemed necessary by both Parties, the Proponent agrees to reimburse the FLRs for their use of the 407ETR upon receipt of a copy of the bill. This agreement will be provided in writing to MCFN's Field Coordinator.
13. If deemed reasonable by both Parties, the Proponent agrees to cover the cost of overnight accommodation for FLRs participating in environmental and/or archaeological fieldwork at locations which would otherwise require more than 90 minutes of travel time at both the beginning and end of the work day, as determined using the MCFN Department of Consultation and Accommodation as the place of departure. An additional Incidental Allowance fee is required for any work which requires overnight accommodations, as set out in Schedule B. This agreement will be provided in writing to MCFN's Field Coordinator.

C – Additional Conditions

14. The parties acknowledge that the Project, in whole or in part, takes place within MCFN Territory and agree that the Proponent shall provide capacity funding for FLR participation on the Project for the duration of the Project.
15. The Proponent agrees that two FLRs shall be on location whenever Project-related activities are taking place within its Territory, as set out in Schedule A.
16. Furthermore, additional FLRs are required if the number of field personnel utilized by the consultant exceeds fourteen (14) individuals and the Proponent agrees to provide capacity funding for additional FLRs as required. MCFN requires one additional FLR per five additional field crew, as outlined in the chart below:

Number of Field Personnel	Number of FLRs Required
1 to 14	2
15 to 19	3
20 to 24	4
25 to 29	5
30 to 34	6
35 to 39	7
40+	8+

17. The Parties acknowledge that the FLRs time and travel will be recorded and verified using the ClockShark Time Tracking Software System and that invoicing will be prepared using these records, not those of a third party.

18. If archaeological resources are encountered at any time during construction or other Project-related activity, all excavation or other activity that could disturb the site shall immediately cease, and the Proponent shall immediately notify MCFN's Archaeological Operations Supervisor or designate. The Parties shall work collaboratively to minimize impacts and ensure respectful treatment of any archaeological resources in accordance with the practices and values of MCFN as identified by MCFN.
19. If human remains are encountered at any time during construction or other Project-related activity, the following steps shall be taken:
 - a. All excavation or other activity that could disturb the site shall immediately cease, and the area shall be secured in a manner which protects the site location and prevents public access and trespass; and
 - b. In addition to any notifications required under the *Funeral, Burial and Cremation Services Act, 2002*, SO 2002, C 33, the Proponent shall immediately contact MCFN's duly appointed Archaeological Operations Supervisor or designate; and
 - c. MCFN shall be permitted to conduct any ceremonies on site in relation to the human remains that may be of Aboriginal ancestry ("Ancestral Remains"); and
 - d. MCFN shall be consulted about all steps in the investigation and any decisions or agreements to be made regarding Ancestral Remains.

D - Coordination of the FLRs

20. The Parties agree that the FLRs will follow the reasonable instructions of the Proponent and their consultant firm(s) conducting the environmental and/or archaeological work concerning safety practices, and that the FLRs will attend "tailgate" safety meetings if requested.
21. The contact person for activities relating to the environmental assessment portion of the Project is [name of contact person #1] from [name of consultant]. Contact information for this person is as follows:
[insert contact information here]
22. The contact person for activities relating to the archaeological assessment portion of the Project is [name of contact person #2] from [name of consultant]. Contact information for this person is as follows:
[insert contact information here]

23. The Parties agree that the contact person for the consultant firm(s) will coordinate site meeting locations and times through MCFN's duly appointed Field Coordinator. Contact information for the Field Coordinator is as follows:

Joelle Williams

Telephone: 905-768-4260

Cell: 905-870-2918

Email: joelle.williams@mncfn.ca

E - Status of the FLRs

24. The FLRs selected by MCFN have appropriate qualifications for the work required – for example, training in environmental and/or archaeological monitoring – and experience in bridging Indigenous perspectives with Western approaches, as reasonably determined by MCFN.

25. The Parties agree that the FLRs are not employees, contractors, or sub-contractors of the Proponent or their consultant(s) and that the FLRs will be responsible for their own personal protective equipment, such as hard hats, safety boots, and safety vests, unless specific or otherwise unique personal protective equipment is required, which will therefore be provided or reimbursed by the Proponent.

26. FLRs take direction from MCFN. MCFN pays Workplace Safety and Insurance Board ("WSIB") contributions in respect of the FLRs and will, at its own expense, maintain for the term of this agreement a comprehensive general liability ("CGL") policy or policies with a limit of at least \$1 million and shall provide the Proponent with evidence of such insurance, upon request. MCFN agrees that FLRs will perform their activities safely, in a good and competent manner, in compliance with all applicable laws, regulations, and guidelines.

27. MCFN expects that the Proponent will comply with the *Occupational Health and Safety Act*, R.S.O. 1990, C. 0.1, the *Ontario Human Rights Code*, R. S. O. 1990, c. H.19, and maintain a safe, harassment-free work environment.

28. The Proponent is responsible for negligence or other failure to maintain a safe and harassment-free work environment. To the extent that the Proponent is responsible for negligence or other failure to maintain a safe and harassment-free work environment, the Proponent is liable and shall indemnify MCFN claims or demands related to injury, accident, discrimination, or harassment by the Proponent's employees, agents, consultants, or other parties under the control or direction of the Proponent.

F - Method of Payment

29. The Parties agree that the Proponent will pay the capacity funding as agreed to above by cheque or bank transfer and upon receipt of an invoice from MCFN. All invoices will be addressed directly to the Proponent, the Project will be noted in the text of each invoice, and all invoices will be prepared as per MCFN-DOCA's standard invoicing format. Invoices should be submitted electronically to the following address:

Email address: [insert email address here]

Attention: [insert name here]

[name of the proponent]

[phone number of proponent]

[full address of proponent]

30. All payment should be made to the MCFN Department of Consultation and Accommodation to the following address. For additional information, please call the office at 905-768-4260.

Email address: nicole.laforme-hess@mncfn.ca

Attention: MCFN-DOCA

4065 Highway 6

Hagersville, Ontario

N0A 1H0

31. After thirty [30] days, a 5% monthly compounded interest rate will be charged on outstanding invoices. After six [6] months of non-payment, a 20% monthly compounded interest rate will be charged on outstanding invoices.

G – Disclaimer

32. The Parties agree that the capacity funding payments for the FLRs will be used only for the purposes described in this Agreement and will not be paid for the improper personal gain of any individual or for any other purpose that might violate any Canadian anti-corruption law.
33. This agreement may be executed in counterparts.
34. This agreement is legally binding on MCFN and the Proponent. This agreement is signed by authorized representatives of the Parties on the date set out in this agreement below.

35. The term of this agreement expires on April 1, 2022. In the event that Project-related activities requiring FLR participation continue past this termination date, a new agreement will be executed between Parties.

[The remainder of this page is intentionally left blank.]

Signed this _____ day of _____, 2021,

Authorized Signatory on behalf of
The Proponent

[printed name of signatory]
[job title]
[department]
[name of the proponent]

Authorized Signatory on behalf of
Mississaugas of the Credit First Nation

Mark LaForme
Director
Dept. of Consultation and Accommodation
Mississaugas of the Credit First Nation

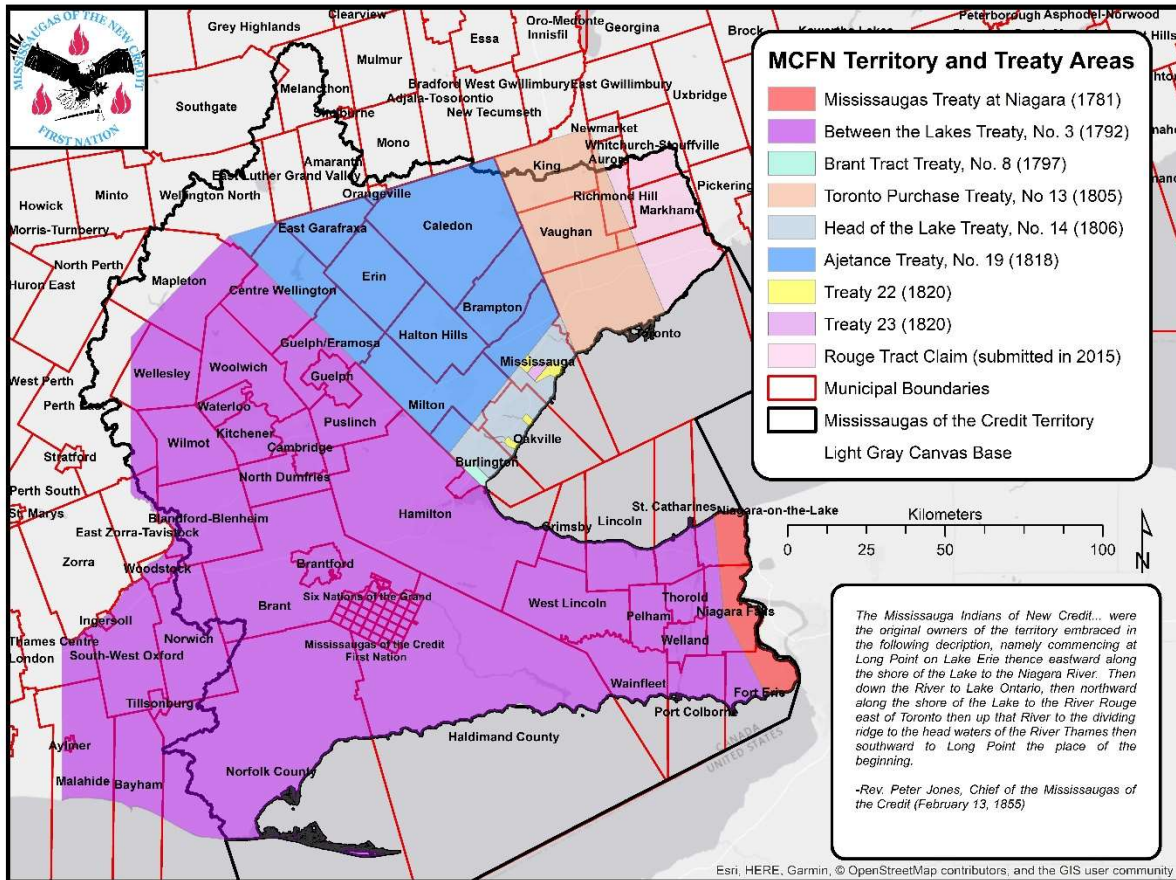
Witness

[printed name of witness]
[job title]
[department]
[name of the proponent]

Witness

Megan DeVries
Archaeological Operations Supervisor
Dept. of Consultation and Accommodation
Mississaugas of the Credit First Nation

Schedule A



Municipalities within Mississaugas of the Credit Treaty Lands and Territory

Schedule B

MISSISSAUGAS OF THE CREDIT FIRST NATION MILEAGE & ALLOWANCE CHART

EFFECTIVE APRIL 1, 2020 to MARCH 31, 2021

MILEAGE

\$ 0.56 per KM

<https://www.njc-cnm.gc.ca/directive/d10/v238/s658/en#s658-tc-tm>

MEAL ALLOWANCE

not eligible if:

BREAKFAST	\$	20.65	leave after 8am; get home before 7:30am
LUNCH	\$	20.90	leave after 1:15pm; get home before 12:15pm
DINNER	\$	51.25	leave after 7pm; get home before 6:30pm
INCIDENTALS	\$	17.30	not staying overnight

<https://www.njc-cnm.gc.ca/directive/d10/v238/s659/en#s659-tc-tm>

NIGHTTIME*	\$	51.25	*Applies only to nighttime surveys that would not otherwise trigger dinner or breakfast.
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From: Megan DeVries <Megan.DeVries@mncfn.ca>
Sent: March 8, 2021 2:54 PM
To: Puri, Ajay <ajay.puri@peelregion.ca>
Cc: Mark LaForme <Mark.LaForme@mncfn.ca>; Fawn Sault <Fawn.Sault@mncfn.ca>
Subject: RE: 2021-0145 MCFN Response to the Class EA for the Relocation of the 1500mm Credit Valley Trunk Sewer

CAUTION: EXTERNAL MAIL. DO NOT CLICK ON LINKS OR OPEN ATTACHMENTS YOU DO NOT TRUST.

Hello Ajay,

Please find attached the fully executed agreements for your records. We look forward to working with the Region of Peel on this project.

Sincerely,
Megan.

Megan DeVries, M.A. (she/her)
Archaeological Operations Supervisor



Department of Consultation and Accommodation (DOCA)
Mississaugas of the Credit First Nation (MCFN)
4065 Highway 6 North, Hagersville, ON N0A 1H0
P: 905-768-4260 | M: 289-527-2763
<http://www.mncfn.ca>

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From: Puri, Ajay <ajay.puri@peelregion.ca>
Sent: Monday, March 8, 2021 11:59 AM
To: Megan DeVries <Megan.DeVries@mncfn.ca>; Fawn Sault <Fawn.Sault@mncfn.ca>
Cc: Mark LaForme <Mark.LaForme@mncfn.ca>; Christopher Lefebvre <CLefebvre@mncbc.ca>
Subject: RE: 2021-0145 MCFN Response to the Class EA for the Relocation of the 1500mm Credit Valley Trunk Sewer

Hi Megan,

Further to my email below, please find attached DOCA Archaeological Review Agreement and MCFN FLR Participation Agreement, duly executed by the Region of Peel. Once the agreements are executed by MCFN, please forward me the executed copies of both the agreements.

Thanks,

Ajay Puri, M.E. (Env.), P.Eng.
Project Manager, Capital Works
Wastewater Collection & Conveyance
Public Works
✉ Ajay.Puri@peelregion.ca
☎ 905.791.7800 x5073

10 Peel Centre Drive, Suite B, 4th Floor
Brampton, ON L6T 4B9



From: Puri, Ajay
Sent: March 2, 2021 12:51 PM
To: Megan DeVries <Megan.DeVries@mncfn.ca>; Fawn Sault <Fawn.Sault@mncfn.ca>
Cc: Mark LaForme <Mark.LaForme@mncfn.ca>; Christopher Lefebvre <CLefebvre@mncbc.ca>
Subject: RE: 2021-0145 MCFN Response to the Class EA for the Relocation of the 1500mm Credit Valley Trunk Sewer

Hi Megan,

Thanks for your email and I reviewed your request with the senior management at Peel. The Region agrees to pay the costs for MCFN to engage in a technical review of the project. I will get the Technical Review agreement completed in the next few days and forward you a copy of the signed copy for execution. With respect to the FLR Participation, we already have an agreement in place and I will mimic that agreement for this project as well and forward you a signed copy in the next few days.

In the meanwhile, please continue to review the Class EA material and engage our consultant, as required.

Thanks,

Ajay Puri, M.E. (Env.), P.Eng.
Project Manager, Capital Works
Wastewater Collection & Conveyance
Public Works

✉ Ajay.Puri@peelregion.ca
☎ 905.791.7800 x5073

10 Peel Centre Drive, Suite B, 4th Floor
Brampton, ON L6T 4B9



From: Megan DeVries <Megan.DeVries@mncfn.ca>
Sent: February 23, 2021 9:00 AM
To: Fawn Sault <Fawn.Sault@mncfn.ca>; Puri, Ajay <ajay.puri@peelregion.ca>
Cc: Mark LaForme <Mark.LaForme@mncfn.ca>; Christopher Lefebvre <CLefebvre@mncbc.ca>
Subject: RE: 2021-0145 MCFN Response to the Class EA for the Relocation of the 1500mm Credit Valley Trunk Sewer

CAUTION: EXTERNAL MAIL. DO NOT CLICK ON LINKS OR OPEN ATTACHMENTS YOU DO NOT TRUST.

Good morning,

Please find attached a letter from the Mississaugas of the Credit First Nation (“MCFN”) regarding the upcoming assessment for the Relocation of the Credit Valley Trunk Sewer, as identified below.

Please note that, in order to continue maintaining DOCA capacity for fulsome project participation, DOCA charges for technical review of project information. In the exercise of its stewardship responsibility, DOCA seeks to work together with project proponents and their archaeological consultants to ensure that archaeological work is done properly and respectfully. DOCA has retained technical advisers with expertise in the field of archaeology. These experts will review the technical aspects and cultural appropriateness of the archaeological assessments and strategies associated with your project. Upon completion of these reviews, MCFN will identify, if necessary, mitigation measures to address any project impacts upon MCFN rights. For cultural materials and human remains, DOCA may advise that this includes ceremonies required by Anishinaabe law, as well as request adjustments to the proposed fieldwork strategy.

The proponent is expected to pay the costs for MCFN to engage in a technical review of the project. DOCA anticipates at this time that all archaeological review will be undertaken by in-house technical experts, but will advise the proponent if an outside peer-review is required. Please find attached the agreement that covers MCFN’s inhouse technical review of the archaeological assessments and strategies associated with your project(s). If you could please fill in the additional required information, highlighted in yellow, and return to us a signed copy, that would be greatly appreciated. After we have

received it, we can execute the contract on our end and return the completed contract to you. Afterwards, I can arrange scheduling and other related matters directly with the consultant if you prefer.

Sincerely,
Megan.

Megan DeVries, M.A. (she/her)
Archaeological Operations Supervisor



Department of Consultation and Accommodation (DOCA)
Mississaugas of the Credit First Nation (MCFN)

4065 Highway 6 North, Hagersville, ON N0A 1H0

P: 905-768-4260 | M: 289-527-2763

<http://www.mncfn.ca>

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From: Fawn Sault

Sent: Wednesday, February 17, 2021 1:32 PM

To: Puri, Ajay <ajay.puri@peelregion.ca>

Cc: Mark LaForme <Mark.LaForme@mncfn.ca>; Megan DeVries <Megan.DeVries@mncfn.ca>;

Christopher Lefebvre <CLefebvre@mncbc.ca>

Subject: 2021-0145 MCFN Response to the Class EA for the Relocation of the 1500mm Credit Valley Trunk Sewer

Dear Ajay,

Please see the attached letter as our response to your Class EA for the relocation of the 1500mm Credit Valley Trunk Sewer.

Miigwech,

Fawn Sault
Consultation Coordinator
Department of Consultation and Accommodation
Mississaugas of the Credit First Nation
Cell – 289-527-6580

Ministry of Environment,
Conservation and Parks

Newton, Dorin/TOR

From: Eby, Bryden
Sent: Wednesday, September 9, 2020 2:56 PM
To: eanotification.cregion@ontario.ca
Cc: Henderson, Emma/KWO; Thannickal, Jimmy/TOR; Dhillon, Paramjit/TOR; ajay.puri@peelregion.ca; andrea.pitura@peelregion.ca; Quintero, Camilo/TOR
Subject: Region of Peel: Credit Valley STS Relocation - Project Information Form Submission
Attachments: D3113400_Peel_Project Information Form.xlsx

Hello,

My name is Bryden Eby and I am an Environmental Planner with Jacobs Engineering. Our organization is currently working on a project with the Region of Peel involving the relocation of the existing 1,500-millimetre Credit Valley Sanitary Trunk Sewer. We are in the process of preparing a Schedule B Class Environmental Assessment and have completed the necessary Project Information Form to be submitted to the Central Region of the MECP.

Please see the attached Excel document for the Project Information Form that has been filled out in accordance with MECP guidelines.

If there is any other information you require at this time, please let me know. Thank you very much.

Sincerely,

Bryden Eby

Bryden Eby, BBA, MES, LEED AP ND

Jacobs

Environmental Planner | Global Environmental Solutions

(519) 514-1612

bryden.eby@jacobs.com

What to do:

Step 1: Look for the type of EA project in column B that applies to you.

Step 2: Complete columns C to J for that project.

Step 3: Send this form in Excel format to the MECP regional office email address where the project is located.

MECP regional office email addresses are listed at www.ontario.ca/page/preparing-environmental-assessments

Class EA/Streamlined EA	Proponent Name	Proponent Contact	Project Name	Project Schedule	Project Type	Project Location	MOECC Region	Project Initiation Date	
1	CO - Remedial flood and erosion control projects								
2	GO Transit - Class EA								
3	Hydro One - Minor transmission facilities								
dat	MEA - Class EA for municipal infrastructure projects	Regional Municipality of Peel	Ajay Puri Ajay.Puri@peelregion.ca	Relocation of the existing 1,500-millimetre Credit Valley Sanitary Trunk Sewer	Schedule B	Municipal water and wastewater projects	Peel, Regional Municipality of	Central	6/1/2020
5	Ministry of Infrastructure - Public work								
6	MNDM - Activities of the Ministry of Northern Development and Mines under the Mining Act								
7	MNRF - Provincial parks and conservation reserves								
8	MNRF - Resource stewardship and facility development projects								
9	MTO - Provincial transportation facilities								
10	O. Reg. 101/07 - Waste management projects								
11	O. Reg. 116/01 - Electricity projects								
12	OWA - Waterpower projects								

Enter the proponent's name.

Enter the name and email address of the person who the MECP should contact about your project. This should be the same contact person who is listed on the notice.

Enter the project name as it appears on the notice.

Select the project schedule from the drop-down menu.

Select the project type from the drop-down menu.

Select the name of the municipality or unorganized/unsurveyed area where your project is located from the drop-down menu.

Select the MECP region from the drop-down menu. Read the "MECP regions" worksheet to find the MECP region where your project is located.

Enter the date that the streamlined EA process was initiated (e.g. notice of commencement). This date may be when the project notice was first published.

From: Bell, Trevor (MECP) <Trevor.Bell@ontario.ca>
Sent: October 15, 2020 3:03 PM
To: Puri, Ajay <ajay.puri@peelregion.ca>
Cc: Papageorgiou, Agni (MECP) <Agni.Papageorgiou@ontario.ca>; Dufresne, Tina (MECP) <Tina.Dufresne@ontario.ca>; paramjit.dhillon@jacobs.com
Subject: Credit Valley Sanitary Trunk Sewer Relocation - Schedule B Municipal Class EA

CAUTION: EXTERNAL MAIL. DO NOT CLICK ON LINKS OR OPEN ATTACHMENTS YOU DO NOT TRUST.

Good afternoon,

Please find attached a letter from the Ministry of the Environment, Conservation and Parks, Environmental Approvals Branch, regarding the above mentioned project. Feel free to contact me directly with any questions or concerns you may have.

Sincerely,

Trevor Bell | Environmental Planner/Environmental Assessment Coordinator
Project Review Unit, Environmental Assessment and Permissions Branch
Ministry of the Environment, Conservation and Parks
5775 Yonge Street, 8th floor, Toronto ON, M2M 4J1
New Phone: 437-770-3731 | trevor.bell@ontario.ca

Ministry of the Environment,
Conservation and Parks

Ministère de l'Environnement, de la
Protection de la nature et des Parcs

Environmental Assessment Branch

*Direction des évaluations
environnementales*



1st Floor
135 St. Clair Avenue W
Toronto ON M4V 1P5
Tel.: 416 314-8001
Fax.: 416 314-8452

Rez-de-chaussée
135, avenue St. Clair Ouest
Toronto ON M4V 1P5
Tél. : 416 314-8001
Télééc. : 416 314-8452

October 15, 2020

Ajay Puri, P.Eng.
Project Manager
Region of Peel
Ajay.Puri@peelregion.ca
BY EMAIL ONLY

Re: **Credit Valley Sanitary Trunk Sewer Relocation
Region of Peel
Schedule B Municipal Class Environmental Assessment
Notice of Study Commencement**

Dear Ajay Puri,

This letter is in response to the Notice of Commencement for the above noted project. The Ministry of the Environment, Conservation and Parks (MECP) acknowledges that the Region of Peel has indicated that the study is following the approved environmental planning process for a Schedule B project under the Municipal Engineers Association's Municipal Class Environmental Assessment (Class EA).

The attached "Areas of Interest" document provides guidance regarding the ministry's interests with respect to the Class EA process. Please identify the areas of interest which are applicable to the project and ensure they are addressed. Proponents who address all the applicable areas of interest can minimize potential delays to the project schedule.

The Crown has a legal duty to consult Aboriginal communities when it has knowledge, real or constructive, of the existence or potential existence of an Aboriginal or treaty right and contemplates conduct that may adversely impact that right. Before authorizing this project, the Crown must ensure that its duty to consult has been fulfilled, where such a duty is triggered. Although the duty to consult with Aboriginal peoples is a duty of the Crown, the Crown may delegate procedural aspects of this duty to project proponents while retaining oversight of the consultation process.

The proposed project may have the potential to affect Aboriginal or treaty rights protected under Section 35 of Canada's *Constitution Act* 1982. Where the Crown's duty to consult is triggered in relation to the proposed project, **the MECP is delegating the procedural aspects of rights-based consultation to the proponent through this letter.** The Crown intends to rely on the delegated consultation process in discharging its duty to consult and maintains the right to participate in the consultation process as it sees fit.

Based on information provided to date and the Crown's preliminary assessment the proponent is required to consult with the following communities who have been identified as potentially affected by the proposed project:

- Mississaugas of the Credit First Nation;
- Six Nations of the Grand River;
- Haudenosaunee Confederacy Chiefs Council; and
- Huron-Wendat Nation, if there are potential archeological impacts

Steps that the proponent may need to take in relation to Aboriginal consultation for the proposed project are outlined in the "[Code of Practice for Consultation in Ontario's Environmental Assessment Process](#)".

Additional information related to Ontario's *Environmental Assessment Act* is available online at: www.ontario.ca/environmentalassessments

Please also refer to the attached document "A Proponent's Introduction to the Delegation of Procedural Aspects of consultation with Aboriginal Communities" for further information.

The proponent must contact the Director of Environmental Assessment Branch under the following circumstances subsequent to initial discussions with the communities identified by MECP:

- Aboriginal or treaty rights impacts are identified to you by the communities;
- You have reason to believe that your proposed project may adversely affect an Aboriginal or treaty right;
- Consultation with Indigenous communities or other stakeholders has reached an impasse; or
- A Part II Order request is expected based on impacts to Aboriginal or treaty rights.

The MECP will then assess the extent of any Crown duty to consult for the circumstances and will consider whether additional steps should be taken, including what role you will be asked to play should additional steps and activities be required.

Once the report is finalized, the proponent must issue a Notice of Completion providing a minimum 30-day period during which documentation may be reviewed and comment and input can be submitted to the Proponent.

Please ensure that the Notice of Completion advises that outstanding concerns are to be directed to the proponent for a response, and that in the event there are outstanding concerns regarding potential adverse impacts to constitutionally protected Aboriginal and treaty rights, Part II Order requests on those matters should be addressed in writing to:

Minister Jeff Yurek
Ministry of Environment, Conservation and Parks
777 Bay Street, 5th Floor
Toronto ON M7A 2J3
minister.mecp@ontario.ca

and

Director, Environmental Assessment Branch
Ministry of Environment, Conservation and Parks

135 St. Clair Ave. W, 1st Floor
Toronto ON, M4V 1P5
EABDirector@ontario.ca

Please note the project cannot proceed until at least 30 days after the end of the public review period provided for in the Notice of Completion.

Further, the project may not proceed after this time if:

- a Part II Order request has been submitted to the ministry regarding potential adverse impacts to constitutionally protected Aboriginal and treaty rights; or
- the Director has issued a Notice of Proposed Order regarding the project.

The public can request a higher level of assessment on a project if they are concerned about potential adverse impacts to constitutionally protected Aboriginal and treaty rights. In addition, the Minister may issue an order on his or her own initiative within a specified time period. The Director will issue a Notice of Proposed Order to the proponent if the Minister is considering an order for the project within 30 days after the conclusion of the comment period on the Notice of Completion. At this time, the Director may request additional information from the proponent.

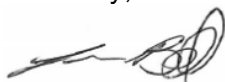
Once the requested information has been received, the Minister will have 30 days to make a decision or impose conditions on your project.

A draft copy of the report should be sent to me prior to the filing of the final report, allowing a minimum of 30 days for the ministry's technical reviewers to provide comments.

Please also ensure a copy of the final notice is sent to the ministry's Central Region EA notification email account (eanotification.cregion@ontario.ca) after the draft report is finalized.

Should you or your project team members have any questions regarding the material above, please contact me at trevor.bell@ontario.ca.

Sincerely,



Trevor Bell
Regional Environmental Assessment Coordinator

cc: Tina Dufresne, Manager, Halton Peel District Office, MECP
Agni Papageorgiou, Supervisor, Project Review Unit
Paramjit Dhillon, Project Manager, Jacobs

Attachments: Areas of Interest
A Proponent's Introduction to the Delegation of Procedural Aspects of
consultation with Aboriginal Communities

AREAS OF INTEREST

It is suggested that you check off each applicable area after you have considered / addressed it.

Species at Risk

- The Ministry of the Environment, Conservation and Parks has now assumed responsibility of Ontario's Species at Risk program. For any questions related to subsequent permit requirements, please contact SAROntario@ontario.ca.

Planning and Policy

- Ontario has released "A Place to Grow: Growth Plan for the Greater Golden Horseshoe (2019)" which replaces the "Growth Plan for the Greater Golden Horseshoe (2017)". More information, including the Plan, is found here: <https://www.placestogrow.ca>.
- Parts of the study area may be subject to the [A Place to Grow: Growth Plan for the Greater Golden Horseshoe](#) (2019), [Oak Ridges Moraine Conservation Plan](#) (2017), [Niagara Escarpment Plan](#) (2017), [Greenbelt Plan](#) (2017) or [Lake Simcoe Protection Plan](#) (2014). Applicable policies should be referenced in the report, and the proponent should describe how the proposed project adheres to the relevant policies in these plans.
- The [Provincial Policy Statement](#) (2020) contains policies that protect Ontario's natural heritage and water resources. Applicable policies should be referenced in the report, and the proponent should describe how the proposed project is consistent with these policies.

Source Water Protection (all projects)

The *Clean Water Act*, 2006 (CWA) aims to protect existing and future sources of drinking water. To achieve this, several types of vulnerable areas have been delineated around surface water intakes and wellheads for every municipal residential drinking water system that is located in a source protection area. These vulnerable areas are known as a Wellhead Protection Areas (WHPAs) and surface water Intake Protection Zones (IPZs). Other vulnerable areas that have been delineated under the CWA include Highly Vulnerable Aquifers (HVAs), Significant Groundwater Recharge Areas (SGRAs), Event-based modelling areas (EBAs), and Issues Contributing Areas (ICAs). Source protection plans have been developed that include policies to address existing and future risks to sources of municipal drinking water within these vulnerable areas.

Projects that are subject to the Environmental Assessment Act that fall under a Class EA, or one of the Regulations, have the potential to impact sources of drinking water if they occur in designated vulnerable areas or in the vicinity of other at-risk drinking water systems (i.e. systems that are not municipal residential systems). MEA Class EA projects may include activities that, if located in a vulnerable area, could be a threat to sources of drinking water (i.e. have the potential to adversely affect the quality or quantity of drinking water sources) and the activity could therefore be subject to policies in a source protection plan. Where an activity poses a risk to drinking water, policies in the local source protection plan may impact how or where that activity is undertaken. Policies may prohibit certain activities, or they may require risk management measures for these activities. Municipal Official Plans, planning decisions, Class EA projects (where the project includes an activity that is a threat to drinking water) and prescribed instruments must conform with policies that address significant risks to drinking water and must have regard for policies that address moderate or low risks.

- In October 2015, the MEA Parent Class EA document was amended to include reference to the

Clean Water Act (Section A.2.10.6) and indicates that proponents undertaking a Municipal Class EA project must identify early in their process whether a project is or could potentially be occurring with a vulnerable area. **Given this requirement, please include a section in the report on source water protection.**

- The proponent should identify the source protection area and should clearly document how the proximity of the project to sources of drinking water (municipal or other) and any delineated vulnerable areas was considered and assessed. Specifically, the report should discuss whether or not the project is located in a vulnerable area and provide applicable details about the area.
- If located in a vulnerable area, proponents should document whether any project activities are prescribed drinking water threats and thus pose a risk to drinking water (this should be consulted on with the appropriate Source Protection Authority). Where an activity poses a risk to drinking water, the proponent must document and discuss in the report how the project adheres to or has regard to applicable policies in the local source protection plan. This section should then be used to inform and be reflected in other sections of the report, such as the identification of net positive/negative effects of alternatives, mitigation measures, evaluation of alternatives etc.
- While most source protection plans focused on including policies for significant drinking water threats in the WHPAs and IPZs it should be noted that even though source protection plan policies may not apply in HVAs, these are areas where aquifers are sensitive and at risk to impacts and within these areas, activities may impact the quality of sources of drinking water for systems other than municipal residential systems.
- In order to determine if this project is occurring within a vulnerable area, proponents can use this mapping tool: <http://www.applications.ene.gov.on.ca/swp/en/index.php>. The mapping tool will also provide a link to the appropriate source protection plan in order to identify what policies may be applicable in the vulnerable area.
- For further information on the maps or source protection plan policies which may relate to their project, proponents must contact the appropriate source protection authority. **Please consult with the local source protection authority to discuss potential impacts on drinking water. The contact for this project is Jennifer Stephens at (416) 661-6600 ext 5568 or jstephens@trca.on.ca. Please document the results of that consultation within the report and include all communication documents/correspondence.**

More Information

For more information on the *Clean Water Act*, source protection areas and plans, including specific information on the vulnerable areas and drinking water threats, please refer to Conservation Ontario's website where you will also find links to the local source protection plan/assessment report.

A list of the prescribed drinking water threats can be found in section 1.1 of Ontario Regulation 287/07 made under the *Clean Water Act*. In addition to prescribed drinking water threats, some source protection plans may include policies to address additional "local" threat activities, as approved by the MECP.

Climate Change

Ontario is leading the fight against climate change through the [Climate Change Action Plan](#). Recently released, the plan lays out the specific actions Ontario will take in the next five years to meet its 2020 greenhouse gas reduction targets and establishes the framework necessary to meet its long-term

targets. As a commitment of the action plan, **the province has now finalized a guide, "[Considering Climate Change in the Environmental Assessment Process](#)" (Guide).**

The Guide is now a part of the Environmental Assessment program's Guides and Codes of Practice. The Guide sets out the MECP's expectation for considering climate change in the preparation, execution and documentation of environmental assessment studies and processes. The guide provides examples, approaches, resources, and references to assist proponents with consideration of climate change in EA. **Proponents should review this Guide in detail.**

- The MECP expects proponents to:
 1. Take into account during the assessment of alternative solutions and alternative designs, the following:
 - a. the project's expected production of greenhouse gas emissions and impacts on carbon sinks (climate change mitigation); and
 - b. resilience or vulnerability of the undertaking to changing climatic conditions (climate change adaptation).
 2. Include a discrete section in the report detailing how climate change was considered in the EA.

How climate change is considered can be qualitative or quantitative in nature, and should be scaled to the project's level of environmental effect. In all instances, both a project's impacts on climate change (mitigation) and impacts of climate change on a project (adaptation) should be considered.

- The MECP has also prepared another guide to support provincial land use planning direction related to the completion of energy and emission plans. The "[Community Emissions Reduction Planning: A Guide for Municipalities](#)" document is designed to educate stakeholders on the municipal opportunities to reduce energy and greenhouse gas emissions, and to provide guidance on methods and techniques to incorporate consideration of energy and greenhouse gas emissions into municipal activities of all types. We encourage you to review the Guide for information.

□ Air Quality, Dust and Noise

- If there are sensitive receptors in the surrounding area of this project, an air quality/odour impact assessment will be useful to evaluate alternatives, determine impacts and identify appropriate mitigation measures. The scope of the assessment can be determined based on the potential effects of the proposed alternatives, and typically includes source and receptor characterization and a quantification of local air quality impacts on the sensitive receptors and the environment in the study area. The assessment will compare to all applicable standards or guidelines for all contaminants of concern. **Please contact this office for further consultation on the level of Air Quality Impact Assessment required for this project if not already advised.**
- **If a full Air Quality Impact Assessment is not required for the project, the report should still contain:**
 - A discussion of local air quality including existing activities/sources that significantly impact local air quality and how the project may impact existing conditions;
 - A discussion of the nearby sensitive receptors and the project's potential air quality impacts on present and future sensitive receptors;
 - A discussion of local air quality impacts that could arise from this project during both construction and operation; and

- A discussion of potential mitigation measures.
- As a common practice, “air quality” should be used as an evaluation criterion for all road projects.
- Dust and noise control measures should be addressed and included in the construction plans to ensure that nearby residential and other sensitive land uses within the study area are not adversely affected during construction activities.
- The MECP recommends that non-chloride dust-suppressants be applied. For a comprehensive list of fugitive dust prevention and control measures that could be applied, refer to [Cheminfo Services Inc. Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities](#). report prepared for Environment Canada. March 2005.
- The report should consider the potential impacts of increased noise levels during the operation of the completed project. The proponent should explore all potential measures to mitigate significant noise impacts during the assessment of alternatives.

□ Ecosystem Protection and Restoration

- Any impacts to ecosystem form and function must be avoided where possible. The report should describe any proposed mitigation measures and how project planning will protect and enhance the local ecosystem.
- All natural heritage features should be identified and described in detail to assess potential impacts and to develop appropriate mitigation measures. The following sensitive environmental features may be located within or adjacent to the study area:
 - Areas of Natural and Scientific Interest (ANSIs)
 - Rare Species of flora or fauna
 - Watercourses
 - Wetlands
 - Woodlots

We recommend consulting with the Ministry of Natural Resources and Forestry (MNRF), Fisheries and Oceans Canada (DFO) and your local conservation authority to determine if special measures or additional studies will be necessary to preserve and protect these sensitive features. In addition, you may consider the provisions of the Rouge Park Management Plan if applicable.

□ Surface Water

- The report must include enough information to demonstrate that there will be no negative impacts on the natural features or ecological functions of any watercourses within the study area. Measures should be included in the planning and design process to ensure that any impacts to watercourses from construction or operational activities (e.g. spills, erosion, pollution) are mitigated as part of the proposed undertaking.
- Additional stormwater runoff from new pavement can impact receiving watercourses and flood conditions. Quality and quantity control measures to treat stormwater runoff should be considered for all new impervious areas and, where possible, existing surfaces. The ministry’s [Stormwater Management Planning and Design Manual \(2003\)](#) should be referenced in the report and utilized when designing stormwater control methods. **A Stormwater Management Plan should be prepared as part of the Class EA process** that includes:
 - Strategies to address potential water quantity and erosion impacts related to stormwater

draining into streams or other sensitive environmental features, and to ensure that adequate (enhanced) water quality is maintained

- Watershed information, drainage conditions, and other relevant background information
 - Future drainage conditions, stormwater management options, information on erosion and sediment control during construction, and other details of the proposed works
 - Information on maintenance and monitoring commitments.
- Ontario Regulation 60/08 under the *Ontario Water Resources Act* (OWRA) applies to the Lake Simcoe Basin, which encompasses Lake Simcoe and the lands from which surface water drains into Lake Simcoe. If the proposed sewage treatment plant is listed in Table 1 of the regulation, the report should describe how the proposed project and its mitigation measures are consistent with the requirements of this regulation and the OWRA.
 - Any potential approval requirements for surface water taking or discharge should be identified in the report. A Permit to Take Water (PTTW) under the OWRA will be required for any water takings that exceed 50,000 L/day, except for certain water taking activities that have been prescribed by the Water Taking EASR Regulation – *O. Reg. 63/16*. These prescribed water-taking activities require registration in the EASR instead of a PTTW. Please review the [Water Taking User Guide for EASR](#) for more information. Additionally, an Environmental Compliance Approval under the OWRA is required for municipal stormwater management works.

Groundwater

- The status of, and potential impacts to any well water supplies should be addressed. If the project involves groundwater takings or changes to drainage patterns, the quantity and quality of groundwater may be affected due to drawdown effects or the redirection of existing contamination flows. In addition, project activities may infringe on existing wells such that they must be reconstructed or sealed and abandoned. Appropriate information to define existing groundwater conditions should be included in the report.
- If the potential construction or decommissioning of water wells is identified as an issue, the report should refer to Ontario Regulation 903, Wells, under the OWRA.
- Potential impacts to groundwater-dependent natural features should be addressed. Any changes to groundwater flow or quality from groundwater taking may interfere with the ecological processes of streams, wetlands or other surficial features. In addition, discharging contaminated or high volumes of groundwater to these features may have direct impacts on their function. Any potential effects should be identified, and appropriate mitigation measures should be recommended. The level of detail required will be dependent on the significance of the potential impacts.
- Any potential approval requirements for groundwater taking or discharge should be identified in the report. A Permit to Take Water (PTTW) under the OWRA will be required for any water takings that exceed 50,000 L/day, with the exception of certain water taking activities that have been prescribed by the Water Taking EASR Regulation – *O. Reg. 63/16*. These prescribed water-taking activities require registration in the EASR instead of a PTTW. Please review the [Water Taking User Guide for EASR](#) for more information.

Contaminated Soils

- Since the removal or movement of soils may be required, appropriate tests to determine contaminant levels from previous land uses or dumping should be undertaken. If the soils are contaminated, you must determine how and where they are to be disposed of, consistent with

Part XV.1 of the Environmental Protection Act (EPA) and Ontario Regulation 153/04, Records of Site Condition, which details the new requirements related to site assessment and clean up. Please contact the appropriate MECP District Office for further consultation if contaminated sites are present.

- Any current or historical waste disposal sites should be identified in the report. The status of these sites should be determined to confirm whether approval pursuant to Section 46 of the EPA may be required for land uses on former disposal sites.
- The location of any underground storage tanks should be investigated in the report. Measures should be identified to ensure the integrity of these tanks and to ensure an appropriate response in the event of a spill. The ministry's Spills Action Centre must be contacted in such an event.
- The report should identify any underground transmission lines in the study area. The owners should be consulted to avoid impacts to this infrastructure, including potential spills.

Excess Materials Management

- Activities involving the management of excess soil should be completed in accordance with the MECP's current guidance document titled "[Management of Excess Soil – A Guide for Best Management Practices](#)" (2014).
- All waste generated during construction must be disposed of in accordance with ministry requirements

Servicing and Facilities

- Any facility that releases emissions to the atmosphere, discharges contaminants to ground or surface water, provides potable water supplies, or stores, transports or disposes of waste must have an Environmental Compliance Approval (ECA) before it can operate lawfully. Please consult with the Environmental Approvals Access and Service Integration Branch (EAASIB) to determine whether a new or amended ECA will be required for any proposed infrastructure.
- We recommend referring to the ministry's [environmental land use planning guides](#) to ensure that any potential land use conflicts are considered when planning for any infrastructure or facilities related to wastewater, pipelines, landfills or industrial uses.

Mitigation and Monitoring

- Contractors must be made aware of all environmental considerations so that all environmental standards and commitments for both construction and operation are met. Mitigation measures should be clearly referenced in the report and regularly monitored during the construction stage of the project. In addition, we encourage proponents to conduct post-construction monitoring to ensure all mitigation measures have been effective and are functioning properly.
- Design and construction reports and plans should be based on a best management approach that centres on the prevention of impacts, protection of the existing environment, and opportunities for rehabilitation and enhancement of any impacted areas.
- The proponent's construction and post-construction monitoring plans must be documented in the report, as outlined in Section A.2.5 and A.4.1 of the MEA Class EA parent document.

□ Consultation

- The report must demonstrate how the consultation provisions of the Class EA have been fulfilled, including documentation of all stakeholder consultation efforts undertaken during the planning process. This includes a discussion in the SR that identifies concerns that were raised and **describes how they have been addressed by the proponent** throughout the planning process. The Class EA also directs proponents to include copies of comments submitted on the project by interested stakeholders, and the proponent's responses to these comments.

□ Class EA Process

- The report should provide clear and complete documentation of the planning process in order to allow for transparency in decision-making.
- If this project is a Master Plan: there are several different approaches that can be used to conduct a Master Plan, examples of which are outlined in Appendix 4 of the Class EA. The Master Plan should clearly indicate the selected approach for conducting the plan, by identifying whether the levels of assessment, consultation and documentation are sufficient to fulfill the requirements for Schedule B or C projects. Please note that any Schedule B or C projects identified in the plan would be subject to Part II Order Requests under the *Environmental Assessment Act*, although the plan itself would not be.
- The report must demonstrate how the consultation provisions of the Class EA have been fulfilled, including documentation of all stakeholder consultation efforts undertaken during the planning process. This includes a discussion in the report that identifies concerns that were raised and **describes how they have been addressed by the proponent** throughout the planning process. The Class EA also directs proponents to include copies of comments submitted on the project by interested stakeholders, and the proponent's responses to these comments.
- The Class EA requires the consideration of the effects of each alternative on all aspects of the environment. The report should include a level of detail (e.g. hydrogeological investigations, terrestrial and aquatic assessments) such that all potential impacts can be identified, and appropriate mitigation measures can be developed. Any supporting studies conducted during the Class EA process should be referenced and included as part of the report.
- Please include in the report a list of all subsequent permits or approvals that may be required for the implementation of the preferred alternative, including but not limited to, MECP's PTTW, EASR Registrations and ECAs, conservation authority permits, species at risk permits, and approvals under the *Impact Assessment Act*, 2019.
- Ministry guidelines and other information related to the issues above are available at <http://www.ontario.ca/environment-and-energy/environment-and-energy>. We encourage you to review all the available guides and to reference any relevant information in the report.

A PROPONENT'S INTRODUCTION TO THE DELEGATION OF PROCEDURAL ASPECTS OF CONSULTATION WITH ABORIGINAL COMMUNITIES

Definitions

The following definitions are specific to this document and may not apply in other contexts:

Aboriginal communities – the First Nation or Métis communities identified by the Crown for the purpose of consultation.

Consultation – the Crown's legal obligation to consult when the Crown has knowledge of an established or asserted Aboriginal or treaty right and contemplates conduct that might adversely impact that right. This is the type of consultation required pursuant to s. 35 of the *Constitution Act, 1982*. Note that this definition does not include consultation with Aboriginal communities for other reasons, such as regulatory requirements.

Crown – the Ontario Crown, acting through a particular ministry or ministries.

Procedural aspects of consultation – those portions of consultation related to the process of consultation, such as notifying an Aboriginal community about a project, providing information about the potential impacts of a project, responding to concerns raised by an Aboriginal community and proposing changes to the project to avoid negative impacts.

Proponent – the person or entity that wants to undertake a project and requires an Ontario Crown decision or approval for the project.

I. Purpose

The Crown has a legal duty to consult Aboriginal communities when it has knowledge of an existing or asserted Aboriginal or treaty right and contemplates conduct that may adversely impact that right. In outlining a framework for the duty to consult, the Supreme Court of Canada has stated that the Crown may delegate procedural aspects of consultation to third parties. This document provides general information about the Ontario Crown's approach to delegation of the procedural aspects of consultation to proponents.

This document is not intended to instruct a proponent about an individual project, and it does not constitute legal advice.

II. Why is it Necessary to Consult with Aboriginal Communities?

The objective of the modern law of Aboriginal and treaty rights is the *reconciliation* of Aboriginal peoples and non-Aboriginal peoples and their respective rights, claims and interests. Consultation is an important component of the reconciliation process.

The Crown has a legal duty to consult Aboriginal communities when it has knowledge of an existing or asserted Aboriginal or treaty right and contemplates conduct that might adversely impact that right. For example, the Crown's duty to consult is triggered when it considers issuing a permit, authorization or approval for a project which has the potential to adversely impact an Aboriginal right, such as the right to hunt, fish, or trap in a particular area.

The scope of consultation required in particular circumstances ranges across a spectrum depending on both the nature of the asserted or established right and the seriousness of the potential adverse impacts on that right.

Depending on the particular circumstances, the Crown may also need to take steps to accommodate the potentially impacted Aboriginal or treaty right. For example, the Crown may be required to avoid or minimize the potential adverse impacts of the project.

III. The Crown's Role and Responsibilities in the Delegated Consultation Process

The Crown has the responsibility for ensuring that the duty to consult, and accommodate where appropriate, is met. However, the Crown may delegate the procedural aspects of consultation to a proponent.

There are different ways in which the Crown may delegate the procedural aspects of consultation to a proponent, including through a letter, a memorandum of understanding, legislation, regulation, policy and codes of practice.

If the Crown decides to delegate procedural aspects of consultation, the Crown will generally:

- Ensure that the delegation of procedural aspects of consultation and the responsibilities of the proponent are clearly communicated to the proponent;
- Identify which Aboriginal communities must be consulted;
- Provide contact information for the Aboriginal communities;
- Revise, as necessary, the list of Aboriginal communities to be consulted as new information becomes available and is assessed by the Crown;
- Assess the scope of consultation owed to the Aboriginal communities;
- Maintain appropriate oversight of the actions taken by the proponent in fulfilling the procedural aspects of consultation;
- Assess the adequacy of consultation that is undertaken and any accommodation that may be required;
- Provide a contact within any responsible ministry in case issues arise that require direction from the Crown; and
- Participate in the consultation process as necessary and as determined by the Crown.

IV. The Proponent's Role and Responsibilities in the Delegated Consultation Process

Where aspects of the consultation process have been delegated to a proponent, the Crown, in meeting its duty to consult, will rely on the proponent's consultation activities and documentation of those activities. The consultation process informs the Crown's decision of whether or not to approve a proposed project or activity.

A proponent's role and responsibilities will vary depending on a variety of factors including the extent of consultation required in the circumstance and the procedural aspects of consultation the Crown has delegated to it. Proponents are often in a better position than the Crown to discuss a project and its potential impacts with Aboriginal communities and to determine ways to avoid or minimize the adverse impacts of a project.

A proponent can raise issues or questions with the Crown at any time during the consultation process. If issues or concerns arise during the consultation that cannot be addressed by the proponent, the proponent should contact the Crown.

a) What might a proponent be required to do in carrying out the procedural aspects of consultation?

Where the Crown delegates procedural aspects of consultation, it is often the proponent's responsibility to provide notice of the proposed project to the identified Aboriginal communities. The notice should indicate that the Crown has delegated the procedural aspects of consultation to the proponent and should include the following information:

- a description of the proposed project or activity;
- mapping;
- proposed timelines;
- details regarding anticipated environmental and other impacts;
- details regarding opportunities to comment; and
- any changes to the proposed project that have been made for seasonal conditions or other factors, where relevant.

Proponents should provide enough information and time to allow Aboriginal communities to provide meaningful feedback regarding the potential impacts of the project. Depending on the nature of consultation required for a project, a proponent also may be required to:

- provide the Crown with copies of any consultation plans prepared and an opportunity to review and comment;
- ensure that any necessary follow-up discussions with Aboriginal communities take place in a timely manner, including to confirm receipt of information, share and update information and to address questions or concerns that may arise;
- as appropriate, discuss with Aboriginal communities potential mitigation measures and/or changes to the project in response to concerns raised by Aboriginal communities;
- use language that is accessible and not overly technical, and translate material into Aboriginal languages where requested or appropriate;
- bear the reasonable costs associated with the consultation process such as, but not limited to, meeting hall rental, meal costs, document translation(s), or to address technical & capacity issues;
- provide the Crown with all the details about potential impacts on established or asserted Aboriginal or treaty rights, how these concerns have been considered and addressed by the proponent and the Aboriginal communities and any steps taken to mitigate the potential impacts;
- provide the Crown with complete and accurate documentation from these meetings and communications; and
- notify the Crown immediately if an Aboriginal community not identified by the Crown approaches the proponent seeking consultation opportunities.

b) What documentation and reporting does the Crown need from the proponent?

Proponents should keep records of all communications with the Aboriginal communities involved in the consultation process and any information provided to these Aboriginal communities.

As the Crown is required to assess the adequacy of consultation, it needs documentation to satisfy itself that the proponent has fulfilled the procedural aspects of consultation delegated to it. The documentation required would typically include:

- the date of meetings, the agendas, any materials distributed, those in attendance and copies of any minutes prepared;
- the description of the proposed project that was shared at the meeting;
- any and all concerns or other feedback provided by the communities;

- any information that was shared by a community in relation to its asserted or established Aboriginal or treaty rights and any potential adverse impacts of the proposed activity, approval or disposition on such rights;
- any proposed project changes or mitigation measures that were discussed, and feedback from Aboriginal communities about the proposed changes and measures;
- any commitments made by the proponent in response to any concerns raised, and feedback from Aboriginal communities on those commitments;
- copies of correspondence to or from Aboriginal communities, and any materials distributed electronically or by mail;
- information regarding any financial assistance provided by the proponent to enable participation by Aboriginal communities in the consultation;
- periodic consultation progress reports or copies of meeting notes if requested by the Crown;
- a summary of how the delegated aspects of consultation were carried out and the results; and
- a summary of issues raised by the Aboriginal communities, how the issues were addressed and any outstanding issues.

In certain circumstances, the Crown may share and discuss the proponent's consultation record with an Aboriginal community to ensure that it is an accurate reflection of the consultation process.

c) Will the Crown require a proponent to provide information about its commercial arrangements with Aboriginal communities?

The Crown may require a proponent to share information about aspects of commercial arrangements between the proponent and Aboriginal communities where the arrangements:

- include elements that are directed at mitigating or otherwise addressing impacts of the project;
- include securing an Aboriginal community's support for the project; or
- may potentially affect the obligations of the Crown to the Aboriginal communities.

The proponent should make every reasonable effort to exempt the Crown from confidentiality provisions in commercial arrangements with Aboriginal communities to the extent necessary to allow this information to be shared with the Crown.

The Crown cannot guarantee that information shared with the Crown will remain confidential. Confidential commercial information should not be provided to the Crown as part of the consultation record if it is not relevant to the duty to consult or otherwise required to be submitted to the Crown as part of the regulatory process.

V. What are the Roles and Responsibilities of Aboriginal Communities' in the Consultation Process?

Like the Crown, Aboriginal communities are expected to engage in consultation in good faith. This includes:

- responding to the consultation notice;
- engaging in the proposed consultation process;
- providing relevant documentation;
- clearly articulating the potential impacts of the proposed project on Aboriginal or treaty rights; and
- discussing ways to mitigate any adverse impacts.

Some Aboriginal communities have developed tools, such as consultation protocols, policies or processes that provide guidance on how they would prefer to be consulted. Although not legally binding, proponents are encouraged to respect these community processes where it is reasonable to do so. Please note that there is no obligation for a proponent to pay a fee to an Aboriginal community in order to enter into a consultation process.

To ensure that the Crown is aware of existing community consultation protocols, proponents should contact the relevant Crown ministry when presented with a consultation protocol by an Aboriginal community or anyone purporting to be a representative of an Aboriginal community.

VI. What if More Than One Provincial Crown Ministry is Involved in Approving a Proponent's Project?

Depending on the project and the required permits or approvals, one or more ministries may delegate procedural aspects of the Crown's duty to consult to the proponent. The proponent may contact individual ministries for guidance related to the delegation of procedural aspects of consultation for ministry-specific permits/approvals required for the project in question. Proponents are encouraged to seek input from all involved Crown ministries sooner rather than later.

MECP Feedback	Addressed in the Project File
<p>Species at Risk The Ministry of the Environment, Conservation and Parks has now assumed responsibility of Ontario's Species at Risk program. For any questions related to subsequent permit requirements, please contact SAROntario@ontario.ca.</p>	<p>Section 2.1.4 Species at Risk and Related Habitat</p>
<p>Ontario has released "A Place to Grow: Growth Plan for the Greater Golden Horseshoe (2019)" which replaces the "Growth Plan for the Greater Golden Horseshoe (2017)". More information, including the Plan, is found here: https://www.placestogrow.ca.</p>	<p>Section 2.2.1 Land Use and Planning</p>
<p>Parts of the study area may be subject to the A Place to Grow: Growth Plan for the Greater Golden Horseshoe (2019), Oak Ridges Moraine Conservation Plan (2017), Niagara Escarpment Plan (2017), Greenbelt Plan (2017) or Lake Simcoe Protection Plan (2014). Applicable policies should be referenced in the report, and the proponent should describe how the proposed project adheres to the relevant policies in these plans.</p>	<p>Section 2.2.1 Land Use and Planning <i>Note: the Oak Ridges Moraine Conservation Plan (2017), Niagara Escarpment Plan (2017) and Lake Simcoe Plan (2014) are not applicable to the Project.</i></p>
<p>The Provincial Policy Statement (2020) contains policies that protect Ontario's natural heritage and water resources. Applicable policies should be referenced in the report, and the proponent should describe how the proposed project is consistent with these policies.</p>	<p>Section 1.3.3 Provincial Policy Statement and 2.2.1 Land Use and Planning</p>
<p>Source Water Protection: Wellhead Protection Areas (WHPAs) and surface water Intake Protection Zones (IPZs). Other vulnerable areas that have been delineated under the CWA include Highly Vulnerable Aquifers (HVAs), Significant Groundwater Recharge Areas (SGRAs), Event-based modelling areas (EBAs), and Issues Contributing Areas (ICAs).</p>	<p>Section 2.1.3 Aquatic Systems</p>
<p>Source Water Protection: Please consult with the local source protection authority to discuss potential impacts on drinking water.</p>	<p>Section 3.4.3 Appendix A4 Consultation and Engagement</p>
<p>Climate Change: Considering Climate Change in the Environmental Assessment Process</p>	<p>Section 2.1.5.1 Climate Change</p>
<p>Climate Change: Community Emissions Reduction Planning: A Guide for Municipalities</p>	<p>Section 4.2: Implementation (mitigation measures to reduce measures during construction)</p>
<p>Air Quality, Dust and Noise</p>	<ul style="list-style-type: none"> • Section 2.1.6 Air Quality • Table 4 Evaluation of Alternatives • Section 4 Implementation Plan
<p>Ecosystem Protection and Restoration</p>	<ul style="list-style-type: none"> • Impacts: Table 4 Evaluation of Alternatives • Features Identified and Described: Section 2.1 Natural Environment

MECP Feedback	Addressed in the Project File
	<ul style="list-style-type: none"> • Consultation: Section 3.4.3 Review Agencies, Appendix A4
Surface Water	Section 4.4.2 <i>Note: there are no areas of new pavement required for the Project</i>
Groundwater	Section 2.1.3: Aquatics Systems Section 4.2: Implementation
Contaminated soils	Section 4.2: Implementation
Excess Materials Management	Section 4.2: Implementation
Servicing and Facilities (ECA)	Section 4.3: Permits and Approvals
Mitigation and Monitoring	Section 4.2: Implementation
Consultation	Section 3.4 Appendix A4
Class EA Process	Section 1.3.2: Class Environmental Assessment Process Appendix A4: Consultation (records and PIC panels) Section 4.3: Permits

Newton, Dorin/TOR

From: Snell, Shamus (MECP) <Shamus.Snell@ontario.ca>
Sent: Wednesday, February 3, 2021 9:16 AM
To: Thannickal, Jimmy/TOR; Paquette, Samantha; Kilis, Jakub
Cc: Puri, Ajay; Dhillon, Paramjit/TOR; Flesher, Chris/TOR; Newton, Dorin/TOR
Subject: [EXTERNAL] Question In-Water Works: East to West Diversion Contract 2 - Credit River Crossing

Hi Jimmy,

So long there is no intrusion into the in-water work timing restrictions which have been put forth by my colleague and there is no additional information which suggests they should be extended then MECP has no concerns if in-water work is extended.

Regards,

Shamus Snell
A/ Management Biologist
Species at Risk Branch
Ministry of Environment, Conservation and Parks
Email: shamus.snell@ontario.ca

From: Thannickal, Jimmy/TOR <Jimmy.Thannickal@jacobs.com>
Sent: February 1, 2021 1:52 PM
To: Paquette, Samantha <samantha.paquette@peelregion.ca>; Kilis, Jakub <Jakub.Kilis@cvc.ca>; Snell, Shamus (MECP) <Shamus.Snell@ontario.ca>
Cc: Puri, Ajay <ajay.puri@peelregion.ca>; Dhillon, Paramjit/TOR <Paramjit.Dhillon@jacobs.com>; Flesher, Chris/TOR <Chris.Flesher@jacobs.com>; Newton, Dorin/TOR <Dorin.Newton@jacobs.com>
Subject: RE: East to West Diversion Contract 2 - Credit River Crossing

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Hi Shamus,

Samantha has informed me that you are replacing Megan as our MECP contact for his project. There is some discussion and questions below. I also shared some information with Megan which I hope was passed along. Please let me know if you need anything. We can have a meeting as well if it would help.

Jimmy Thannickal, P.Eng. | Jacobs
647.382.5056 mobile
Jimmy.Thannickal@jacobs.com | www.jacobs.com

From: Paquette, Samantha <samantha.paquette@peelregion.ca>
Sent: Monday, February 1, 2021 1:39 PM
To: Thannickal, Jimmy/TOR <Jimmy.Thannickal@jacobs.com>; Eplett, Megan (MECP) <Megan.Eplett@ontario.ca>; Kilis, Jakub <Jakub.Kilis@cvc.ca>
Cc: Puri, Ajay <ajay.puri@peelregion.ca>; Dhillon, Paramjit/TOR <Paramjit.Dhillon@jacobs.com>; Flesher, Chris/TOR <Chris.Flesher@jacobs.com>; Newton, Dorin/TOR <Dorin.Newton@jacobs.com>
Subject: [EXTERNAL] RE: East to West Diversion Contract 2 - Credit River Crossing

Hi Jimmy,

Her replacement for the time being will be Shamus Snell, Shamus.Snell@ontario.ca.

Thank you,

Samantha Paquette, C.E.T., OALA, ISA

Project Manager, Infrastructure Programming and Studies
Transportation, Public Works
Region of Peel
10 Peel Centre Dr., Suite B, 4th Floor
Brampton, ON L6T 4B9
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From: Thannickal, Jimmy/TOR <Jimmy.Thannickal@jacobs.com>

Sent: February 1, 2021 11:11 AM

To: Eplett, Megan (MECP) <Megan.Eplett@ontario.ca>; Kilis, Jakub <Jakub.Kilis@cvc.ca>; SAROntario@ontario.ca

Cc: Puri, Ajay <ajay.puri@peelregion.ca>; Paquette, Samantha <samantha.paquette@peelregion.ca>; Dhillon, Paramjit/TOR <Paramjit.Dhillon@jacobs.com>; Flesher, Chris/TOR <Chris.Flesher@jacobs.com>; Newton, Dorin/TOR <Dorin.Newton@jacobs.com>

Subject: RE: East to West Diversion Contract 2 - Credit River Crossing

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It would appear Megan is on maternity leave (best wishes Megan). I've included the general SAR Ontario email on this reply. I trust someone else will be taking over the file in her absence.

Jimmy

From: Thannickal, Jimmy/TOR

Sent: Monday, February 1, 2021 11:07 AM

To: Eplett, Megan (MECP) <Megan.Eplett@ontario.ca>; Kilis, Jakub <Jakub.Kilis@cvc.ca>

Cc: Puri, Ajay <ajay.puri@peelregion.ca>; Paquette, Samantha <samantha.paquette@peelregion.ca>; Dhillon, Paramjit/TOR <Paramjit.Dhillon@jacobs.com>; Flesher, Chris/TOR <Chris.Flesher@jacobs.com>; Newton, Dorin/TOR <Dorin.Newton@jacobs.com>

Subject: RE: East to West Diversion Contract 2 - Credit River Crossing

Hi Megan/Jakub,

Further to the below exchange between Megan and I, I've included Jakub from the CVC as the window of work is also important to the CVC and clarifying this window is important to the project.

As per Matrix's NHA report and in consultation with MECP for American Eel considerations, Jacobs will plan to complete the in-water works window starting on November 15, however, we would like to know if it would be okay to extend the window until March 31 rather than end on January 31. We anticipate no impacts to American Eel with this window or salmonid fall migration. CVC has stated an in-water works window from July 1 – March 31 and so there is a bit of a discrepancy. Could you please confirm that November 15 – March 31 is amicable by both? DFO will revert to the general timing window and MNRF likely won't confirm until a License to Collect Fish is retained so we hope to confirm with both MECP and CVC.

We'd greatly appreciate your feedback,

Jimmy Thannickal, P.Eng. | Jacobs
647.382.5056 mobile
Jimmy.Thannickal@jacobs.com | www.jacobs.com

From: Eplett, Megan (MECP) <Megan.Eplett@ontario.ca>
Sent: Thursday, January 28, 2021 10:44 AM
To: Thannickal, Jimmy/TOR <Jimmy.Thannickal@jacobs.com>
Cc: Puri, Ajay <ajay.puri@peelregion.ca>; Paquette, Samantha <samantha.paquette@peelregion.ca>; Dhillon, Paramjit/TOR <Paramjit.Dhillon@jacobs.com>; Flesher, Chris/TOR <Chris.Flesher@jacobs.com>; Newton, Dorin/TOR <Dorin.Newton@jacobs.com>
Subject: [EXTERNAL] RE: East to West Diversion Contract 2 - Credit River Crossing

Hello Jimmy,

I've reviewed the drawing as well as our reference material for American Eel. I understand that Matrix Solutions has identified the appropriate window for works for Eel to be November 15th to January 31st.

From review of our reference material this window would be appropriate. American Eel generally emigrate through this system June to October with emigration peaking between July-September. Therefore the July – September window would be the mostly likely time they could be encountered and should be avoided.

The timing window address section 9 species impacts under the *Endangered Species Act* however Eel is also afforded general habitat protection under Section 10 of the Act. I understand that the works are proposed to be constructed through open cut methods. MECP will require additional information to assess whether the proposed works will impact American Eel habitat. Can you please provide rationale as to why open cutting is the preferred method for installation? Additionally if there are any supporting reports that could be provided for review that would be helpful.

Thank you,

Megan

Megan Eplett | Management Biologist | Permissions and Compliance | Species at Risk Branch | Ontario Ministry of Environment, Conservation and Parks
50 Bloomington Road, Aurora, Ontario, L4G 0L8 | Phone: 289-221-1794 |
Email: megan.eplett@ontario.ca

Megan Eplett | Management Biologist | Permissions and Compliance | Species at Risk Branch |
Ontario Ministry of Environment, Conservation and Parks
50 Bloomington Road, Aurora, Ontario, L4G 0L8 | Phone: 289-221-1794 |
Email: megan.eplett@ontario.ca

From: Thannickal, Jimmy/TOR <Jimmy.Thannickal@jacobs.com>

Sent: Friday, January 22, 2021 3:31 PM

To: Eplett, Megan (MECP) <Megan.Eplett@ontario.ca>

Cc: Puri, Ajay <ajay.puri@peelregion.ca>; Paquette, Samantha <samantha.paquette@peelregion.ca>; Dhillon, Paramjit/TOR <Paramjit.Dhillon@jacobs.com>; Flesher, Chris/TOR <Chris.Flesher@jacobs.com>; Newton, Dorin/TOR <Dorin.Newton@jacobs.com>

Subject: RE: East to West Diversion Contract 2 - Credit River Crossing

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Hi Megan,

Just following up on this item. We are hoping you can provide confirmation of the appropriate timing window and any concerns you have in regards to SAR so we can continue with our other required permits for this project, especially in regards to CVC.

Thank you,

Jimmy

From: Thannickal, Jimmy/TOR

Sent: Tuesday, January 19, 2021 1:35 PM

To: Eplett, Megan (MECP) <Megan.Eplett@ontario.ca>

Cc: Puri, Ajay <ajay.puri@peelregion.ca>; Paquette, Samantha <samantha.paquette@peelregion.ca>; Dhillon, Paramjit/TOR <Paramjit.Dhillon@jacobs.com>; Flesher, Chris/TOR <Chris.Flesher@jacobs.com>; Newton, Dorin/TOR <Dorin.Newton@jacobs.com>

Subject: East to West Diversion Contract 2 - Credit River Crossing

Hi Megan

I've attached a figure which shows the location of our crossing of the credit river. I've also attached drawings which show the work. I thought the figure would be more helpful for you to try and determine the exact location.

Let me know if you need further information,

Jimmy Thannickal, P.Eng. | Jacobs

647.382.5056 mobile

Jimmy.Thannickal@jacobs.com | www.jacobs.com

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Ministry of Heritage, Sport,
Tourism and Culture Industries

From: Harvey, Joseph (MHSTCI) <Joseph.Harvey@ontario.ca>
Sent: Wednesday, October 7, 2020 1:18 PM
To: Dhillon, Paramjit/TOR <Paramjit.Dhillon@jacobs.com>
Cc: Puri, Ajay <ajay.puri@peelregion.ca>; Hatcher, Laura (MHSTCI) <Laura.E.Hatcher@ontario.ca>; Barboza, Karla (MHSTCI) <Karla.Barboza@ontario.ca>; Eby, Bryden <Bryden.Eby@jacobs.com>
Subject: [EXTERNAL] File 0013138: Notice of Study Commencement: Relocation of the 1,500-millimetre Credit Valley Trunk Sewer

Paramjit Dhillon,

Please find attached MHSTCI comments on the above referenced project update.
Please do not hesitate to contact Laura Hatcher if you have any questions.

Joseph Harvey
On behalf of

Laura Hatcher
Heritage Planner
Heritage Planning Unit
laura.e.hatcher@ontario.ca

Ministry of Heritage, Sport,
Tourism and Culture Industries

Programs and Services Branch
401 Bay Street, Suite 1700
Toronto, ON M7A 0A7
Tel: 437.239.3404

Ministère des Industries du Patrimoine,
du Sport, du Tourisme et de la Culture

Direction des programmes et des services
401, rue Bay, Bureau 1700
Toronto, ON M7A 0A7
Tél: 437.239.3404



October 7, 2020

EMAIL ONLY

Paramjit Dhillon, P.Eng.
Project Manager
Jacobs
245 Consumers Road, Suite 400
Toronto, ON M2J 1R3
Paramjit.Dhillon@jacobs.com

MHSTCI File : 0013138
Proponent : The Region of Peel
Subject : Notice of Study Commencement – Schedule ‘B’ MCEA
Project : Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer
Location : City of Mississauga, Region of Peel

Dear Paramjit Dhillon:

Thank you for providing the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI) with the Notice of Study Commencement for the above-referenced project. MHSTCI’s interest in this Environmental Assessment (EA) project relates to its mandate of conserving Ontario’s cultural heritage, which includes:

- Archaeological resources, including land and marine;
- Built heritage resources, including bridges and monuments; and,
- Cultural heritage landscapes.

Under the EA process, the proponent is required to determine a project’s potential impact on cultural heritage resources.

Project Summary

The Region of Peel (Region) is completing an Environmental Assessment (EA) study for the realignment of a section of the 1,500-millimetre (mm) Credit Valley Sanitary Trunk Sewer (CVS) in the City of Mississauga. The EA study is being carried out in accordance with the planning and design process for “Schedule B” projects under the Environmental Assessment Act as outlined in the Municipal Engineers Association’s Municipal Class Environmental Assessment document (2000, as amended in 2007, 2011, and 2015).

Identifying Cultural Heritage Resources

While some cultural heritage resources may have already been formally identified, others may be identified through screening and evaluation. Indigenous communities may have knowledge that can contribute to the identification of cultural heritage resources, and we suggest that any engagement with Indigenous communities includes a discussion about known or potential cultural heritage resources that are of value to these communities. Municipal Heritage Committees, historical societies and other local heritage organizations may also have knowledge that contributes to the identification of cultural heritage resources.

Archaeological Resources

This EA project may impact archaeological resources and should be screened using the MHSTCI [Criteria for Evaluating Archaeological Potential](#) and [Criteria for Evaluating Marine Archaeological Potential](#) to determine if an archaeological assessment is needed. MHSTCI archaeological sites data are available at archaeology@ontario.ca. If the EA project area exhibits archaeological potential, then an archaeological assessment (AA) should be undertaken by an archaeologist licenced under the OHA, who is responsible for submitting the report directly to MHSTCI for review.

Built Heritage and Cultural Heritage Landscapes

The MHSTCI [Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes](#) should be completed to help determine whether this EA project may impact cultural heritage resources. If potential or known heritage resources exist, MHSTCI recommends that a Heritage Impact Assessment (HIA), prepared by a qualified consultant, should be completed to assess potential project impacts. Our Ministry's [Info Sheet #5: Heritage Impact Assessments and Conservation Plans](#) outlines the scope of HIAs. Please send the HIA to MHSTCI for review and make it available to local organizations or individuals who have expressed interest in review.

Environmental Assessment Reporting

All technical cultural heritage studies and their recommendations are to be addressed and incorporated into EA projects. Please advise MHSTCI whether any technical cultural heritage studies will be completed for this EA project, and provide them to MHSTCI before issuing a Notice of Completion or commencing any work on the site. If screening has identified no known or potential cultural heritage resources, or no impacts to these resources, please include the completed checklists and supporting documentation in the EA report or file.

Thank you for consulting MHSTCI on this project and please continue to do so throughout the EA process. If you have any questions or require clarification, do not hesitate to contact Laura Hatcher.

Sincerely,

Joseph Harvey
On behalf of

Laura Hatcher
Heritage Planner
Heritage Planning Unit
laura.e.hatcher@ontario.ca

Copied to: Ajay Puri, Project Manager The Regional Municipality of Peel
Bryden Eby, Environmental Planner, Jacobs

It is the sole responsibility of proponents to ensure that any information and documentation submitted as part of their EA report or file is accurate. MHSTCI makes no representation or warranty as to the completeness, accuracy or quality of the any checklists, reports or supporting documentation submitted as part of the EA process, and in no way shall MHSTCI be liable for any harm, damages, costs, expenses, losses, claims or actions that may result if any checklists, reports or supporting documents are discovered to be inaccurate, incomplete, misleading or fraudulent.

Please notify MHSTCI if archaeological resources are impacted by EA project work. All activities impacting archaeological resources must cease immediately, and a licensed archaeologist is required to carry out an archaeological assessment in accordance with the *Ontario Heritage Act* and the *Standards and Guidelines for Consultant Archaeologists*.

If human remains are encountered, all activities must cease immediately and the local police as well as the Registrar, Burials of the Ministry of Government and Consumer Services (416-326-8800) must be contacted. In situations where human remains are associated with archaeological resources, MHSTCI should also be notified to ensure that the site is not subject to unlicensed alterations which would be a contravention of the *Ontario Heritage Act*.

Ministry of Natural
Resources and Forestry

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 Canada
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Subject MNR Meeting #1

Project East to West Diversion Sanitary Trunk Sewer and Highway 401 Crossings Projects

Project No. 703215 and D3113400

Prepared by Andrea Pitura **Phone No.** 416.200.8777

Location 10 Peel Centre Drive **Date/Time** December 11, 2018
 Room 4-831 9:30 am to 11:00 am

Participants MNR Region of Peel Jacobs
 Mark Heaton Nick Gan Camilo Quintero
 Frank Pugliese Andrea Pitura

Objectives

To discuss CVC requirements and issues relating to the East to West Diversion and Highway 401 Crossings Projects.
Items in italics were carried out following the meeting.

	Notes	Action	Due Date
1	Project outline		
	Jacobs summarized the scope of the projects and indicated that the East to West Sanitary tunnel project will cross Fletcher's Creek, Levi Creek, the Credit River and construction will occur on Willow Lane and at the Meadowvale Pumping Station. The Highway 401 Tunnel Crossings Project will cross the Credit River and Mullet Creek in two locations.		
2	Email from Matrix		
	<p>Items in the email from Matrix to Jacobs on 10-Dec-18 were discussed:</p> <p><u>Aquatic</u> Credit River</p> <ul style="list-style-type: none"> ▪ MNR indicated Credit River is confirmed American Eel habitat (Endangered under ESA) ▪ Construction in water work timing window (in-water works permitted) likely Nov 15 – Jan 31 to avoid conflict with migratory salmonids and American Eel ▪ Classified as warmwater sportfish habitat & coldwater sportfish migratory corridor - Commercial, Recreational or Aboriginal Fishery (CRA Fishery) ▪ Confirmed Chinook Salmon spawning location ▪ Minimum setback is considered whichever is greater of the watercourse meander belt width or 15 m (Credit River Fisheries Management Plan) <p>Mullet Creek</p> <ul style="list-style-type: none"> ▪ Construction timing window (in-water works permitted) July 1 – March 31 ▪ Warmwater bait/forage fish community – supports CRA Fishery ▪ No SAR concerns identified 		

	Notes	Action	Due Date
	<ul style="list-style-type: none"> Minimum setback is considered whichever is greater of the watercourse meander belt width or 15 m (Credit River Fisheries Management Plan) <p><u>Terrestrial</u></p> <ul style="list-style-type: none"> <i>Potential Bobolink and Eastern Meadowlark habitat (adjacent to Site 4a and at Site 11)</i> <p>Jacobs to check with CVC to see if there are any local records of these birds in this area.</p> <p>MH stated that Matrix should conduct field investigation and call counts in May- June to see if the bobolink and eastern meadowlark are actually in this area. Matrix will be able to comment on the quality of the habitat.</p> <p>MH indicated that these birds leave in late August and return in early May. The bird habitat must be restored before the birds in the spring.</p> <ul style="list-style-type: none"> <i>Confirmed Barn Swallow nesting on Hwy 401 bridge over Credit River</i> <p>MH stated there is no action for Jacobs regarding the barn swallow nest.</p> <ul style="list-style-type: none"> <i>Potential Significant Wildlife Habitat (SWH) - Habitat for several Species of Conservation Concern (Eastern Wood-Pewee, Snapping Turtle, Monarch Butterfly)</i> <p>MH indicated the SWH is regarding the Planning Act which pertains to subdivisions only.</p> <ul style="list-style-type: none"> <i>Peel Caledon Significant Woodlands and Wildlife Habitat Study- The area near Highway 401 and Creditview Road qualifies as SWH – criteria B4: foraging area with abundant mast</i> <p>MH indicated the SWH is regarding the Planning Act which pertains to subdivisions only.</p>	<p>Jacobs</p> <p>Matrix</p>	<p>11-Jan-19</p> <p>25-Jan-19</p>
3	East to West Diversion Project		
a)	Fletcher's Creek (Golf Course)		
	<p>MH noted that Fletcher's Creek is a regulated habitat for red side dace. Fletcher's Creek is a regulated stream. 30m outside of the meander belt is included in the regulated area.</p> <p>If the disturbed area is less than 300m², registration needs to be made with the Ministry. If the disturbed area is greater than 300m², a permit is required.</p> <p>Once the planned disturbed area has been determined by Jacobs, Jacobs to forward to MNRF for review and discussion.</p>	Jacobs	25-Jan-19
b)	Meadowvale Village (Willow Lane and Meadowvale SPS)		
	MH indicated that MNR has no concerns in this area.		
c)	Credit River crossing on Old Derry Rd		
	MH indicated that the crossing of Credit River will require a new easement from The Crown. Permit is part of the Public Lands Act.	Jacobs	25-Feb-19

Notes		Action	Due Date
d)	Shaft 1		
	MH indicated that there are no aquatic SAR at Shaft 1. If the creek is to be open cut and diverted during construction, Jacobs will require a license to collect fish in water works. Fish rescue may be required.	Jacobs	15-Mar-19
e)	MH 11		
	MH indicated that there is likely Bobolink and Eastern Meadowlark habitats in the in the vicinity of MH11.		
4	Highway 401 Crossings Project		
a)	Crossing 11- Credit River		
	<p>MH indicated that Golder does not require a permit to drill boreholes near the Credit River.</p> <p>AMP explained that the installation of the new 1500mm trunk sewer will be installed in the same easement as the ex. 675mm trunk sewer. The ex. 675mm will be removed. CQ stated that the current design shows an open cut crossing of the Credit River due to the minimal cover underneath the creek bed. MH noted that MNR prefers and open cut crossing. MH indicated that the crossing of Credit River will not require a new easement from The Crown as the Region's existing easement is being utilized.</p> <p>MH noted that the open cut construction should occur between July 1 and September 30; this is the time period where the River has the least amount of flow. November 15 to January 31 is another time period for open cut to avoid conflict with migratory salmonids and American Eel.</p> <p>AMP indicated that a fluvial geomorphological and scour erosion investigation is being conducted by Matrix.</p> <p>MH confirmed that the existing 1500mm trunk and concrete encasement that will be abandoned is to be removed beyond the extent of the new Credit River culvert underneath Highway 401.</p> <p>MH indicated that there is likely Bobolink and Eastern Meadowlark habitats on the north side of Highway 401 in the fields on the Sanford Farm property and in the fields on the south side at Crossing 11.</p>		
b)	Crossings 7&8- Mullet Creek		
	MH indicated that MNRF have no concerns regarding this crossing.		
c)	Crossings 5&6- Mullet Creek		
	MH indicated that MNRF have no concerns regarding this crossing.		
d)	Crossing 4		
	MH indicated that there is likely Bobolink and Eastern Meadowlark habitats on the north side of Highway 401 in the empty property at Crossing 4. These birds are of the grassland species.		
4	Next Steps		
	AMP to forward these meeting minutes to Matrix which will provide clarifications on the email sent by Erica on 10-Dec-18.	Andrea	11-Jan-19

Ministry of Transportation/
Infrastructure Ontario

Subject OE Highway 401 Expansion:
 Peel Region Utilities – Feasibility of Raising Water Valves / Maintenance Holes

Date Tuesday, January 15, 2019

Time 2:30 pm – 3:30 pm

Location Region of Peel, 10 Peel Centre Drive

Attendees MTO
 Wayne Bell Major Projects

AECOM
 Karen Cooper Deputy Project Manager
 Felipe Sapateiro Highway Engineering
 Steven Guan Highway Engineering

Peel Region
 Frank Pugliese Public Works
 Anthony Parente
 Nicholas Gan
 Jeanne Thomsen Utility Coordinator

Jacobs
 Andrea Pitura

T2 Utility Engineers
 Mark Cavanaugh

Prepared January 15, 2019

Prepared by Mark Cavanaugh

Distribution Attendees
 Fayyaz Siddiqui (MTO)
 Iqbal Muhammad (MTO)

Description	Action by:
<p><u>Purpose of Meeting</u></p> <p>This meeting is to discuss the November 30th memorandum titled “Mitigation of Peel Region Utility Conflicts at Highway 401”, prepared by AECOM for the Highway 401 Peel crossings. The purpose of the technical memo is to discuss options and recommended solutions for Peel Region utility conflicts at Crossings 1, 2, 3, 10, and 11.</p> <p><u>Detailed Discussions</u></p> <ul style="list-style-type: none"> • Mark C. advised that the formal approval for SUE was processed within the past 10 days; current forecast for SUE work to begin is 3 months and would be completed in approximately one month. T2ue to provide an update on schedule once confirmed. • The Permission to Enter (PTE) for the SUE will expire in November 2019. • Updated Peel Region relocation cost estimates were provided by Peel Region to MTO on January 14, 2019. Peel advised that should MTO eliminate the requirement for tunnel / liner to be installed for all Peel installations, it will reduce the cost by approximately \$3 million overall (rough estimate, to be confirmed by 	<p>T2ue</p> <p>MTO</p>

Description	Action by:
<p>Peel). Peel advised that time savings during construction would be cut by 50-60% by NOT using liners. MTO to review and provide direction to Peel on liner requirement.</p> <ul style="list-style-type: none"> Peel Region emphasized that lack of advancement of design due to lack of design criteria, engineering solutions to allow infrastructure in place, and SUE information. This is delaying the schedule of the Peel Region relocations. Peel Region will be happy to allow relocations to be included into the AFP package through use of pre-approved contractors. MTO / IO to consider. Peel Region advised that they have not been provided a confirmed directive from the MTO to proceed with any detailed design relocations. Wayne B. to review internally at MTO to establish definitive design criteria, and instruct Peel Region to proceed on that basis. Peel noted that approval to proceed can be done in sections: not all crossings need to be approved at once and approval to proceed with 3-4 crossings would allow Jacobs to proceed. 	<p>MTO/IO</p> <p>MTO</p>
<p><u>Crossing 1 – Sta. 10+350</u></p> <ul style="list-style-type: none"> Peel Region advised that 1.5 m clearance from manhole to a proposed barrier wall is not acceptable for their maintenance purposes. AECOM advised that providing additional room will not meet highway design standards. Peel Region advised they will not compromise worker safety to allow watermain to stay, and the criteria is not completely set to allow a proper design review. Current design also includes a 2:1 slope at the chamber location, which would also impact safe entry conditions for maintenance crews. Potential acceptable solution for Peel would be an urban section with a toe wall to eliminate slope at the chamber, a full barrier protection from Highway 401 traffic and access from outside of Highway 401 (i.e from existing Peel easement, which would require new property arrangements). Peel advised that chamber can be raised at lid location to match local grading. Potential solutions: <ol style="list-style-type: none"> Remove existing valve, replace it off of the Highway 401 right-of-way, and protect watermain (WM) in place under ramp. Existing WM must be reviewed to ensure it can handle proposed loading due to realigned Ramp E-N/S. AECOM to provide profile and cross sections every 20 m illustrating existing and proposed grading over watermain. Loading analysis to be performed by Jacobs. Jacobs to review for loading and if can be protected. If loading cannot be accommodated, must replace parallel section of WM, moving the WM back towards the property line within the MTO corridor For this solution, construction could not be completed from May through October due to high usage and Project Co. would need to allow time and space for Peel Region construction, which would be approximately 6 weeks. 	<p>AECOM / Jacobs</p>
<p>Peel needs to perform a full operations assessment to determine the typical work for this site, and that will dictate the grading / flat area needed to successfully perform operations / maintenance. Peel will review and provide requirements for grading around the chamber. Requirements will be provided to AECOM for design accommodation development. Jacobs will provide a sketch of the concept by January 30, 2019.</p>	<p>Peel Region</p>
<p><u>Crossing 2 – Sta. 10+640</u></p> <ul style="list-style-type: none"> South chamber is currently designed to be accommodated as per AECOM revision. Peel needs to perform a full operations assessment to determine on the typical work for this site, and that will dictate the grading / flat area needed to successfully perform operations / maintenance. Peel will review and provide requirements for grading around the chamber, including vehicle turnaround area. Requirements will be provided to AECOM for design accommodation 	<p>Peel Region</p>

Description	Action by:
<p>development and construction will be by Project Co.</p>	
<p><u>Crossing 3 – 1200 mm Watermain / Chamber Access @ Sta. 11+400</u></p> <ul style="list-style-type: none"> • Jacobs’ concept is to construct a ‘culvert-like’ structure to provide access to the water valve in order to mitigate the need for relocation of the watermain. • Reduction of the cross-sectional elements of Highway 401 Westbound Core and Collector is not recommended. • No further work is required from AECOM for this crossing. • Mark C advised that SUE already completed will cover the majority of the proposed entrance / shaft location; design should proceed based on SUE currently available. Mark C to provide available Alectra design drawings to Jacobs. • Mark C advised that any impact to existing Alectra infrastructure will trigger a large Alectra relocation. Jacobs to review and advise. • Jacobs to proceed with design. 	<p>T2ue</p> <p>Jacobs</p> <p>Jacobs</p>
<p><u>Crossing 4 – 900 mm Watermain @ 11+800</u></p> <ul style="list-style-type: none"> • Jacobs to proceed with their relocation detail design based on current highway and OPP property design. Mark C noted that Jacobs should review extents of completed SUE limits as it appears that the areas are covered under the investigation limits provided. • Peel indicated that this location would be ideal for site laydown (storage of materials, etc.). 	<p>Jacobs</p>
<p><u>Crossings 5 and 6 – 600 mm and 750 mm WM’s at Derry Road</u></p> <ul style="list-style-type: none"> • Relocation of Crossing 5 (600 mm) not required due to relaxed requirement from MTO – extension of liner not required. • Crossing 6 (750 mm) – relocation needed; will be drilled in. Region cost based on liner vs. no liner. SUE required prior to proceeding with detailed design due to presence of many underground utilities. 	<p>T2ue</p>
<p><u>Crossings 7 and 8 – Sanitary and Watermain Crossings at Mullet Creek</u></p> <ul style="list-style-type: none"> • Watermain and sanitary sewer must be replaced due to age and material of WM (ductile iron (DI)), and location of existing sanitary chambers. • Need additional detail on extended retaining wall to the east, information received from AECOM was the final draft GA received previously and used for the bidding process. Additional details are needed from Project Co. • Crossing may be installed in a number of ways – single pipe x 2, container pipe with 2 pipes within it. Relocations will be drilled from Century Avenue to Syntax Court. • Peel will be coordinating with Project Co. for working out the design details to incorporate sanitary sewer / WM into proposed Highway 401 retaining wall(s). • AECOM advised that design of retaining wall will not be enhanced any further under their scope; coordination with Project Co. will be required. 	
<p><u>Crossing 10 – 400 mm Watermain at Creditview Road</u></p> <ul style="list-style-type: none"> • AECOM to prepare a concept illustrating proposed retaining walls / toe walls to allow water valves (WVs) to remain in place. Peel / AECOM need to be very aware of any requirements in future to access watermain / valves and the potential impact to retaining walls when excavating WM. • To allow watermain to remain in place, toe wall will be required which could potentially impact existing 200 mm gas main. Group to review potential impacts. 	<p>AECOM</p> <p>AECOM / T2ue</p>
<p><u>Crossing 10 (Sta. 14+875) and Crossing 11 (Sta. 14+900)</u></p> <ul style="list-style-type: none"> • Peto McCallum (under AECOM) cannot complete boreholes for slope failure analysis under Jacobs’ current PTE with the conservation area; must complete 	

Description	Action by:
<p>their own PTE. Jacobs' PTE required indication of individual bore hole locations and it was noted that the landowner (developer was unresponsive initially). Even if a very thorough slope failure analysis proves that sewer can remain (likely by installation of a retaining wall), Peel Region will likely state that leaving the sanitary sewer in place will be the wrong decision for both stakeholders.</p> <ul style="list-style-type: none">• AECOM has started PTE application with land owner (Post Meeting Note: PTE received on January 23 and shared with PML). PML to commence investigations shortly. AECOM will advise on progress. <p>Next Steps AECOM and Jacobs to provide the drawings, sketches and information noted above. T2ue to complete requested SUE and provide already completed SUE information as appropriate. Wayne B. to discuss with MTO/IO/TA to facilitate the approvals. Peel to update the cost-sharing and submit for presentation to Peel Region Council.</p>	AECOM

Meeting Minutes

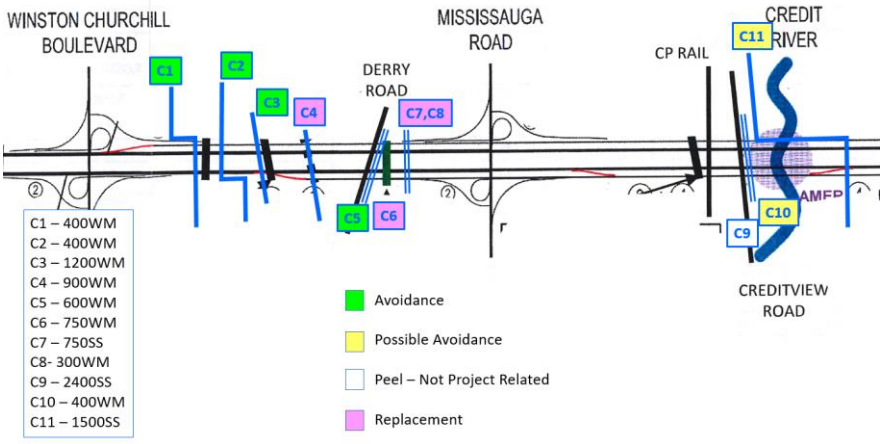
Subject	OE Highway 401 Expansion: Peel Region Utilities – Water / Sanitary Utility Relocation / Protection	
Date	Monday, March 4, 2019	
Time	9:30 am – 11:30 am	
Location	Region of Peel, 45 Cottrelle Blvd, Brampton – Airport Pump Station	
Attendees	<p><u>MTO</u> Calvin Curtis Iqbal Muhammad Wayne Bell</p> <p><u>Infrastructure Ontario</u> Kelvin Chu</p> <p><u>AECOM</u> Karen Cooper Felipe Sapateiro</p> <p><u>Peel Region</u> Frank Pugliese Nicholas Gan Jeanne Thomsen</p> <p><u>Jacobs</u> Rachel Plourde</p> <p><u>T2 Utility Engineers</u> Mark Cavanaugh</p>	<p>Manager, Major Projects Office Project Lead, Major Projects Office Utilities, Major Projects Office</p> <p>Project Manager, Civil Infrastructure</p> <p>Deputy Project Manager Project Engineer, Highways</p> <p>Public Works Public Works Public Works</p> <p>Project Engineer</p> <p>Utility Coordinator</p>
Prepared	March 4, 2019	
Prepared by	Mark Cavanaugh	
Distribution	Attendees Fayyaz Siddiqui (MTO) Tim Sorochinsky (AECOM) Anthony Parente (Peel) Steven Guan (AECOM)	
Description		Action by:
<p>Purpose of Meeting To confirm the status of Peel Region investigations, relocation designs and identify the final strategies for the relocation / avoidance strategies for all conflict locations.</p> <p>General Crossing Update from Peel Region</p> <ul style="list-style-type: none"> Crossing 1: Peel will be open cutting new installation north of and parallel to the MTO ROW; will need a new easement with the existing property to the north. Valve chamber within the MTO ROW will be removed; new WVC will be installed at connection point between existing and proposed outside of ROW. 		

<ul style="list-style-type: none"> • Crossing 2: Lane shift from AECOM allows manholes to stay in place. All constraints satisfied, will remain in place. • Crossing 3: Access chamber on the north side will be built to avoid removal / relocation of the valve chamber lid. Chamber will remain in place, just the cover will be removed, all access with be from outside of ROW. Peel Region believes that there will be no impact to Alectra. • Crossing 4: Full replacement / crossing will be required due to shallow watermain and loading. • Crossing 5 – 600mm relocation not required. • Crossing 6 – 750mm impacted by new extended bridge structure and must be relocated. North side SUE investigation is critical due to amount of existing utilities, T2ue to prioritize this location to facilitate sending / receiving pit location. Vibration monitoring during piling activities will be required. 	T2ue
<ul style="list-style-type: none"> • Crossings 7 and 8: Proposed culvert / retaining wall will be impacting water and sanitary sewer. Both utilities to be relocated into a single tunnel installation from Century to Syntex. Peel having issues now obtaining PTE from Golder's landowner to access the site to complete the geotech. MTO can help in two ways: <ul style="list-style-type: none"> - MTO could provide historical geotechnical information - Once PCo is awarded, temporary road to be constructed, as required. 	MTO
<ul style="list-style-type: none"> • Crossing 9: 2400mm sanitary is to be constructed by Peel Region, will be occurring outside of the MTO ROW / Project area. Scope of work / tie location in will depend on scope of work. • Crossing 10: 400mm watermain was installed approx. 5 years ago, ideally, it is kept in place. Issue is WVCs on east side of Creditview, Peel concerned about access but more pressing issue is potential slope failure of Creditview Road should Peel Region need to expose / fix WVC. Awaiting final slope failure analysis from Peto McCallum (contracted by AECOM) prior to final decision to remain or relocate. 	AECOM
<p>AECOM advised that a proposed retaining wall along the east side of Creditview Road would provide access to the water valves. The retaining wall would basically be a toe wall along the Highway 401, transitioning into a retaining wall along Creditview Road. Design contingent on a thorough slope analysis.</p>	AECOM
<ul style="list-style-type: none"> • Crossing 11: 1950mm sanitary sewer and 1500mm sanitary sewer running parallel to Highway 401. Slope failure analysis forthcoming from Peto McCallum for 1500mm sanitary sewer. Peel concerned about feasibility of access and safety if future repairs are warranted. Design contingent on a thorough slope analysis. <p>Peel Region reviewed the DRAFT slope failure analysis by Peto McCallum. Comments included:</p> <ul style="list-style-type: none"> - For the report figures, illustrate the existing sanitary, trench boxes and edge of pavement/limits of Highway 401. - Accuracy in soil condition analysis is too general and does not consider ground water or soil saturation in failure analysis. All analysis needs to consider these conditions. 	AECOM

<ul style="list-style-type: none"> - For crossing 10 (watermain valves and chambers on east side of Creditview Road), concerns that slope failure analysis does not account for high ground water tables or saturated soil conditions outside of the proposed retaining wall. Primary concern is that, if chambers were open for repairs, the proposed retaining wall footing is higher than the proposed base of chambers which may introduce slope failure. - Further comments / concerns on the DRAFT Peto McCallum report to be provided via email, however based on information reviewed to date, Peel Region prefers the full relocation of Crossing 11 (full relocation of the 1950 /1500mm sanitary sewer). 	
<p>If the MTO were to provide approval for the relocation of the 1500 / 1950mm sanitary sewer at Crossing 11, Jacobs would engage in detailed design immediately. Once a detailed design is ready, Peel Region real estate would begin contacting landowners for easement acquisitions. Final decision to be made following receipt and review of final geotechnical slope failure analysis report.</p>	
<p>Peel Region not able to provide a confirmed relocation schedule for the 1950 / 1500mm sanitary sewer, however targeted construction start is spring 2021 (assuming property is in place, permits etc. are in place). Scheduling priority will be refined with awarded PCo.</p>	
<p>Jacobs will put a relocation schedule together for all crossings on the assumption that crossings 10 and 11 will be relocations. Jacobs is proceeding with detailed design of Crossing 11 at this time.</p>	<p>Jacobs</p>
<p>Peel Region not satisfied with expropriation for the 1500mm sanitary main running parallel to the 401. Peel Region currently reviewing with legal.</p>	<p>Peel</p>
<ul style="list-style-type: none"> • Infrastructure Ontario advised that all bids have been received, with a preferred proponent identified and negotiations are currently ongoing with that proponent. Anticipated that this Friday the preferred proponent will be announced publicly. Agreement would be finalized late-April, however proponent has advised that they will begin to engage stakeholders (i.e. Peel Region) after this Friday. The first meetings with the proponent would be coordinated by MTO / IO, at the end of April the Project Co. would take over the meetings. 	
<ul style="list-style-type: none"> • Peel Region will provide MTO with an updated SUE requirements scope of work, considering revised designs and the need for test holes in refined location. MTO to provide to T2ue, T2ue to determine schedule for test holes and respond to MTO. Peel Region may use an alternate contractor if T2ue's schedule does not meet schedule needs. 	<p>Peel Region / T2ue</p>
<ul style="list-style-type: none"> • MTO confirmed that if Peel Region were to be drilling beneath the proposed bridge construction (i.e. crossing 4, 7, 8) and the PCo is constructing above, there will be no concerns regarding MOL issues provided the installation shafts do not impact the PCo. 	
<ul style="list-style-type: none"> • Peel Region has no issues with allowing the awarded PCo to complete the relocation of the Peel Region utility work, if Peel is able to prequalify contractors to complete the work. Peel Region would complete the detailed design and run the prequalification, and let PCo. complete the construction. Contractors that have been prequalified before for Peel Region relocations are CRS, Technicor Underground Inc., Earthboring, McNally, C&M McNally, Southland, DIBCO, Warren Burke. IO / MTO – will discuss with preferred proponent this Wednesday to determine the level of interest to take on the Peel Region relocation works. 	<p>IO/MTO</p>

MEETING: H401 Expansion Project- Region of Peel DATE: Friday, April 5, 2019
 TIME: 09:30 AM to 11:00 AM
 LOCATION: Aecon, 20 Carlson Court RFP NO. 17-178
 Etobicoke, ON.
 Toll-free number: Passcode:

ATTENDEES: Kelvin Chu (IO), Wayne H Bell (MTO), Iqbal Muhammad (MTO), Brett Kish (MTO), Sammy Lee (Altus Group), David Ellis (WCC), Harrie Van Dyk (WCC), Mukesh Sekar (WCC), Noris Bot (WCC), Luis Chavez (WCC), Nicholas Gan (PEEL), Rachele Plourde (JACOBS), Frank Pugliese (PEEL), Jeanne Thomsen (PEEL)

ITEM	DESCRIPTION	ACTION BY	DUE BY
1.	<p>Introduction</p> <ul style="list-style-type: none"> - Attendees <p>Safety Moment</p> <ul style="list-style-type: none"> - Check tire pressures after swapping winter to summer <p>Key Points of Contact</p> <ul style="list-style-type: none"> - WCC: Noris Bot - MTO: Wayne Bell - Region of Peel: Frank Pugliese 		
2.	<p>Peel Region's Scope (Third Party Works), As Per Latest Strategy Document</p>  <ul style="list-style-type: none"> - Crossing 1: Refer to H401-Peel Strategy. Peel's plan is to extend the watermain via open cut and place a new chamber outside the MTO ROW, connecting to the watermain. WCC will confirm commercial impact of access and protection measures. - Crossing 2: Refer to H401-Peel Strategy. Relocation of this crossing is no longer required. WCC will confirm commercial impact of access and protection measures. - Crossing 3: Refer to H401-Peel Strategy. This crossing was originally proposed to be relocated. Peel has developed a feasible solution to avoid access issues. Peel proposes to cut off the chamber valve and build an off-line chamber with access provided by an adit. The adit will be installed via open cut and buried below grade. - Crossing 4: Refer to H401-Peel Strategy. WCC will confirm commercial impact of access and protection measures. 		

ITEM	DESCRIPTION	ACTION BY	DUE BY
	<p>nature of the work (i.e., bridge replacement/widening), and WCC must replace the Creditview Road bridge within two years from Financial Close. David proposed to Peel and CA for interim protection measures to the water main/sewer lines under highway if schedule deemed to be an issue and to that Frank agreed: commercial impacts to be further reviewed. Peel to confirm loading impacts.</p> <ul style="list-style-type: none"> - David requested Peel to share their 30-50% design for information purposes along with the SUE data to that Frank agreed to share if CA doesn't have any objections. He also added that design could change depending on SUE and geomorphology report. David noted that WCC will share their 30% design upon receipt of an executed NDA. - Action: David to provide NDA for Peel. - Action: Peel to share their 30-50% design and SUE data to WCC. - Action: Peel to follow up with Mark (T2UE) regarding collecting SUE data on the storm sewer at Derry Road and forward the data to WCC. 	<p>DE FP FP</p>	<p>April 5 TBD TBD</p>
4.	<p>New Information Available</p> <ul style="list-style-type: none"> - Peel addressed the opportunity for WCC to manage the construction process. This would involve Peel providing IFC drawings and qualified contractors to conduct the work, and WCC managing procurement and construction. Peel would remain responsible for all property/easement acquisition. Frank noted that Peel would provide support during the procurement and construction process, as required. Frank confirmed that WCC could select which crossings they would be interested in managing and that Peel was open to various options. It was noted that WCC would be compensated by the CA through the variation process. - Action: WCC to confirm preferred approach. - Frank noted Peel would need 20 weeks to produce prequalification documents with the list of vendors from the time of agreement with WCC. If WCC does not wish to manage the construction, Peel will work with WCC to meet schedule timelines, and will consider mitigation measures such as staggered tender calls to meet WCC's schedule priorities (e.g., Derry Road). - David proposed that Peel and WCC could implement a hybrid solution; Nicholas agreed Peel would not be opposed to that idea. Nicholas also added that Peel will prepare a single prequalification document for the all crossings. - Frank noted that Peel would require a 2-year warranty from the date of commissioning. - Rachelle noted the prequalification would apply for the selection of tunnel contractors only, and the intent is WCC would self-perform the open cut works should the decision be made to include construction of crossings within WCC's work. 	<p>DE</p>	<p>May 3</p>
5.	<p>Peel Region's Expectations of WCC during Construction</p> <ul style="list-style-type: none"> - Frank noted that if WCC agree to take the responsibility of all the crossings, Peel or Jacobs will provide on-site inspections. - Frank noted that WCC is to make sure all of the existing sanitary manholes and watermain valve chambers are protected at all times and that Peel can access them. He also added no removal or stockpiling of materials over watermain or sanitary unless Peel reviews the load 		

ITEM	DESCRIPTION	ACTION BY	DUE BY
	<p>implications, including loading by heavy equipment or traffic. WCC is not permitted to operate valves or enter manholes.</p> <ul style="list-style-type: none"> - Frank noted that Peel requires at least 4 weeks to do model analysis prior to shutting down watermain. Jeanne noted that Peel have more restrictions during summer months. - Noris raised a question about the integrity of Crossing 5 which is not being relocated, given adjacent pile driving. Pier foundation will be 5 - 6 m from the watermain. Frank noted that Peel could install settlement/vibration monitoring in that area. Peel will look into this issue in depth including the type of piling, depth, type of forces, type of machinery etc., once WCC has a detailed design at that location. 		
6.	<p>Easement – Approvals</p> <ul style="list-style-type: none"> - Frank noted all easement approvals will be done by Peel. He also noted timelines for getting easements range from one week to 12 months, with expropriation taking up to and beyond 18 months. 		
7.	<p>Other Business</p> <ul style="list-style-type: none"> - Frank explained in depth the commissioning process if WCC choses to manage construction. Peel’s expectation is that the contractor hire an approved commissioning company likely Corix. Once the samples pass, Peel will shut down the watermain to allow the contractor to make the connections. Peel will not shut down the existing watermain until the new watermain is commissioned. - Jeanne noted that Peel could set up access for WCC to do file sharing after the financial close. 		

MEETING:	H401 Expansion Project – Peel Region Utility Meeting	DATE:	May 9, 2019
		TIME:	01:00 PM to 02:30 PM
LOCATION:	Aecon 20 Carlson Court, Toronto	RFP NO.	17-178
Toll-free number:		Passcode:	

ATTENDEES: Kelvin Chu (IO), Wayne Bell (MTO), Iqbal Muhammad (MTO), Sammy Lee (Altus Group), David Ellis (WCC), Mukesh Sekar (WCC), Harrie Van Dyk (WCC), Noris Bot (WCC), Daragh Aspell (WCC), Frank Pugliese (PR), Nicholas Gan (PR), Rachele Ploudre (Jacobs)

ITEM	DESCRIPTION	ACTION BY	DUE BY
1.	<p>Design Status Update</p> <ul style="list-style-type: none"> - Frank updated the group on the status of design: <ul style="list-style-type: none"> o Level B SUE is complete; Level A will commence as required o Topographic survey is complete o Archaeological investigations are underway o ESA is underway o Geotechnical boreholes nearing completion w/ ground monitoring wells installed - Crossings 2 & 5 remain as avoidances; protection measures and access will be required (e.g., barrier, fence gates); WCC will be compensated through a Variation for any protection measures not already considered in WCC's design, if such measures are deemed outside the scope of the PA - 50% design completed for Crossings 1, 3, 4, & 6. - Solution for crossing 7 & 8 is still conceptual; Region is considering tunnel from Syntex with alignment to the east of the Mullet Creek crossing; will be separate lines/casings for watermain and sanitary; existing watermain is ductile iron – Peel is concerned about loading during construction prior to replacement. - Frank reviewed the designed crossings in detail: <ul style="list-style-type: none"> o Crossing 1: Open cut solution to relocate line running parallel to Highway 401 and in conflict with proposed off ramp; easement required. o Crossing 3: Will include capping of the existing chamber in conflict with the highway widening, constructing an adit to access the chamber from a safe location; capped chamber will be capable of sustaining load; easement may be required for access by Peel o Crossing 4: Will be a new tunnel across Highway 401 on a skew; crossing pits not expected to impact widening; Peel concerned about loading live watermains (without casings) during construction. o Crossing 6: Will be a new tunnel within the Derry Road allowance; There is an opportunity for WCC to lengthen the span of the north widening to push back the proposed east abutment and avoid the existing watermain; WCC would be compensated for additional cost through a Variation. - Action: WCC to review opportunity to lengthen span of north widening of Derry Road bridge. - Additional information provided on remaining crossings: <ul style="list-style-type: none"> o Crossing 9: Will be outside of the limits of the Project, tunneled approximately 30 m deep in rock; construction expected to commence in 2021. 	David E	May 15

ITEM	DESCRIPTION	ACTION BY	DUE BY
	<ul style="list-style-type: none"> o Crossing 10: WCC presented cross-sections of the proposed alignment of the Creditview Road bridge and the impact of the retaining wall / embankment on the vent chamber and drainage chamber; Frank suggested that localized relocation of the vent chamber (MH1) may be possible; the drainage chamber (MH2) may be in the proposed ditch – solutions will be considered for avoidance including revised slopes, piped drainage, etc. - Action: Peel Region to review potential relocation of vent/chamber. - Action: WCC to review grading plan to avoid conflict with drainage chamber. o Conflict 11: Region is still reviewing potential conflict, but Wayne noted that the line running parallel Highway 401 will not conflict with WCC's proposed infrastructure, but will impact long-term maintenance access. - Frank confirmed that the Region is open to protection solutions, during construction, to allow widening of the highway to proceed; Wayne confirmed that any protection measures could be abandoned in place. 	<p>Frank P David E</p>	<p>May 31 May 22</p>
2. c	<p>Commercial Discussion re. WCC Performance of Works</p> <ul style="list-style-type: none"> - Frank clarified process for WCC self-performing/managing construction of the Peel Region watermain/sanitary relocations: <ul style="list-style-type: none"> o Tendering of the work, once prequalified contractors have been identified (by Peel) will be at WCC's discretion, i.e., WCC could tender the work to select prequalified contractors. o WCC would not need to prequalify for open cut work – could commence upon delivery (by Peel Region) of For Construction package (IFC drawings, permits, property easements). o WCC would need to prequalify for Single Pass tunneling solutions, but not for Double Pass or Triple Pass methodologies; this includes subcontractors that WCC may use. o Design is being developed based on Single Pass, but could be modified to suit WCC's preferred method; Peel will work with WCC to design accordingly. o Geotechnical Baseline Report (GBR) is available to WCC. o For Construction package will include IFC drawings, permits, land easements, etc. o Peel Region will provide design support during construction (Jacobs), inspection during construction (Jacobs), and commissioning works, at Peel Region's cost. - Kelvin confirmed that any work completed by WCC would be paid via Variation. - David noted WCC's concerns with committing to the work, including: <ul style="list-style-type: none"> o Concerns regarding WCC's relief for differing ground conditions, design delays, permitting delays, land acquisition delays, and delays due to issues with design during construction. o Disagreement on cost for Variation, and delays associated with abandonment of approach if agreement cannot be reached. o Unknown delivery date of For Construction package. o Unknown payment schedule for Variation (i.e., Financing costs) - Action: WCC to provide indicative price for relocations for early discussion with CA - Action: Peel to provide schedule for delivering IFC designs 	<p>Harrie V Frank P</p>	<p>May 31 June 3</p>

MEETING:	H401 Expansion Project – Peel Region (PR) - Meeting No. 3	DATE:	Friday, July 12, 2019
		TIME:	9:00 AM to 12:00 PM
LOCATION:	10 Peel Centre Drive, Brampton Room Brampton, ON L6T 4B9	RFP NO.	17-178
Toll free number:	N/A	Passcode:	N/A

ATTENDEES: Wayne Bell (MTO), Fayyaz Siddiqui (MTO), Iqbal Muhammad (MTO), Sammy Lee (TA), Alberto Bravo (TA), David Ellis (WCC), Derek Surgeoner (WCC), Noris Bot (WCC), Saad Syed (WCC), Salina Chan (WCC), Frank Pugliese (PR), Ajay Puri (PR), Serguei Kabanov (PR), Nicholas Gan (PR), Lyle LeDrew (PR), Emily Pelleja (CoM)

ITEM	DESCRIPTION	ACTION BY	DUE BY
1.	Introductions Meeting attendees were introduced	Info	-
2.	Safety Moment Outdoor Activities	Info	-
3.	Key Points of Contact Peel Region (PR): <ul style="list-style-type: none"> Frank Pugliese (Lead) – one point of contact for PR City of Mississauga (CoM): <ul style="list-style-type: none"> Emily Pelleja West Corridor Constructors (WCC): <ul style="list-style-type: none"> David Ellis - Project Director (Primary Construction Contact) Derek Surgeoner (Primary Design Contact) Ministry of Transportation (MTO): <ul style="list-style-type: none"> Fayyaz Siddiqui / Iqbal Muhammad Wayne Bell (Utilities) 	Info	-
4.	WCC Project Scope and Schedule WCC Primary Project scope interfaces with PR: <ul style="list-style-type: none"> Derry Road Overpass Widening Winston Churchill Boulevard Underpass Rehabilitation Winston Churchill Boulevard Parking Lot Mississauga Road Parking Lot Creditview Road Underpass Replacement Water and Wastewater Relocations WCC Project Schedule was summarized, as follows: <ul style="list-style-type: none"> There is an approximately one-year design period (aim to be completed in April 2020). WCC is currently in the pre-final design stage; Pre-Final Civil Package is scheduled for early September 2019. Major construction will start in Spring 2020, with some early works (clearing and grubbing, CN, CP and Trafalgar Road bridges) starting in Fall 2019. Substantial completion in Fall 2022. 	Info	-

<p>5.</p>	<p>Derry Road Construction Strategy</p> <ul style="list-style-type: none"> • WCC is preparing a traffic analysis memo for the proposed construction staging at Derry Road Overpass. • The bridge needs to be widened on both sides of Highway 401. Currently, six lanes of Derry Road cross under the bridge. Working room is required in the median and outside lanes on Derry Road to accommodate construction. This will reduce Derry Road to two lanes per direction. It is anticipated that the work will take seven months to complete. Start date is dependent upon PR watermain relocation (Crossing 6). • There is one sidewalk along the east side under the bridge that will need to be maintained. • Appropriate signage and warning will be provided for construction work. There is the potential for traffic signal timing adjustments as well. • There will be future traffic restrictions at Creditview Road, though it is not anticipated that this work will overlap with Derry Road. • There will be future work at Argentinia/Derry in 2023, which is later than the proposed Highway 401 works at Derry Road. PR can provide these plans when they are available (currently approaching 90% design). • CoM needs to be notified when there are lane closures so that they can notify councilors. PR will also provide notification of work to stakeholders (e.g. Council, EMS, etc.). CoM suggested PR should have a website for the Derry Road closure as well as linking to WCC's Project website. WCC indicated that its Project website would be updated with traffic disruptions and closures, including this Derry Road work, separate from CoM and PR websites. CoM would like to discuss more comprehensive communications strategy for construction notification. Action: PR (Serguei) to send a draft of the notice so WCC knows what information needs to be provided to PR. • When more information is available, WCC to provide a more detailed memo regarding Derry Road construction staging. Action: WCC to provide Notice of Project for PR information. • In general, PR does not have concerns with WCC's approach to Derry Road, given the nature of the work and required impact. 	<p>PR</p> <p>WCC (HV)</p>	<p>July 26</p> <p>July 19</p>
<p>6.</p>	<p>Winston Churchill Boulevard</p> <ul style="list-style-type: none"> • PR is currently undertaking a Class EA for the future widening of Winston Churchill Blvd. The EA is currently 90% complete. The EA is anticipated to be done by 2020, with the RFP for detail design issued shortly after and construction anticipated for 2025. • The Highway 407ETR structure north on Winston Churchill Blvd is being widened. WCC will not affect the Highway 407ETR structure at this location. • Action: WCC to share preliminary plan with PR for information and comment. • WCC drawings are part of a Non-Disclosure Agreement (NDA). Action: WCC (Dave) to confirm that the drawings can be shared with the EA consultant. WCC (Derek) to send digital drawing (CAD) to overlay onto EA drawings. • Discussed that the EA recommends three lanes on Winston Churchill Blvd north of the structure but WCC's design shows only two lanes (this is consistent with existing conditions). WCC cannot widen further to the east due to property constraints. CA indicated that PR may need to consider future property acquisition as part of the EA for future widening. Action: PR to confirm who owns the lands to the east. 	<p>Info</p> <p>WCC (DS)/PR</p> <p>WCC (DE/DS)</p> <p>PR</p>	<p>July 19</p> <p>July 19</p> <p>July 26</p>

7.	<p>West Trunk Twinning project</p> <ul style="list-style-type: none"> PR is completing twinning of a trunk sewer under Highway 401 near Creditview Road / Argentia Road at a depth of approximately 30m below ground. It is anticipated that construction tender will go out in 2020. Discussed concerns about how PR will do settlement monitoring when WCC is actively constructing in that area during that time. It was noted that WCC has a two-year warranty period, which will likely be in effect when this construction is ongoing. Action: WCC to inquire with exp about settlement monitoring. 	WCC (DE)	July 26
8.	<p>Permits</p> <ul style="list-style-type: none"> WCC would like to avoid multiple permits (if possible) and would like to obtain one permit covering all works within PR lands. PR is not opposed to this but will need to review internally that this permit would not restrict works in the area for other contractors. Action: PR (Frank) to review internally. WCC to provide general sketch up, scope, and timeline of works to give PR an idea of work. PR to waive fees for permits. PR indicated there is precedent for PR to waive fees for other MTO projects. The main permit needed would be a Road Occupancy Permit. This permit is based on a Certificate of Insurance and the Traffic Plan. These need to be renewed annually, though the renewal process is not difficult. PR will consider project-wide permit. WCC will require PTE to access PR's easement to get to Mullet Creek lands. MTO currently owns this PTE, which is transferable to WCC. 	PR/WCC (HV)	July 19
9.	<p>Design Reviews</p> <ul style="list-style-type: none"> WCC design packages are submitted through Aconex. WCC will provide 17 business days for review; PR is ok with this timeline. Action: WCC (Derek) to send PR (Frank) a link for Aconex complete with design schedule. WCC will provide a truncated civil package showing profiles, typical cross sections, etc. For PR's review, drawings will be submitted as PDFs. Ultimately, as-builts will need to be submitted to PR in CAD format. Action: WCC (Derek) to send PR the 30% design for WCB and Derry Road. 	WCC (DS)	July 19
10.	<p>Environmental</p> <ul style="list-style-type: none"> The MTO Class EA process is being followed for this project. A Design and Construction Report (DCR) will be completed and published for public review late August 2019 for early works. The DCR documents the EA process and design. A copy of this DCR will be made available at the PR head office during the public review period. No significant environmental issues related to PR. 	Info	-
11.	<p>Utility Crossings Design Status Update</p> <ul style="list-style-type: none"> A general discussion was held on the status of each crossing design: Crossing #1 Open cut solution to relocate line running parallel to Highway 401 and in conflict with proposed off ramp; easement required. 50% design is to be 		

	<p>resubmitted, with the crossing complete by December 2020. Design should take less than 4 months. WCC has provided price to CA for undertaking the construction work. However, WCC (Parsons) do not see any benefit in assuming the design work, as Property is likely the Critical Path item, not design; although property is not expected to be an issue. Outstanding items include geotechnical, archaeological, and Phase 2 ESA.</p> <p>Crossing #2 and #5</p> <ul style="list-style-type: none"> Deemed not in conflict in AECOM Report. WCC to confirm conclusion remains valid, based on updated Detailed Design. WCC proposed to undertake site visit/survey to verify manhole coordinates and verify inverts etc. but noted that they did not currently have any proposals to daylight PR infrastructure (deemed out-of-scope). Action: Frank to provide 'As-Built' drawings. MTO (Wayne) to check with T2 to ensure all information has been uploaded to the Data Room. Post-meeting Note: As built drawings for Crossings #2 and #5 received from PR on 2019-07-16. <p>Crossing #3</p> <ul style="list-style-type: none"> Includes capping of the existing chamber in conflict with the highway widening, constructing an adit to access the chamber from a safe location; capped chamber will be capable of sustaining load; easement may be required for access by PR. WCC noted that the proposed 30% design for the adit will conflict with the Alectra duct bank at this location. The current proposal is for the duct bank to remain therefore the design will need to be revised. WCC has provided price to CA for undertaking the construction work. However, WCC (Parsons) do not see any benefit in assuming the design work, as Property is likely the Critical Path item, not design. Action: PR to review and revise 30% design to avoid conflict with Alectra duct bank. <p>Crossing #4</p> <ul style="list-style-type: none"> Will be a new tunnel across Highway 401 on a skew; crossing pits not expected to impact widening; PR concerned about loading live watermains (without casings) during construction. It was noted that this crossing is currently designed to be within the overburden (not rock). A GDR has been prepared, with the GBR to follow (TBD). WCC has provided price to CA for undertaking the construction work. However, WCC (Parsons) do not see any benefit in assuming the design work, as Property is likely the Critical Path item, not design. See also discussion around 'Jack and Bore' vs 'Micro-tunneling'. Current design is for a 'micro-tunneling' solution. Action: WCC to confirm what Means and Methods have been priced and submitted to CA. <p>Crossing #6</p> <ul style="list-style-type: none"> Current proposal is for a new micro tunnel within the Derry Road allowance. WCC has provided price to CA for undertaking the construction work. However, WCC (Parsons) do not see any benefit in assuming the design work, as Property is likely the Critical Path item, not design. WCC presented proposals to lengthen the span of the north widening to push back the proposed east abutment and avoid the existing watermain and eliminating the need for this tunnel. However, PR 	<p>PR / CA</p> <p>PR</p> <p>WCC (DE)</p>	<p>July 19</p> <p>TBD</p> <p>July 15</p>
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	<p>expressed some concerns with this approach:</p> <ul style="list-style-type: none"> ○ PR noted that this infrastructure is now halfway through its useful design life (constructed around 1980) and that provision of new infrastructure as per the previously proposed design is preferred ○ Depth of proposed footing vs existing watermain. Footing will need to extend below the watermain level to ensure no washout, if the main breaks in future ○ Concern with the proposed caissons near the main; concerns with accuracy of drilling and accuracy of watermain information – Level ‘A’ SUE required ○ There may be some concerns if soil integrity close to the bends is compromised by the drilled caissons (loss of thrust effect). Action: WCC (EXP) to comment on drilling impacts. <ul style="list-style-type: none"> ● During further discussion, PR noted that they could likely accept a third proposal; to extend the current main enough distance from the bridge to permit the two-span concept design to be constructed without impacting the watermain. PR noted that this would be at sole cost to MTO (100% cost-share) as this would not provide a full design life and was only proposed to minimize impacts and overall cost. PR and MTO will discuss further. Action: PR to review feasibility of this proposal and advise. <p>Crossing #7 and #8</p> <ul style="list-style-type: none"> ● Preliminary Design is ongoing (30%) and awaiting geotechnical information. PR is awaiting confirmation of the verbal request to design north of the highway and evaluate whether the 1950 diameter can remain. The concern is that the pipe will be under the toe of the slope. The location of the manhole is to be confirmed, to better locate the alignment. ● City of Mississauga will not allow the drill shaft to be located within the baseball diamond therefore will have to be located within Syntex Court. ● WCC (Parsons) do not see any benefit in assuming the design work. <p>Crossing #9</p> <ul style="list-style-type: none"> ● Will be outside of the limits of the Project, tunneled approximately 30m deep in rock; construction expected to commence in 2021. No update required. <p>Crossing #10</p> <ul style="list-style-type: none"> ● Frank provided his comments on the previously issued cross-sections of the proposed alignment of the Creditview Road bridge and the impact of the retaining wall / embankment on the vent chamber and drainage chamber; Frank noted concerns with property at this location. It will be necessary to review the alignment and conflicts at Sections along this wall to determine accurately whether the conflict can be avoided. It was noted that any assumptions regarding zone of influence and support conditions of soil (including liquefaction) should be considered. Action: WCC to review grading plan and provide further sections, showing proposed foundation elevations of RSS wall- with a view to avoid conflict with drainage chamber. EXP (Geotechnical) will have to comment on the proposals. PR to share the current geotechnical information for this crossing. Action: PR to provide as built drawings for Crossing #10. Post-meeting Note: As built drawings and geotechnical reports for Crossing 	<p>WCC</p> <p>PR</p> <p>WCC (DE)</p> <p>PR</p>	<p>July 26</p> <p>July 26</p> <p>July 26</p> <p>July 17</p>
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	<p><i>#10 received from PR on 2019-07-17.</i></p> <p>Crossing #11</p> <ul style="list-style-type: none"> PR is still under discussion with MTO; impacts still to be fully determined. However, Wayne noted that the line running parallel to Highway 401 should not conflict with WCC's proposed infrastructure but will impact long-term maintenance access. EA process for this crossing is ongoing. Action: WCC to survey chamber on north side to confirm no conflict. A general discussion on the provision of 'Jack and Bore' solutions vs 'Micro tunneling' was held. With regards to 'Jack and Bore' solutions, Frank noted that PR had never received approval from MTO to utilize 'jack and bore' for utilities under MTO highway. Frank highlighted the criticality of knowing whether this solution would be required, noting that it was discussed previously. The chosen construction method has a significant impact on design. Action: WCC methods and PR design must be coordinated, with direction coming from MTO. MTO (Wayne) to setup meeting with MTO Foundations group to discuss means and methods. WCC offered to conduct PR daylighting (test pitting) under a Variation, given that WCC is already conducting field work and can react timelier than another contractor. Action: PR/CA to provide list/locations for test pits. WCC (David) stressed the importance of the CA making a timely decision regarding WCC self-performing the watermain and sanitary relocation works. David reminded the CA/PR that the intent of providing indicative pricing was to obtain confirmation regarding the completion of the works by WCC, or if not to be performed by WCC, to allow PR sufficient time to tender the works (including prequalification) so as to not impact WCC's schedule. David confirmed that the pricing provided by WCC was indicative of the information provided by PR and that the estimate could be impacted by final design, geotechnical information, etc.; however, the pricing provided should be adequate for the CA to make a decision. 	<p>WCC (DE)</p> <p>CA</p> <p>PR/CA</p>	<p>July 26</p> <p>July 26</p> <p>July 19</p>
	<p>Next Meeting: Friday, July 26, 9:00 a.m., WCC's project office</p>		

WCC Design Schedule - Peel Region					
<u>Submittal</u>	<u>Pre Final Submittal</u>	<u>Requested Review Comments Due</u>	<u>Final Submittal</u>	<u>Requested Review Comments Due</u>	<u>Const Stamped Drawings (For Information)</u>
Design - East Segment Civil (<i>all disciplines</i>)	Wed - 04Sep2019	Fri - 27Sep2019	Wed - 08Jan2020	Fri - 31Jan2020	Wed - 04Mar2020
Design - BR12 - 9th Line Underpass	Thu - 29Aug2019	Mon - 23Sep2019	Fri - 25Oct2019	Tue - 19Nov2019	Tue - 28Jan2020
Design - BR16 - Winston Churchill Boulevard Underpass	Fri - 28Jun2019	Tue - 23Jul2019	Fri - 23Aug2019	Tue - 17Sep2019	Fri - 04Oct2019
Design - BR17 - Derry Road Overpass - Eastbound and Westbound	Tue - 20Aug2019	Thu - 12Sep2019	Wed - 08Jan2020	Fri - 31Jan2020	Wed - 04Mar2020
Design - BR15 - Winston Churchill West Culvert	Thu - 23Jan2020	Mon - 17Feb2020	Thu - 19Mar2020	Mon - 13Apr2020	Thu - 14May2020
Note: 'Comments Due' dates above are based on a 17 Business Day review period.					

MEETING:	H401 Expansion Project – Peel Region (PR) - Meeting No. 5	DATE:	Friday, August 16, 2019
		TIME:	9:00 AM to 11:00 AM
LOCATION:	2000 Argentia Road, Plaza 5, Suite 500	RFP NO.	17-178
Toll free number:		Passcode:	

ATTENDEES: Kelvin Chu (IO), Wayne Bell (MTO), Iqbal Muhammad (MTO), Sammy Lee (Altus), Alberto Bravo (Altus), David Ellis (WCC), Harrie Van Dyk (WCC), Dave Callander (WCC), Derek Surgeoner (WCC), Noris Bot (WCC), Frank Pugliese (PR), Nicholas Gan (PR), Adam Van Nood (Marathon), Humberto Ferrer (Marathon), Bruce Knight (Marathon), Troy Skinner (Marathon), Rachelle Plourde (Jacobs), Camilo Quintero (Jacobs)

ITEM	DESCRIPTION	ACTION BY	DUE BY
1.	<p>Crossing Relocations</p> <p>Crossing 1 – Frank noted that design is progressing to 50%; property acquisition will commence [same comment as last meeting].</p> <p>Crossing 2 – WCC presented the proposed cover for the existing watermain, based on WCC’s road profile (attached). Peel noted that their minimum cover requirement is 1.8 m, however some tolerance would be acceptable with insulation. Peel noted that a localized relocation (similar to Crossing 1) may be possible. WCC will also review the grading to determine if an avoidance is possible. Potential issue with the drain chamber on the south side – PR is to locate chamber in field so WCC can survey. Peel indicated a need for concrete barrier protection for their staff when attending valves within the Highway 401 corridor. CA indicated concern about introducing new roadside barriers if not already required for other protection warrants.</p> <p>Action: WCC to review grading at this location. Action: PR to locate (east) chamber on south side. Action: WCC to survey chambers on south and north side to confirm conflict.</p> <p>Crossing 3 – PR noted that additional SUE investigation is required for this crossing – pending completion by T2UE; design is not anticipated to alter from the concept previously provided (simply shift further to the west).</p> <p>Crossing 4 –PR is developing a plan for the south access with the CA. WCC confirmed that a round, 10 m dia. entry shaft and 6 m dia. exit shaft is ideal, based on a steel liner; a concrete liner will reduce the entry shaft to 7 m dia. WCC confirmed that OPSS specifications are preferred. CA confirmed that a concrete liner is acceptable. PR noted that property acquisition will commence with the property owner on the north side.</p>	<p>WCC PR WCC</p>	<p>Aug 30 Aug 21 Aug 23</p>

	<p>Crossing 5 – WCC presented sections for this crossing, noting approximate 3 m clearance from edge of watermain to face of pier footing. WCC is to incorporate vibration monitoring into roadway protection installation.</p> <p>Crossing 6 – WCC noted challenges with daylighting on Derry Road, due to inaccurate locates; noted that future work may have to be completed on Time & Materials basis (noted by CA). Discussion also took place regarding extension of existing watermain to the north (and potentially the south) versus a new line installed via micro-tunneling. WCC/PR/CA to await results of daylighting prior to confirming approach. Jacobs noted potential conflict with existing watermain on south side – WCC to review.</p> <p>Action: PR to provide suitable locates or WCC to proceed with remaining test pitting on T&M basis – PR to advise. PR to also provide coordinates for additional holes on south side of Derry Road.</p> <p>Crossing 7/8 – Discussion regarding proposed (PR) design; WCC noted that a straight alignment of the watermain is preferred from a schedule perspective, noting additional costs for a second entry shaft adjacent the proposed. WCC also noted that the profile of the line should either start in rock and remain in rock or remain above rock – tunneling in a mixed face is more challenging and entering rock further along the profile is also challenging. PR noted that Golder is providing additional boreholes, which are expected in a few weeks. 30% design is anticipated for August 29, 2019. PR also noted that an additional 200 mm watermain (fire line) in the easement adjacent Thermo Fisher may need replacement and should be completed as part of these works.</p> <p>Crossing 9 – Jacobs confirmed that no work will be completed prior to Spring of 2021 and will be located at a depth with 10 m of rock overburden. WCC noted that settlement monitoring will need to be provided by PR.</p> <p>Action: WCC to provide settlement monitoring recommendations for PR implementation.</p> <p>Crossing 10 – WCC reviewed revised cross-sections for this crossing, noting that the slope has been reduced to 2:1. PR noted that the previously provided 3:1 slope is preferred, but PR requires exp to provide a more detailed report with various failure analyses including scenarios with excavation for watermain replacement and both dry/wet conditions (assuming watermain failure). If exp are satisfied with the design, PR will require a signed/sealed letter stating this. PR also noted issues with WCC’s plan stations.</p> <p>Action: WCC to provide technical report for slope stability. Action: WCC to conduct avoidance analysis for drain chamber in proposed ditch. Action: WCC to revise stations on plan.</p> <p>Crossing 11 – WCC presented results of survey (attached) noting potential conflict between existing manholes and proposed grade (i.e., manholes will be well above grade).</p> <p>Action: WCC to conduct avoidance analysis for manholes. Action: PR to review option of adjusting manhole heights.</p>	<p>PR</p> <p>WCC</p> <p>WCC</p> <p>WCC</p> <p>WCC</p> <p>WCC</p> <p>PR</p>	<p>Aug 21</p> <p>Sept 6</p> <p>Aug 30</p> <p>Aug 30</p> <p>Aug 23</p> <p>Aug 30</p> <p>Aug 30</p>
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	<p>Other Business</p> <p>PR noted that all designs skipping 50% and going straight to 90%; all designs to be provided by October 2, 2019.</p> <p>Permitting: WCC confirmed that Permits to Take Water could be provided by WCC (provided information is provided within next two weeks), CVC permits are to be provided by PR, and Road Occupancy Permits will be obtained by WCC.</p> <p>Jacobs noted the need to ensure that all information pertaining to existing as-built data should be checked to ensure that the appropriate Survey System is being referenced.</p> <p>PR noted that additional works are anticipated at Derry Road and Argentinia Road – WCC is interested in looking at these works.</p> <p>Action: PR to provide design details to WCC for review</p> <p>WCC to coordinate road closure for Creditview Road.</p> <p>Action: WCC to coordinate website link for closure information</p>	<p>PR</p> <p>WCC</p>	<p>Aug 23</p> <p>Aug 23</p>
	<p>Next Meeting: Friday, September 6, 9:00 a.m., WCC's project office</p>		

MEETING: H401 Expansion Project – Peel Region DATE: Friday, September 6, 2019
(PR) - Meeting No. 6 TIME: 9:00 AM to 10:30 AM

LOCATION: 2000 Argentia Road, Plaza 5, Suite RFP NO. 17-178
500

Toll free number: Passcode:

ATTENDEES: Kelvin Chu (IO), Wayne Bell (MTO), Iqbal Muhammad (MTO), Sammy Lee (Altus), Alberto Bravo (Altus), David Ellis (WCC), Dave Callander (WCC), Derek Surgeoner (WCC), Noris Bot (WCC), Frank Pugliese (PR), Nicholas Gan (PR), Rachelle Plourde (Jacobs), Dorin Newton (Jacobs)

ITEM	DESCRIPTION	ACTION BY	DUE BY
1.	<p>Crossing Relocations</p> <p>General</p> <ul style="list-style-type: none"> - Frank noted that the 90% designs have been delayed due to late SUE information. 90% design for Crossings 1, 3, 4, 6 will be available <u>November 14, 2019</u>; Crossings 7/8 will be available <u>December 17, 2019</u>. IFC for Crossings 1, 3, 4, 6 will be available <u>December 19, 2019</u>; Crossings 7/8 will be available <u>February 4, 2020</u>. Property acquisition is underway for Crossings 1, 3, 4, and 6. <p>Crossing 1 – David noted that WCC is conducting a Design Verification Review (DVR) to ensure there are no conflicts with PR's design.</p> <p>Crossing 2 – David noted that WCC is conducting a Conflict Avoidance for the watermain on the south side of Highway 401. Frank noted that test pits will be required to locate the (east) chamber on the south side and additional test pits should be conducted along the section running parallel Highway 401 to verify location and elevation. WCC will conduct test pits on T&M basis.</p> <ul style="list-style-type: none"> - Action: PR to organize notifications and easement occupancy approvals. - Action: WCC to advise PR when test pits can be completed. - Action: WCC to survey location of chamber on north side. <p>Crossing 3 – Revised design for Crossing 3 has been provided. WCC to review and advise of any additional costs. WCC will also conduct DVR to ensure there are no conflicts with PR's design.</p> <p>Crossing 4 – PR noted that the pit sizes are required.</p> <ul style="list-style-type: none"> - Action: WCC to confirm the pit sizes for Crossing 4. <p>Crossing 5 – Frank noted that PR will be replacing the existing 600 mm watermain, in the same tunnel as the 750 mm watermain (Crossing 6).</p> <ul style="list-style-type: none"> - Action: PR to provide WCC with concept (e.g., tunnel section) such that WCC can provide a price. 	<p>PR WCC WCC</p> <p>WCC</p> <p>PR</p>	<p>Sept 11 Sept 10 TBD</p> <p>Sept 13</p> <p>Sept 13</p>

	<p>Crossing 6 – PR will be moving forward with the realigned 750 mm watermain for this location. Additional test pits required for Derry Road will be conducted on T&M basis, as the utility locate information is not accurate.</p> <ul style="list-style-type: none"> - Action: WCC to provide revised price based on updated geotechnical information. - Action: WCC to organize test pits for both Crossings 5 and 6 and advise PR of schedule such that they can organize notifications; CA to expedite TDN. - Action: PR to review if protection measures can be implemented to allow WCC to construct the east abutments for the Derry Road bridge in advance of decommissioning of existing 750 mm watermain. <p>Crossing 7/8 – 30% design for Crossings 7/8 provided. WCC will provide a price for the work (+/- 2 weeks). David noted an existing sanitary line within the easement coming from the Thermo Fisher building – PR to review and advise. Frank confirmed that the new watermain within the easement will be part of the Crossing 7/8 works.</p> <ul style="list-style-type: none"> - Action: PR to confirm sanitary and watermain designs for Crossing 7/8. - Action: WCC to price Crossings 7/8. <p>Crossing 9</p> <ul style="list-style-type: none"> - Action: WCC to provide settlement monitoring recommendations for PR implementation. <p>Crossing 10 – WCC is finalizing technical memo from exp regarding slope stability. David to organize meeting with PR to review findings of memo. WCC continues to investigate Utility Avoidance Strategy for drain chamber – complicated by drainage design at Credit River. WCC is also conducting test pit at south side of Highway 401 to ensure no conflict.</p> <ul style="list-style-type: none"> - Action: WCC to provide technical report for slope stability. - Action: WCC to conduct avoidance analysis for drain chamber in proposed ditch. <p>Crossing 11 – WCC is conducting Utility Avoidance Strategy for existing manholes.</p> <ul style="list-style-type: none"> - Action: WCC to conduct avoidance analysis for manholes. - Action: PR to review option of adjusting manhole heights. 	<p>WCC</p> <p>WCC</p> <p>PR</p> <p>PR</p> <p>WCC</p> <p>WCC</p> <p>WCC</p> <p>WCC</p> <p>WCC</p> <p>PR</p>	<p>Sept 20</p> <p>Sept 10</p> <p>Sept 20</p> <p>Sept 13</p> <p>Sept 20</p> <p>Sept 20</p> <p>Sept 11</p> <p>Sept 17</p> <p>Sept 17</p> <p>Sept 17</p>
	<p>Other Business</p> <p>Frank suggested that WCC set up a meeting to review and discuss the coordination of PR's EA for Winston Churchill Boulevard with WCC's design.</p> <ul style="list-style-type: none"> - Action: WCC (Derek) to send CAD file to PR. - Action: PR (Frank) to organize meeting. <p>Permitting: PR confirmed that Jacobs will continue with the PTTW application.</p> <p>Jacobs noted the need to ensure that all information pertaining to existing as-built data should be checked to ensure that the appropriate Survey System is being referenced.</p> <p>WCC (Noris) discussed fencing/gate requirements.</p> <ul style="list-style-type: none"> - Action: WCC to provide PR with proposed fencing plan; PR to mark-up gate requirements. 	<p>WCC</p> <p>PR</p> <p>WCC</p>	<p>Sept 6</p> <p>Sept 13</p> <p>Sept 6</p>

	WCC/PR discussed lane reductions at Creditview Road. WCC noted that they will be recommending a full closure of the bridge. PR to coordinate with WCC (Ryan) on communication timing for any traffic impacts.		
	Next Meeting: TBD		

MEETING:	H401 Expansion Project – Peel Region (PR) - Meeting No. 8	DATE:	Wednesday, October 18, 2019
		TIME:	1:00 PM to 3:00 PM
LOCATION:	2000 Argentia Road, Plaza 5, Suite 500	RFP NO.	17-178
Toll free number:		Passcode:	

ATTENDEES: Kelvin Chu (IO), Wayne Bell (MTO), Iqbal Muhammad (MTO), Sammy Lee (Altus), David Ellis (WCC), Derek Surgeoner (WCC), Noris Bot (WCC), Frank Pugliese (PR), Nicholas Gan (PR), Pascal Pitre (Jacobs)

ITEM	DESCRIPTION	ACTION BY	DUE BY
1.	<p>Utility Review</p> <ul style="list-style-type: none"> - Crossings 1, 3, 4, 7, 8: <ul style="list-style-type: none"> o DVRs completed for Crossings 1, 3, 4, 7, 8; MTO to review WCC's DVR process to determine if this can be used to satisfy requirements for Encroachment Permits. <ul style="list-style-type: none"> ▪ Action: WCC to send example DVR to Wayne Bell for review. o WCC noted that geomorphology has been completed for Mullet Creek; information can be provided to Peel Region. <ul style="list-style-type: none"> ▪ Action: WCC to send Geomorphology Report to Peel Region/Jacobs. o WCC noted that the DVR for Crossing 7 and Crossing 8 is missing the proposed Mullet Creek culvert. This information is to be added along with the proposed retaining walls on the south side. <ul style="list-style-type: none"> ▪ Action: WCC to update DVR 7 and DVR 8 with proposed Mullet Creek culvert and retaining walls. o Peel Region requested additional borehole information on the south side adjacent the Marriott hotel. <ul style="list-style-type: none"> ▪ Action: WCC to review geotechnical information available at this location and provide to Peel Region. o Peel Region noted that the GDR information is complete for all crossings, except Crossings 7 and 8 (pending south side at Mullet Creek); SUE information still outstanding. <ul style="list-style-type: none"> ▪ Action: Peel Region to provide WCC with all GDR and SUE information once available. 	<p>WCC</p> <p>WCC</p> <p>WCC</p> <p>WCC</p> <p>WCC</p>	<p>Oct 22</p> <p>Oct 22</p> <p>Oct 30</p> <p>Oct 22</p> <p>TBD</p>

	<ul style="list-style-type: none"> ○ Peel Region confirmed that both steel casings and concrete liners are acceptable, noting that concrete is preferred for curved lines from a constructability perspective. ○ Peel noted that Crossing 4 may require isolation fencing for access road. WCC requested that Peel review all crossing locations again and mark-up Fencing Plan with proposed access points/roads for WCC review. <ul style="list-style-type: none"> ▪ Action: WCC to coordinate the coordinate system for the Fencing Plan with Jacobs. ▪ Action: Peel Region to mark-up Fencing Plan with proposed access points/roads for WCC action. - Crossing 2 <ul style="list-style-type: none"> ○ WCC presented the revised profile for Crossing 2, based on the updated SUE and survey, noting no conflict with the proposed highway design. WCC will prepare DVR for MTO/Peel Region use. <ul style="list-style-type: none"> ▪ Action: WCC to draft DVR for Crossing 2. - Crossing 5 <ul style="list-style-type: none"> ○ WCC confirmed no conflict based on SUE data obtained. Peel Region confirmed that Crossing 5 will remain as is. Peel noted that WCC will need to propose monitoring program during construction for Peel Region review. <ul style="list-style-type: none"> ▪ Action: WCC to send DVR for Crossing 5 to MTO/Peel Region. ▪ Action: WCC to provide proposed monitoring during construction. - Crossing 6 <ul style="list-style-type: none"> ○ WCC confirmed conflicts on both the north and south side of the proposed Derry Road bridge widening, based on SUE data. Peel region confirmed that a localized relocation will be designed for both the north and south side, with a long-term solution completed in the future. Jacobs noted that IFC design for Crossing 6 will be completed by February 2020, and that no property will be required for this work – as such, construction could commence immediately. Peel requested to provide concept design as soon as possible for WCC pricing. Peel noted that WCC will need to propose monitoring program during construction for Peel Region review. <ul style="list-style-type: none"> ▪ Action: WCC to provide proposed monitoring during construction. - Crossing 10 <ul style="list-style-type: none"> ○ WCC presented an avoidance strategy for Crossing 10 for the air chamber adjacent Highway 401; solution includes a closed drainage system to avoid the proposed ditching conflict. Avoidance profile to include proposed chamber. Peel Region noted that isolation of the 400 mm watermain on Creditview Road is not possible and that the watermain will be relocated at a future date. Peel noted that WCC will have to propose a monitoring program during construction. WCC suggested that light weight fill could be used for the embankment construction. 	<p>WCC</p> <p>PR</p> <p>WCC</p> <p>WCC</p> <p>WCC</p> <p>WCC</p> <p>WCC</p>	<p>Oct 23</p> <p>Oct 30</p> <p>Oct 25</p> <p>Oct 23</p> <p>TBD</p> <p>TBD</p>
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	<ul style="list-style-type: none"> ▪ Action: Peel Region to provide WCC with CAD files of Crossing #10 infrastructure. ▪ Action: WCC to update plan/profile with Peel Region chamber. ▪ Action: WCC to finalize cost associated with avoidance strategy. ▪ Action: WCC to provide proposed monitoring during construction. ▪ Action: WCC to discuss light weight fill options with exp. ▪ Action: Peel Region to provide WCC with 400 mm watermain material information. <ul style="list-style-type: none"> - Crossing 11 <ul style="list-style-type: none"> o WCC presented an avoidance strategy for Crossing 11. <ul style="list-style-type: none"> ▪ Action: WCC to provide Peel Region with plan showing all manholes in area. - Other <ul style="list-style-type: none"> o WCC suggested that contingencies plans should be developed in the event that property is not available when required to maintain WCC's schedule. Ideas noted during the meeting included tunneling from within the ROW and open cutting to the required limits once property is available. WCC will have to provide "no later than" dates for each crossing. <ul style="list-style-type: none"> ▪ Action: WCC to provide relevant dates for each crossing with proposed contingency plans for review by MTO/Peel Region. 	<p>PR</p> <p>WCC</p> <p>WCC</p> <p>WCC</p> <p>WCC</p> <p>WCC</p> <p>PR</p> <p>WCC</p>	<p>Oct. 25</p> <p>Oct 25</p> <p>Oct 25</p> <p>TBD</p> <p>TBD</p> <p>Oct 25</p> <p>Oct 21</p> <p>Nov 1</p>
<p>2</p>	<p>Other Business</p> <ul style="list-style-type: none"> - Peel Region confirmed that they will not be proceeding with the watermain project at Derry Road and Argentia at this time. - CA reminded WCC that there may remain drainage conflict at the North-East corner of Derry Road. <ul style="list-style-type: none"> o Action: WCC to confirm drainage design at this location. - Peel Region confirmed that the SUE data provided by WCC for Derry Road is acceptable and that Jacobs will advise if any additional information is required. WCC to stamp drawing and send to Peel Region. <ul style="list-style-type: none"> o Action: WCC to stamp drawing and send to Peel Region. o Action: Jacobs to confirm if additional SUE information is required for Derry Road. - WCC noted that traffic closure request documents have not yet been received from Peel Region. <ul style="list-style-type: none"> o Action: Peel Region to provide templates for WCC use. 	<p>WCC</p> <p>WCC</p> <p>PR</p> <p>PR</p>	<p>Nov 1</p> <p>Oct 25</p> <p>Oct 25</p> <p>Oct 25</p>

	<ul style="list-style-type: none"> - WCC requested that Peel Region provide Municipal Consent, in lieu of Road Occupancy Permits. WCC noted that other municipalities are proceeding in this fashion. <ul style="list-style-type: none"> o Action: Peel Region to confirm MUC. - Peel Region confirmed that they will submit the PUCC to the City of Mississauga at 90% design development. - WCB: It was agreed by all parties that WCC's design will govern at Winston Churchill Boulevard and that Peel's design will coordinate with WCC's IFC design. - WCC requested watermain access for water taking during construction at a few locations. Peel Region noted that this will be acceptable at no cost to WCC; WCC to provide requested locations. <ul style="list-style-type: none"> o Action: WCC to provide drawing indicating requested locations for water meters. 	PR	Nov 1
	Next Meeting: TBD WCC's office		

MEETING:	H401 Expansion Project – Peel Region (PR) - Meeting No. 8	DATE:	Monday, December 16, 2019
		TIME:	1:00 PM to 3:00 PM
LOCATION:	2000 Argentia Road, Plaza 5, Suite 500	RFP NO.	17-178
Toll free number:		Passcode:	

ATTENDEES: Kelvin Chu (IO), Wayne Bell (MTO), Iqbal Muhammad (MTO), Sammy Lee (Altus), David Ellis (WCC), Derek Surgeoner (WCC), Noris Bot (WCC), Frank Pugliese (PR), Pascal Pitre (Jacobs), Pagni Parmar (Jacobs)

ITEM	DESCRIPTION	ACTION BY	DUE BY
1.	<p>Utility Review</p> <ul style="list-style-type: none"> - Crossing 1: <ul style="list-style-type: none"> o 90% design is available now and will be shared with WCC. o IFC is pending completion of SUE (T2UE); WCC agreed to provide Peel with SUE obtained through WCC's investigations at this location (for information). o WCC agreed that access to this crossing can be achieved through the MTO ROW; Peel can now move forward with land acquisition based on the reduced footprint (as per Peels PIPs Markup.pdf). <ul style="list-style-type: none"> ▪ Action: WCC to provide SUE data for Crossing 1. ▪ Action: Peel to provide 90% design. - Crossing 2: <ul style="list-style-type: none"> o WCC reviewed the revised avoidance strategy for Crossing 2 (pass-through culvert); conflict has been avoided. - Crossing 3: <ul style="list-style-type: none"> o 90% design will be available as per Peel's latest schedule (January 31, 2020). o IFC is pending completion of SUE (T2UE); WCC agreed to provide Peel with SUE obtained through WCC's investigations at this location (for information). o WCC agree that access to this crossing can be achieved through the MTO ROW; Peel can now move forward with land acquisition based on the reduced footprint (as per Peels PIPs Markup.pdf). o WCC/Peel discussed the possibility of constructing the portion within the MTO ROW up to property line separately if necessary, to move forward with highway infrastructure as per WCC schedule; remainder of crossing could be constructed once property is available. If this scenario is advanced, access from private lands would be necessary in order to complete adit construction. <ul style="list-style-type: none"> ▪ Action: WCC to provide SUE data for Crossing 3. 	<p>WCC Peel</p>	<p>Dec 19 Dec 19</p>
		WCC	Dec 19

	<ul style="list-style-type: none"> - Crossing 4: <ul style="list-style-type: none"> o 90% design will be available as per Peel's latest schedule (January 31, 2020). o Peel noted that there are no property concerns on the south side of this crossing, noting that lanes on Argentia can be provided through City of Mississauga Road Occupancy permit; property on the north side will be challenging given that development of the property has already commenced and is encroaching within Peel's intended property take. o WCC agree that access to this crossing can be achieved through the MTO ROW, although laydown within MTO ROW could impact completion of the highway infrastructure. Peel will approach property owner based on the reduced footprint (as per Peels PIPs Markup.pdf). o Discussion regarding WCC previously submitted monitoring plans; Jacobs to review for comment. <ul style="list-style-type: none"> ▪ Action: Jacobs to review WCC's monitoring plan. o Peel noted that GBR is outstanding pending further discussion with MTO. o IFC is pending completion of SUE (T2UE); WCC agreed to provide Peel with SUE data obtained through WCC's investigations at this location (for information). <ul style="list-style-type: none"> ▪ Action: WCC to provide SUE data for Crossing 4, including drainage information for existing culvert at south end. o WCC noted that construction of highway infrastructure impacts the south crossing of the existing ditch resulting in a vertical clearance from pipe to bottom of ditch of approximately 0.6 m; Peel agreed that this could be protected during construction, if necessary. - Crossing 5: <ul style="list-style-type: none"> o Discussion regarding WCC monitoring plans previously submitted; Jacobs to review for comment. <ul style="list-style-type: none"> ▪ Action: Jacobs to review WCC's monitoring plan. - Crossing 6: <ul style="list-style-type: none"> o 30% design is available now and will be shared with WCC. <ul style="list-style-type: none"> ▪ Action: Peel to provide 30% design. o WCC reviewed the proposed methodology; agreed by Peel Region. Peel commented that the water main will be able to be shut down for up to 3 days continuously or for extended periods through nightly flushes, to avoid conflicts with chipping existing concrete encasement. WCC noted that the fabrication of the customized connection would take 1-3 weeks, which would be installed concurrently with commissioning. WCC to coordinate commissioning with Peel Region. WCC noted a revised alignment could aid with utility conflicts. WCC to provide redline mark-up of 30% design for Peel Region revisions. <ul style="list-style-type: none"> ▪ Action: WCC to provide redline mark-up of 30% design. ▪ Action: Jacobs to provide (draft) construction special provisions. o WCC noted that the fabrication of the concrete pressure pipe could take 6-8 weeks; WCC is interested in ordering materials by 	<p>Jacobs</p> <p>WCC</p> <p>Jacobs</p> <p>Peel</p> <p>WCC Jacobs</p>	<p>Jan 3</p> <p>Dec 19</p> <p>Jan 3</p> <p>Dec 19</p> <p>Dec 23 Jan 3</p>
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	<p>mid-January. Peel noted that 90% design could be accelerated based on WCC redlines.</p> <ul style="list-style-type: none"> ○ Peel requested design information for the existing drainage/culvert on the north side of Derry Road, as well as WCC's Derry Road structure design. <ul style="list-style-type: none"> ▪ Action: WCC to provide drainage/structures information. ○ Discussion regarding WCC monitoring plans; Jacobs to review for comment. <ul style="list-style-type: none"> ▪ Action: Jacobs to review WCC's monitoring plan. <p>- Crossing 7</p> <ul style="list-style-type: none"> ○ WCC (exp) noted that the drilling for Crossing 7 will be completed today; exp to have lab expedite test results; exp to confirm. <ul style="list-style-type: none"> ▪ Action: exp to confirm lab test result timeline. ○ Peel noted that SUE information is outstanding for both Syntex Road and Century Avenue. ○ Peel noted that design timeline is pending SUE and geotechnical data. ○ Peel discussed access to the south manhole through Peel's easement (9 m width); also raised concerns with the proximity of the shaft to the top of bank for Mullet Creek. ○ WCC discussed the lack of asbuilt information to determine the impact of construction on the existing sanitary. Peel noted that they can provide the invert(s) of the pipe at the manhole and grade of the pipe. <ul style="list-style-type: none"> ▪ Action: Peel to provide invert/grade information. ○ WCC will provide the design for Mullet Creek including scour analysis where proposed sanitary crosses, and DFO application. <ul style="list-style-type: none"> ▪ Action: WCC to provide Mullet Creek design information including DFO application. ○ Peel noted that a single pass solution (1200 mm) for Crossing 7 is acceptable (modelling results are good), however Peel has noted issues with pressure testing for diameters larger than 600 mm; WCC to take this into consideration as Peel will require that the pressure test results are acceptable. <p>- Crossing 8:</p> <ul style="list-style-type: none"> ○ Peel noted that changes are forthcoming for the private watermain supply Thermo Fisher and will be reflected on the next design iteration. ○ Peel has met with the City of Mississauga regarding permitting for Syntex Road and Century Avenue to discuss permits for road occupancy; IBI is developing the traffic management plans. WCC will be responsible for the Road Occupancy permit(s). ○ WCC is finalizing the retaining wall design for Crossing 7 and Crossing 8; WCC will provide once available. <ul style="list-style-type: none"> ▪ Action: WCC to provide retaining wall design(s) for Crossing 7 and Crossing 8 (south side). <p>- Crossing 9:</p> <ul style="list-style-type: none"> ○ Discussion regarding WCC previously submitted monitoring plans; Jacobs to review for comment. <ul style="list-style-type: none"> ▪ Action: Jacobs to review WCC's monitoring plan. 	<p>WCC</p> <p>WCC</p> <p>WCC</p> <p>exp</p> <p>Peel</p> <p>WCC</p> <p>WCC</p> <p>Jacobs</p>	<p>Dec 19</p> <p>Jan 3</p> <p>Dec 19</p> <p>Dec 20</p> <p>Jan 3</p> <p>Dec 19</p> <p>Dec 23</p> <p>Jan 3</p>
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	<ul style="list-style-type: none"> ○ Jacobs noted that construction of this crossing is planned for late 2021. - Crossing 10: <ul style="list-style-type: none"> ○ WCC noted that the ditch design for the north side of Highway 401 does not avoid the existing drain chamber; Peel has accepted that as the watermain will be relocated. ○ WCC noted that based on the revised design (deeper set RSS walls) the differential settlement is reduced to 4 mm. <ul style="list-style-type: none"> ▪ Action: Peel Region is to review the WCC/exp report and provide comments. - Crossing 11: <ul style="list-style-type: none"> ○ WCC confirmed that the avoidance strategy has been confirmed. 	Peel	Jan 3
2	<p>Other Business</p> <ul style="list-style-type: none"> - WCC/Peel discussed the gate locations. Peel confirmed that gates are required for Crossing 11. Peel/WCC to further review gate requirements. <ul style="list-style-type: none"> ○ Action: WCC to review gate requirements. ○ Action: Peel to review gate requirements. ○ Outstanding Action: WCC to provide drawings indicating requested locations for water meters during construction. 	WCC Peel	Jan 3 Jan 3
	Next Meeting: January 17, 9:00 – 11:00, WCC's office		

Office of Completion

Environmental Assessment Study

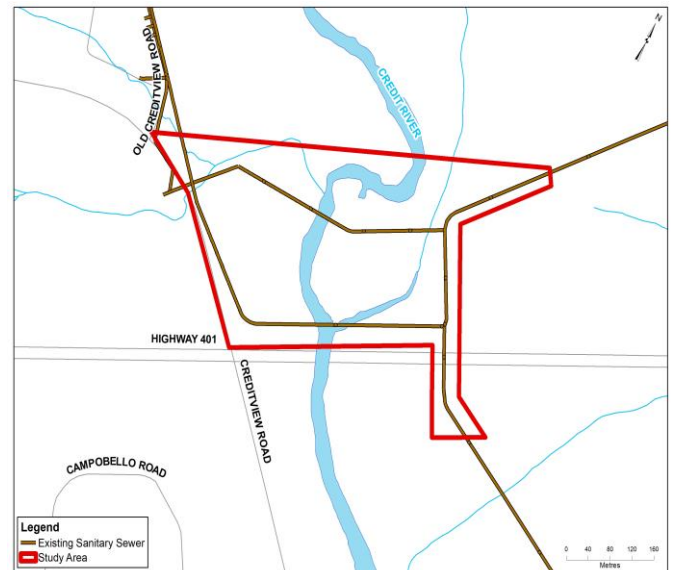
NOTICE OF STUDY COMPLETION

Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer

The Study

The Region of Peel has completed the Schedule 'B' Municipal Class Environmental Assessment (Class EA) study for the realignment of a section of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer (CVSTS), in the City of Mississauga. The study area for this Class EA is shown in the map. The study identified the preferred alignment for the relocated sanitary sewer. It will start east of the Creditview Rd. and Old Creditview Rd. intersection, diagonally cross the private property including the Credit River, and finally cross Highway 401 perpendicularly to south of Highway 401.

Study-specific evaluation criteria was developed, and subsequent evaluation was undertaken. The evaluation and the resulting recommendation were made public through a virtual Public Information Centre. Feedback from the public, approval agencies and stakeholders were collected and addressed. To find out more about the project, please visit the Region's website at <https://peelregion.ca/pw/water/enviro-assess/relocation-of-credit-valley-sanitary-trunk-sewer.asp>



Comments

A Project File has been prepared to document the study and its findings. The completed Project File will be made available for public review and comment for 40 calendar days, starting on September 23, 2021 and ending on November 1, 2021. Subject to comments obtained during this period, the Region will implement the recommended solution by proceeding to design and construction. Interested persons may provide written comments to the project team by November 1, 2021. All comments and concerns should be sent directly to the contact listed below:

Ajay Puri, M.E. (Env.), P.Eng.

Project Manager, Engineering Services Division
Wastewater Collection & Conveyance
Tel.: (905) 791-7800 x. 5073
Ajay.Puri@peelregion.ca

Process

In addition, a request may be made to the Ministry of the Environment, Conservation and Parks for an order requiring a higher level of study (i.e., requiring an individual/ comprehensive EA approval before being able to proceed), or that conditions be imposed (e.g., require further studies), only on the grounds that the requested order may prevent, mitigate or remedy adverse impacts on constitutionally protected Aboriginal and treaty rights. Requests on other grounds will not be considered. Requests should include the requested contact information and full name.

Requests should specify what kind of order is being requested (request for conditions or a request for an individual/comprehensive environmental assessment), how an order may prevent, mitigate, or remedy potential adverse impacts on Aboriginal and treaty rights, and any information in support of the statements in the request. This will ensure that the ministry is able to efficiently begin reviewing the request.

The request should be sent in writing or by email to:

Minister of the Environment, Conservation and Parks
Ministry of Environment, Conservation and Parks
777 Bay Street, 5th Floor
Toronto ON M7A 2J3
minister.mecp@ontario.ca

Director, Environmental Assessment Branch
Ministry of Environment, Conservation and Parks
135 St. Clair Ave. W, 1st Floor
Toronto ON, M4V 1P5
EABDirector@ontario.ca

Requests should also be copied to the Region by mail or by e-mail. Please visit the ministry's website for more information on requests for orders under section 16 of the Environmental Assessment Act at: ontario.ca/page/class-environmental-assessments-part-ii-order.

All personal information included in your request – such as name, address, telephone number and property location – is collected, under the authority of section 30 of the Environmental Assessment Act and is collected and maintained for the purpose of creating a record that is available to the general public. As this information is collected for the purpose of a public record, the protection of personal information provided in the Freedom of Information and Protection of Privacy Act (FIPPA) does not apply (s.37). Personal information you submit will become part of a public record that is available to the general public unless you request that your personal information remain confidential.

This notice was first issued on September 23, 2021.

The Region of Peel is committed to ensure that all Regional services, programs and facilities are inclusive and accessible for persons with disabilities. Please contact the Project Manager if you need any disability accommodations to provide comments or feedback for this study.

Subject: Notice of Completion: Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer
To:

Cc: Puri, Ajay <ajay.puri@peelregion.ca>

Bcc: Dhillon, Paramjit/TOR <Paramjit.Dhillon@jacobs.com>; Kilis, Jakub <Jakub.Kilis@cvc.ca>;
kerry.mulchansingh@cvc.ca; Thannickal, Jimmy/TOR <Jimmy.Thannickal@jacobs.com>;
brian.mackay@canada.ca; rob.dobos@canada.ca; dave.gibson@dfo-mpo.gc.ca; emilie.st-
onges@canada.ca; cleo.bigeagle@canada.ca; monique.mousseau@tc.gc.ca; rabelljr@hotmail.com;
jocko@sixnationsns.com; administration@cnhw.qc.ca; info@scugogfirstnation.com;
office.clerk@mncfn.ca; fawn.sault@mncfn.ca; markhill@sixnations.ca; mno@metisnation.org; Sammy
Lee (Sammy.Lee@altusgroup.com); David Ellis <daellis@aecon.com>; mayor@mississauga.ca;
chris.rouse@mississauga.ca; darren.morita@mississauga.ca; eniber.cabrera@mississauga.ca;
george.carlson@mississauga.ca; 'Gino Dela Cruz' <gino.delacruz@mississauga.ca>;
john.mcdougall@mississauga.ca; leslie.green@mississauga.ca; scott.sorenson@mississauga.ca; Evelyn
Krolicka <Evelyn.Krolicka@mississauga.ca>; andrew.farr@peelregion.ca; margie.chung@peelregion.ca;
nando.iannicca@peelregion.ca; paul.callanan@peelregion.ca; peter.dundas@peelregion.ca;
lisa.myslicki@infrastructureontario.ca; Kelvin (IO <Kelvin.Chu@infrastructureontario.ca>;
karla.barboza@ontario.ca; michele.doncaster@ontario.ca; trevor.bell@ontario.ca;
Rebecca.Quach@ontario.ca; lise.chabot@ontario.ca; diana.spadafora@ontario.ca;
steven.strong@ontario.ca; ruth.lindenburger@ontario.ca; dawn.irish@ontario.ca; Bell, Wayne (MTO)
<Wayne.H.Bell@ontario.ca>; Maxwell Watters <Maxwell.Watters@alecrautilities.com>;
rowcentre@bell.ca; Jacquelyn Scott <Jacquelyn.Scott@enbridge.com>;
michael.maceacheron@enbridge.com; Ian Moase <Ian.Moase@enbridge.com>;
jim.arnott@enbridge.com; est.reg.crossing@enbridge.com; Monica Lapointe
<Monica.LaPointe@rci.rogers.com>; Rogers.MOC <Rogers.MOC@telecon.ca>;
ontariochapter@sierraclub.ca; info@craa.on.ca; mcccocommodore@mississaugacanoclub.ca

Good afternoon,

The Region of Peel has completed the Schedule 'B' Municipal Class Environmental Assessment (Class EA) study on the Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer. The Region has identified the preferred alignment for the relocation of the sanitary sewer. A Project File for the EA Study will be available for review for 40 calendar days, starting on September 23, 2021 and ending on November 1, 2021, as shown in the attached notice. It will be available online at <https://peelregion.ca/pw/water/environ-assess/relocation-of-credit-valley-sanitary-trunk-sewer.asp>. All comments and concerns should be sent directly to the Region of Peel Project Manager listed below:

Thank you,

Dorin Newton, P.Eng., M.Eng. | Jacobs | Engineering

On behalf of:

Ajay Puri, M.E. (Env.), P.Eng.

Project Manager, Engineering Services Division

Wastewater Collection & Conveyance

Tel.: (905) 791-7800 x. 5073

Ajay.Puri@peelregion.ca

Newton, Dorin/TOR

From: Newton, Dorin/TOR
Sent: Tuesday, September 28, 2021 6:13 PM
To: eanotification.cregion@ontario.ca
Subject: Notice of Completion: Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer
Attachments: Notice-of-Completion-creditvalley.pdf

Good afternoon,

The Region of Peel has completed the Schedule 'B' Municipal Class Environmental Assessment (Class EA) study on the Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer. The Region has identified the preferred alignment for the relocation of the sanitary sewer. A Project File for the EA Study will be available for review for 40 calendar days, starting on September 23, 2021 and ending on November 1, 2021, as shown in the attached notice. It will be available online at <https://peelregion.ca/pw/water/environ-assess/relocation-of-credit-valley-sanitary-trunk-sewer.asp>. All comments and concerns should be sent directly to the Region of Peel Project Manager listed below:

Thank you,

Dorin Newton, P.Eng., M.Eng. | Jacobs | Engineering

On behalf of:

Ajay Puri, M.E. (Env.), P.Eng.
Project Manager, Engineering Services Division
Wastewater Collection & Conveyance
Tel.: (905) 791-7800 x. 5073
Ajay.Puri@peelregion.ca

Newton, Dorin/TOR

From: Puri, Ajay <ajay.puri@peelregion.ca>
Sent: Monday, October 25, 2021 10:13 AM
To: Dhillon, Paramjit/TOR; Thannickal, Jimmy/TOR; Newton, Dorin/TOR
Subject: [EXTERNAL] FW: Notice of Completion: Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer
Attachments: Report Review Funding Agreement Template June 2021.pdf

FYI.....

From: Puri, Ajay
Sent: October 18, 2021 11:26 AM
To: Dominic Ste-Marie <Dominic.Sainte-Marie@wendake.ca>
Cc: Lori-Jeanne Bolduc <Lori-Jeanne.Bolduc@wendake.ca>
Subject: RE: Notice of Completion: Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer

Good morning Dominic,

Thank you for your email and your interest in the project. We have now completed a Schedule B Municipal Class Environmental Assessment (Class EA) for the Relocation of the 1500mm Credit Valley Sanitary Trunk Sewer. As part of the Class EA, we completed a Stage 2 Archaeological Investigation and the report titled Stage 2 Archaeological Assessment, Highway 401 Crossings, Various Locations dated Feb. 4, 2021 and prepared by Aecom is included in Appendix C of the Project File Report. The Project File Report can be found at <https://peelregion.ca/pw/water/environ-assess/pdf/credit-valley-sanitary-trunk-sewer-report.pdf>. We are currently in the process of wrapping up the Stage 3 field investigations. We recognize that this work falls within your traditional territory and we'd be happy to share information and provide the ability to review reports prior to sending to the Ministry.

Due to increased interest from indigenous groups in participating in field work and document review, the Region is undergoing a process of standardizing protocol and agreement templates. I have attached the updated templates for your review. Terms, rates, etc. are subject to change from project to project as we continue to work towards fair and equitable opportunities for inclusion. Please provide us with the names/contact info as required. We will complete the agreement upon receiving the names/contact information.

Once again, thank you for your interest and participation. Please don't hesitate to reach out with any further questions.

Regards,

Ajay Puri, M.E. (Env.), P.Eng.
Project Manager, Engineering
Wastewater Collection & Conveyance
Engineering Services Division
Public Works
Email: Ajay.Puri@peelregion.ca
Tel: (905) 791-7800 x 5073

10 Peel Centre Drive, Suite B, 4th Floor
Brampton, ON L6T 4B9

From: Dominic Ste-Marie <Dominic.Sainte-Marie@wendake.ca>
Sent: October 5, 2021 10:24 AM
To: Puri, Ajay <ajay.puri@peelregion.ca>
Cc: Lori-Jeanne Bolduc <Lori-Jeanne.Bolduc@wendake.ca>
Subject: RE: Notice of Completion: Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer

CAUTION: EXTERNAL MAIL. DO NOT CLICK ON LINKS OR OPEN ATTACHMENTS YOU DO NOT TRUST.

Hello Ajay,

Thank you for your email. Could you please let us know what are the upcoming steps in the project and if any archaeological studies or fieldwork will be necessary as part of this project?

Please note that the Huron-Wendat Nation is interested in participating in all archaeological fieldwork for this project, as well as receiving copies of the draft reports for review and comments.

Dominic Ste-Marie

ATTENTION: Please note that Maxime Picard has a new position at the Huron-Wendat Nation Council and is no longer in charge of Ontario consultations. Any new consultation from Ontario must be sent to Mario Gros-Louis (mario.gros-louis@wendake.ca), Lori-Jeanne Bolduc (lori-jeanne.bolduc@wendake.ca) and Dominic Ste-Marie (dominic.ste-marie@wendake.ca).

For inquiries relating specifically to archaeology (fieldwork planning, monitoring, reports review, etc.), please contact Marie-Sophie Gendron (marie-sophie.gendron@wendake.ca), Isabelle Lechasseur (isabelle.lechasseur@wendake.ca) and Jean-François Richard (jean-francois.richard@wendake.ca).

De : Newton, Dorin/TOR <Dorin.Newton@jacobs.com>
Envoyé : 24 septembre 2021 16:54
Cc : Puri, Ajay <ajay.puri@peelregion.ca>
Objet : Notice of Completion: Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer

Good afternoon,

The Region of Peel has completed the Schedule 'B' Municipal Class Environmental Assessment (Class EA) study on the Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer. The Region has identified the preferred alignment for the relocation of the sanitary sewer. A Project File for the EA Study will be available for review for 40 calendar days, starting on September 23, 2021 and ending on November 1, 2021, as shown in the attached notice. It will be available online at <https://peelregion.ca/pw/water/environ-assess/relocation-of-credit-valley-sanitary-trunk-sewer.asp>. All comments and concerns should be sent directly to the Region of Peel Project Manager listed below:

Thank you,

Dorin Newton, P.Eng., M.Eng. | Jacobs | Engineering

On behalf of:

Ajay Puri, M.E. (Env.), P.Eng.

Project Manager, Engineering Services Division

Wastewater Collection & Conveyance

Tel.: (905) 791-7800 x. 5073

Ajay.Puri@peelregion.ca

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REPORT REVIEW FUNDING AGREEMENT

(the "Agreement")

THIS AGREEMENT is made as of the ____ day of _____, 20____ (the "Effective Date").

BETWEEN:

[●], as represented by its Chief and Council having the capacity of a Band pursuant to the *Indian Act (Canada)*,

("[] FN")

-and-

THE REGIONAL MUNICIPALITY OF PEEL

(the "Region")

WHEREAS:

- A. The Region is the proponent undertaking [Insert details of work being undertaken by the Region that will require archaeological work.] (the "Project").
- B. The Project will require [insert the studies and reports required] .
- C. The Region acknowledges the importance of [] FN participating in and being kept apprised of the archaeological and environmental aspects of the Project. To further this objective the Region wishes to provide [] FN with funding to assist [] FN to review and comment on reports for the Project, all in accordance with the terms and conditions of this Agreement,

NOW THEREFORE, in consideration of the terms and conditions set out below, and the sum of one dollar (\$1.00) paid by each Party to the other Party, and for other good and valuable consideration (the receipt and sufficiency of which is hereby acknowledged) the Parties agree as follows:

- 1 **Right to Review Reports.** The Region agrees to provide [] FN with requested: (a) draft archaeological reports; (b) environmental reports; (c) related supplementary material necessary to understand the reports (the "Report Material"), when same becomes available to the Region.
- 2 **Purpose of FN Review.** The purpose of providing the draft archaeological reports is to allow [] FN an opportunity to review and provide meaningful comments to the Region, prior to the Region's submission of the final archaeological report to the applicable regulatory authority. The purpose of providing environmental reports to [] FN is to provide the [] FN an opportunity to review and assess potential impacts on [] FN's Aboriginal and treaty rights.
- 3 **Review Period.** The Region will provide [] FN a reasonable time period to conduct its review (the "[FN Review]" and the "Review Period"). When making a determination of what is reasonable the Region will take into account the complexity of the report and supplementary material, Project timelines and any other relevant factors brought to its attention by [] FN. The Parties agree that any initial review by [] FN will not be less than [●] days.
- 4 **Fieldwork.** The Region agrees that during the Review Period, fieldwork which could adversely impact a site of archaeological interest will be suspended.
- 5 **[FN Reviewers' Qualifications.** [] FN agrees that its review of the Report Material will be conducted by persons with appropriate qualifications for the work required – for example, education in archaeological assessments, environmental sciences – and experience in bridging Indigenous perspectives with Western approaches, as reasonably determined by MCFN ("[FN Reviewers]").
- 6 **Archaeological Report Review Funding.** The Region will provide funding for the [] FN Review to the maximum amount provided in Schedule A. If [] FN after receiving the Report Material and consulting with the [] FN Reviewer determines that the maximum amount set out in Schedule A is insufficient, given the unique nature or complexity of the proposed review, it shall provide a workplan and budget to the Region for the Region's approval. The Region is not obliged to pay any amount for archaeological review work that is not pre-approved by the Region.
- 7 **Environmental Report Review Funding:** Should the [] FN wish to review environmental reports , the [] FN after receiving the Report Material and consulting with the [] FN Reviewer may provide to the Region a workplan and budget for the Region's approval. The Region is not obliged to pay any amount for environmental review work that is not pre-approved by the Region.
- 8 **No Duplication of Payments:** In the event that [] FN has entered into another agreement with the Region under which funding is provided for the review of any Report Materials the review of those Report Materials will not be payable under this Agreement.
- 9 **Payment of Funding.** The Parties agree that the Region will pay any funding provided for under this Agreement to [] FN by cheque or bank transfer within thirty (30) days of delivery by [] FN to the Region of i) an invoice explaining in reasonable detail a [] FN Reviewer's time and fees and ii) the comments on the Report Material from the [] FN Reviewer.
- 10 **Form of Invoice.** All invoices shall be in a form satisfactory to the Region. Invoices shall be addressed directly to the Region as set out herein. The Project should be noted in the text of each invoice. Invoices should be submitted electronically to the following address:

by email:

WS DRAFT JUNE 11, 2021

Attention:

by mail:

Address:

Attention:

and in each case with a copy to:

[●]

- 11 **Representations and Warranties of the Region.** The Region acknowledges that [] FN is relying upon the representations and warranties set out in this Agreement and in connection with its entering into this Agreement, the Region represents and warrants as follows:
- (a) The Region has all requisite power and authority to execute and deliver this Agreement and has all necessary power and authority to perform the obligations of the Region as set out herein.
 - (b) The entering into this Agreement will not result in the violation of any of the terms and provisions of any agreement, written or oral, to which the Region may be a party.
 - (c) The execution and delivery of this Agreement has been duly authorized by all necessary actions on the part of the Region and this Agreement when duly executed and delivered by the Region will constitute a legal and binding obligation of the Region enforceable in accordance with its terms.
- 12 **Representations and Warranties of [] FN.** [] FN acknowledges that the Region is relying upon the representations and warranties set out in this Agreement and in connection with its entering into this Agreement [] FN represents and warrants as follows:
- (a) The execution and delivery of this Agreement has been duly authorized by all necessary actions on the part of [] FN and this Agreement when duly executed and delivered by [] FN will constitute a legal and binding obligation of [] FN enforceable in accordance with its terms.
 - (b) [] FN has all requisite power and authority to execute and deliver this Agreement and has all necessary power and authority to perform the obligations as set out herein.
 - (c) The entering into this Agreement will not result in the violation of any of the terms and provisions of any agreement, written or oral, to which [] FN may be a party.
- 13 **Term.** This Agreement shall commence on the Effective Date and continue until the earlier of (a) thirty (30) days after the provision by the Region to [] FN of a notice of termination; and (b) notification from the Region to [] FN that the Region's Project has concluded, (the "Term").
- 14 **Notices.** Any notice, demand or other communication (in this Article, a "Notice") required or permitted to be given or made under this Agreement must be in writing and is sufficiently given or made if:
- (a) delivered in person or by prepaid courier service and left with a receptionist or other responsible employee of the relevant Party at the applicable address set forth below;
 - (b) sent by mail (except in the case of actual or apprehended disruption of postal service); or
 - (c) sent by facsimile, email or other form of electronic communication. In the case of a notice to:
 - i. the Region, addressed to it as follows:

Attention:
Facsimile No.:
Telephone No.:
Email:
 - ii. [] FN , addressed to it as follows:

Attention:
Facsimile No.:
Telephone No.:
Email:
addressed to it as follows:
 - (d) Any Notice sent in accordance with this Article shall be deemed to have been received:
 - i. if delivered in person or by prepaid courier service during normal business hours (9:00am - 4:30pm) on the date of delivery;
 - ii. if sent by mail, on the fifth (5th) business day after mailing, or, in the case of disruption of postal service, on the fifth (5th) such business day after cessation of that disruption; or

WS DRAFT JUNE 11, 2021

- iii. if sent by facsimile, email or other form of electronic communication, during normal business hours (9:00am - 4:30pm) on confirmation of transmission,

except that any Notice delivered in person, by prepaid courier service or sent by facsimile, or email or other form of electronic communication not on a business day or after normal business hours (9:00am - 4:30pm) on a business day, in each case in the place where the Notice is received, shall be deemed to have been received on the next succeeding business day in the place where the notice is received. Any Party may change its address for Notice by giving Notice to the other Party.

- 15 **Entire Agreement.** This Agreement constitutes the entire agreement between the Parties pertaining to the subject matter of this Agreement and supersedes all prior correspondence, agreements, negotiations, discussions and understandings, written or oral between the Parties. Except as specifically set out in this Agreement, there are no representations, warranties, conditions or other agreements or acknowledgements, whether direct or collateral, express or implied, written or oral, statutory or otherwise, that form part of or affect this Agreement or which induced any Party to enter into this Agreement.
- 16 **Non-Derogation.** The Parties hereby acknowledge and agree that nothing in this Agreement or any document leading to it, or deriving from it is intended to, or shall be construed so to define or amend, recognize, affirm, abrogate, derogate from or deny the existence of, or in any way limit any Aboriginal or treaty rights of [] FN.
- 17 **Enurement and Assignment.** This Agreement shall enure to the benefit of, and be binding upon, the respective successors and assigns of each of the Parties.
- 18 **Waiver.** Any waiver of, or consent to depart from, the requirements of any provision of this Agreement shall be effective only if it is in writing and signed by the Party giving it, and only in the specific instance and for the specific purpose for which it has been given. No failure on the part of any Party to exercise, and no delay in exercising, any right under this Agreement shall operate as a waiver of that or any future right. No single or partial exercise of any such right shall preclude any other or further exercise of that right or the exercise of any other right.
- 19 **Further Assurances.** Each of the Parties to this Agreement hereby agree that it will promptly do, make, execute or deliver, or cause to be done, made, executed or delivered, all such further acts, documents and things as another Party may reasonably require from time to time for the purpose of giving effect to the provisions of this Agreement and each of the Parties to this Agreement agrees that it will use reasonable efforts and take all such steps as may be reasonably within its power to implement to their full extent the provisions of this Agreement.
- 20 **No Partnership.** Nothing in this Agreement shall be construed as creating a partnership, joint venture, association or trust, fiduciary or similar relationship. It is further understood and agreed that no Party is liable for the acts, covenants and agreements of any other Party, except as may be expressly provided in this Agreement.
- 21 **Modification.** No modification, amendment, supplement to or waiver of this Agreement or any schedule hereunder, or any of their provisions shall be binding upon the Parties hereto unless made in writing and duly signed by both Parties.
- 22 **Governing Law.** This Agreement shall be governed by, and interpreted and enforced in accordance with, the laws of the Province of Ontario and the federal laws of Canada applicable therein and the Parties hereby irrevocably submit to the exclusive jurisdiction of the courts of the Province of Ontario in connection with this Agreement.
- 23 **Counterparts and Transmission.** This Agreement may be executed in several counterparts, each of which when so executed shall be deemed to be an original and all counterparts together shall constitute one and the same instrument. A signed counterpart provided by way of facsimile or other form of electronic transmission shall be as binding upon the parties as an originally signed counterpart.

IN WITNESS WHEREOF the Parties have duly executed this Agreement as of the Effective Date.

[●],

Per:

Name:

Title:

I have authority to bind the First Nation.

REGIONAL MUNICIPALITY OF PEEL,

Per:

Name:

Title:

Schedule A

Costs for Technical Review

For review of materials and communications associated with Stage 1 Archaeological Assessment (AA)

	<i>Number</i>		<i>Rate</i>		<i>Total</i>
review hours	4.0	\$	150.00	\$	600.00
contingency (@ 20%)				\$	120.00
Total				\$	720.00

For review of materials and communications associated with Stage 2 AAs.

	<i>Number</i>		<i>Rate</i>		<i>Total</i>
review hours	4.0	\$	150.00	\$	600.00
contingency (@ 20%)				\$	120.00
Total				\$	720.00

For review of materials and communications associated with Stage 3 AAs.

	<i>Number</i>		<i>Rate</i>		<i>Total</i>
review hours	8.0	\$	150.00	\$	1,200.00
contingency (@ 20%)				\$	240.00
Total				\$	1,440.00

For review of materials and communications associated with Stage 4 AAs.

	<i>Number</i>		<i>Rate</i>		<i>Total</i>
review hours	8.0	\$	150.00	\$	1,200.00
contingency (@ 20%)				\$	240.00
Total				\$	1,440.00

Newton, Dorin/TOR

From: Achankunju, Merlin <Merlin.Achankunju@Telecon.ca>
Sent: Friday, October 15, 2021 4:07 PM
To: Newton, Dorin/TOR
Cc: Puri, Ajay; GTAW.Markups
Subject: [EXTERNAL] M214392_Old Creditview Rd
Attachments: M214392_Old Creditview Rd_Rogers Markup Response Letter.pdf; M214392_Old Creditview Rd.dwg

Hi,

Please find attached completed markup request.

***** Please use "REGEN" command for proper line style *****

Thank you,

Regards,

Merlin Achankunju

CAD Technician, Engineering - Central Canada
Technicien CAO, Ingénierie - Centre du Canada

7777 Weston Rd, Woodbridge (Ontario) L4L 0G9



telecon.ca

From: Newton, Dorin/TOR <Dorin.Newton@jacobs.com>
Sent: Friday, September 24, 2021 4:54 PM
Cc: Puri, Ajay <ajay.puri@peelregion.ca>
Subject: Notice of Completion: Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer

Good afternoon,

The Region of Peel has completed the Schedule 'B' Municipal Class Environmental Assessment (Class EA) study on the Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer. The Region has identified the preferred alignment for the relocation of the sanitary sewer. A Project File for the EA Study will be available for review for 40 calendar days, starting on September 23, 2021 and ending on November 1, 2021, as shown in the attached notice. It will be available online at <https://peelregion.ca/pw/water/envIRON-assess/relocation-of-credit-valley-sanitary-trunk-sewer.asp>. All comments and concerns should be sent directly to the Region of Peel Project Manager listed below:

Thank you,

Dorin Newton, P.Eng., M.Eng. | Jacobs | Engineering

On behalf of:

Ajay Puri, M.E. (Env.), P.Eng.

Project Manager, Engineering Services Division

Wastewater Collection & Conveyance

Tel.: (905) 791-7800 x. 5073

Ajay.Puri@peelregion.ca

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Markup Response Form

Application Date September 24, 2021 **Applicant:** Jacobs
Date Returned: October 15, 2021
Rogers Ref. No.: M214392 **Applicant Ref. No.:** n/a
Location / Municipality: Old Creditview Rd

**Rogers Communications has reviewed your drawing(s) as requested.
Our comments follow below with an "X" indicating Rogers' stance on your proposed plan.**

Please inform Rogers Communications a minimum of 6 - 12 months in advance of the proposed construction schedule in order to coordinate our plant relocation.

Contact Ontario One Call at 1-800-400-2255 or www.on1call.com at least 5 business days before beginning work to obtain utility locates. Hand dig / Vac truck when crossing, or within 1.0m of existing Rogers plant. Plant is to approximation.

Comments:

- Markup Only** Not for PUC Approval
- For your Reference** Rogers Communications currently has existing plant as marked on your drawing. Our standard depth in this municipality is: 1m.
Please ensure you maintain clearances of 0.3m vertically and 0.6m horizontally.
- No Conflict** Rogers Communications currently does not possess existing plant in the area indicated on your attached plans.
- CONFLICT** Your proposed construction appears to encroach within existing Rogers Communications plant. Please ensure you maintain clearances of 0.3 m vertically and 1 m horizontally. For hand dig maintain 0.6 m and for directional bore maintain 1.0 m horizontally. Please relocate your proposed construction to allow adequate clearance.

CAUTION NOTES:

- Use vactruck and expose ducts, maintain minimum of 0.6m clearance.
- Rogers Communications has aerial plant in this area, as it is indicated on the attached plans.
- Fiber Optic Cable is present in the area of your proposed construction. Please obtain locates and maintain minimum 1.0m/1.0m clearance.
- Proposed Fiber Optic Cable in a joint use duct structure .
- Plant currently under construction.

Merlin Achankunju

Rogers.MOC@telecon.ca

October 15, 2021

DATE

Newton, Dorin/TOR

From: Hatcher, Laura (MHSTCI) <Laura.E.Hatcher@ontario.ca>
Sent: Thursday, October 28, 2021 4:53 PM
To: Puri, Ajay
Cc: Newton, Dorin/TOR
Subject: [EXTERNAL] RE: File 0013138: Notice of Completion: Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer

Good afternoon Ajay Puri,

Thank you for the Notice of Completion for the above mentioned project. I have reviewed the project file report and have the following comments:

The proponent has carried out due diligence with respect to cultural heritage resources, through the preparation of an archaeological assessment and cultural heritage assessment report, and detailing further work to be undertaken during the detailed design phase.

I did want to share some observations for future EA reports:

- For alignment with cultural heritage policy and legislation in the province, we recommend that the terms “archaeological resources”, “built heritage resources”, and “cultural heritage landscapes” are used, and defined, in EA reporting. This report often used the term “heritage or cultural resources” and it was unclear what it referred to, although it seems that it was most often used to refer to archaeological resources. Sometimes it was used to describe a collective of all resource types.
- The discussion of built heritage resources (BHR) and cultural heritage landscapes (CHL) in the Existing Conditions section (2.3.2) should have described what known or potential resources were identified in the previous HIA (Golder, 2016) that is being relied upon for this report. Furthermore, this HIA was not included in the Appendix so could not be easily referenced. I was able to locate the HIA in our Ministry’s files by referring to the EWD STS EA documentation but not all readers will have access to these materials.

The report states that stage 3 archaeological assessment will be undertaken during the detailed design phase of the project. Archaeological concerns have not been addressed until reports have been entered into the Ontario Public Register of Archaeological Reports where those reports recommend that:

1. the archaeological assessment of the project area is complete and
2. all archaeological sites identified by the assessment are either of no further cultural heritage value or interest (as per Section 48(3) of the Ontario Heritage Act) or that mitigation of impacts has been accomplished through an avoidance and protection strategy.

Thank you for the opportunity to comment on this report. Please let me know if you wish to discuss these comments.

Sincerely,

Laura

Laura Hatcher, MCIP, RPP

Heritage Planner

Heritage Planning Unit | Programs and Services Branch | Heritage, Tourism and Culture Division

Ministry of Heritage, Sport, Tourism and Culture Industries

401 Bay Street Suite 1700 Toronto ON M7A 0A7

From: Newton, Dorin/TOR <Dorin.Newton@jacobs.com>

Sent: September-24-21 4:54 PM

Cc: Puri, Ajay <ajay.puri@peelregion.ca>

Subject: Notice of Completion: Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Good afternoon,

The Region of Peel has completed the Schedule 'B' Municipal Class Environmental Assessment (Class EA) study on the Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer. The Region has identified the preferred alignment for the relocation of the sanitary sewer. A Project File for the EA Study will be available for review for 40 calendar days, starting on September 23, 2021 and ending on November 1, 2021, as shown in the attached notice. It will be available online at <https://peelregion.ca/pw/water/environ-assess/relocation-of-credit-valley-sanitary-trunk-sewer.asp>. All comments and concerns should be sent directly to the Region of Peel Project Manager listed below:

Thank you,

Dorin Newton, P.Eng., M.Eng. | Jacobs | Engineering

On behalf of:

Ajay Puri, M.E. (Env.), P.Eng.

Project Manager, Engineering Services Division

Wastewater Collection & Conveyance

Tel.: (905) 791-7800 x. 5073

Ajay.Puri@peelregion.ca

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Newton, Dorin/TOR

From: Bell, Trevor (MECP) <Trevor.Bell@ontario.ca>
Sent: Tuesday, November 23, 2021 3:54 PM
To: Newton, Dorin/TOR
Cc: Puri, Ajay; Dhillon, Paramjit/TOR; Thannickal, Jimmy/TOR; Potter, Katy (MECP)
Subject: [EXTERNAL] RE: Notice of Completion: Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer

Hi Dorin,

Thanks for your email. We understand that the preferred alternative is Alternative #2, which involves replacing the existing 1500 mm trunk sewer with a new sewer to be installed in a 510 m-long open-cut trench that crosses the Credit River, and a 200 m-long tunnel section that crosses Highway 401.

We are generally satisfied that the report provides an appropriate level of detail in the evaluation of alternatives and identification of potential impacts and mitigation measures for your project at this stage. We have no technical comments or concerns at this time. We understand that the project will require an Environmental Compliance Approval for sewage works, and a Category 3 Permit to Take Water. Ministry staff may undertake a more detailed technical review during the permitting stage.

The following general comments are offered for your consideration:

- We understand that of all the Indigenous communities that were notified of the project, only one responded and engaged in consultation. The report should describe any follow-up communications with the communities that did not respond to the notices. If no follow-up attempts were made, please ensure for future reference that additional efforts are made to engage with potentially interested Indigenous communities who may not have responded to project notices. It is important to note that different communities have different levels of capacity to respond, engage, and review. For this reason it is necessary to take additional steps to strengthen consultation so communities who may be interested but don't have the immediate capacity to respond can still be engaged.
- The report should include a brief section referencing the Section 16 Order request process (as in the Notice of Completion).

Please feel free to contact me directly with any questions or concerns you may have.

Sincerely,

Trevor Bell | Regional Environmental Planner
Project Review Unit, Environmental Assessment Branch
Ministry of the Environment, Conservation and Parks
5775 Yonge Street, 8th floor, Toronto ON, M2M 4J1
New Phone: 437-770-3731 | trevor.bell@ontario.ca

From: Newton, Dorin/TOR <Dorin.Newton@jacobs.com>
Sent: November 22, 2021 12:15 PM

To: Bell, Trevor (MECP) <Trevor.Bell@ontario.ca>

Cc: Puri, Ajay <ajay.puri@peelregion.ca>; Dhillon, Paramjit/TOR <Paramjit.Dhillon@jacobs.com>; Thannickal, Jimmy/TOR <Jimmy.Thannickal@jacobs.com>

Subject: RE: Notice of Completion: Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Good afternoon Trevor,

The Region of Peel has completed the Schedule 'B' Municipal Class Environmental Assessment (Class EA) study on the Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer, and had put the Project File up for public review for 40 calendar days, ending November 1, 2021. As per the letter received on October 15, 2020 from yourself in response to the Notice of Commencement, we had provided the Notice of Completion to MECP contacts on our project list including yourself (see email below) and the ministry's Central Region EA notification email (attached email). The draft final Project File was made available on the Region's website. We wanted to follow-up with you to see if the MECP had any comments at this time that we should address ahead of finalizing the Project File and completing the EA. If there is anything we can help with in completing your review, please let us know and we would be happy to assist.

Thank you,

Dorin Newton, P.Eng., M.Eng. | [Jacobs](#) | Engineering
O:+00.416.499.0090 Ext. 73713 | M:+00.519.575.5585 | Dorin.Newton@jacobs.com

From: Newton, Dorin/TOR

Sent: Friday, September 24, 2021 4:54 PM

Cc: Puri, Ajay <ajay.puri@peelregion.ca>

Subject: Notice of Completion: Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer

Good afternoon,

The Region of Peel has completed the Schedule 'B' Municipal Class Environmental Assessment (Class EA) study on the Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer. The Region has identified the preferred alignment for the relocation of the sanitary sewer. A Project File for the EA Study will be available for review for 40 calendar days, starting on September 23, 2021 and ending on November 1, 2021, as shown in the attached notice. It will be available online at <https://peelregion.ca/pw/water/environ-assess/relocation-of-credit-valley-sanitary-trunk-sewer.asp>. All comments and concerns should be sent directly to the Region of Peel Project Manager listed below:

Thank you,

Dorin Newton, P.Eng., M.Eng. | [Jacobs](#) | Engineering

On behalf of:

Ajay Puri, M.E. (Env.), P.Eng.

Project Manager, Engineering Services Division

Wastewater Collection & Conveyance

Tel.: (905) 791-7800 x. 5073

Ajay.Puri@peelregion.ca

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Newton, Dorin/TOR

From: Newton, Dorin/TOR
Sent: Tuesday, December 14, 2021 4:23 PM
To: wesley.plant@ec.gc.ca
Cc: Puri, Ajay
Subject: Notice of Completion: Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer
Attachments: Notice-of-Completion-creditvalley.pdf

Dear Wesley Plant,

The Region of Peel has completed the Schedule 'B' Municipal Class Environmental Assessment (Class EA) study on the Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer. The Region has identified the preferred alignment for the relocation of the sanitary sewer and has prepared a Project File to document the process undertaken in the EA. The previous contact we had from ECCC was emailed the Notice of Completion. Unfortunately we received a bounce-back email and understand that they are no longer with ECCC. Please let us know if you are the appropriate contact, or if another contact from ECCC is better suited to receive this please provide us with their contact information. We have attached the Notice of Completion for your convenience.

Thank you,
Dorin Newton, P.Eng., M.Eng. | Jacobs | Engineering

On behalf of:

Ajay Puri, M.E. (Env.), P.Eng.
Project Manager, Engineering Services Division
Wastewater Collection & Conveyance
Tel.: (905) 791-7800 x. 5073
Ajay.Puri@peelregion.ca

Newton, Dorin/TOR

From: Newton, Dorin/TOR
Sent: Tuesday, December 14, 2021 4:27 PM
To: Carol.Baker-Lai@ontario.ca
Cc: Puri, Ajay
Subject: Notice of Completion: Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer
Attachments: Notice-of-Completion-creditvalley.pdf

Dear Carol Baker-Lai,

The Region of Peel has completed the Schedule 'B' Municipal Class Environmental Assessment (Class EA) study on the Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer. The Region has identified the preferred alignment for the relocation of the sanitary sewer and has prepared a Project File to document the process undertaken in the EA. The previous contact we had from MoH was emailed the Notice of Completion. Unfortunately we received a bounce-back email and understand that they are no longer with MoH. Please let us know if you are the appropriate contact, or if another contact from MoH is better suited to receive this please provide us with their contact information. We have attached the Notice of Completion for your convenience.

Thank you,
Dorin Newton, P.Eng., M.Eng. | Jacobs | Engineering

On behalf of:

Ajay Puri, M.E. (Env.), P.Eng.
Project Manager, Engineering Services Division
Wastewater Collection & Conveyance
Tel.: (905) 791-7800 x. 5073
Ajay.Puri@peelregion.ca

Newton, Dorin/TOR

From: Newton, Dorin/TOR
Sent: Tuesday, December 14, 2021 4:43 PM
To: 'irina.brailovski@ontario.ca'
Cc: Puri, Ajay
Subject: Notice of Completion: Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer
Attachments: Notice-of-Completion-creditvalley.pdf

Dear Irina Brailovski,

The Region of Peel has completed the Schedule 'B' Municipal Class Environmental Assessment (Class EA) study on the Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer. The Region has identified the preferred alignment for the relocation of the sanitary sewer and has prepared a Project File to document the process undertaken in the EA. The previous contact we had from MoH was emailed the Notice of Completion. Unfortunately we received a bounce-back email and understand that they are no longer with MoH. Please let us know if you are the appropriate contact, or if another contact from MoH is better suited to receive this please provide us with their contact information. We have attached the Notice of Completion for your convenience.

Thank you,
Dorin Newton, P.Eng., M.Eng. | Jacobs | Engineering

On behalf of:

Ajay Puri, M.E. (Env.), P.Eng.
Project Manager, Engineering Services Division
Wastewater Collection & Conveyance
Tel.: (905) 791-7800 x. 5073
Ajay.Puri@peelregion.ca



December 16, 2021

Attention: Trevor Bell
Regional Environmental Planner, Ministry of the Environment, Conservation and Parks
5775 Yonge Street, 8th Floor
Toronto ON, M2M 4J1

Project Name: Relocation of the 1,500-millimetre Credit Valley

Subject: Notice of Completion Comments

Dear Trevor Bell

Thank you for your response to the Notice of Completion for the Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer. We value your feedback and have addressed the points you have put forward for our consideration. We have revised the Project File to incorporate these changes. Please find below a table documenting your feedback and our responses.

MECP Comment	Response/ Project File Revision
We understand that of all the Indigenous communities that were notified of the project, only one responded and engaged in consultation. The report should describe any follow-up communications with the communities that did not respond to the notices. If no follow-up attempts were made, please ensure for future reference that additional efforts are made to engage with potentially interested Indigenous communities who may not have responded to project notices. It is important to note that different communities have different levels of capacity to respond, engage, and review. For this reason it is necessary to take additional steps to strengthen consultation so communities who may be interested but don't have the	Section 3.4.4 Indigenous Communities has been revised and is presented below. It includes that two communities have responded; the Mississaugas of the Credit First Nation had responded earlier in the study and the Huron-Wendat Nation have responded to the Notice of Completion.

245 Consumers Road, Suite 400
Toronto, ON M2J 1R3
416-499-9000
416-499-4687
www.jacobs.com

immediate capacity to respond can still be engaged.	
The report should include a brief section referencing the Section 16 Order request process (as in the Notice of Completion).	Section 3.4.5 Notice of Completion has been revised and is presented below.

3.4.4 Indigenous Communities

Seven Indigenous communities listed below were contacted as part of this Project, including those identified by the MECP:

- Mississaugas of the Credit First Nation
- Six Nations of the Grand River
- Houdenosaunee Confederacy
- Huron-Wendat Nation
- Mississaugas of Scugog Island First Nation
- The Métis Nation of Ontario
- Credit River Metis Council

They were contacted three times throughout the project: by the Notice of Commencement, Notice of Virtual Public Information Event, and finally by the Notice of Completion. Response was received from the Mississaugas of the Credit First Nation (MCFN) for the Virtual Public Information Event. MCFN indicated their acknowledgement of the Project but did not have any direct concerns or questions regarding the Project information. They expressed interest in participating in field work and provided their terms of involvement; as documented in **Table 1**, agreements on field work participation were signed between the Region and MCFN. Following the Notice of Completion, the Huron-Wendat Nation expressed interest in participating in archaeological fieldwork, and in reviewing and providing comments on draft reports. However, as the Stage 3 Archaeological Assessment fieldwork has ended, the Region offered to set up an agreement for the Huron-Wendat Nation to review the draft report.

Table 1. Summary of Consultation with Indigenous Communities

Date	Method	Issue/Topic
MCFN		
February 17, 2021	Email (Appendix D)	MCFN indicated their acknowledgement of the Project and specified the terms of their involvement.
February 23, 2021	Email (Appendix D)	MCFN provided the standards and guidelines required for their involvement.
March 8, 2021	Email (Appendix D)	Region had mailed the agreement for MCFN to sign. MCFN has signed and returned the field agreements provided by the Region

Table 1. Summary of Consultation with Indigenous Communities

Date	Method	Issue/Topic
<i>Huron-Wendat Nation</i>		
October 5, 2021	Email (Appendix D)	Huron-Wendat Nation requested to be informed of the next steps of the project, specifically those pertaining to archaeological studies/fieldwork. They informed the Region that they are interested in participating in archaeological fieldwork and in providing review/comments of draft reports.
October 18, 2021	Email (Appendix D)	The Region noted that the project is wrapping up Stage 3 archaeological assessment fieldwork, including area that would be of interest to the Huron-Wendat Nation. The Region offered to provide the reports to the Huron-Wendat Nation for review and asked for the name/contact information of those members of the community who will be involved in the review. This information will be used to prepare an agreement.

3.4.5 Notice of Completion

The Project-specific Notice of Completion was distributed to notify public and stakeholders of Project completion (Appendix D). The Notice of Completion serves as the final point of public contact and is intended to do the following:

- Notify the public and stakeholders that the study has been completed
- Invite the public and stakeholders to review the Project File posted to the Region’s website

The Notice of Completion was issued providing a 40-calendar day period (starting on September 23, 2021 and ending on November 1, 2021) during which comments and inputs were received by the Project Team.

All questions or comments regarding the Class EA were to be submitted to the Region’s project manager listed below:

Ajay Puri, P.Eng.

Project Manager, Engineering Services Division
 Wastewater Collection & Conveyance
 The Regional Municipality of Peel
 Suite B, 4th Floor, 10 Peel Centre Drive
 Brampton, ON L6T 4B9
 Email: Ajay.Puri@peelregion.ca
 Phone: 1-905-791-7800 ext. 5073

In addition, a request may be made to the Ministry of the Environment, Conservation and Parks for an order requiring a higher level of study (i.e., requiring an individual/ comprehensive EA approval

December 16, 2021

Subject: Notice of Completion Comments

before being able to proceed), or that conditions be imposed (e.g., require further studies), only on the grounds that the requested order may prevent, mitigate or remedy adverse impacts on constitutionally protected Aboriginal and treaty rights. Requests on other grounds will not be considered. Requests should include the requested contact information and full name.

Requests should specify what kind of order is being requested (request for conditions or a request for an individual/comprehensive environmental assessment), how an order may prevent, mitigate, or remedy potential adverse impacts on Aboriginal and treaty rights, and any information in support of the statements in the request. This will ensure that the ministry is able to efficiently begin reviewing the request.

The request should be sent in writing or by email to:

Minister of the Environment, Conservation and Parks Ministry of Environment, Conservation and Parks 777 Bay Street, 5th Floor Toronto ON M7A 2J3 minister.mecp@ontario.ca	Director, Environmental Assessment Branch Ministry of Environment, Conservation and Parks 135 St. Clair Ave. W, 1st Floor Toronto ON, M4V 1P5 EABDirector@ontario.ca
--	---

Requests should also be copied to the Region by mail or by e-mail. Please visit the ministry's website for more information on requests for orders under section 16 of the Environmental Assessment Act at: ontario.ca/page/class-environmental-assessments-part-ii-order.

All personal information included in your request – such as name, address, telephone number and property location – is collected, under the authority of section 30 of the Environmental Assessment Act and is collected and maintained for the purpose of creating a record that is available to the general public. As this information is collected for the purpose of a public record, the protection of personal information provided in the Freedom of Information and Protection of Privacy Act (FIPPA) does not apply (s.37). Personal information you submit will become part of a public record that is available to the general public unless you request that your personal information remain confidential.

We hope the revisions adequately address the consideration put forward in the email dated November 23, 2021. We are looking to finalize this Project File prior to the holidays. If you have any additional comments, we would appreciate receiving them as soon as possible so that they can be addressed in a timely manner.

Yours sincerely



Paramjit Dhillon, P.Eng.
Project Manager
416-499-9000
paramjit.dhillon@jacobs.com



December 16, 2021

Subject: Notice of Completion Comments

Copies to: Katy Potter (Katy.Potter@ontario.ca)

Ajay Puri (Ajay.Puri@peelregion.ca)

Jimmy Thannickal (jimmy.thannickal@jacobs.com)

Dorin Newton (dorin.newton@jacobs.com)

Newton, Dorin/TOR

From: Bell, Trevor (MECP) <Trevor.Bell@ontario.ca>
Sent: Monday, December 20, 2021 11:52 AM
To: Newton, Dorin/TOR
Cc: Puri, Ajay; Dhillon, Paramjit/TOR; Thannickal, Jimmy/TOR; Potter, Katy (MECP)
Subject: [EXTERNAL] RE: Notice of Completion: Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer

Hi Dorin,

Thank you for providing responses to our comments, it is much appreciated. We have no further comments at this time.

Sincerely,

Trevor Bell | Regional Environmental Planner
Project Review Unit, Environmental Assessment Branch
Ministry of the Environment, Conservation and Parks
5775 Yonge Street, 8th floor, Toronto ON, M2M 4J1
New Phone: 437-770-3731 | trevor.bell@ontario.ca

From: Newton, Dorin/TOR <Dorin.Newton@jacobs.com>
Sent: December 16, 2021 11:16 AM
To: Bell, Trevor (MECP) <Trevor.Bell@ontario.ca>
Cc: Puri, Ajay <ajay.puri@peelregion.ca>; Dhillon, Paramjit/TOR <Paramjit.Dhillon@jacobs.com>; Thannickal, Jimmy/TOR <Jimmy.Thannickal@jacobs.com>; Potter, Katy (MECP) <Katy.Potter@ontario.ca>
Subject: RE: Notice of Completion: Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Good morning Trevor,

Please find attached our responses to the considerations put forward by MECP. Should you have any questions, please feel free to reach out to us.

Thank you,

Dorin Newton, P.Eng., M.Eng. | [Jacobs](#) | Engineering
O:+00.416.499.0090 Ext. 73713 | M:+00.519.575.5585 | Dorin.Newton@jacobs.com
Upcoming PTO: December 24-28, 31 2021

From: Bell, Trevor (MECP) <Trevor.Bell@ontario.ca>
Sent: Tuesday, November 23, 2021 3:54 PM
To: Newton, Dorin/TOR <Dorin.Newton@jacobs.com>
Cc: Puri, Ajay <ajay.puri@peelregion.ca>; Dhillon, Paramjit/TOR <Paramjit.Dhillon@jacobs.com>; Thannickal, Jimmy/TOR <Jimmy.Thannickal@jacobs.com>; Potter, Katy (MECP) <Katy.Potter@ontario.ca>
Subject: [EXTERNAL] RE: Notice of Completion: Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer

Hi Dorin,

Thanks for your email. We understand that the preferred alternative is Alternative #2, which involves replacing the existing 1500 mm trunk sewer with a new sewer to be installed in a 510 m-long open-cut trench that crosses the Credit River, and a 200 m-long tunnel section that crosses Highway 401.

We are generally satisfied that the report provides an appropriate level of detail in the evaluation of alternatives and identification of potential impacts and mitigation measures for your project at this stage. We have no technical comments or concerns at this time. We understand that the project will require an Environmental Compliance Approval for sewage works, and a Category 3 Permit to Take Water. Ministry staff may undertake a more detailed technical review during the permitting stage.

The following general comments are offered for your consideration:

- We understand that of all the Indigenous communities that were notified of the project, only one responded and engaged in consultation. The report should describe any follow-up communications with the communities that did not respond to the notices. If no follow-up attempts were made, please ensure for future reference that additional efforts are made to engage with potentially interested Indigenous communities who may not have responded to project notices. It is important to note that different communities have different levels of capacity to respond, engage, and review. For this reason it is necessary to take additional steps to strengthen consultation so communities who may be interested but don't have the immediate capacity to respond can still be engaged.
- The report should include a brief section referencing the Section 16 Order request process (as in the Notice of Completion).

Please feel free to contact me directly with any questions or concerns you may have.

Sincerely,

Trevor Bell | Regional Environmental Planner
Project Review Unit, Environmental Assessment Branch
Ministry of the Environment, Conservation and Parks
5775 Yonge Street, 8th floor, Toronto ON, M2M 4J1
New Phone: 437-770-3731 | trevor.bell@ontario.ca

From: Newton, Dorin/TOR <Dorin.Newton@jacobs.com>
Sent: November 22, 2021 12:15 PM
To: Bell, Trevor (MECP) <Trevor.Bell@ontario.ca>
Cc: Puri, Ajay <ajay.puri@peelregion.ca>; Dhillon, Paramjit/TOR <Paramjit.Dhillon@jacobs.com>; Thannickal, Jimmy/TOR <Jimmy.Thannickal@jacobs.com>
Subject: RE: Notice of Completion: Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Good afternoon Trevor,

The Region of Peel has completed the Schedule 'B' Municipal Class Environmental Assessment (Class EA) study on the Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer, and had put the Project File up for public review for 40 calendar days, ending November 1, 2021. As per the letter received on October 15, 2020 from yourself in

response to the Notice of Commencement, we had provided the Notice of Completion to MECP contacts on our project list including yourself (see email below) and the ministry's Central Region EA notification email (attached email). The draft final Project File was made available on the Region's website. We wanted to follow-up with you to see if the MECP had any comments at this time that we should address ahead of finalizing the Project File and completing the EA. If there is anything we can help with in completing your review, please let us know and we would be happy to assist.

Thank you,

Dorin Newton, P.Eng., M.Eng. | [Jacobs](#) | Engineering
O:+00.416.499.0090 Ext. 73713 | M:+00.519.575.5585 | Dorin.Newton@jacobs.com

From: Newton, Dorin/TOR
Sent: Friday, September 24, 2021 4:54 PM
Cc: Puri, Ajay <ajay.puri@peelregion.ca>
Subject: Notice of Completion: Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer

Good afternoon,

The Region of Peel has completed the Schedule 'B' Municipal Class Environmental Assessment (Class EA) study on the Relocation of the 1,500-millimetre Credit Valley Sanitary Trunk Sewer. The Region has identified the preferred alignment for the relocation of the sanitary sewer. A Project File for the EA Study will be available for review for 40 calendar days, starting on September 23, 2021 and ending on November 1, 2021, as shown in the attached notice. It will be available online at <https://peelregion.ca/pw/water/enviro-assess/relocation-of-credit-valley-sanitary-trunk-sewer.asp>. All comments and concerns should be sent directly to the Region of Peel Project Manager listed below:

Thank you,

Dorin Newton, P.Eng., M.Eng. | Jacobs | Engineering

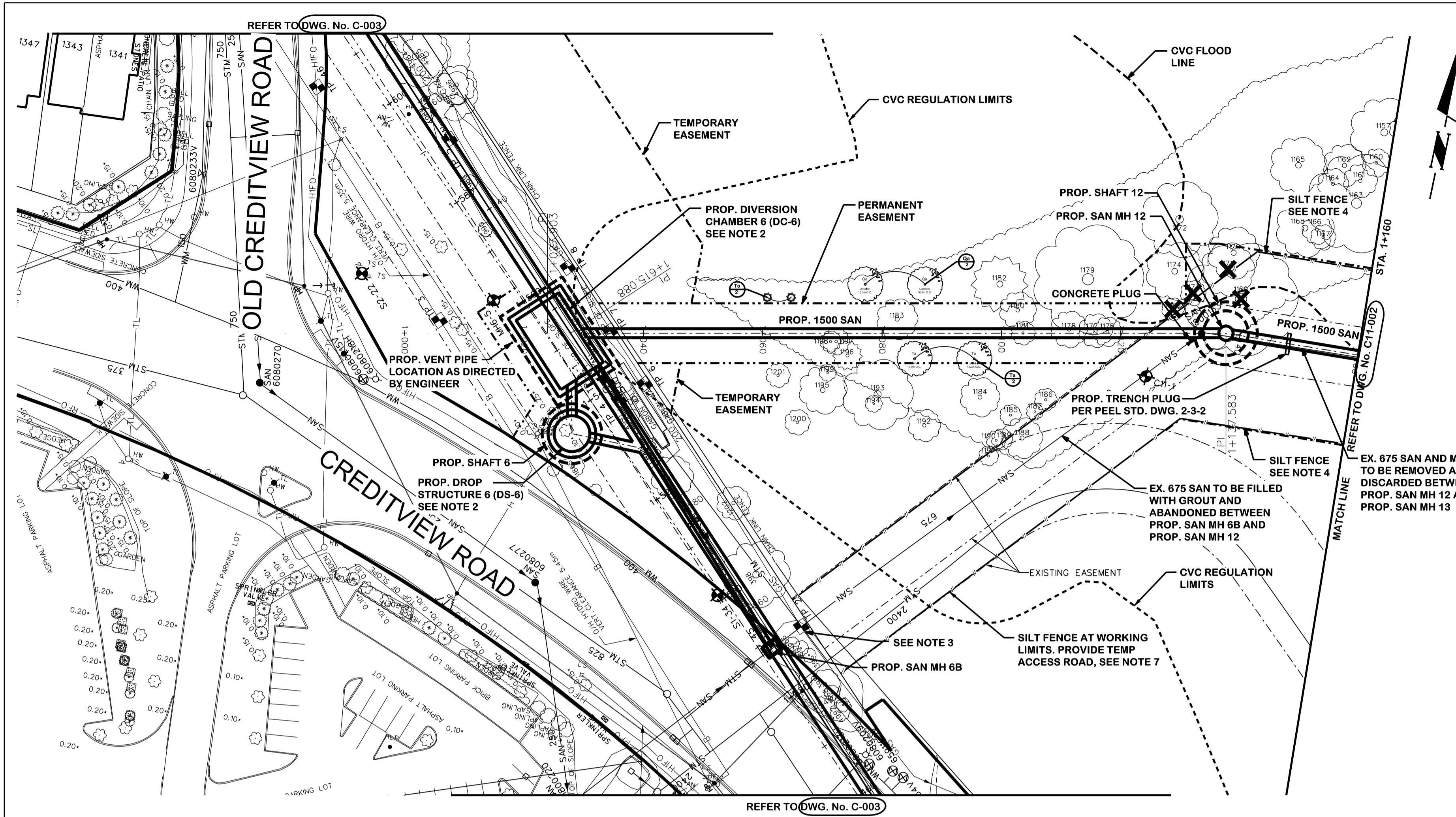
On behalf of:

Ajay Puri, M.E. (Env.), P.Eng.
Project Manager, Engineering Services Division
Wastewater Collection & Conveyance
Tel.: (905) 791-7800 x. 5073
Ajay.Puri@peelregion.ca

NOTICE - This communication may contain confidential and privileged information that is for the sole use of the intended recipient. Any viewing, copying or distribution of, or reliance on this message by unintended recipients is strictly prohibited. If you have received this message in error, please notify us immediately by replying to the message and deleting it from your computer.

NOTICE - This communication may contain confidential and privileged information that is for the sole use of the intended recipient. Any viewing, copying or distribution of, or reliance on this message by unintended recipients is strictly prohibited. If you have received this message in error, please notify us immediately by replying to the message and deleting it from your computer.

Appendix E. Design



PLANT SCHEDULE

QTY	KEY	BOTANICAL NAME	COMMON NAME	LOCATION	SIZE AT INSTALLATION	PLANT SPACING	ROOT CONTAINMENT	REMARKS
				STATIONING	CALIPER	HEIGHT		
				STA. FROM	STA. TO	(m)		
2		EVERGREEN CONIFEROUS TREES						
2	Ts	THUJA OCCIDENTALIS	EASTERN WHITE CEDAR			300	AS SHOWN	BBB 1 W/B BRANCHED TO GROUND
12		DECIDUOUS SHADE TREES						
2	M	MAHONIA ACUTIFOLIA	RED MAPLE		2	40	AS SHOWN	BBB 1 W/B FULL AND EQUAL FORM
2	QV	QUERCUS VIRGINIANA	HORSEWOOD		2	40	AS SHOWN	BBB 1 W/B FULL AND EQUAL FORM
2	QW	QUERCUS ALBA	WHITE OAK		2	40	AS SHOWN	BBB 1 W/B FULL AND EQUAL FORM
2	QW	QUERCUS IMBRICARIA	BURR OAK		2	40	AS SHOWN	BBB 1 W/B FULL AND EQUAL FORM
2	SA	SALIX AMYGDALOIDES	BEECH-LEAVED WILLOW		2	40	AS SHOWN	BBB 1 W/B FULL AND EQUAL FORM
2	Ta	TILIA AMERICANA	AMERICAN BASWOOD		2	40	AS SHOWN	BBB 1 W/B FULL AND EQUAL FORM

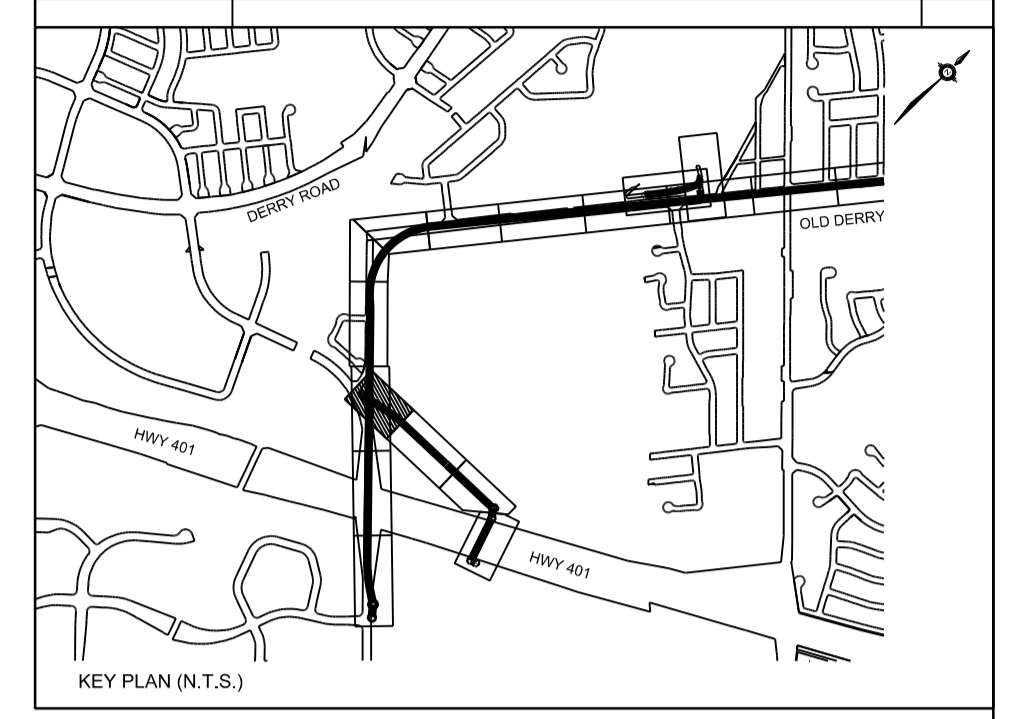
REFER TO SITE RESTORATION PLAN FOR DESIGNATION OF TREES PLANTING BEDS
 SOURCE OF PLANT MATERIALS TO BE PROVIDED BY CONTRACTOR
 ALL ACER SPECIES TO BE SPRUNG TO PREVENT DIE BACK
 ALL SUBSTITUTIONS TO THE SPECIES ON THIS LIST MUST BE APPROVED BY CONTRACT ADMINISTRATOR

EXISTING TREE INVENTORY:

Tag #	Species Scientific Name	Species Common Name	DBH (cm)	Radial TPZ (m)	Radial Drip-line (m)	Tree Protection Measures		
						No Injury	Protective /Injury	Removal
1169	Quercus alba	White Oak	80	9.6	6			X
1170	Acer negundo	Manitoba Maple	37	4.44	7		X	
1171	Unknown species	Unknown species	38	4.56	6			X
1172	Tilia americana	Basswood	54	6.48	6		X	
1173	Acer negundo	Manitoba Maple	18	2.16	5			X
1174	Acer negundo	Manitoba Maple	41	4.92	6		X	
1175	Acer negundo	Manitoba Maple	16	1.92	4			X

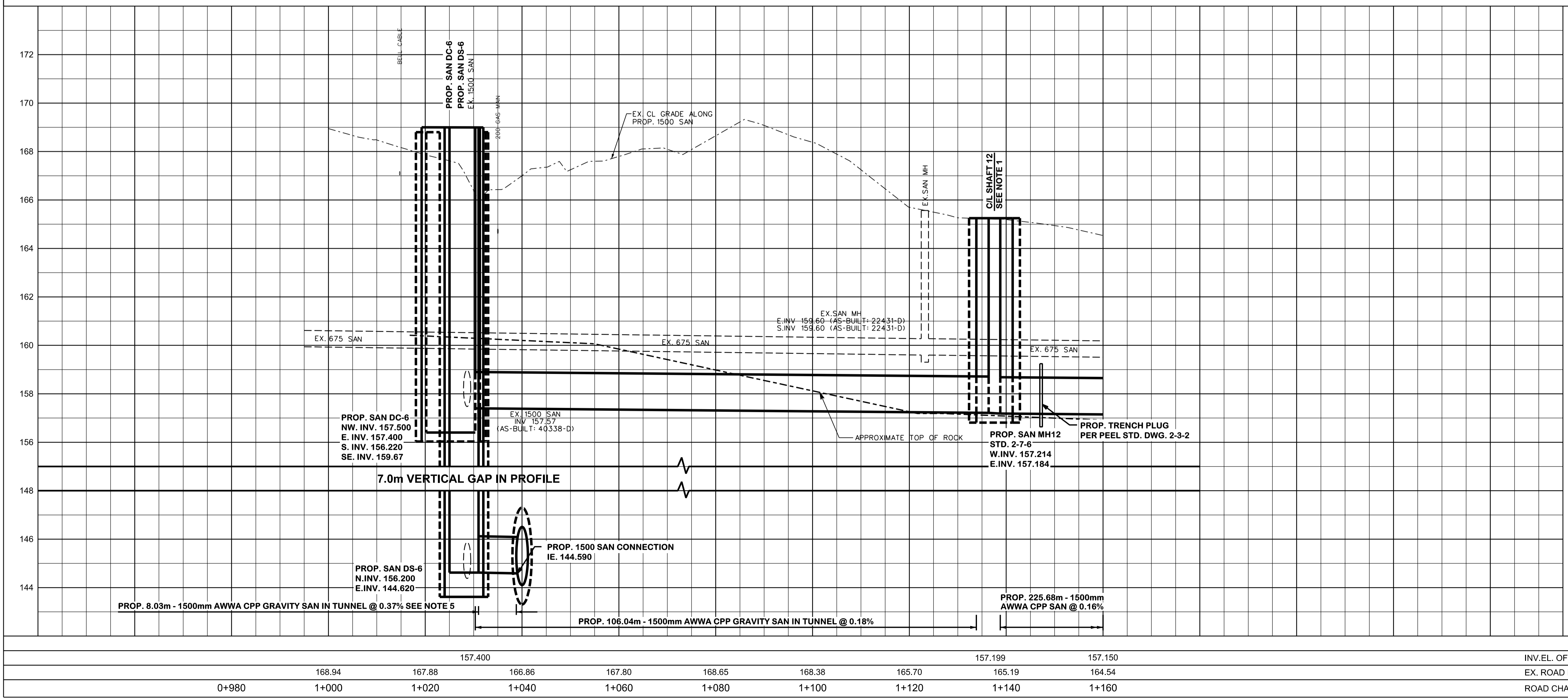
SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	NOV 6, 2018	C.K.	GAS MAINS	NOV 5, 2018	C.K.
STORM SEWERS	DEC 6, 2019	C.K.	BELL UIG CABLE	APR 23, 2019	C.K.
WATERMANS	MAR 8, 2019	C.K.	HYDRO UIG CABLE	OCT 29, 2018	C.K.
TRANSIT			HYDRO ONE	OCT 29, 2018	C.K.
PARKS & REC.	DEC 6, 2019	C.K.	CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES	APR 29, 2019	C.K.



NOTES:

- REFER TO DWG. (6-S-00) FOR SHAFT 6 EXCAVATION SUPPORT DETAILS. SHAFT 12 OUTLINE SHOWN FOR ILLUSTRATION PURPOSES ONLY. VENDOR TO SUBMIT EXCAVATION SUPPORT DETAILS.
- REFER TO DWG. (6-S-20) AND (6-S-203) FOR DC-6 AND DS-6 DETAILS, RESPECTIVELY.
- VENDOR TO FIELD VERIFY HORIZONTAL AND VERTICAL ALIGNMENT OF STM PRIOR TO COMMENCING WORK AT SITE 6.
- HEAVY DUTY SILT FENCE AS PER OPSD 219.130/13.
- REFER TO DWG. (T-2-003) DETAIL 5 FOR TUNNEL EXCAVATION SUPPORT DETAILS BETWEEN DS-6 AND 2400 TRUNK SEWER. GROUT TUNNEL ANNULAR SPACE, SEE DETAIL 5 ON DWG. T-2-004.
- FOR SITE 6 DETAILS, REFER TO DWG. (6-SP-00) FOR EXISTING SITE CONDITIONS AND REMOVALS (6-SP-00) FOR SITE PREPARATION DETAILS, AND (6-R-00) FOR SITE RESTORATION DETAILS.
- REFER TO DWG. (11-AP-002) FOR SITE ACCESS PLANS.



General Notes

All Driveways Are ASPHALT Unless Otherwise Noted
 All Water And Sanitary Service Locations Are Approximate And Must Be Located Accurately In The Field
 All Horizontal And Vertical Bends Are In Degrees
 All Pipes Size In mm
 200 Existing Water Service, Size In mm
 WS25 Proposed Water Service, Size In mm
 B.M. No. Description Location
 Elev.
 The Contractor Is Responsible For Locating And Protecting All Existing Utilities Prior To And During Construction, Location Of Existing Utilities Approximate Only, To Be Verified In Field By Contractor.

JACOBS

Approved by _____

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL	CABLE TELEVISION/FIBROPTIC PROVIDERS:
CITY OF MISSISSAUGA WORKS DEPT.	BELL CANADA
CITY OF BRAMPTON WORKS DEPT.	ENERSOURCE TELECOM
TOWN OF CALEDON WORKS DEPT.	HYDRO ONE TELECOM
BELL CANADA	ROGERS CABLE
ENBRIDGE INCORPORATED-GAS DISTRIBUTION	ALLSTREAM
ONTARIO MINISTRY OF TRANSPORTATION	PSN (PUBLIC SECTOR NETWORK)
ONTARIO CLEAN WATER AGENCY	FUTUREWAY (FCI BROADBAND)
HYDRO ONE NETWORKS	
ENERSOURCE, HYDRO MISSISSAUGA	
HYDRO ONE BRAMPTON	

10m 0 10 20 30m HORIZONTAL SCALE
 2m 0 2 4 6m VERTICAL SCALE

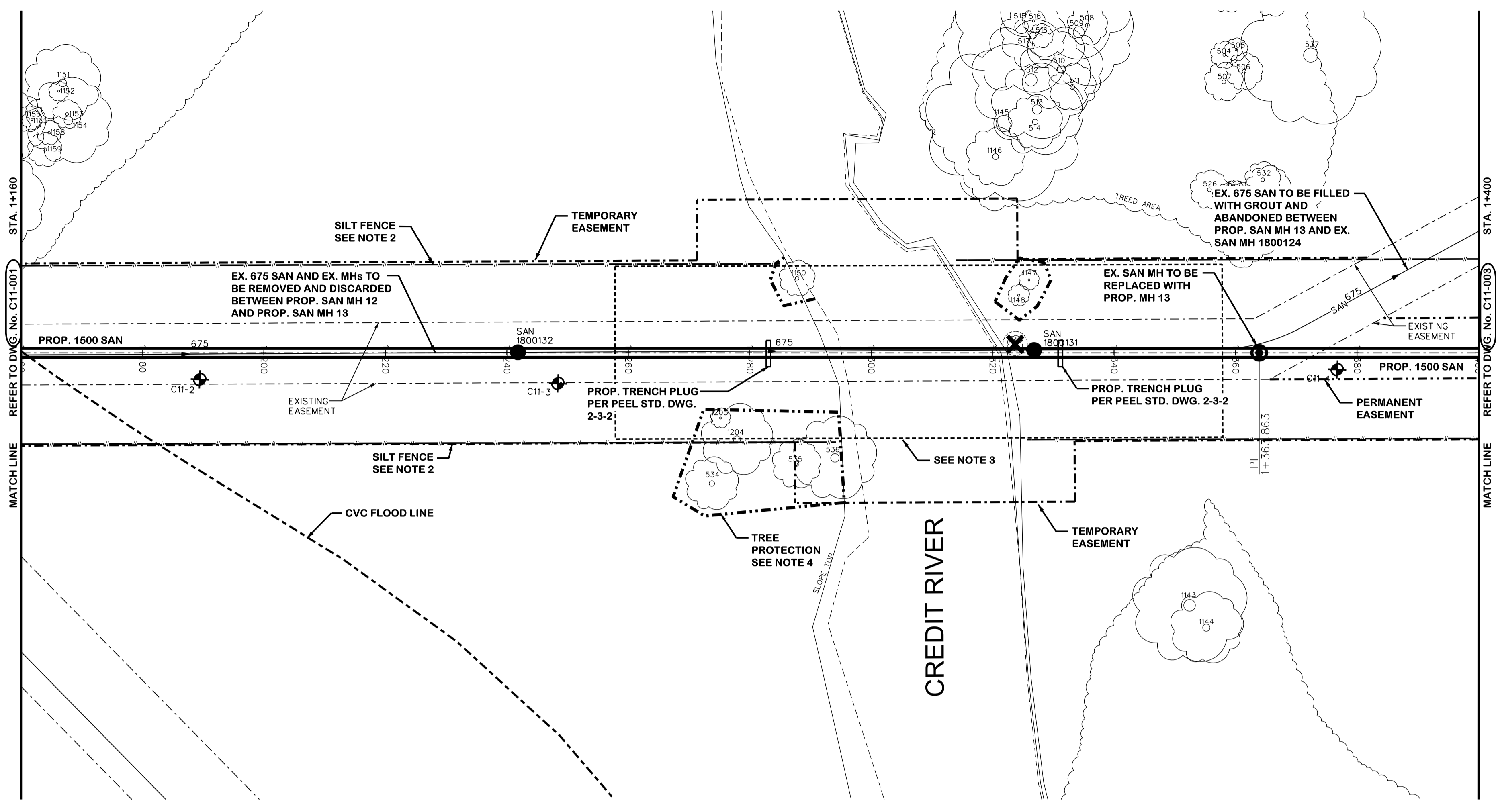
Region of Peel
 working with you

HIGHWAY 401 CROSSING

CROSSING NO. 11
PROP. 1500mm SANITARY SEWER

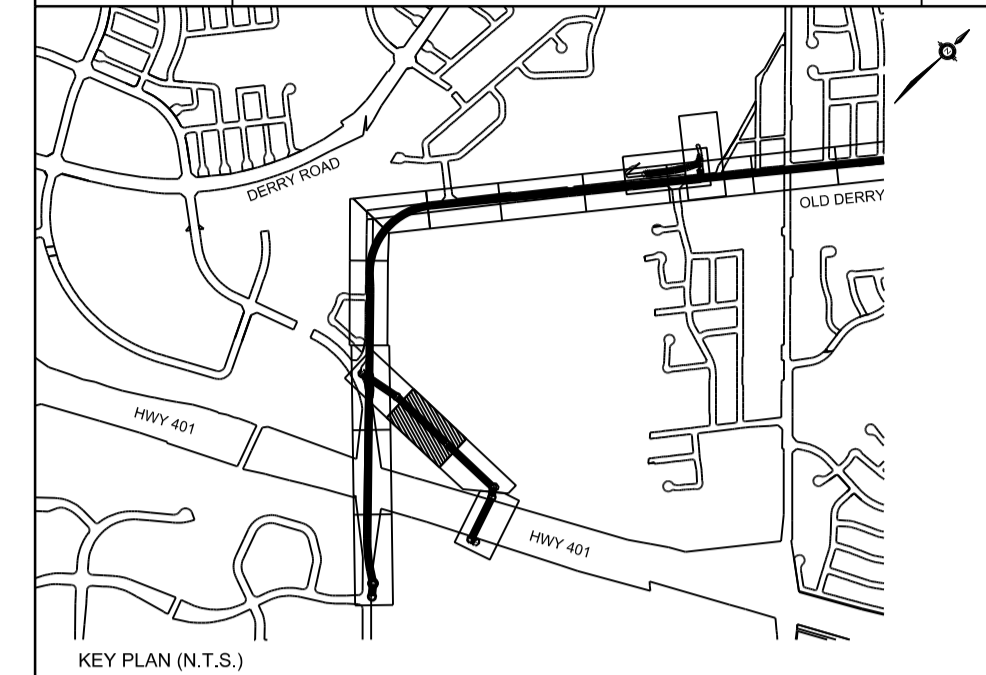
STA. 1+000 TO STA. 1+160

INV. EL. OF SAN.	CAD Area	Area	141 to 148	Project No.	16-2291
EX. ROAD ELEV.	Checked by	P.D.	Drawn by	H.B.	
ROAD CHAINAGE	Date	MAR 2021	Sheet	29 of 166	Plan No. C11-001



SERVICE DATA					
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	NOV 6, 2018	C.K.	GAS MAINS	NOV 5, 2018	C.K.
STORM SEWERS	DEC 6, 2019	C.K.	BELL U/G CABLE	APR 23, 2019	C.K.
WATERMANS	MAR 8, 2019	C.K.	HYDRO U/G CABLE	OCT 29, 2018	C.K.
TRANSIT			HYDRO ONE	OCT 29, 2018	C.K.
PARKS & REC.	DEC 6, 2019	C.K.	CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES	APR 29, 2019	C.K.

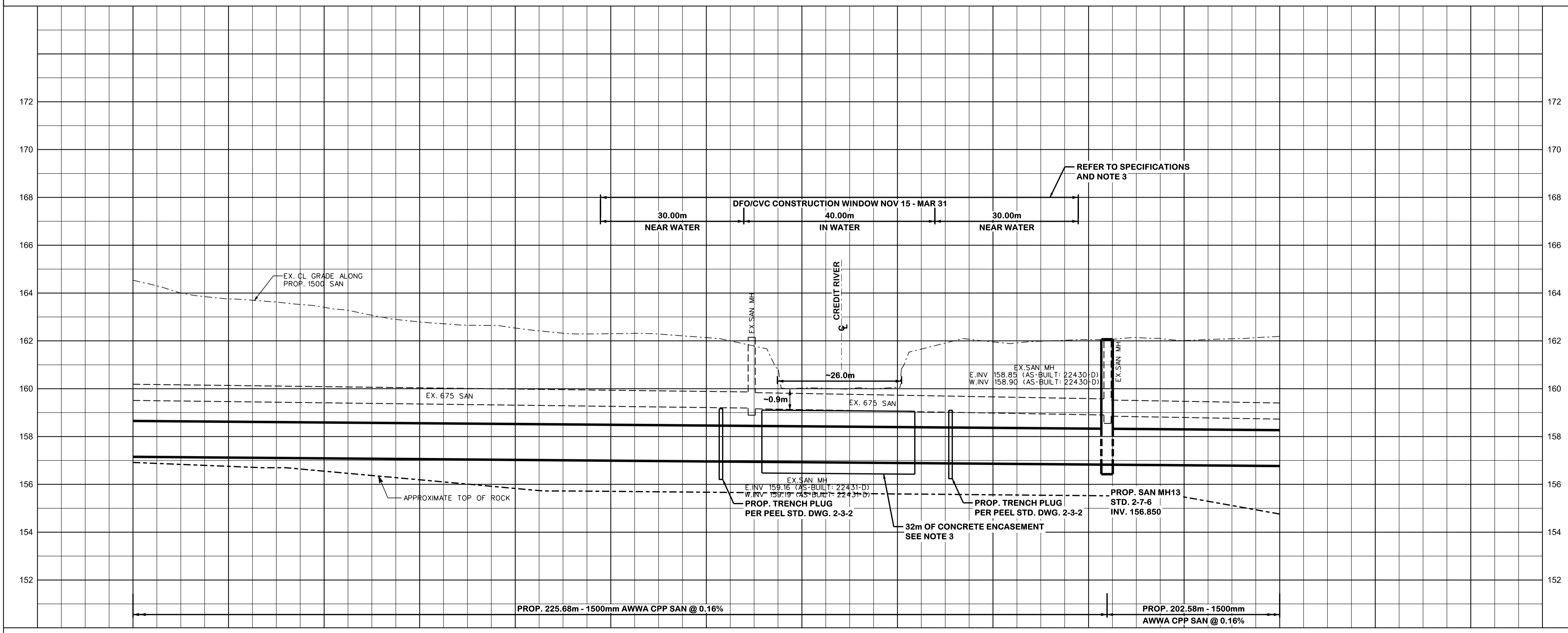
REVISIONS		
DATE	DETAILS	INIT.
SEP 25, 2020	ISSUED FOR 90% DESIGN REVIEW	C.K.
MAR 05, 2021	ISSUED FOR 100% DESIGN REVIEW	C.K.



- NOTES:**
- REFER TO DWG. 11-AP-002 FOR SITE ACCESS PLANS.
 - HEAVY DUTY SILT FENCE AS PER OPSD 219.130/13.
 - REFER TO DWG. CVC-C2-002 FOR RIVER CROSSING DETAILS.
 - TREE PROTECTION PER CITY OF MISSISSAUGA STD. DETAIL 02830-6. TREE PROTECTION TO BE APPROVED BY CITY OF MISSISSAUGA URBAN FORESTRY PRIOR TO VENDOR COMMENCING ANY WORKS.

EXISTING TREE INVENTORY:

Tag #	Species Scientific Name	Species Common Name	DBH (cm)	Radial TPZ (m)	Radial Dripline (m)	Tree Protection Measures		
						No Injury	Protected /Injury	Removal
1147	Acer negundo	Manitoba Maple	14	1.68	3		X	
1148	Acer negundo	Manitoba Maple	15	1.8	3		X	
1149	Acer negundo	Manitoba Maple	11	1.32	2			X
1150	Acer negundo	Manitoba Maple	25	3	4		X	
1203	Acer negundo	Manitoba Maple	14	1.68	3		X	
1204	Acer negundo	Manitoba Maple	50	6	6		X	



General Notes

All Driveways Are ASPHALT Unless Otherwise Noted
 All Water And Sanitary Service Locations Are Approximate And Must Be Located Accurately In The Field
 All Horizontal And Vertical Bends Are In Degrees
 All Pipes Size In mm
 20C Existing Water Service, Size In mm
 WS25 Proposed Water Service, Size In mm
 B.M. No. Elev.
 Description Location
 The Contractor Is Responsible For Locating And Protecting All Existing Utilities Prior To And During Construction, Location Of Existing Utilities Approximate Only, To Be Verified In Field By Contractor.

JACOBS

Approved by _____

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEELE	CABLE TELEVISION/FIBROPTIC PROVIDERS:
CITY OF MISSISSAUGA WORKS DEPT.	BELL CANADA
CITY OF BRAMPTON WORKS DEPT.	ENERSOURCE TELECOM
TOWN OF CALEDON WORKS DEPT.	HYDRO ONE TELECOM
BELL CANADA	ROGERS CABLE
ENBRIDGE INCORPORATED-GAS DISTRIBUTION	ALLSTREAM
ONTARIO MINISTRY OF TRANSPORTATION	PSN (PUBLIC SECTOR NETWORK)
ONTARIO CLEAN WATER AGENCY	FUTUREWAY (FCI BROADBAND)
HYDRO ONE NETWORKS	
ENERSOURCE, HYDRO MISSISSAUGA	
HYDRO ONE BRAMPTON	

10m 0 10 20 30m HORIZONTAL SCALE
 2m 0 2 4 6m VERTICAL SCALE

Region of Peel
 working with you

HIGHWAY 401 CROSSING

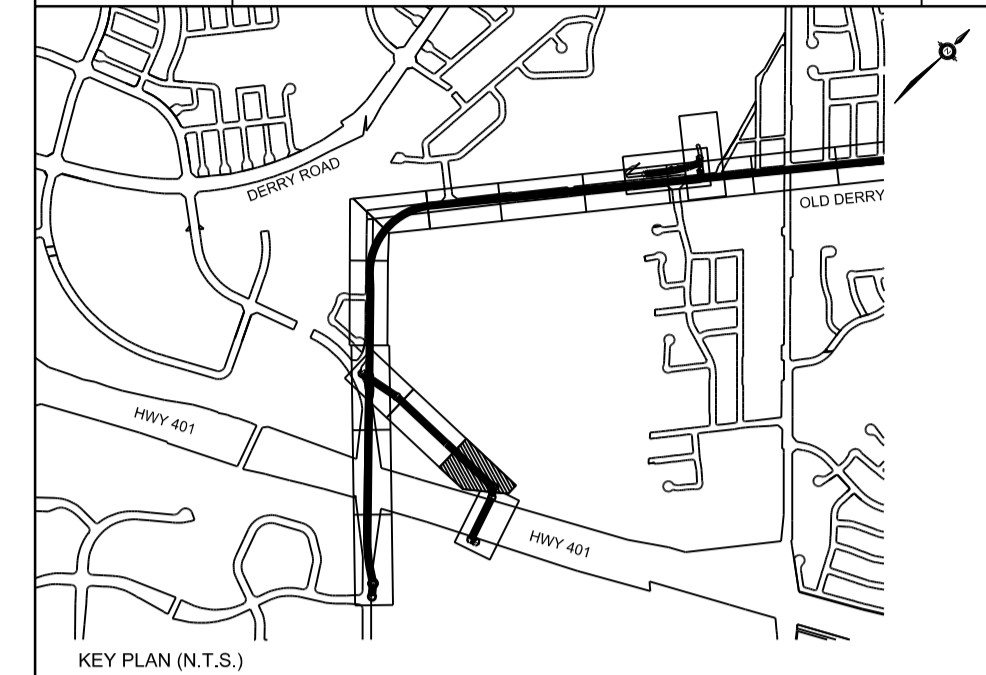
CROSSING NO. 11
PROP. 1500mm SANITARY SEWER

STA. 1+160 TO STA. 1+400

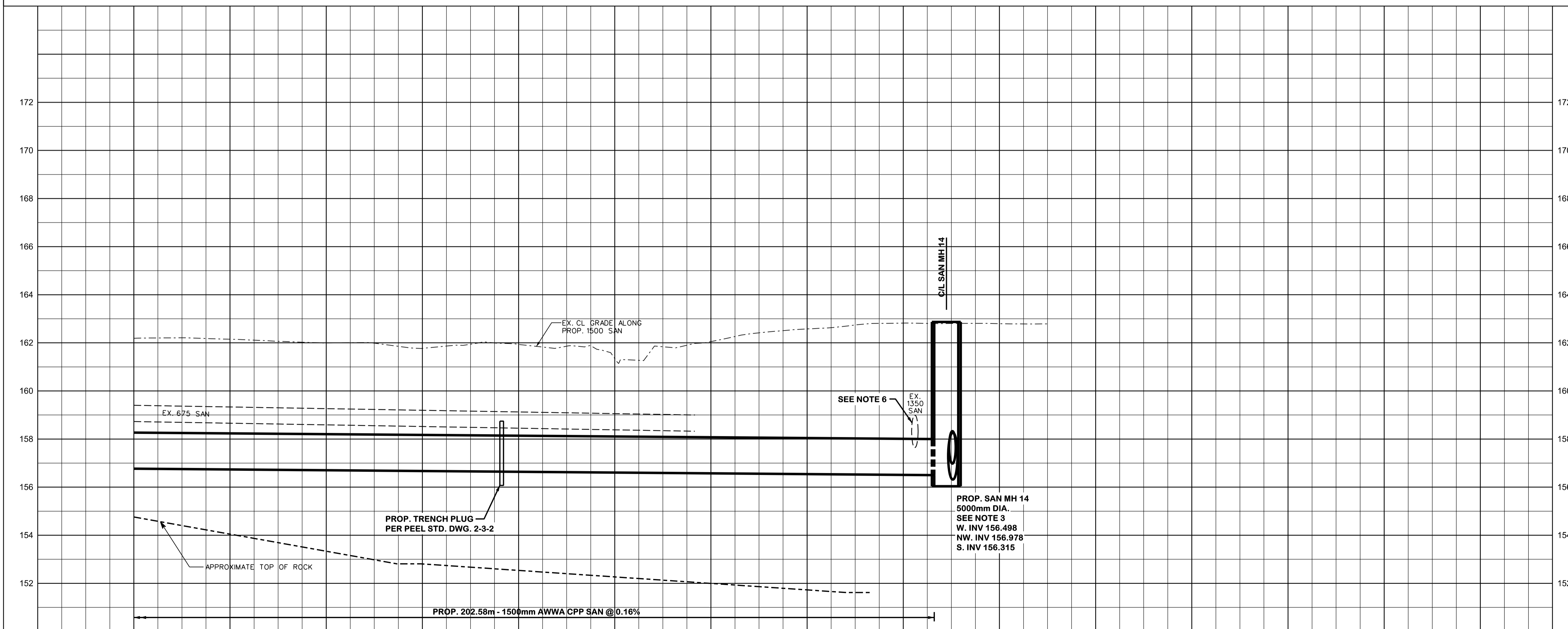
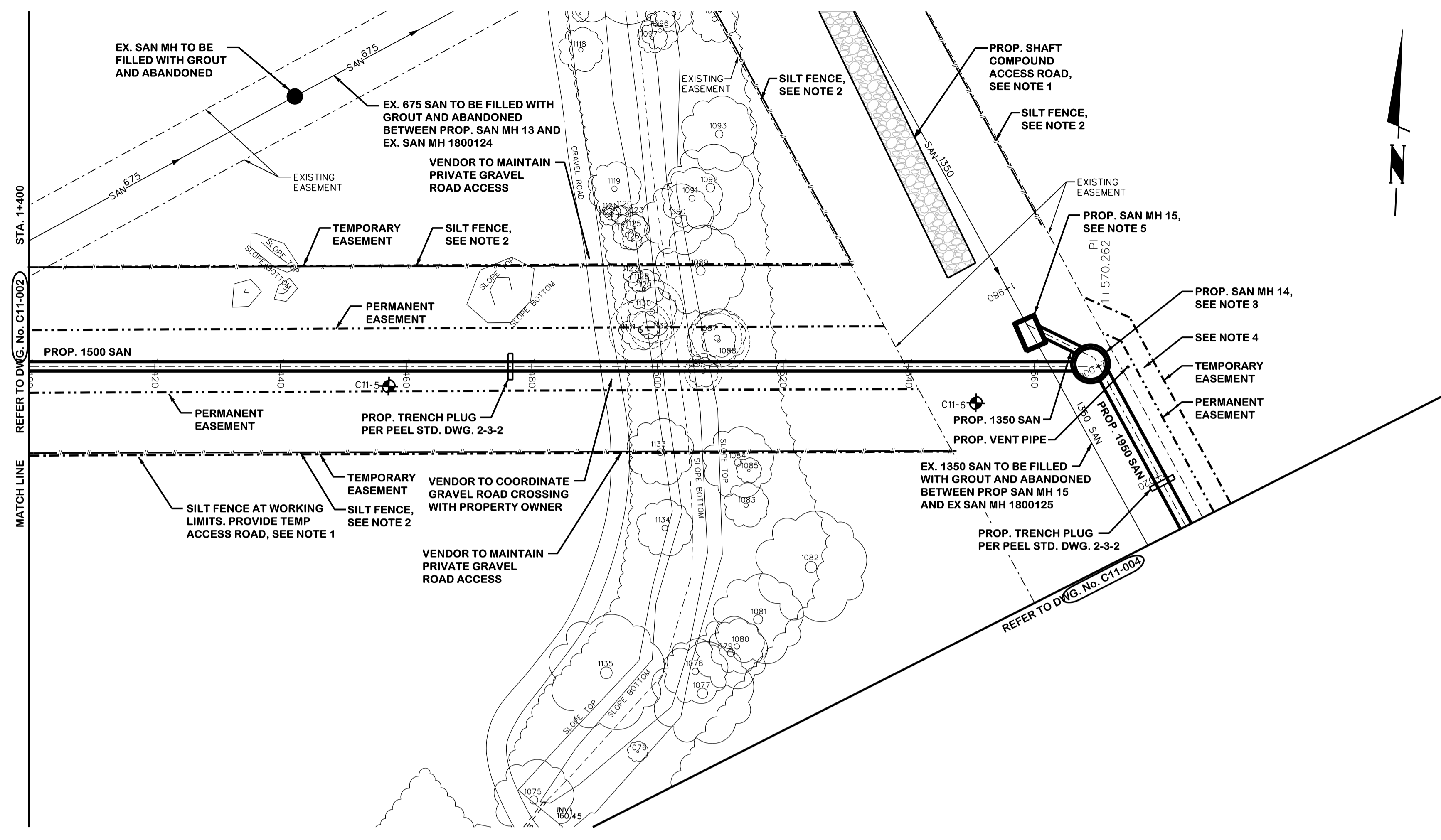
157.150	157.118	157.086	157.054	157.022	156.990	156.958	156.926	156.894	156.862	156.830	156.799	156.767	INV. EL. OF SAN.	CAD Area	Area 2.41 to 2.45	Project No. 16-2291
164.54	163.76	163.40	162.79	162.54	162.30	162.14	160.80	160.82	161.96	162.05	162.01	162.19	EX. ROAD ELEV.	Checked by P.D.	Drawn by H.B.	Sheet 30 of 166
1+160	1+180	1+200	1+220	1+240	1+260	1+280	1+300	1+320	1+340	1+360	1+380	1+400	ROAD CHAINAGE	Date MAR 2021	Sheet 30 of 166	Plan No. C11-002

SERVICE DATA					
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	NOV 6, 2018	C.K.	GAS MAINS	NOV 5, 2018	C.K.
STORM SEWERS	DEC 6, 2019	C.K.	BELL U/G CABLE	APR 23, 2019	C.K.
WATERMANS	MAR 8, 2019	C.K.	HYDRO U/G CABLE	OCT 29, 2018	C.K.
TRANSIT			HYDRO ONE	OCT 29, 2018	C.K.
PARKS & REC.	DEC 6, 2019	C.K.	CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES	APR 29, 2019	C.K.

REVISIONS		
DATE	DETAILS	INIT.
SEP 25, 2020	ISSUED FOR 90% DESIGN REVIEW	C.K.
MAR 05, 2021	ISSUED FOR 100% DESIGN REVIEW	C.K.



- NOTES:**
- REFER TO DWG. (11-AP-002) FOR SITE ACCESS PLANS.
 - HEAVY DUTY SILT FENCE PER OPSD 219.130/13.
 - REFER TO DWG. (14-S-20) FOR SAN MH 14 DETAILS.
 - REFER TO DWG. (8-SP-002) FOR EXISTING SITE AND SITE PREPARATION DETAILS, AND DWG. (11-R1-00) FOR RESTORATION WORKS.
 - REFER TO DWG. (D-2-008) FOR MAINTENANCE HOLE DETAILS.
 - VENDOR TO NOTE CONFLICT AND TO DIVERT FLOW UPSTREAM AT PROP. SAN MH 15 PRIOR TO REMOVAL OF EXISTING 1350 SAN.



General Notes

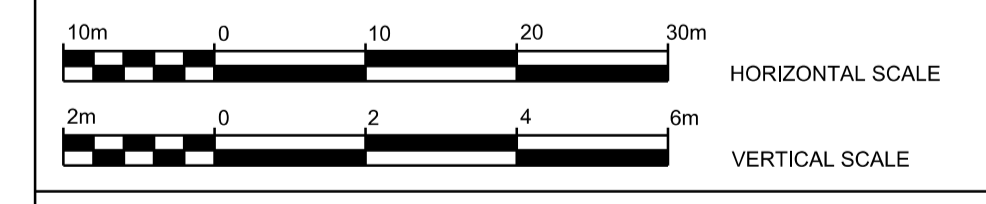
All Driveways Are ASPHALT Unless Otherwise Noted
 All Water And Sanitary Service Locations Are Approximate And Must Be Located Accurately In The Field
 All Horizontal And Vertical Bends Are In Degrees
 All Pipes Size In mm
 20C Existing Water Service, Size In mm
 WS25 Proposed Water Service, Size In mm
 B.M. No. Description Location Elev.
 The Contractor Is Responsible For Locating And Protecting All Existing Utilities Prior To And During Construction, Location Of Existing Utilities Approximate Only, To Be Verified In Field By Contractor.



NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL	CABLE TELEVISION/FIBROPTIC PROVIDERS:
CITY OF MISSISSAUGA WORKS DEPT.	BELL CANADA
CITY OF BRAMPTON WORKS DEPT.	ENERSOURCE TELECOM
TOWN OF CALEDON WORKS DEPT.	HYDRO ONE TELECOM
BELL CANADA	ROGERS CABLE
ENBRIDGE INCORPORATED-GAS DISTRIBUTION	ALLSTREAM
ONTARIO MINISTRY OF TRANSPORTATION	PSN (PUBLIC SECTOR NETWORK)
ONTARIO CLEAN WATER AGENCY	FUTUREWAY (FCI BROADBAND)
HYDRO ONE NETWORKS	
ENERSOURCE, HYDRO MISSISSAUGA	
HYDRO ONE BRAMPTON	



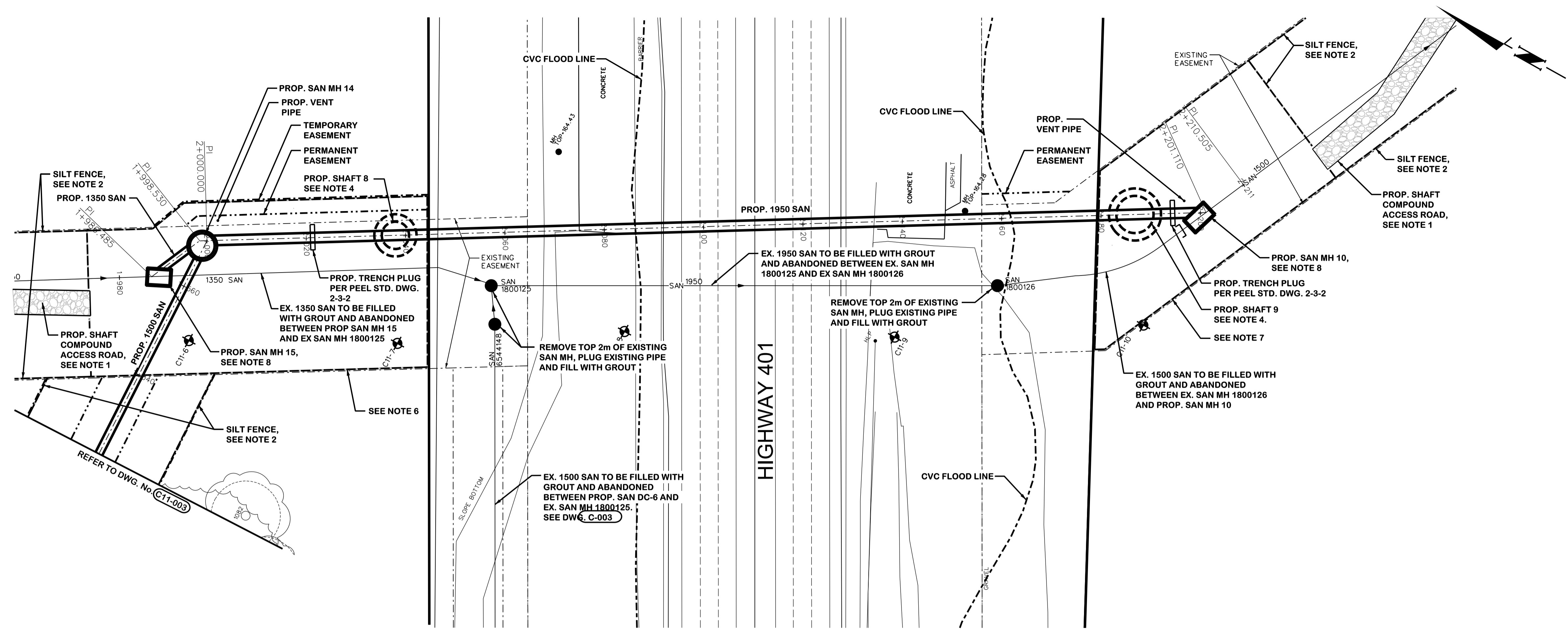
HIGHWAY 401 CROSSING

CROSSING NO. 11

PROP. 1500mm SANITARY SEWER

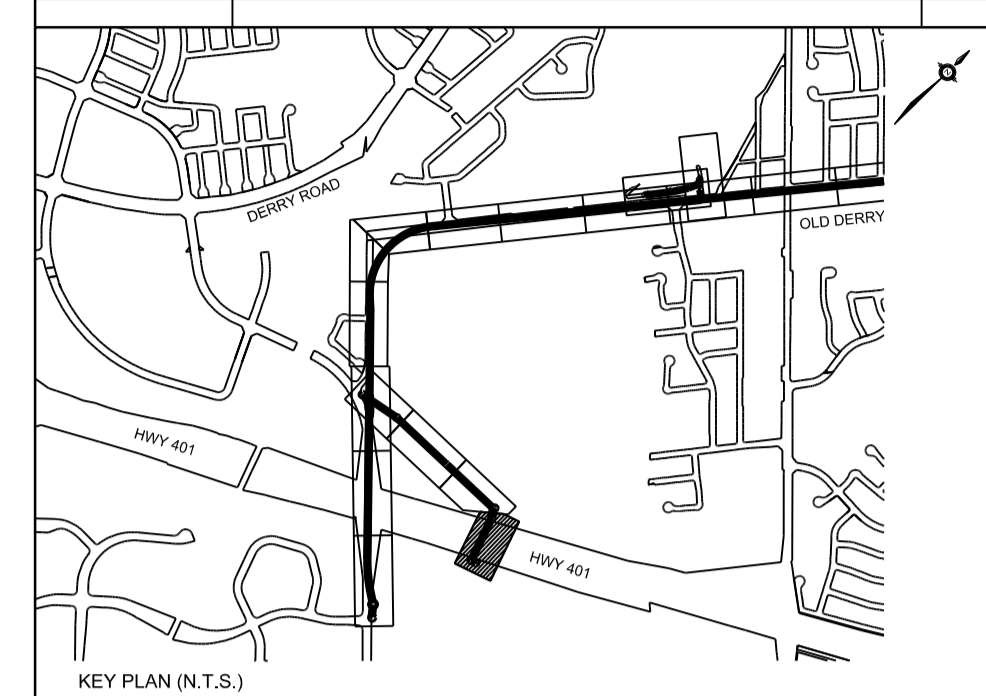
STA. 1+400 TO STA. 1+580

156.767											156.498	INV. EL. OF SAN.	CAD Area	Area	4.41 to 4.45	Project No.	16-2291	
162.19	162.15	161.99	161.77	161.94	161.35	162.05	162.58	162.80	162.76			EX. ROAD ELEV.	Checked by	P.D.	Drawn by	H.B.		
1+400	1+420	1+440	1+460	1+480	1+500	1+520	1+540	1+560	1+580			ROAD CHAINAGE	Date	MAR 2021	Sheet	31 of 166	Plan No.	C11-003

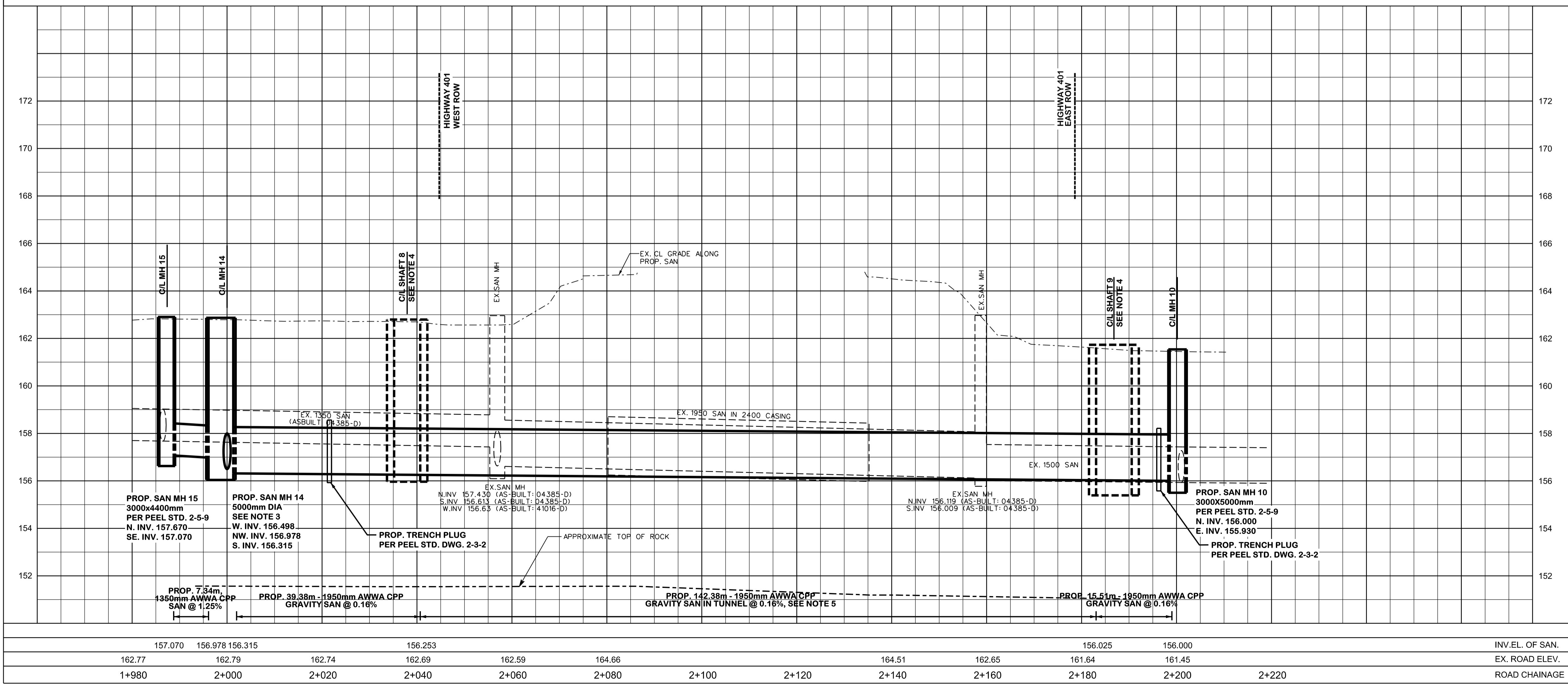


SERVICE DATA					
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	NOV 6, 2018	C.K.	GAS MAINS	NOV 5, 2018	C.K.
STORM SEWERS	DEC 6, 2019	C.K.	BELL U/G CABLE	APR 23, 2019	C.K.
WATERMANS	MAR 8, 2019	C.K.	HYDRO U/G CABLE	OCT 29, 2018	C.K.
TRANSIT			HYDRO ONE	OCT 29, 2018	C.K.
PARKS & REC.	DEC 6, 2019	C.K.	CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES	APR 29, 2019	C.K.

REVISIONS		
DATE	DETAILS	INIT.
SEP 25, 2020	ISSUED FOR 90% DESIGN REVIEW	C.K.
MAR 05, 2021	ISSUED FOR 100% DESIGN REVIEW	C.K.



- NOTES:**
- REFER TO DWG. (1-AP-007) FOR SITE ACCESS PLANS.
 - HEAVY DUTY SILT FENCE AS PER OPSD 219.130/13.
 - REFER TO DWG. (14-S-201) FOR SAN MH 14 DETAILS.
 - SHAFT OUTLINE SHOWN FOR ILLUSTRATION PURPOSES ONLY. VENDOR TO SUBMIT EXCAVATION SUPPORT DETAILS.
 - REFER TO SPEC SECTION 02440 FOR TUNNELING DETAILS.
 - REFER TO DWG. (8-SP-002) FOR EXISTING SITE AND SITE PREPARATION DETAILS, AND DWG. (11-RT-00) FOR SITE RESTORATION WORKS.
 - REFER TO DWG. (8-SP-002) FOR EXISTING SITE AND SITE PREPARATION DETAILS, AND DWG. (11-RT-00) FOR SITE RESTORATION WORKS.
 - REFER TO DWG. (D-2-008) FOR MAINTENANCE HOLE DETAILS.



General Notes

All Driveways Are ASPHALT Unless Otherwise Noted
 All Water And Sanitary Service Locations Are Approximate And Must Be Located Accurately In The Field
 All Horizontal And Vertical Bends Are In Degrees
 All Pipes Size In mm
 20C Existing Water Service, Size In mm
 W825 Proposed Water Service, Size In mm
 B.M. No. Description Location Elev.
 The Contractor Is Responsible For Locating And Protecting All Existing Utilities Prior To And During Construction, Location Of Existing Utilities Approximate Only, To Be Verified In Field By Contractor.

JACOBS

Approved by _____

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL
 CITY OF MISSISSAUGA WORKS DEPT.
 CITY OF BRAMPTON WORKS DEPT.
 TOWN OF CALEDON WORKS DEPT.
 BELL CANADA
 ENBRIDGE INCORPORATED-GAS DISTRIBUTION
 ONTARIO MINISTRY OF TRANSPORTATION
 ONTARIO CLEAN WATER AGENCY
 HYDRO ONE NETWORKS
 ENERSOURCE, HYDRO MISSISSAUGA
 HYDRO ONE BRAMPTON

CABLE TELEVISION/FIBROPTIC PROVIDERS:
 BELL CANADA
 ENERSOURCE TELECOM
 HYDRO ONE TELECOM
 ROGERS CABLE
 ALLSTREAM
 PSN (PUBLIC SECTOR NETWORK)
 FUTUREWAY (FCI BROADBAND)

10m 0 10 20 30m HORIZONTAL SCALE
 2m 0 2 4 6m VERTICAL SCALE

Region of Peel
 working with you

HIGHWAY 401 CROSSING

CROSSING NO. 11
PROP. 1500mm SANITARY SEWER

STA. 1+980 TO STA. 2+220

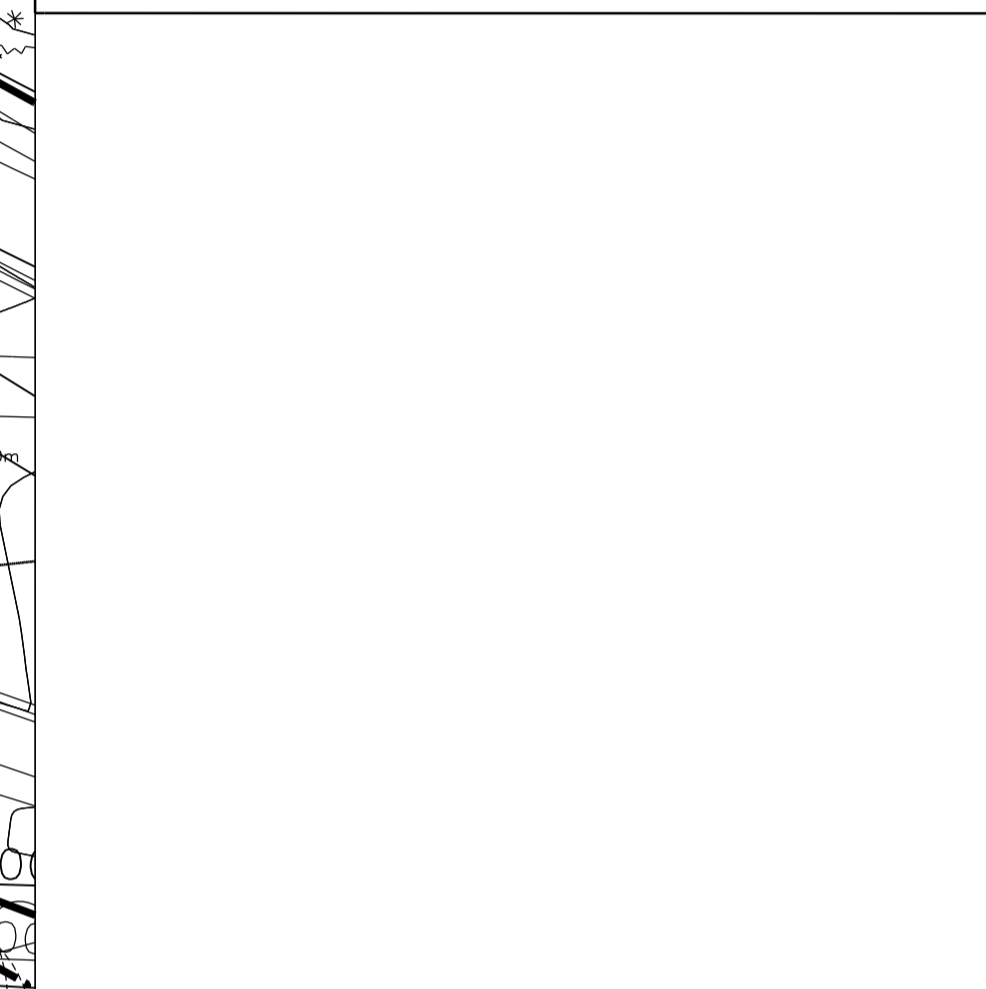
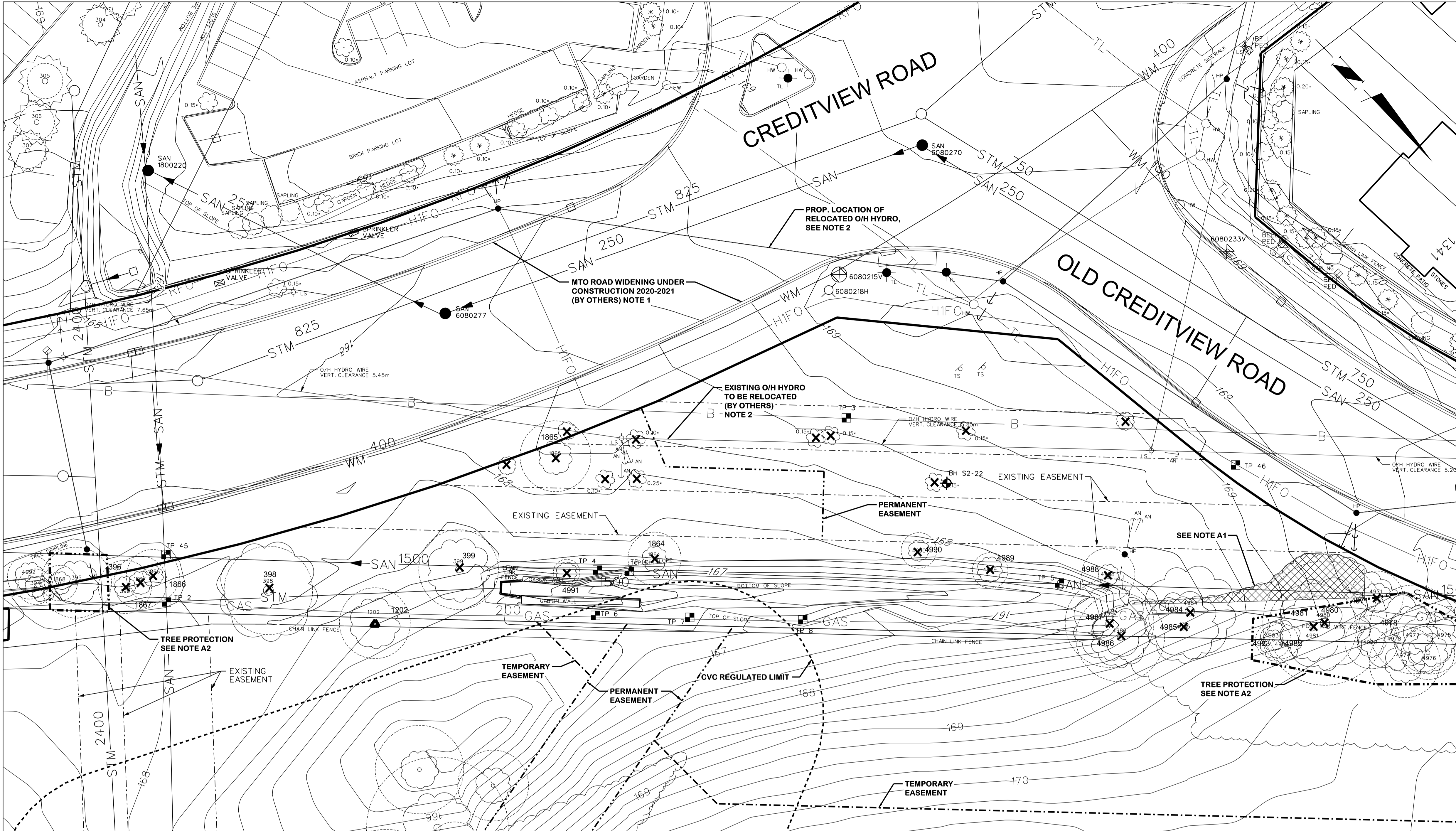
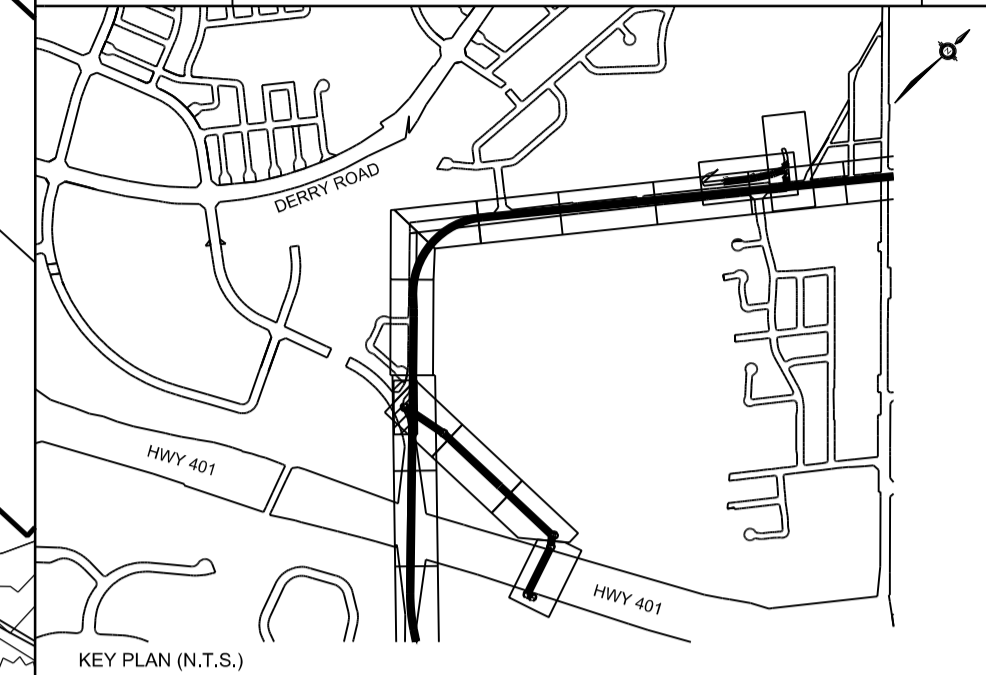
INV. EL. OF SAN.	CAD Area	Area	Checked by	Drawn by	Project No.
162.77	162.79	162.74	162.69	162.59	164.66
164.51	162.65	161.64	161.45		

ROAD CHAINAGE

Date MAR 2021 Sheet 32 of 166 Plan No. **C11-004**

SERVICE DATA					
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	NOV 6, 2018	C.K.	GAS MAINS	NOV 5, 2018	C.K.
STORM SEWERS	DEC 6, 2019	C.K.	BELL UIG CABLE	APR 23, 2019	C.K.
WATERMANS	MAR 8, 2019	C.K.	HYDRO UIG CABLE	OCT 29, 2018	C.K.
TRANSIT			HYDRO ONE	OCT 29, 2018	C.K.
PARKS & REC.	DEC 6, 2019	C.K.	CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES	APR 29, 2019	C.K.

REVISIONS		
DATE	DETAILS	INIT.
AUG 01, 2019	ISSUED FOR 50% DESIGN REVIEW	S.A.
SEP 25, 2020	ISSUED FOR 90% DESIGN REVIEW	C.K.
MAR 05, 2021	ISSUED FOR 100% DESIGN REVIEW	C.K.



General Notes

All Driveways Are ASPHALT Unless Otherwise Noted
 All Water And Sanitary Service Locations Are Approximate And Must Be Located Accurately In The Field
 All Horizontal And Vertical Bends Are In Degrees
 All Pipes Size In mm
 20C Existing Water Service, Size In mm
 WS25 Proposed Water Service, Size In mm
 B.M. No. Description Location
 The Contractor Is Responsible For Locating And Protecting All Existing Utilities Prior To And During Construction. Location Of Existing Utilities Approximate Only. To Be Verified In Field By Contractor.



EXISTING SITE PLAN AND TREE REMOVALS

SCALE: 1:250

EXISTING TREE INVENTORY:

Tag #	Species Scientific Name	Species Common Name	DBH (cm)	Radial TPZ (m)	Radial Drip-line (m)	Tree Protection Measures		
						No Injury	Protected / Injury	Removal
396	Ulmus sp.	Elm sp.	10	1.2	3			X
398	NA	Unknown sp.	47	5.64	5			X
399	Salix sp.	Willow sp.	30	3.6	4			X
1202	Unknown species	Unknown species	24	2.88	4		X	
1864	Acer sp.	Maple sp.	12	1.44	3			X
1865	Salix sp.	Willow sp.	16	1.92	4			X
1866	Salix sp.	Willow sp.	10	1.2	3			X
1867	Ulmus sp.	Elm sp.	11	1.32	3			X
4971	Salix sp.	Willow sp.	14	1.68	3			X
4978	NA	Unknown sp.	36	4.32		X		
4980	Quercus macrocarpa	Bur Oak	44	5.28	7			X
4981	NA	Unknown sp.	31	3.72	5			X
4982	Tilia americana	American Basswood	20	2.4	2	X		
4983	Tilia americana	American Basswood	10	1.2	2	X		
4984	NA	Unknown sp.	44	5.28	2			X
4985	Quercus macrocarpa	Bur Oak	34	4.08	4			X
4986	Quercus macrocarpa	Bur Oak	28	3.36	5			X
4987	Quercus macrocarpa	Bur Oak	35	4.2	5			X
4988	Acer negundo	Manitoba Maple	10	1.2	3			X
4989	Ulmus pumila	Siberian Elm	12	1.44	2			X
4990	Acer negundo	Manitoba Maple	10	1.2	2			X
4991	Quercus macrocarpa	Bur Oak	10	1.2	1.5			X

PROPERTY: CREDITVIEW ROAD AND OLD CREDITVIEW ROAD
 OWNER: CITY OF MISSISSAUGA (FOR PRIVATE PROPERTY - SIMQIA DEVELOPMENTS INC. AND HANLON GLEN HOMES INC.)
 ADDRESS: CREDITVIEW ROAD AND OLD CREDITVIEW ROAD.

LEGEND AND ABBREVIATIONS:
 REFER TO DWG G-1-003

- NOTES:**
- NOTIFY AGENCY BEFORE TREE REMOVAL OR TREE PRUNING. REFER TO DWG D-1-004 FOR TREE PROTECTION NOTES.
 - TREE PROTECTION PER CITY OF MISSISSAUGA STD. DETAIL 02830-6. TREE PROTECTION TO BE APPROVED BY CITY OF MISSISSAUGA URBAN FORESTRY PRIOR TO VENDOR COMMENCING ANY WORKS.

- TREE SURVEY NOTES:**
- TREE DATA BASED ON ARBORIST REPORT PREPARED BY MATRIX AND DATED DECEMBER 17, 2019.
 - POTENTIAL INJURY TO TREE MAY OCCUR WHEN CONSTRUCTION ACTIVITIES TAKE PLACE WITHIN RECOMMENDED MINIMUM TREE PROTECTION ZONE. REFER TO TYPICAL TREE PROTECTION DETAIL FOR ADDITIONAL INFORMATION.

- NOTES:**
- CREDITVIEW ROAD BRIDGE AND ROAD WIDENING CURRENTLY UNDER CONSTRUCTION (BY OTHERS) 2020-2021.
 - EXISTING OVERHEAD HYDRO TO BE RELOCATED BY OTHERS PRIOR TO THIS CONTRACT. HYDRO LINES OMITTED ON SUBSEQUENT DRAWINGS FOR CLARITY. SITE PREP DRAWINGS SHOW ONLY RELOCATED HYDRO.

NOTICE TO CONTRACTOR
 48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL	CABLE TELEVISION/FIBROPTIC PROVIDERS:
CITY OF MISSISSAUGA WORKS DEPT.	BELL CANADA
CITY OF BRAMPTON WORKS DEPT.	ENERSOURCE TELECOM
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BELL CANADA	ROGERS CABLE
ENBRIDGE INCORPORATED-GAS DISTRIBUTION	ALLSTREAM
ONTARIO MINISTRY OF TRANSPORTATION	PSN (PUBLIC SECTOR NETWORK)
ONTARIO CLEAN WATER AGENCY	FUTUREWAY (FCI BROADBAND)
HYDRO ONE NETWORKS	
ENERSOURCE, HYDRO MISSISSAUGA	
HYDRO ONE BRAMPTON	

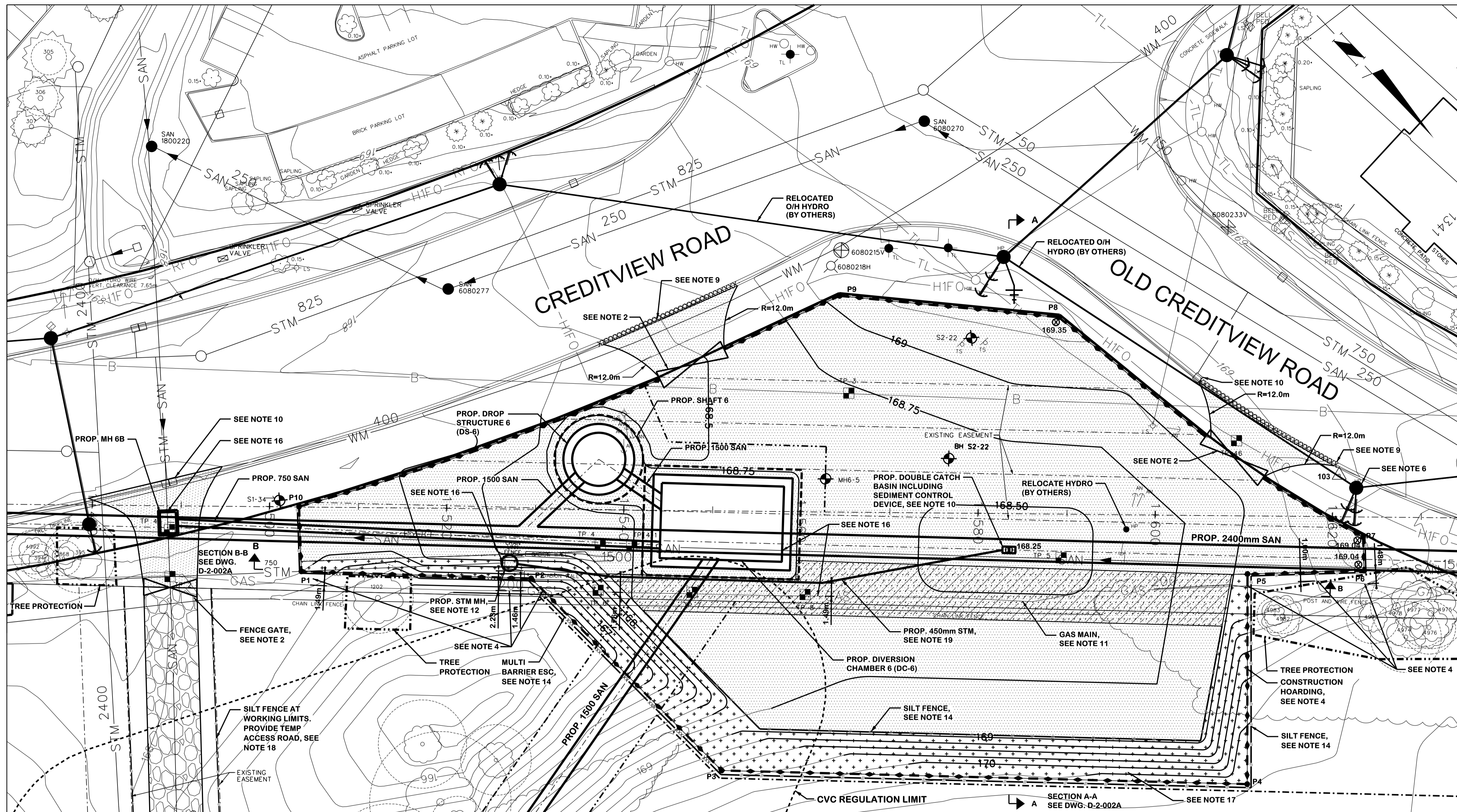
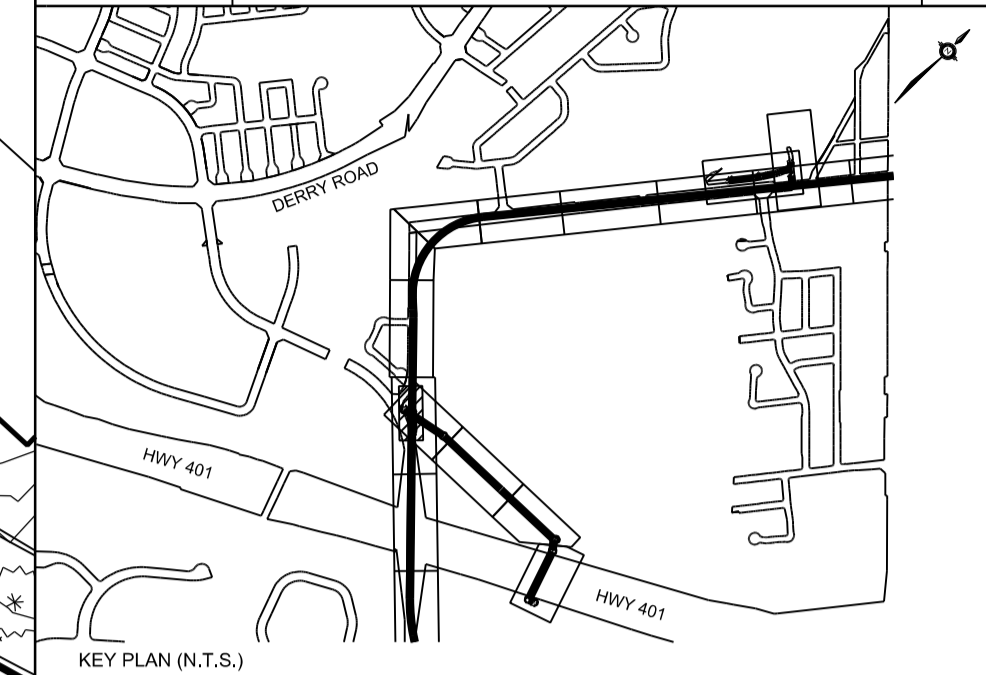


**EAST TO WEST DIVERSION
 SANITARY TRUNK SEWER
 CONTRACT 2
 SITE NO. 6
 EXISTING SITE PLAN AND TREE REMOVALS**

CAD Area	Area	2-41 to 2-45	Project No.	16-2291
Checked by	P.D.	Drawn by	H.B.	
Date	MAR 2021	Sheet	44 of 166	Plan No. 6-SP-001

SERVICE DATA					
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	NOV 6, 2018	C.K.	GAS MAINS	NOV 5, 2018	C.K.
STORM SEWERS	DEC 6, 2019	C.K.	BELL UIG CABLE	APR 23, 2019	C.K.
WATERMANS	MAR 8, 2019	C.K.	HYDRO UIG CABLE	OCT 29, 2018	C.K.
TRANSIT			HYDRO ONE	OCT 29, 2018	C.K.
PARKS & REC.	DEC 6, 2019	C.K.	CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES	APR 29, 2019	C.K.

REVISIONS		
DATE	DETAILS	INIT.
AUG 01, 2019	ISSUED FOR 50% DESIGN REVIEW	S.A.
SEP 25, 2020	ISSUED FOR 90% DESIGN REVIEW	C.K.
MAR 05, 2021	ISSUED FOR 100% DESIGN REVIEW	C.K.



SITE PREPARATION PLAN
SCALE: 1:250

General Notes

All Driveways Are ASPHALT Unless Otherwise Noted
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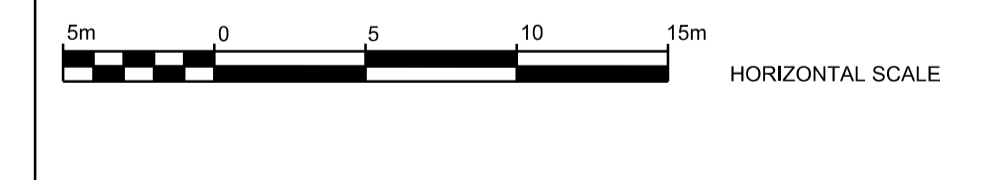
JACOBS

Approved by _____

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL	CABLE TELEVISION/FIBROPTIC PROVIDERS:
CITY OF MISSISSAUGA WORKS DEPT.	BELL CANADA
CITY OF BRAMPTON WORKS DEPT.	ENERSOURCE TELECOM
TOWN OF CALEDON WORKS DEPT.	HYDRO ONE TELECOM
BELL CANADA	ROGERS CABLE
ENBRIDGE INCORPORATED-GAS DISTRIBUTION	ALLSTREAM
ONTARIO MINISTRY OF TRANSPORTATION	PSN (PUBLIC SECTOR NETWORK)
ONTARIO CLEAN WATER AGENCY	FUTUREWAY (FCI BROADBAND)
HYDRO ONE NETWORKS	
ENERSOURCE, HYDRO MISSISSAUGA	
HYDRO ONE BRAMPTON	



**EAST TO WEST DIVERSION
SANITARY TRUNK SEWER
CONTRACT 2
SITE NO. 6
SITE PREPARATION PLAN**

CAD Area	Area	2.41 to 2.45	Project No.	16-2291
Checked by	P.D.	Drawn by	H.B.	
Date	MAR 2021	Sheet	45 of 166	Plan No. 6-SP-002

PROPERTY: CREDITVIEW ROAD AND OLD CREDITVIEW ROAD
 OWNER: CITY OF MISSISSAUGA (FOR PRIVATE PROPERTY - SIMQUA DEVELOPMENTS INC. AND HANLON GLEN HOMES INC.)
 ADDRESS: CREDITVIEW ROAD AND OLD CREDITVIEW ROAD.

COMPOUND AREA: 3930sq.m.
 COMPOUND PERIMETER: 430m.
 100 YR FLOOD ELEVATION: 163.85m
 REGIONAL FLOOD ELEVATION: 164.60m

LEGEND AND ABBREVIATIONS:
 REFER TO DWG. G-1-003

COMPOUND LIMIT COORDINATES:

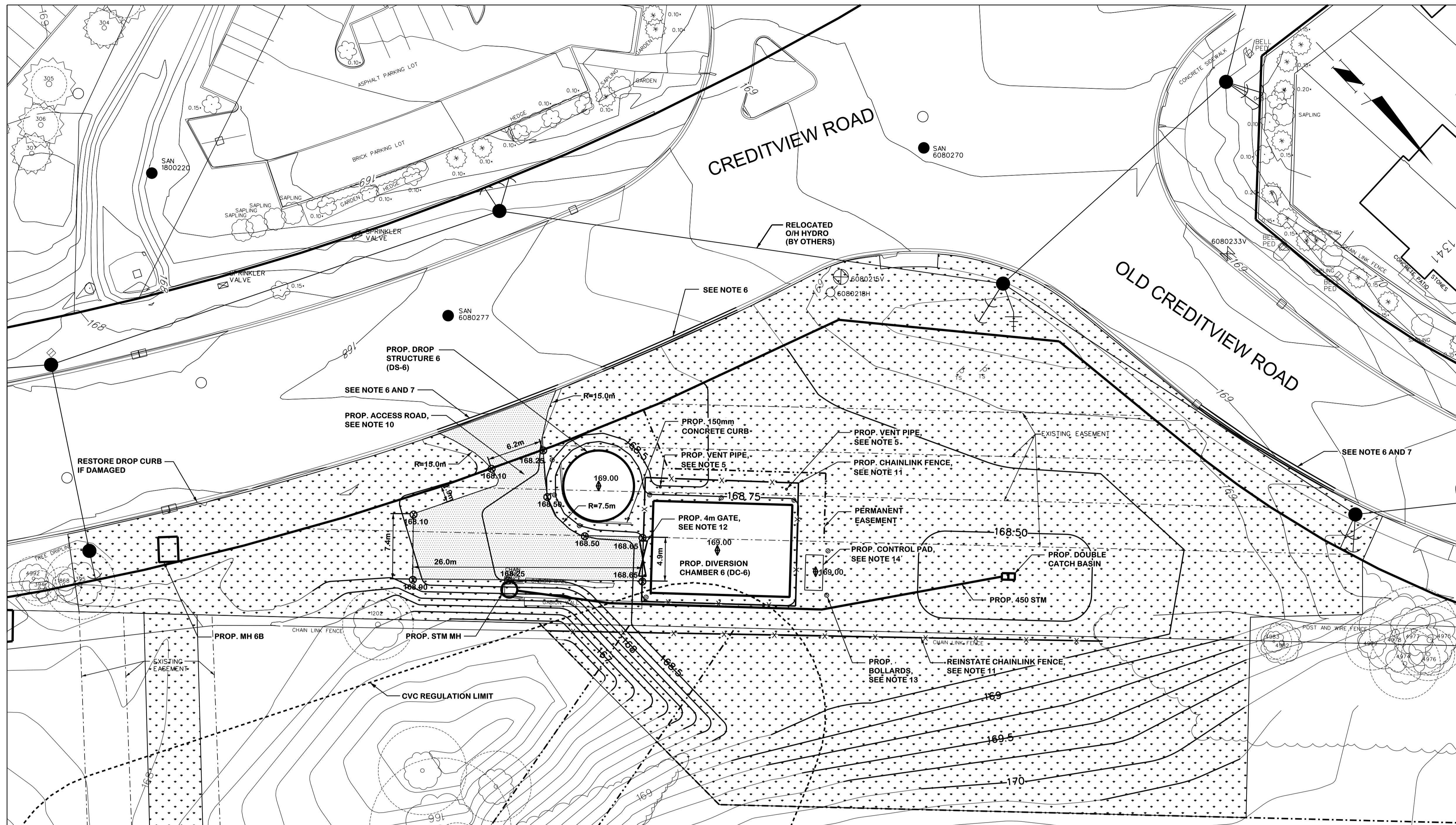
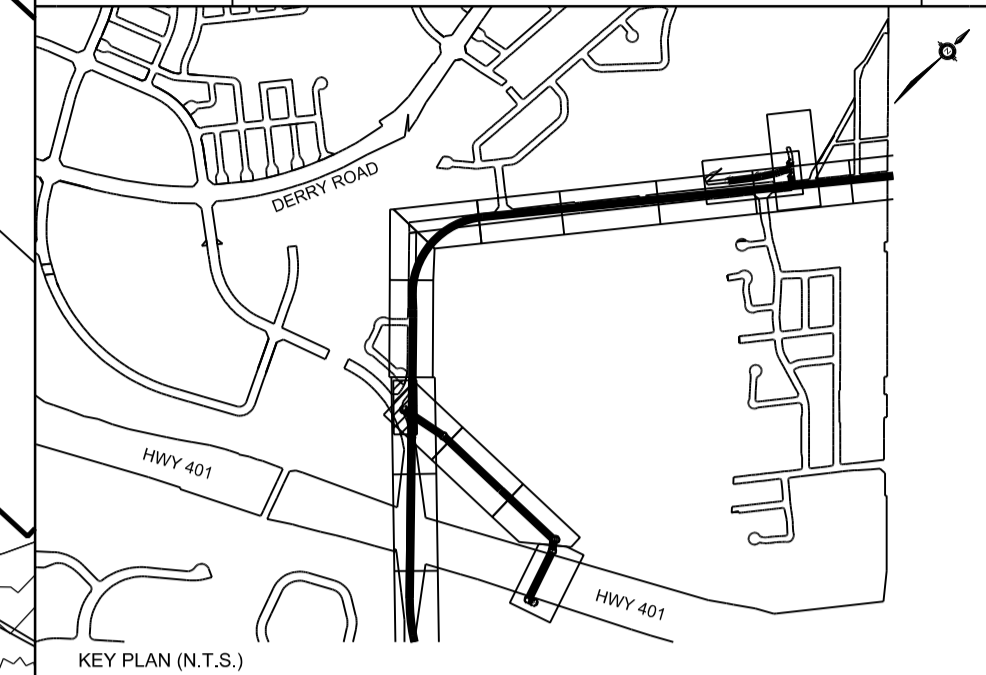
PT NO.	NORTHING	EASTING
P1	4 829 731.29	602 200.04
P2	4 829 738.91	602 171.464
P3	4 829 769.44	602 170.86
P4	4 829 811.49	602128.96
P5	4 829 794.33	602 112.56
P6	4 829 814.00	602 113.13
P7	4 829 811.17	602 110.60
P8	4 829 769.50	602 118.35
P9	4 829 750.69	602 134.59
P10	4 829 725.82	602 195.19

NOTES:

- REFER TO DWG. G-1-003 FOR GENERAL SITE PREPARATION AND ENVIRONMENTAL MANAGEMENT NOTES.
- REFER TO DWG. TMP-2-003 FOR THE TRAFFIC MANAGEMENT PLAN. ACCESS GATE(S) SHALL BE CONTROLLED DURING WORKING HOURS BY TRAFFIC CONTROL PERSON. VENDOR TO MAINTAIN PEDESTRIAN WALKWAYS ADJACENT TO THE COMPOUND AT ALL TIMES, UNLESS OTHERWISE INDICATED IN THE TRAFFIC MANAGEMENT PLAN BY MEANS OF A DETOUR PLAN.
- VENDOR SHALL SUBMIT A DETAILED SITE LAYOUT PLAN FOR APPROVAL BY THE AGENCY. VENDOR MAY PROPOSE CHANGES TO THE SITE LAYOUT OR PROPOSE A NEW SITE LAYOUT WITHIN LIMITS SPECIFIED. VENDOR WILL NOT BE REIMBURSED FOR THE COST OF CHANGES, DIRECT OR INDIRECT THAT RESULT FROM A NEW PROPOSED PLAN. REFER TO SPECIFICATIONS.
- CONSTRUCTION HOARDING TO BE 3.6m TALL TIMBER HOARDING, REFER TO SPECIFICATION FOR DETAILS. VENDOR TO MAINTAIN MINIMUM 1m HORIZONTAL CLEARANCE BETWEEN THE GAS MAIN AND HOARDING FOOTING.
- VENDOR TO SUBMIT A DUST AND MUD MANAGEMENT PLAN FOR APPROVAL. REFER TO SPECIFICATIONS.
- VENDOR SHALL MAINTAIN MIN 3m DISTANCE AWAY FROM OVERHEAD HYDRO AT ALL TIMES. VENDOR SHALL INSTALL ALARMS AND SENSORS, IN ADDITION TO SIGNAGE, TO WARN OPERATOR IF EQUIPMENT IS WITHIN 3m OF OVERHEAD HYDRO. ALL ABOVE GROUND HYDRO INFRASTRUCTURE, INCLUDING GUY WIRES WITHIN OR ADJACENT TO WORKING AREAS, ARE TO BE PROTECTED.
- EXISTING MAINTENANCE HOLES AND CATCH BASIN TO BE ADJUSTED TO PROPOSED WORKING SURFACE GRADES.
- VENDOR TO CLEAR AND GRUB SITE WITHIN COMPOUND LIMITS PRIOR TO PLACEMENT OF TEMPORARY WORKING SURFACE. VENDOR TO PROVIDE AND MAINTAIN TEMPORARY WORKING SURFACE WITHIN THE COMPOUND PER DETAIL 1 ON DWG. D-2-002A. VENDOR TO GRADE TEMPORARY WORKING SURFACE PER DETAIL 1 ON DWG. D-2-002A. VENDOR TO CONVEY SURFACE RUNOFF AS INDICATED IN THE PLAN ABOVE.
- CURB(S) TO BE CUT TO ALLOW FOR ACCESS TO SITE COMPOUNDS. PROVIDE TEMPORARY DRIVEWAY TO PROPOSED SITE ACCESS GATES. TEMPORARY DRIVEWAY SURFACE TO MATCH COMPOUND WORKING SURFACE.
- CATCH BASIN SEDIMENT CONTROL DEVICE PER CITY OF MISSISSAUGA STANDARD NO. 2830.040.
- STORING OR STOCKPILING OF ANY MATERIALS, EQUIPMENT, AND/OR TRAILERS ON TOP OF THE GAS MAINS IS STRICTLY PROHIBITED. ENBRIDGE IS TO HAVE ACCESS TO ALL GAS MAINS AT ALL TIMES IN CASE OF AN EMERGENCY OR MAINTENANCE. SEE GENERAL NOTES 10-13 ON SHEET G-1-003 FOR WORKING AROUND ENBRIDGE, GAS MAINS AND SERVICES. VENDOR TO PROVIDE AND MAINTAIN TEMPORARY WORKING SURFACE OVER GAS MAIN PER DETAIL 2 ON DWG. D-2-002A.
- REMOVE EXISTING HEADWALL AND INSTALL 1500mm DIA. PRECAST CONCRETE MH PER OPSD 701.011 AND CONNECT EXISTING STM WITH PROP. STM MH.
- REFER TO CVC PERMIT PACKAGE FOR EROSION AND SEDIMENT CONTROL REQUIREMENTS.
- MULTI BARRIER EROSION SEDIMENT CONTROL TO INCLUDE SILT FENCE PER OPSD 219.130/131 AND SILT SOCK PER OPSD 219.120.
- LEFT INTENTIONALLY BLANK.
- VENDOR TO PROVIDE THE HORIZONTAL AND VERTICAL ALIGNMENT OF EXISTING INFRASTRUCTURE FOUR WEEKS PRIOR TO SUBMITTING SHOP DRAWINGS RELATED TO THE CONNECTION, INCLUDING TEMPORARY EXCAVATION SUPPORT, CONCRETE REINFORCEMENT AND BYPASS PUMPING.
- FILL SLOPES TO BE PROTECTED WITH GEOTEXTILE LAYER PRIOR TO HYDROSEEDING PER DETAIL 3125-150.
- REFER TO DWG. 11-AP-100 FOR ACCESS ROAD ROUTE PLAN.
- REFER TO DWG. D-2-002A FOR DETAILS. VENDOR TO MAINTAIN MINIMUM 1m HORIZONTAL CLEARANCE FROM THE EXISTING GAS MAIN AND PROPOSED STM.

SERVICE DATA					
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	NOV 6, 2018	C.K.	GAS MAINS	NOV 5, 2018	C.K.
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WATERMANS	MAR 8, 2019	C.K.	HYDRO U/G CABLE	OCT 29, 2018	C.K.
TRANSIT			HYDRO ONE	OCT 29, 2018	C.K.
PARKS & REC.	DEC 6, 2019	C.K.	CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES	APR 29, 2019	C.K.

REVISIONS		
DATE	DETAILS	INIT.
AUG 01, 2019	ISSUED FOR 50% DESIGN REVIEW	S.A.
SEP 25, 2020	ISSUED FOR 90% DESIGN REVIEW	C.K.
MAR 05, 2021	ISSUED FOR 100% DESIGN REVIEW	C.K.



SITE RESTORATION PLAN

SCALE: 1:250

PROPERTY: CREDITVIEW ROAD AND OLD CREDITVIEW ROAD

OWNER: CITY OF MISSISSAUGA (FOR PRIVATE PROPERTY - SIMQUA DEVELOPMENTS INC. AND HANLON GLEN HOMES INC.)
ADDRESS: CREDITVIEW ROAD AND OLD CREDITVIEW ROAD.

LEGEND AND ABBREVIATIONS:

REFER TO DWG. C-1-003

PLANT SCHEDULE:

QTY	KEY	BOTANICAL NAME	COMMON NAME	SIZE AT INSTALLATION		PLANT SPACING	ROOT CONTAINMENT	REMARKS
				CALIPER [mm]	HEIGHT [cm]			
9 EVERGREEN CONIFEROUS TREES								
6	Pg	<i>PICEA GLAUCA</i>	WHITE SPRUCE	-	300	AS SHOWN	B&B / W.B.	BRANCHED TO GROUND
3	Ps	<i>PINUS STROBUS</i>	WHITE PINE	-	300	AS SHOWN	B&B / W.B.	BRANCHED TO GROUND
10 DECIDUOUS CALIPER TREES								
1	Ar	<i>ACER RUBRUM</i>	RED MAPLE	60	-	AS SHOWN	B&B / W.B.	FULL AND EQUAL FORM
3	As	<i>ACER SACCHARUM</i>	SUGAR MAPLE	60	-	AS SHOWN	B&B / W.B.	FULL AND EQUAL FORM
3	Om	<i>QUERCUS MACROCARPA</i>	BURR OAK	60	-	AS SHOWN	B&B / W.B.	FULL AND EQUAL FORM
3	Ta	<i>TILIA AMERICANA</i>	AMERICAN BASSWOOD	60	-	AS SHOWN	B&B / W.B.	FULL AND EQUAL FORM

- REFER TO SITE RESTORATION PLAN FOR DESIGNATION OF TREES PLANTING BEDS
- SOURCE OF PLANT MATERIALS TO BE PROVIDED BY CONTRACTOR
- ALL ACER SPECIES TO BE SPRUNG DUG TO PREVENT DIE-BACK
- ALL SUBSTITUTIONS TO THE SPECIES ON THIS LIST MUST BE APPROVED BY CONTRACT ADMINISTRATOR

ABBREVIATIONS:
W.B. - WIRE BASKET
B&B - BALLED AND BURLAPED

NOTES:

- REGRADE SITE LAYDOWN AREA TO EXISTING UNLESS OTHERWISE INDICATED. FILL AREAS TO BE COMPACTED PRIOR TO PLACEMENT OF TOPSOIL.
- MAINTAIN PERIMETER EROSION SEDIMENT CONTROL MEASURES UNTIL NEW SURFACE VEGETATION / PLANTING HAS BEEN ESTABLISHED. AT SUCH TIME AND WITH THE APPROVAL OF THE AGENCY, REMOVE EROSION AND SEDIMENT CONTROL MEASURES.
- REMOVE TEMP. WORK SHOWN ON SITE PREPARATION DRAWING UNLESS OTHERWISE INSTRUCTED BY THE ENGINEER.
- VENDOR SHALL RESTORE ALL DAMAGED ITEMS, INCLUDING BUT NOT LIMITED TO, CURBS, SIDEWALKS, SPLASHPADS, DRIVEWAYS, ROADWAYS, GUIDE RAILS, TOPSOIL AND SOD AFFECTED BY THE WORKS OUTSIDE OF THE COMPOUND LIMITS SPECIFIED.
- MAINTENANCE HOLE VENTING DETAIL PER DETAIL 4 ON DWG. D-2-003 LOCATION TO BE VERIFIED WITH ENGINEER.
- STANDARD CONCRETE CURB AND GUTTER PER CITY OF MISSISSAUGA STANDARD NO. 2230.020. DROP CURB AT ENTRANCES. CURB AND GUTTER AT CATCH BASIN DETAIL PER CITY OF MISSISSAUGA STANDARD NO. 2230.011.
- STANDARD ROADWAY SUBDRAIN DETAIL PER CITY OF MISSISSAUGA STANDARD NO. 2220.040.
- VENDOR SHALL CUT SHAFT EXCAVATION SUPPORT TO 2m BELOW FINAL GRADE AND BACKFILL PER SPECIFICATION SECTION 02412.
- TRENCH RESTORATION AS PER DETAILS ON DWG. D-2-003 AND TO COMPLY WITH PEEL STD. DWG. 5-2-2A AND 5-2-2B.
- REFER TO DETAIL 4 ON DWG. D-2-003 FOR PERMANENT ACCESS ROAD DETAILS. DRIVEWAY ENTRANCE DETAIL PER REGION OF PEEL STD DWG 5-1-9.
- STANDARD 1800mm CHAIN LINK FENCE PER CITY OF MISSISSAUGA STANDARD 2850.010.
- SECURITY ACCESS GATE PER CITY OF MISSISSAUGA STANDARD 2850.020.
- BOLLARD INSTALLATION PER DETAIL 3305-954
- REFER TO ELECTRICAL DRAWINGS FOR CONTROL PANEL PAD DETAILS.
- STANDARD CONCRETE SIDEWALK PER CITY OF MISSISSAUGA STANDARD 2240.010., SIDEWALK WIDTH TO MATCH EXISTING.
- RESTORE CONCRETE BUS SHELTER PAD PER CITY OF MISSISSAUGA STANDARD 2250.030 AND REINSTATE EXISTING BUS STOP MARKER PER CITY OF MISSISSAUGA STANDARD 2280.01

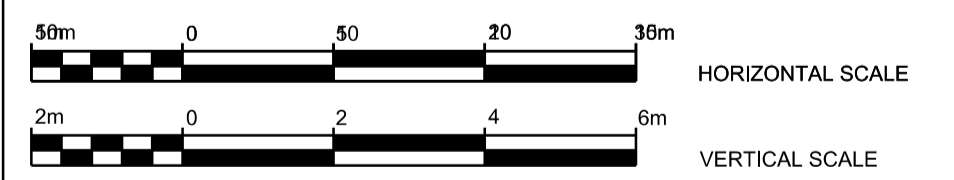


Approved by _____

NOTICE TO CONTRACTOR

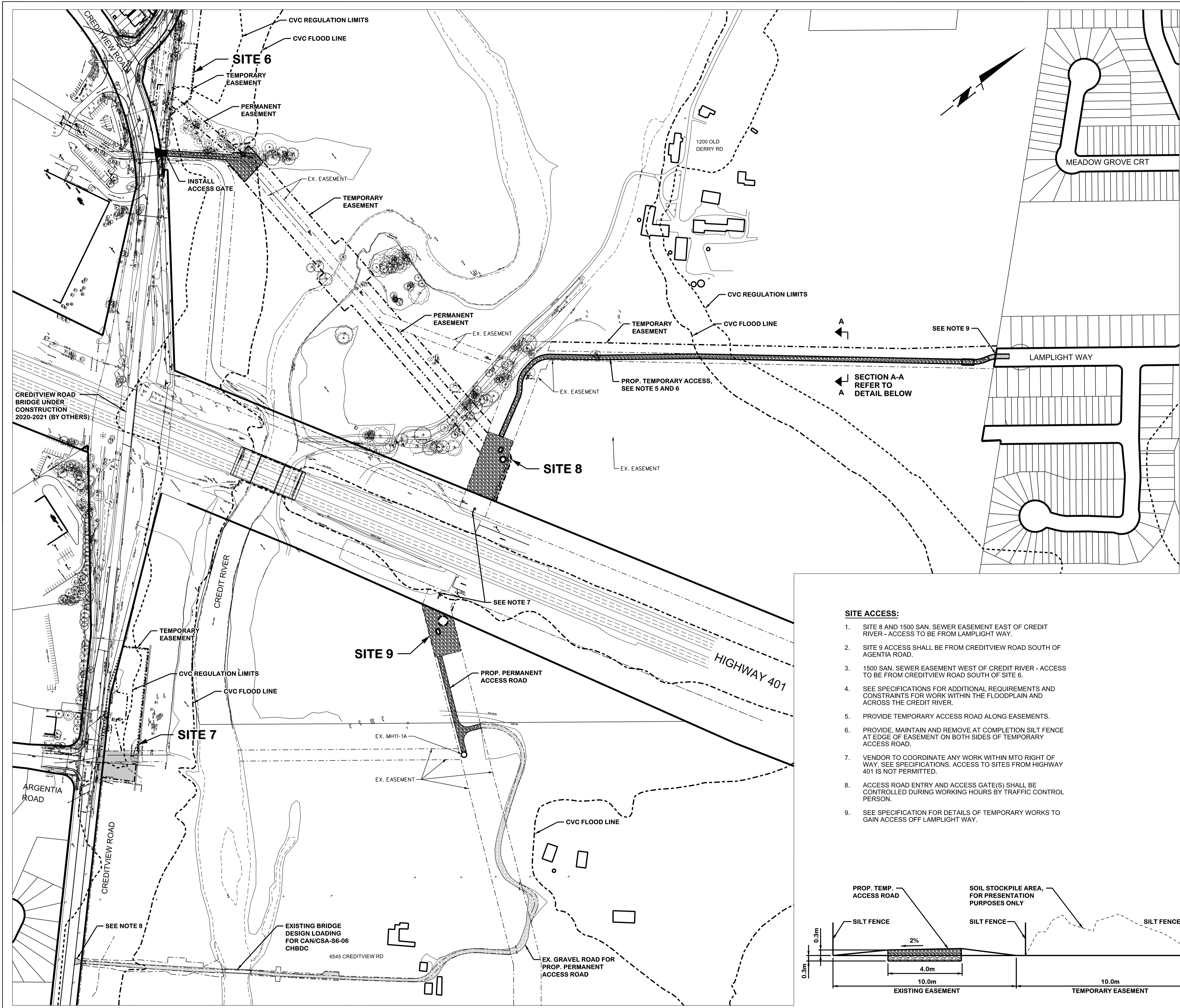
48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

- | | | |
|---|--|-----------------------------|
| 1 | ENBRIDGE INCORPORATED-GAS DISTRIBUTION | ALLSTREAM |
| 1 | ONTARIO MINISTRY OF TRANSPORTATION | PSN (PUBLIC SECTOR NETWORK) |
| 1 | ONTARIO CLEAN WATER AGENCY | FUTUREWAY (FCI BROADBAND) |
| 1 | HYDRO ONE NETWORKS | |
| 1 | ENERSOURCE, HYDRO MISSISSAUGA | |
| 1 | HYDRO ONE BRAMPTON | |



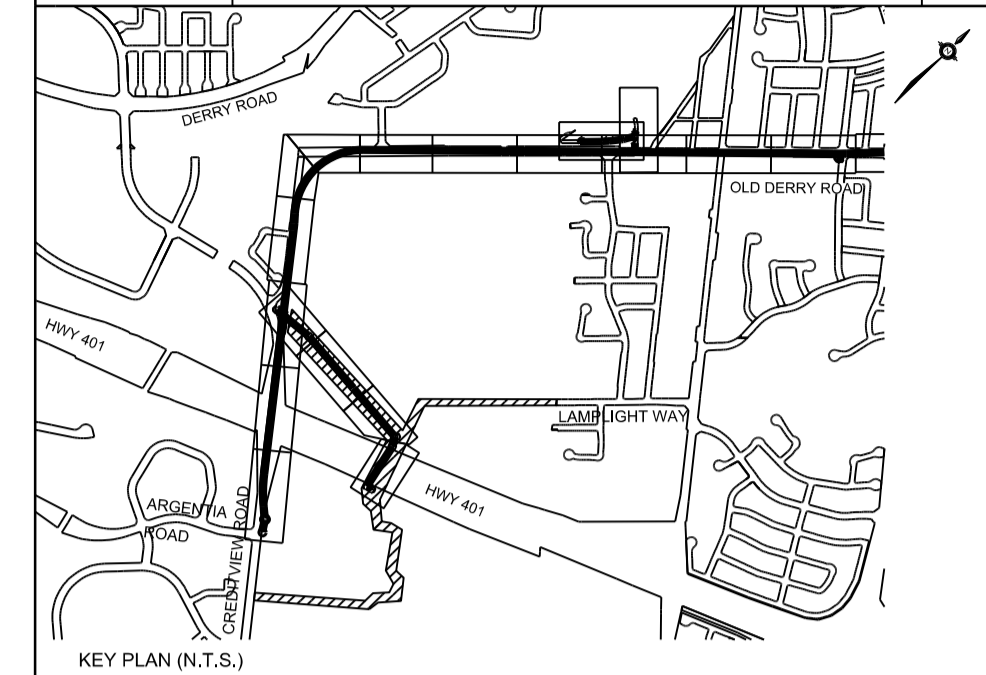
EAST TO WEST DIVERSION SANITARY TRUNK SEWER CONTRACT 2 SITE NO. 6 SITE RESTORATION PLAN

CAD Area	Area	2-41 to 2-45 2-49 to 2-53	Project No.	16-2291	
Checked by	P.D.	Drawn by	H.B.		
Date	MAR 2021	Sheet	46 of 166	Plan No.	6-R-001



SERVICE DATA					
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	NOV 6, 2018	C.K.	GAS MAINS	NOV 5, 2018	C.K.
STORM SEWERS	DEC 6, 2019	C.K.	BELL U/G CABLE	APR 23, 2019	C.K.
WATERMANS	MAR 8, 2019	C.K.	HYDRO U/G CABLE	OCT 29, 2018	C.K.
TRANSIT			HYDRO ONE	OCT 29, 2018	C.K.
PARKS & REC.	DEC 6, 2019	C.K.	CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES	APR 29, 2019	C.K.

REVISIONS		
DATE	DETAILS	INIT.
SEP 25, 2020	ISSUED FOR 90% DESIGN REVIEW	C.K.
MAR 05, 2021	ISSUED FOR 100% DESIGN REVIEW	C.K.



- GENERAL NOTES:**
- G1. UPON COMPLETION OF WORK, REINSTATE STANDARD CONCRETE CURB AND GUTTER PER CITY OF MISSISSAUGA STANDARD NO. 2230.020. DROP CURB AT ENTRANCES. CURB AND GUTTER AT CATCH BASIN DETAIL PER CITY OF MISSISSAUGA STANDARD NO. 2230.011.
 - G2. UPON COMPLETION OF WORK, REINSTATE STANDARD ROADWAY SUBDRAIN DETAIL PER CITY OF MISSISSAUGA STANDARD NO. 2220.040.
 - G3. GUIDE RAIL INSTALLATION DETAIL PER CITY OF MISSISSAUGA STANDARD 2200.030.
 - G4. UPON COMPLETION OF WORK, REMOVE TEMP. ACCESS ROAD AND RESTORE WITH TOPSOIL AND SEEDING.

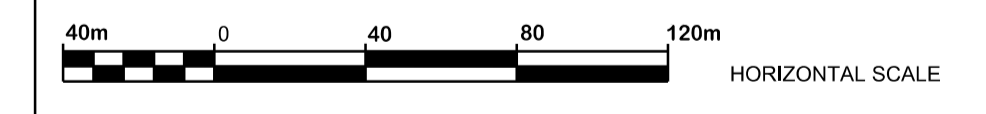
General Notes

All Driveways Are ASPHALT Unless Otherwise Noted
 All Water And Sanitary Service Locations Are Approximate And Must Be Located Accurately In The Field
 All Horizontal And Vertical Bends Are In Degrees
 All Pipes Size In mm
 20C Existing Water Service, Size In mm
 WS25 Proposed Water Service, Size In mm
 B.M. No. Description Location Elev.
 The Contractor Is Responsible For Locating And Protecting All Existing Utilities Prior To And During Construction, Location Of Existing Utilities Approximate Only, To Be Verified In Field By Contractor.

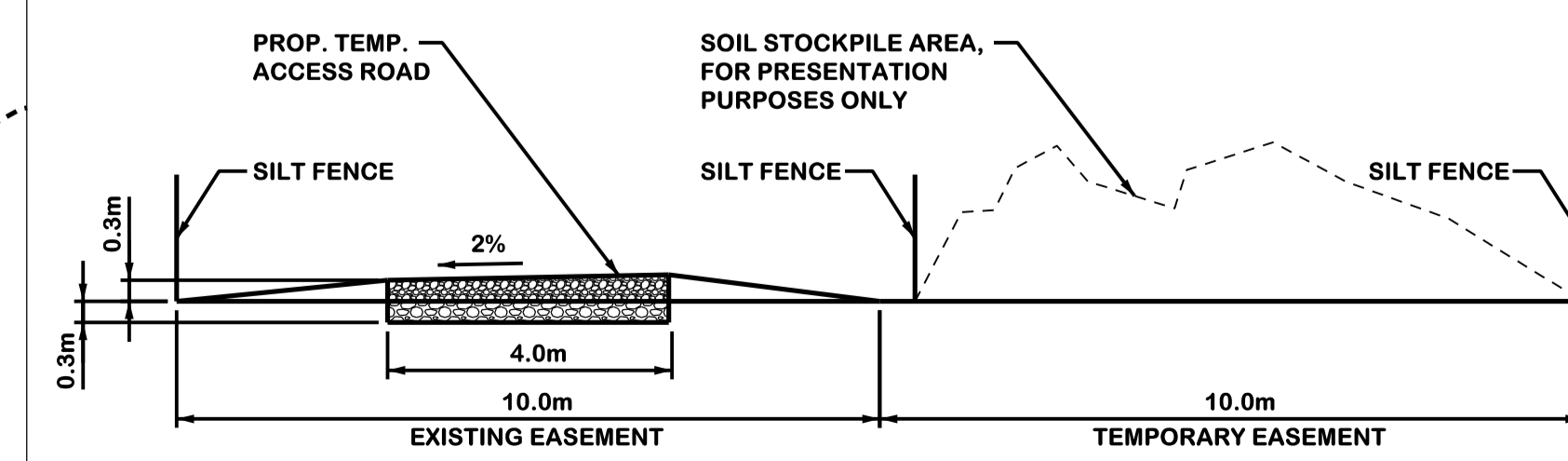


NOTICE TO CONTRACTOR
 48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL	CABLE TELEVISION/FIBROPTIC PROVIDERS:
CITY OF MISSISSAUGA WORKS DEPT.	BELL CANADA
CITY OF BRAMPTON WORKS DEPT.	ENERSOURCE TELECOM
TOWN OF CALEDON WORKS DEPT.	HYDRO ONE TELECOM
BELL CANADA	ROGERS CABLE
ENBRIDGE INCORPORATED-GAS DISTRIBUTION	ALLSTREAM
ONTARIO MINISTRY OF TRANSPORTATION	PSN (PUBLIC SECTOR NETWORK)
ONTARIO CLEAN WATER AGENCY	FUTUREWAY (FCI BROADBAND)
HYDRO ONE NETWORKS	
ENERSOURCE, HYDRO MISSISSAUGA	
HYDRO ONE BRAMPTON	



- SITE ACCESS:**
1. SITE 8 AND 1500 SAN. SEWER EASEMENT EAST OF CREDIT RIVER - ACCESS TO BE FROM LAMPLIGHT WAY.
 2. SITE 9 ACCESS SHALL BE FROM CREDITVIEW ROAD SOUTH OF ARGENTIA ROAD.
 3. 1500 SAN. SEWER EASEMENT WEST OF CREDIT RIVER - ACCESS TO BE FROM CREDITVIEW ROAD SOUTH OF SITE 6.
 4. SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS AND CONSTRAINTS FOR WORK WITHIN THE FLOODPLAIN AND ACROSS THE CREDIT RIVER.
 5. PROVIDE TEMPORARY ACCESS ROAD ALONG EASEMENTS.
 6. PROVIDE, MAINTAIN AND REMOVE AT COMPLETION SILT FENCE AT EDGE OF EASEMENT ON BOTH SIDES OF TEMPORARY ACCESS ROAD.
 7. VENDOR TO COORDINATE ANY WORK WITHIN MTO RIGHT OF WAY. SEE SPECIFICATIONS. ACCESS TO SITES FROM HIGHWAY 401 IS NOT PERMITTED.
 8. ACCESS ROAD ENTRY AND ACCESS GATE(S) SHALL BE CONTROLLED DURING WORKING HOURS BY TRAFFIC CONTROL PERSON.
 9. SEE SPECIFICATION FOR DETAILS OF TEMPORARY WORKS TO GAIN ACCESS OFF LAMPLIGHT WAY.



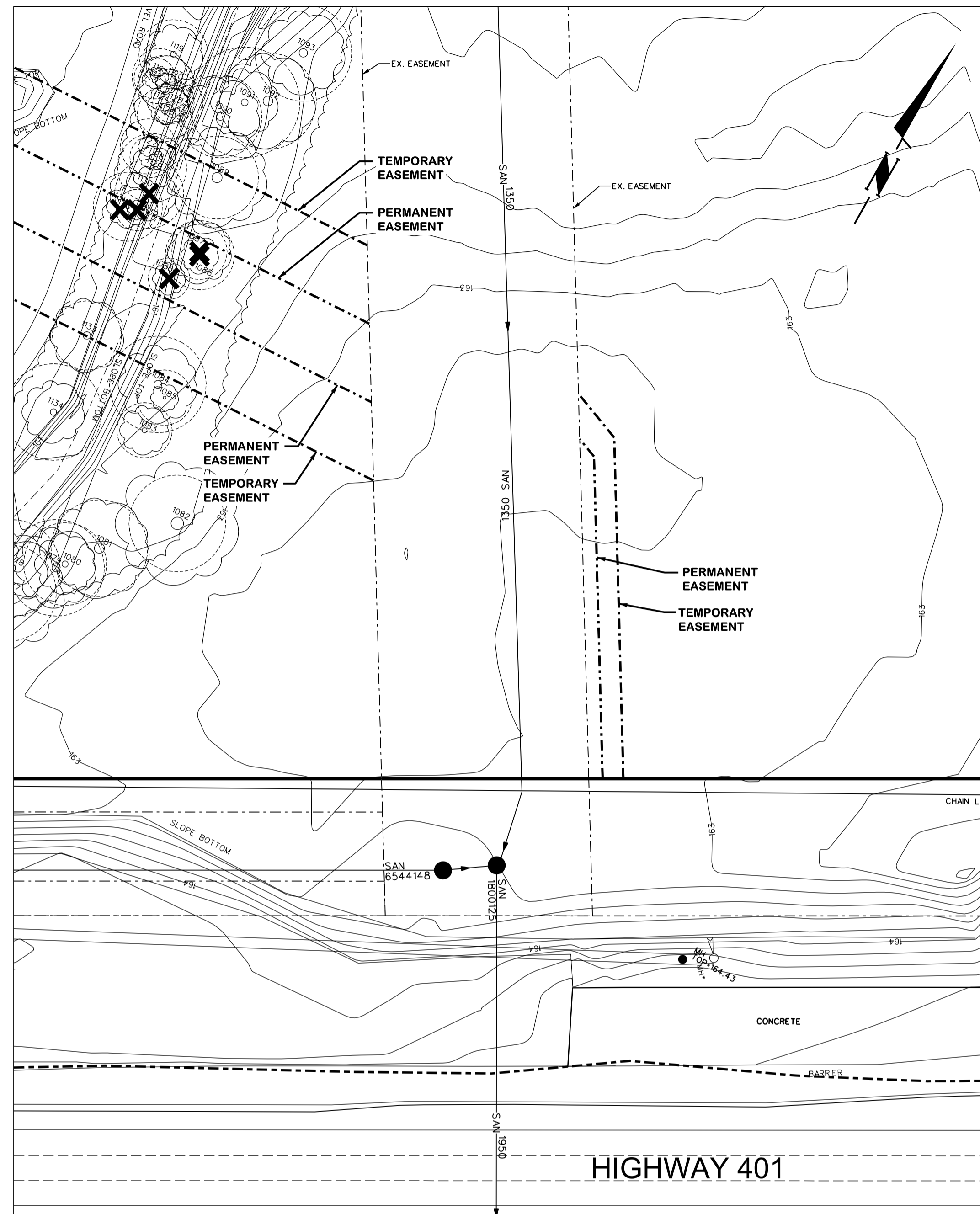
SITE ACCESS PLAN
 SCALE: 1:2000

SECTION A
 SCALE: 1:100

Region of Peel
 working with you

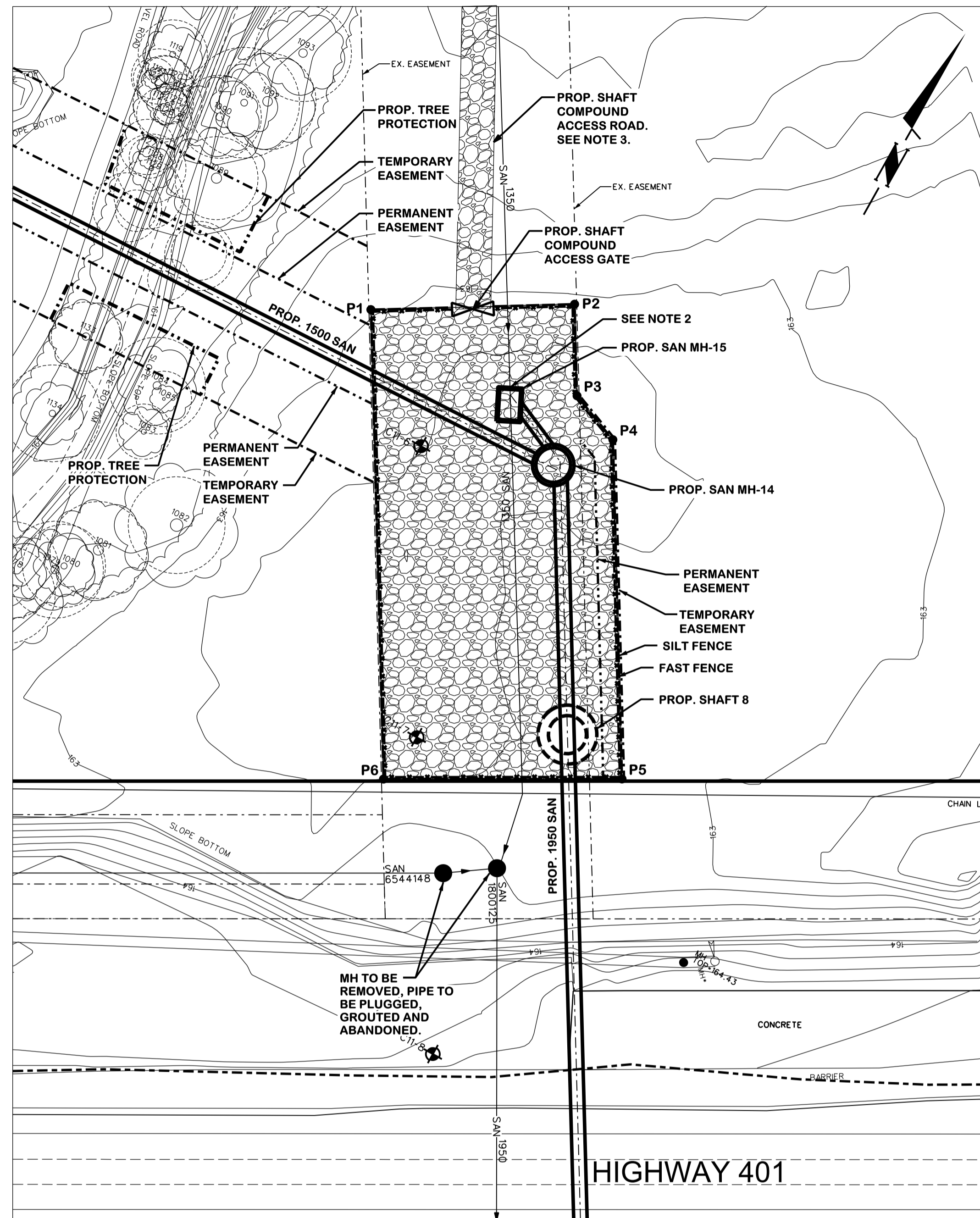
EAST TO WEST DIVERSION SANITARY TRUNK SEWER
 CONTRACT 2
 SHAFT 8 AND SHAFT 9
 SITE ACCESS PLAN

CAD Area	Area	2-41 to 2-45	Project No.	16-2291
Checked by	P.D.	Drawn by	H.B.	
Date	MAR 2021	Sheet	50 of 166	Plan No. 11-AP-002



EXISTING SITE PLAN AND TREE REMOVAL

SCALE: 1:500



SITE PREPARATION PLAN

SCALE: 1:500

PROPERTY: CREDITVIEW ROAD

OWNER: SIMQUA DEVELOPMENTS INC AND HANLONM GLEN HOMES INC.
ADDRESS: CREDITVIEW ROAD (CONCESSION 3 WHS LOT 9)

COMPOUND AREA: 2265sq.m.
COMPOUND PERIMETER: 200m.

2 YR FLOOD ELEVATION: 161.39m
5 YR FLOOD ELEVATION: 162.04m
100 YR FLOOD ELEVATION: 163.75m
REGIONAL FLOOD ELEVATION: 164.55m

LEGEND AND ABBREVIATIONS:

REFER TO DWG. G-1-003

NOTES:

- A1. NOTIFY AGENCY BEFORE TREE REMOVAL OR TREE PRUNING. REFER TO DWG. G-1-003 FOR TREE PROTECTION NOTES.
- A2. TREE PROTECTION PER CITY OF MISSISSAUGA STD. DETAIL 02830-6. TREE PROTECTION TO BE APPROVED BY CITY OF MISSISSAUGA URBAN FORESTRY PRIOR TO VENDOR COMMENCING ANY WORKS.

TREE SURVEY NOTES:

- B1. TREE DATA BASED ON ARBORIST REPORT PREPARED BY MATRIX AND DATED DECEMBER 17, 2019.
- B2. POTENTIAL INJURY TO TREE MAY OCCUR WHEN CONSTRUCTION ACTIVITIES TAKE PLACE WITHIN RECOMMENDED MINIMUM TREE PROTECTION ZONE. REFER TO TYPICAL TREE PROTECTION DETAIL FOR ADDITIONAL INFORMATION.

EXISTING TREE INVENTORY:

Tag #	Species Scientific Name	Species Common Name	DBH (cm)	Radial TPZ (m)	Radial Drip-line (m)	Tree Protection Measures			
						No Injury	Protection	Injury	Removal
1084	Tilia americana	Basswood	48	5.76	7			X	
1085	Tilia americana	Basswood	17	2.04	4			X	
1086	Unknown species	Unknown species	20	2.4	3				X
1087	Acer negundo	Manitoba Maple	39	4.68	4				X
1088	Acer negundo	Manitoba Maple	23	2.76	5				X
1089	Carya cordiformis	Bitternut Hickory	61	7.32	6			X	
1127	Acer negundo	Manitoba Maple	12	1.44	4			X	
1128	Tsuga canadensis	Unknown species	14	1.68	3			X	
1129	Salix sp.	Willow sp.	27	3.24	5			X	
1130	Unknown species	Unknown species	33	3.96	5				X
1131	Unknown species	Unknown species	26	3.12	5				X
1132	Acer negundo	Manitoba Maple	12	1.44	3				X
1133	Acer negundo	Manitoba Maple	45	5.4	5			X	

NOTES:

1. REFER TO DWG. G-1-003 FOR GENERAL SITE PREPARATION AND ENVIRONMENTAL MANAGEMENT NOTES.
2. VENDOR TO PROVIDE THE HORIZONTAL AND VERTICAL ALIGNMENT OF EXISTING INFRASTRUCTURE FOUR WEEKS PRIOR TO SUBMITTING SHOP DRAWINGS RELATED TO THE CONNECTION, INCLUDING TEMPORARY EXCAVATION SUPPORT, CONCRETE REINFORCEMENT AND BYPASS PUMPING.
3. REFER TO DWG. 11-AP-003 FOR ACCESS ROAD ROUTE PLAN
4. VENDOR SHALL SUBMIT A DETAILED SITE LAYOUT PLAN FOR APPROVAL BY THE AGENCY. VENDOR MAY PROPOSE CHANGES TO THE SITE LAYOUT OR PROPOSE A NEW SITE LAYOUT WITHIN LIMITS SPECIFIED. VENDOR WILL NOT BE REIMBURSED FOR THE COST OF CHANGES, DIRECT OR INDIRECT THAT RESULT FROM A NEW PROPOSED PLAN. REFER TO SPECIFICATIONS.
5. CONSTRUCTION HOARDING TO BE FAST FENCE. REFER TO SPECIFICATION FOR DETAILS.
6. VENDOR TO SUBMIT A DUST AND MUD MANAGEMENT PLAN FOR APPROVAL. REFER TO SPECIFICATIONS.
7. VENDOR SHALL MAINTAIN MIN 3m DISTANCE AWAY FROM OVERHEAD HYDRO AT ALL TIMES. VENDOR SHALL INSTALL ALARMS AND SENSORS, IN ADDITION TO SIGNAGE, TO WARN OPERATOR IF EQUIPMENT IS WITHIN 3m OF OVERHEAD HYDRO. ALL ABOVE GROUND HYDRO INFRASTRUCTURE, INCLUDING GUY WIRES WITHIN OR ADJACENT TO WORKING AREAS, ARE TO BE PROTECTED.
8. EXISTING MAINTENANCE HOLES AND CATCH BASIN TO BE ADJUSTED TO PROPOSED WORKING SURFACE GRADES.
9. VENDOR TO CLEAR AND GRUB SITE WITHIN COMPOUND LIMITS PRIOR TO PLACEMENT OF TEMPORARY WORKING SURFACE. VENDOR TO PROVIDE AND MAINTAIN TEMPORARY WORKING SURFACE WITHIN THE COMPOUND PER DETAIL ON DWG. D-2-005. VENDOR TO GRADE TEMPORARY WORKING SURFACE TO CONVEY SURFACE RUNOFF TO EXISTING DITCH OR AS INDICATED IN THE PLAN ABOVE.
10. REFER TO CVC PERMIT PACKAGE FOR EROSION AND SEDIMENT CONTROL REQUIREMENTS.
11. HEAVY DUTY SILT FENCE PER OPSD 219.130/131.

SERVICE DATA					
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	NOV 6, 2018	C.K.	GAS MAINS	NOV 5, 2018	C.K.
STORM SEWERS	DEC 6, 2019	C.K.	BELL UIG CABLE	APR 23, 2019	C.K.
WATERMANS	MAR 8, 2019	C.K.	HYDRO UIG CABLE	OCT 29, 2018	C.K.
TRANSIT			HYDRO ONE	OCT 29, 2018	C.K.
PARKS & REC.	DEC 6, 2019	C.K.	CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES	APR 29, 2019	C.K.

REVISIONS		
DATE	DETAILS	INIT.
SEP 25, 2020	ISSUED FOR 90% DESIGN REVIEW	C.K.
MAR 05, 2021	ISSUED FOR 100% DESIGN REVIEW	C.K.

COMPOUND LIMIT COORDINATES:

PT NO.	NORTHING	EASTING
P1	4 829 808.80	602 667.90
P2	4 829 823.88	602 693.13
P3	4 829 812.53	602 699.92
P4	4 829 809.54	602 707.53
P5	4 829 767.52	602 732.64
P6	4 829 750.66	602 702.65

General Notes

All Driveways Are ASPHALT Unless Otherwise Noted
All Water And Sanitary Service Locations Are Approximate And Must Be Located Accurately In The Field
All Horizontal And Vertical Bends Are In Degrees
All Pipes Size In mm
200 Existing Water Service, Size In mm
WS25 Proposed Water Service, Size In mm
B.M. No. Elev.
Description
Location
The Contractor Is Responsible For Locating And Protecting All Existing Utilities Prior To And During Construction, Location Of Existing Utilities Approximate Only, To Be Verified In Field By Contractor.

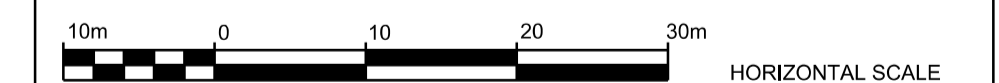
JACOBS

Approved by _____

NOTICE TO CONTRACTOR

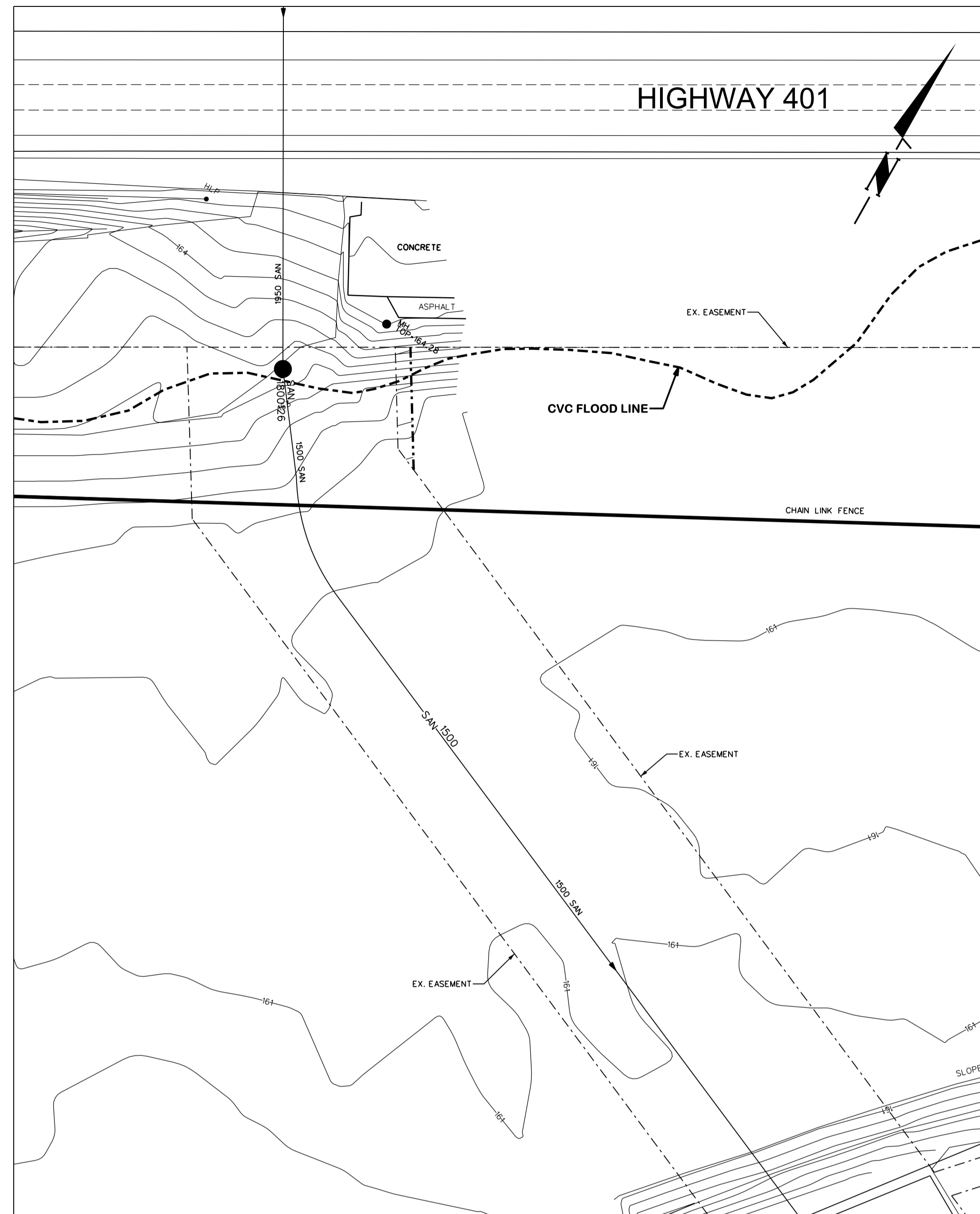
48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL	CABLE TELEVISION/FIBROPTIC PROVIDERS:
CITY OF MISSISSAUGA WORKS DEPT.	BELL CANADA
CITY OF BRAMPTON WORKS DEPT.	ENERSOURCE TELECOM
TOWN OF CALEDON WORKS DEPT.	HYDRO ONE TELECOM
BELL CANADA	ROGERS CABLE
ENBRIDGE INCORPORATED-GAS DISTRIBUTION	ALLSTREAM
ONTARIO MINISTRY OF TRANSPORTATION	PSN (PUBLIC SECTOR NETWORK)
ONTARIO CLEAN WATER AGENCY	FUTUREWAY (FCI BROADBAND)
HYDRO ONE NETWORKS	
ENERSOURCE, HYDRO MISSISSAUGA	
HYDRO ONE BRAMPTON	



**EAST TO WEST DIVERSION
SANITARY TRUNK SEWER
CONTRACT 2
SITE NO. 8 - EXISTING SITE, TREE REMOVALS
AND SITE PREPARATION PLAN**

CAD Area	Area	4.41 to 4.45	4.49 to 4.53	Project No.	16-2291
Checked by	P.D.	Drawn by	H.B.		
Date	MAR 2021	Sheet	51 of 166	Plan No.	8-SP-002



EXISTING SITE PLAN AND TREE REMOVAL
SCALE: 1:500

PROPERTY: CREDITVIEW ROAD

OWNER: CITY OF MISSISSAUGA
ADDRESS: CREDITVIEW ROAD (CONCESSION 3 WHS LOT 9)

COMPOUND AREA: 1350sq.m.
COMPOUND PERIMETER: 195m.

2 YR FLOOD ELEVATION: 161.05m
5 YR FLOOD ELEVATION: 161.75m
100 YR FLOOD ELEVATION: 163.25m
REGIONAL FLOOD ELEVATION: 162.75m

LEGEND AND ABBREVIATIONS:

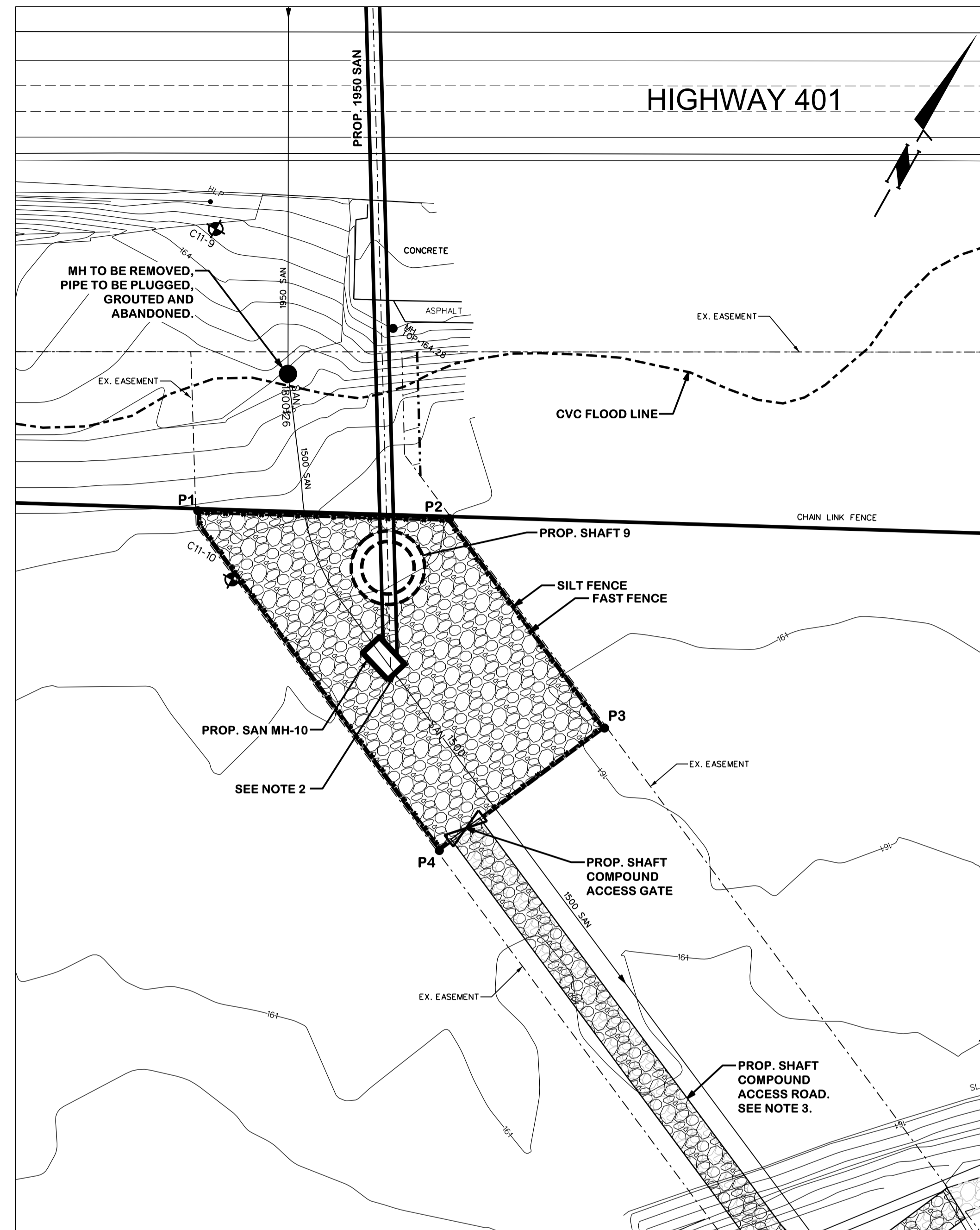
REFER TO DWG G-1-003

NOTES:

- A1. NOTIFY AGENCY BEFORE TREE REMOVAL OR TREE PRUNING. REFER TO DWG G-1-003 FOR TREE PROTECTION NOTES.
- A2. TREE PROTECTION PER CITY OF MISSISSAUGA STD. DETAIL 02930-6. TREE PROTECTION TO BE APPROVED BY CITY OF MISSISSAUGA URBAN FORESTRY PRIOR TO VENDOR COMMENCING ANY WORKS.

TREE SURVEY NOTES:

- B1. TREE DATA BASED ON ARBORIST REPORT PREPARED BY MATRIX AND DATED DECEMBER 17, 2019.
- B2. POTENTIAL INJURY TO TREE MAY OCCUR WHEN CONSTRUCTION ACTIVITIES TAKE PLACE WITHIN RECOMMENDED MINIMUM TREE PROTECTION ZONE. REFER TO TYPICAL TREE PROTECTION DETAIL FOR ADDITIONAL INFORMATION.



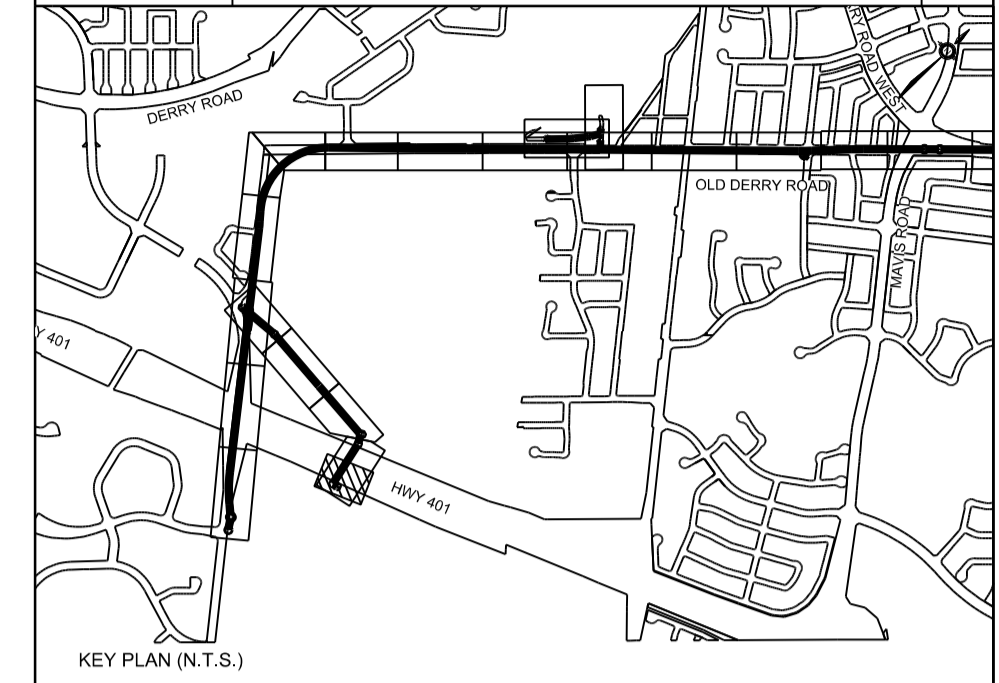
SITE PREPARATION PLAN
SCALE: 1:500

NOTES:

1. REFER TO DWG G-1-003 FOR GENERAL SITE PREPARATION AND ENVIRONMENTAL MANAGEMENT NOTES.
2. VENDOR TO PROVIDE THE HORIZONTAL AND VERTICAL ALIGNMENT OF EXISTING INFRASTRUCTURE FOUR WEEKS PRIOR TO SUBMITTING SHOP DRAWINGS RELATED TO THE CONNECTION INCLUDING TEMPORARY EXCAVATION SUPPORT, CONCRETE REINFORCEMENT AND BYPASS PUMPING.
3. REFER TO DWG 11-AP-003 FOR ACCESS ROAD ROUTE PLAN.
4. VENDOR SHALL SUBMIT A DETAILED SITE LAYOUT PLAN FOR APPROVAL BY THE AGENCY. VENDOR MAY PROPOSE CHANGES TO THE SITE LAYOUT OR PROPOSE A NEW SITE LAYOUT WITHIN LIMITS SPECIFIED. VENDOR WILL NOT BE REIMBURSED FOR THE COST OF CHANGES, DIRECT OR INDIRECT THAT RESULT FROM A NEW PROPOSED PLAN. REFER TO SPECIFICATIONS.
5. CONSTRUCTION HOARDING TO BE FAST FENCE, REFER TO SPECIFICATION FOR DETAILS.
6. VENDOR TO SUBMIT A DUST AND MUD MANAGEMENT PLAN FOR APPROVAL. REFER TO SPECIFICATIONS.
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10. REFER TO CVC PERMIT PACKAGE FOR EROSION AND SEDIMENT CONTROL REQUIREMENTS.
11. HEAVY DUTY SILT FENCE PER OPSD 219.130/131.

SERVICE DATA					
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WATERMANS	MAR 8, 2019	C.K.	HYDRO UIG CABLE	OCT 29, 2018	C.K.
TRANSIT			HYDRO ONE	OCT 29, 2018	C.K.
PARKS & REC.	DEC 6, 2019	C.K.	CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES	APR 29, 2019	C.K.

REVISIONS		
DATE	DETAILS	INIT.
SEP 25, 2020	ISSUED FOR 90% DESIGN REVIEW	C.K.
MAR 05, 2021	ISSUED FOR 100% DESIGN REVIEW	C.K.



COMPOUND LIMIT COORDINATES:

PT NO.	NORTHING	EASTING
P1	4 829 635.23	602 771.34
P2	4 829 651.85	602 803.23
P3	4 829 636.64	602 837.21
P4	4 829 609.82	602 825.20

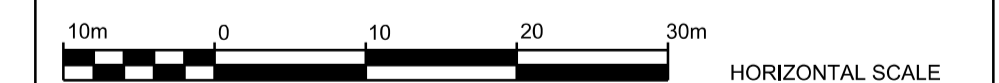
General Notes

All Driveways Are ASPHALT Unless Otherwise Noted
All Water And Sanitary Service Locations Are Approximate And Must Be Located Accurately In The Field
All Horizontal And Vertical Bends Are In Degrees
All Pipe Size In mm
20C Existing Water Service, Size In mm
WS25 Proposed Water Service, Size In mm
B.M. No. Description Location Elev.
The Contractor Is Responsible For Locating And Protecting All Existing Utilities Prior To And During Construction, Location Of Existing Utilities Approximate Only, To Be Verified In Field By Contractor.



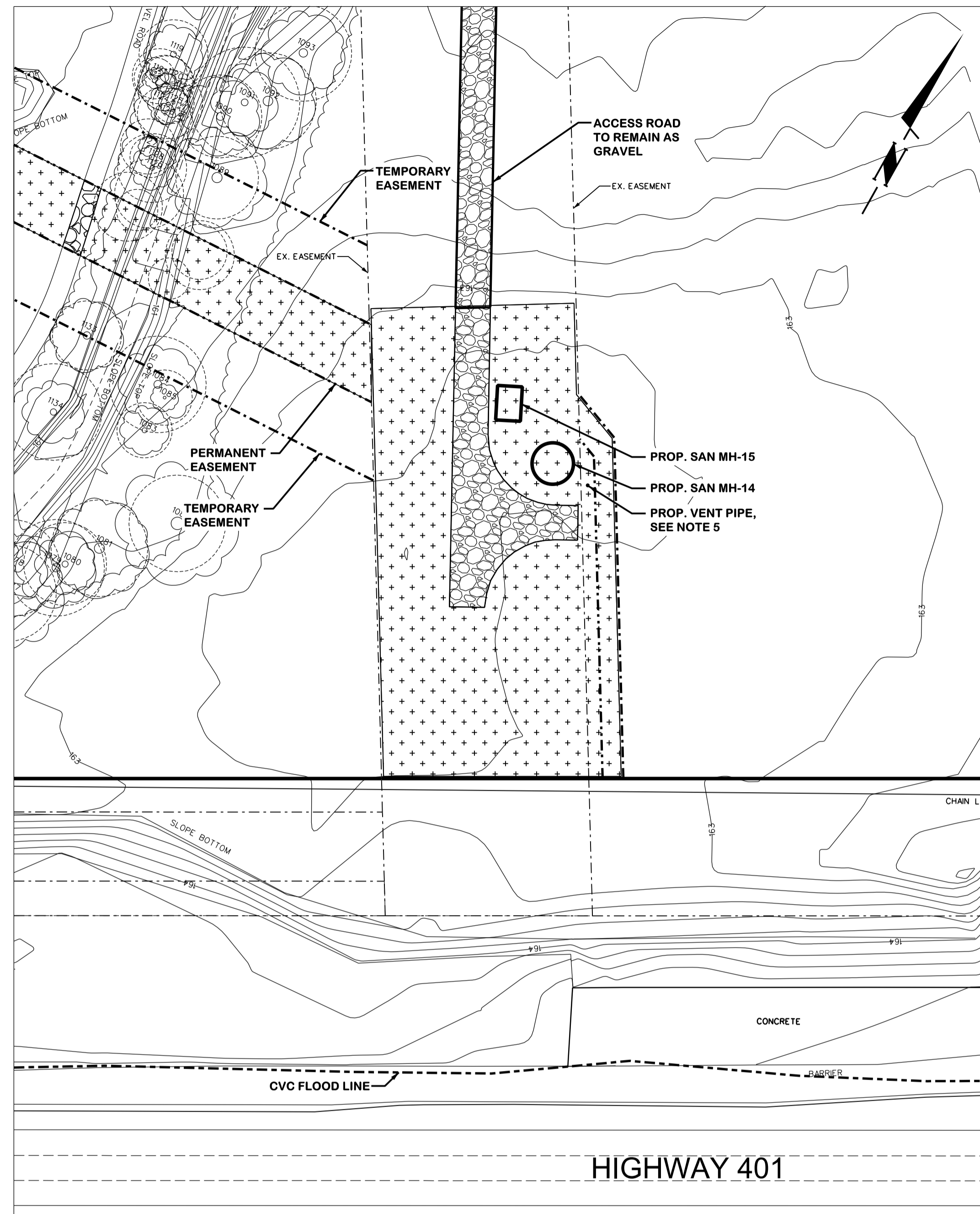
NOTICE TO CONTRACTOR
48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL	CABLE TELEVISION/FIBROPTIC PROVIDERS:
CITY OF MISSISSAUGA WORKS DEPT.	BELL CANADA
CITY OF BRAMPTON WORKS DEPT.	ENERSOURCE TELECOM
TOWN OF CALEDON WORKS DEPT.	HYDRO ONE TELECOM
BELL CANADA	ROGERS CABLE
ENBRIDGE INCORPORATED-GAS DISTRIBUTION	ALLSTREAM
ONTARIO MINISTRY OF TRANSPORTATION	PSN (PUBLIC SECTOR NETWORK)
ONTARIO CLEAN WATER AGENCY	FUTUREWAY (FCI BROADBAND)
HYDRO ONE NETWORKS	
ENERSOURCE, HYDRO MISSISSAUGA	
HYDRO ONE BRAMPTON	



**EAST TO WEST DIVERSION
SANITARY TRUNK SEWER
CONTRACT 2
SITE NO. 9 - EXISTING SITE, TREE REMOVALS
AND SITE PREPARATION PLAN**

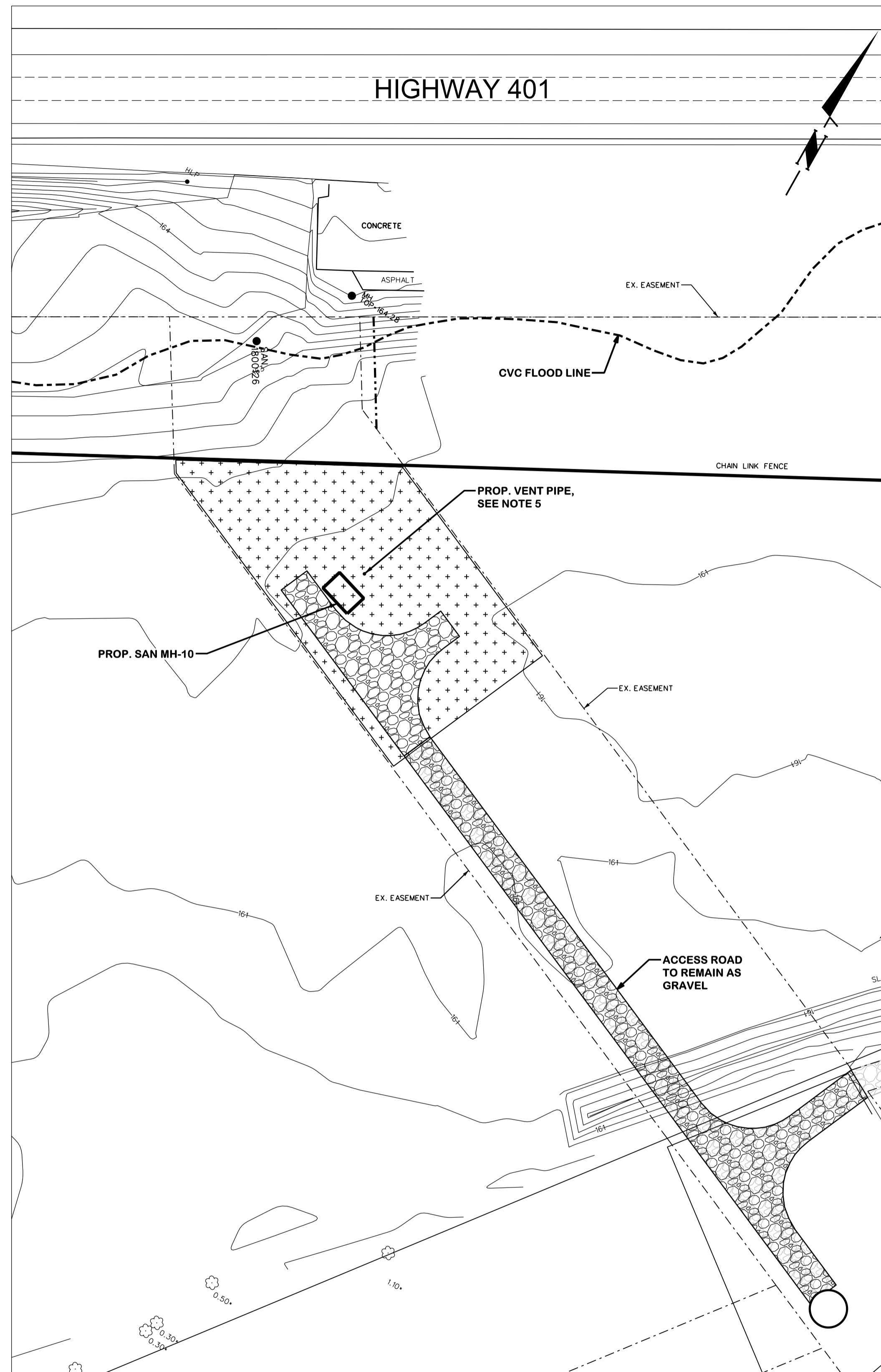
CAD Area	Area	2-41 TO 2-45 2-49 TO 2-53	Project No.	16-2291
Checked by	P.D.	Drawn by	H.B.	
Date	MAR 2021	Sheet	52 of 166	Plan No. 9-SP-002



SITE NO. 8 - SITE RESTORATION PLAN
SCALE: 1:500

NOTES:

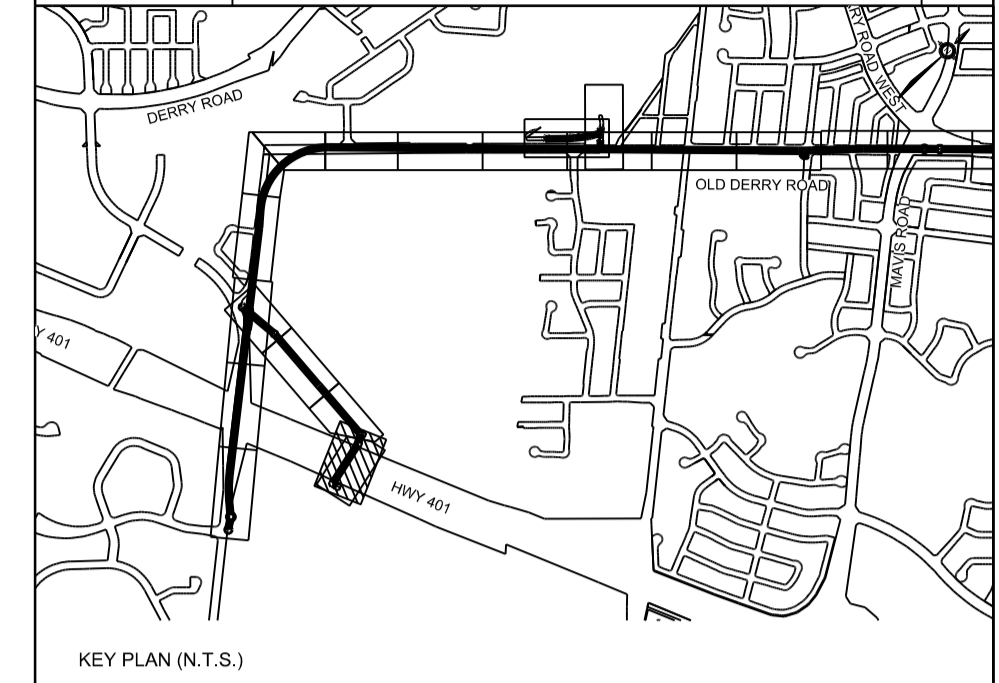
1. REGRADE SITE LAYDOWN AREA TO EXISTING UNLESS OTHERWISE INDICATED. REESTABLISH DRAINAGE DITCH TO MATCH EXISTING CONDITION. FILL AREAS TO BE COMPACTED PRIOR TO PLACEMENT OF TOPSOIL.
2. MAINTAIN PERIMETER EROSION SEDIMENT CONTROL MEASURES UNTIL NEW SURFACE VEGETATION / PLANTING HAS BEEN ESTABLISHED. AT SUCH TIME AND WITH THE APPROVAL OF THE AGENCY, REMOVE EROSION AND SEDIMENT CONTROL MEASURES.
3. REMOVE TEMP. WORK SHOWN ON SITE PREPARATION DRAWING UNLESS OTHERWISE INSTRUCTED BY THE ENGINEER.
4. VENDOR SHALL RESTORE ALL DAMAGED ITEMS, INCLUDING BUT NOT LIMITED TO, CURBS, SIDEWALKS, SPLASHPADS, DRIVEWAYS, ROADWAYS, GUIDE RAILS, TOPSOIL AND SOD AFFECTED BY THE TUNNEL WORK OUTSIDE OF THE COMPOUND LIMITS SPECIFIED.
5. MAINTENANCE HOLE VENTING DETAIL PER REGION OF PEEL STD. DWG. 2-5-22, LOCATION TO BE VERIFIED WITH ENGINEER.
6. VENDOR SHALL CUT SHAFT EXCAVATION SUPPORT TO 2m BELOW FINAL GRADE AND BACKFILL PER SPECIFICATION SECTION 02412.
7. TRENCH RESTORATION AS PER DETAILS ON DWG. 1-D-009 AND TO COMPLY WITH PEEL STD. DWG. 5-2-2A AND 5-2-2B.
8. SANITARY CHAMBER MARKING POST PER REGION OF PEEL STD. DWG. 2-6-17, LOCATION TO BE VERIFIED WITH ENGINEER.
9. SAN SEWER BEDDING AND COVER DETAIL TO COMPLY WITH GRANULAR BEDDING REGION OF PEEL STD. DWG. 2-3-1.



SITE NO. 9 - SITE RESTORATION PLAN
SCALE: 1:500

SERVICE DATA					
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	NOV 6, 2018	C.K.	GAS MAINS	NOV 5, 2018	C.K.
STORM SEWERS	DEC 8, 2019	C.K.	BELL UIG CABLE	APR 23, 2019	C.K.
WATERMANS	MAR 8, 2019	C.K.	HYDRO UIG CABLE	OCT 29, 2018	C.K.
TRANSIT			HYDRO ONE	OCT 29, 2018	C.K.
PARKS & REC.	DEC 6, 2019	C.K.	CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES	APR 29, 2019	C.K.

REVISIONS		
DATE	DETAILS	INIT.
SEP 25, 2020	ISSUED FOR 90% DESIGN REVIEW	C.K.
MAR 05, 2021	ISSUED FOR 100% DESIGN REVIEW	C.K.



General Notes

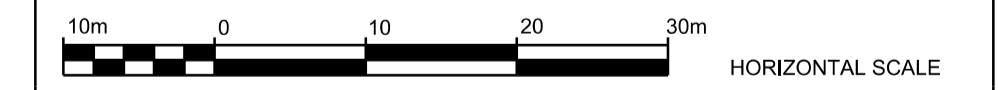
All Driveways Are ASPHALT Unless Otherwise Noted
 All Water And Sanitary Service Locations Are Approximate And Must Be Located Accurately In The Field
 All Horizontal And Vertical Bends Are In Degrees
 All Pipes Size In mm
 20C Existing Water Service, Size In mm
 WS25 Proposed Water Service, Size In mm
 B.M. No., Description, Location, Elev.

The Contractor Is Responsible For Locating And Protecting All Existing Utilities Prior To And During Construction, Location Of Existing Utilities Approximate Only, To Be Verified In Field By Contractor.



NOTICE TO CONTRACTOR
 48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

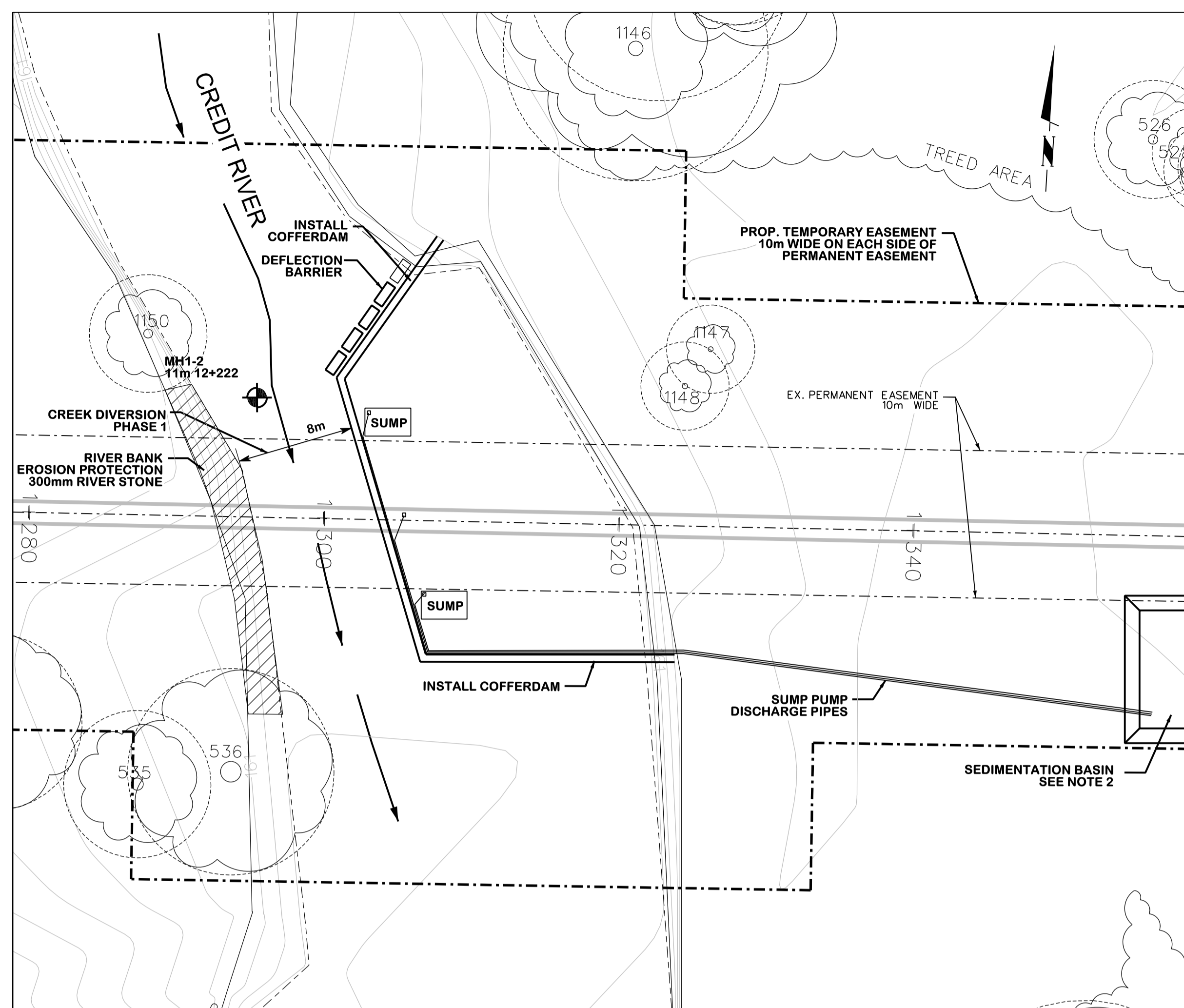
THE REGIONAL MUNICIPALITY OF PEEL	CABLE TELEVISION/FIBROPTIC PROVIDERS:
CITY OF MISSISSAUGA WORKS DEPT.	BELL CANADA
CITY OF BRAMPTON WORKS DEPT.	ENERSOURCE TELECOM
TOWN OF CALEDON WORKS DEPT.	HYDRO ONE TELECOM
BELL CANADA	ROGERS CABLE
ENBRIDGE INCORPORATED-GAS DISTRIBUTION	ALLSTREAM
ONTARIO MINISTRY OF TRANSPORTATION	PSN (PUBLIC SECTOR NETWORK)
ONTARIO CLEAN WATER AGENCY	FUTUREWAY (FCI BROADBAND)
HYDRO ONE NETWORKS	
ENERSOURCE, HYDRO MISSISSAUGA	
HYDRO ONE BRAMPTON	



**EAST TO WEST DIVERSION
 SANITARY TRUNK SEWER
 CONTRACT 2
 SITE NO. 8 AND SITE NO. 9
 SITE RESTORATION PLAN**

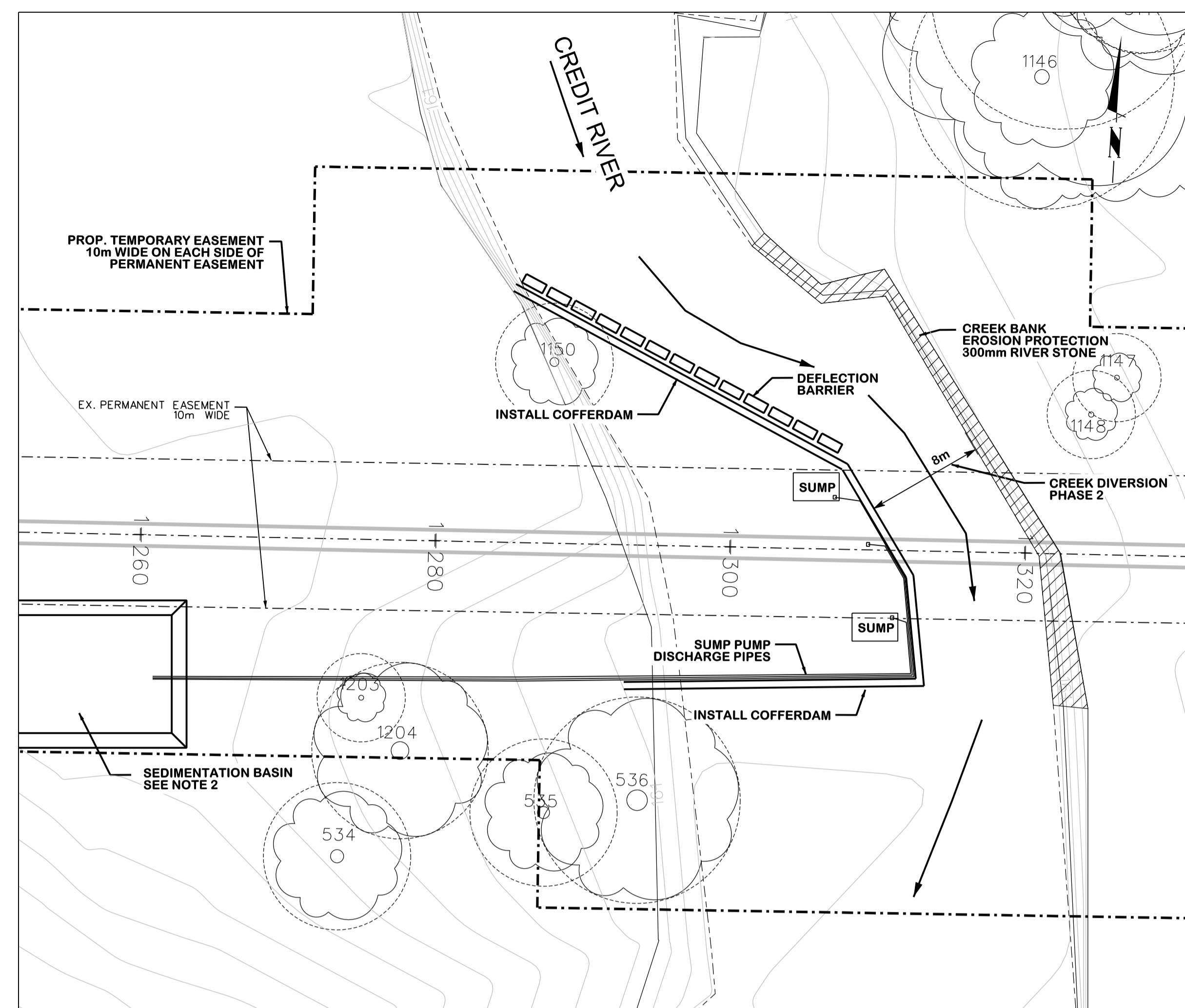
CAD Area	Area	2-41 to 2-45 2-49 to 2-53	Project No.	16-2291
Checked by	P.D.	Drawn by	H.B.	
Date	MAR 2021	Sheet	53 of 166	Plan No.

8-R-001



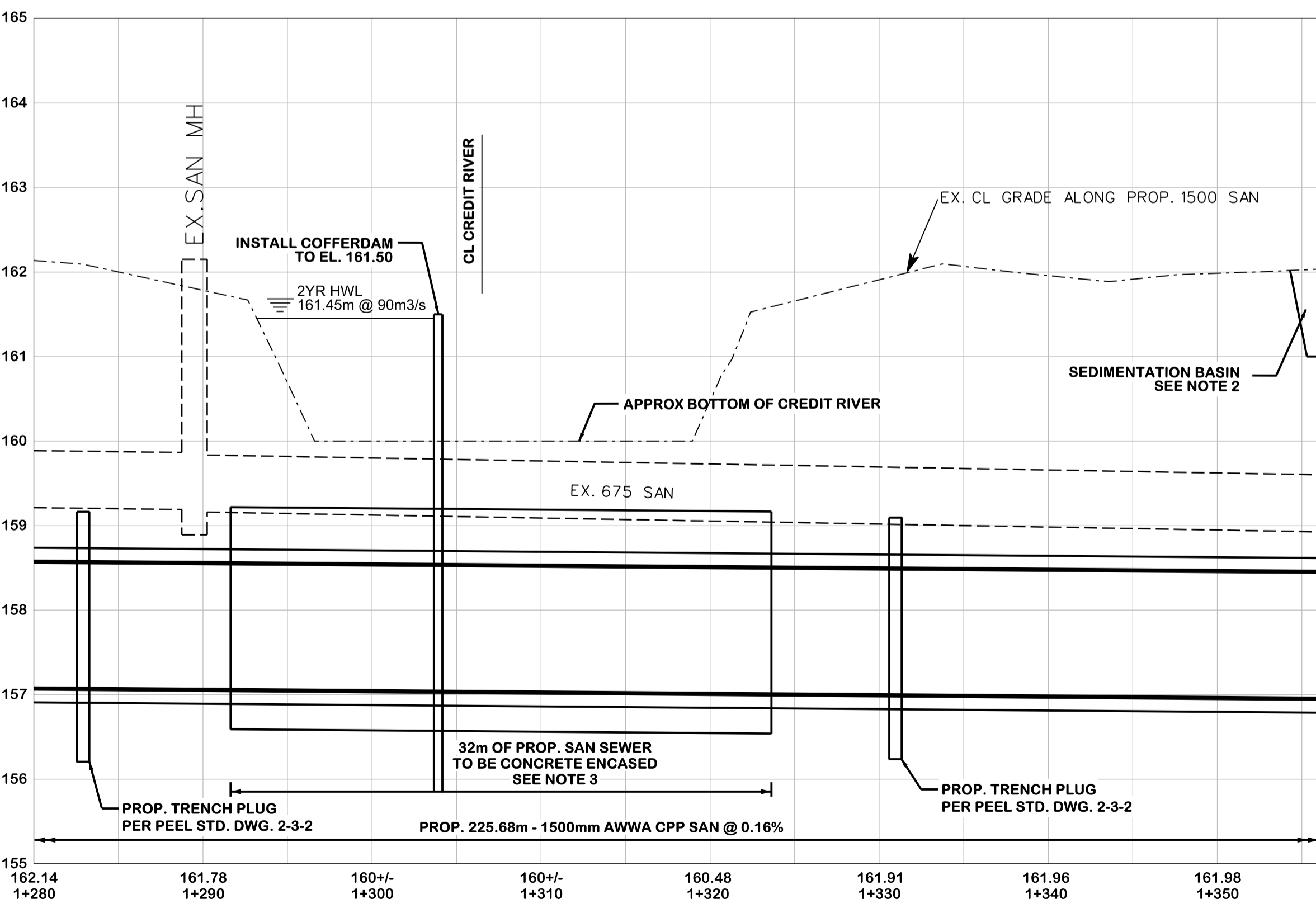
RIVER DIVERSION PHASE 1

SCALE 1:250

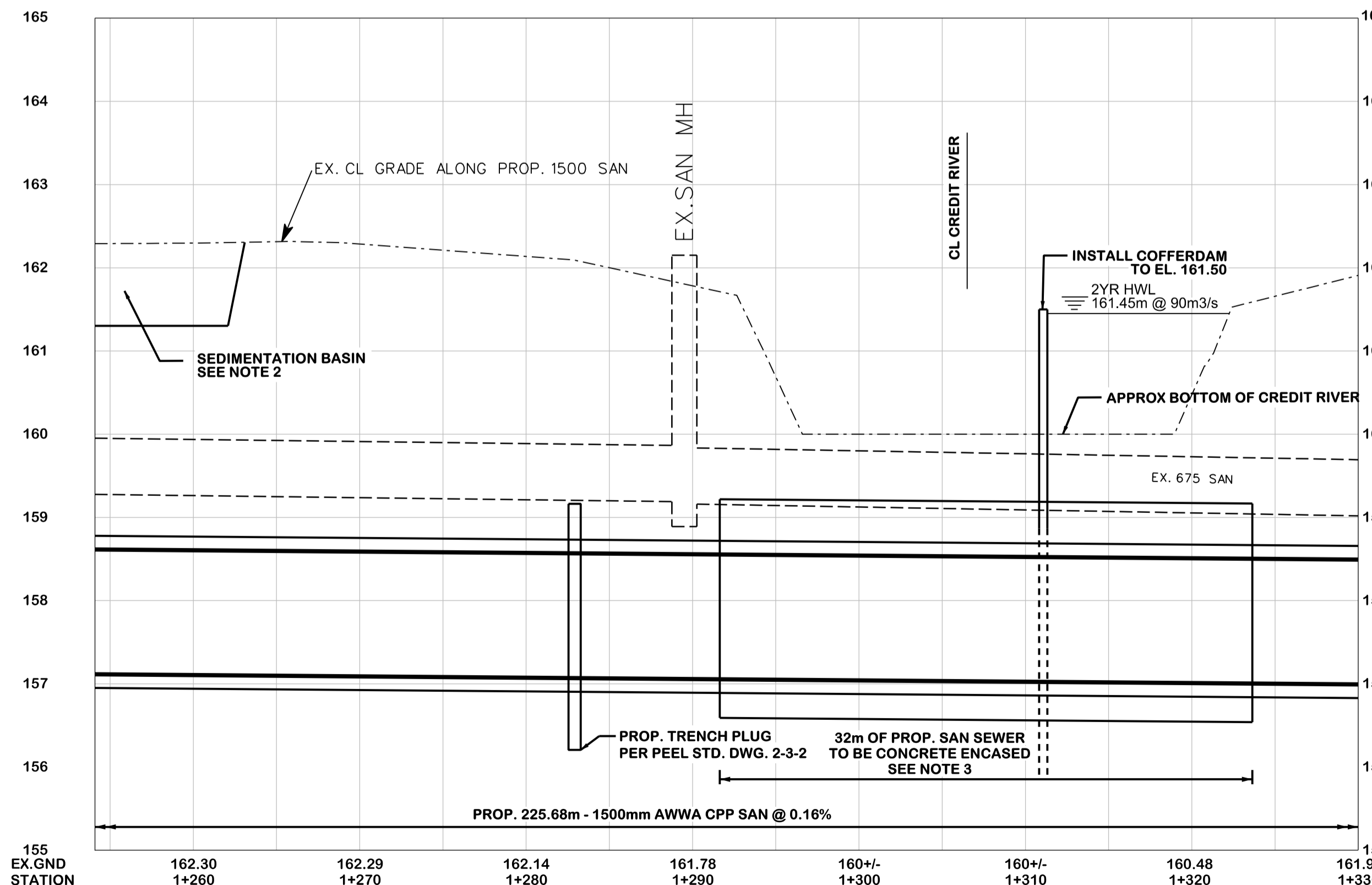


RIVER DIVERSION PHASE 2

SCALE 1:250



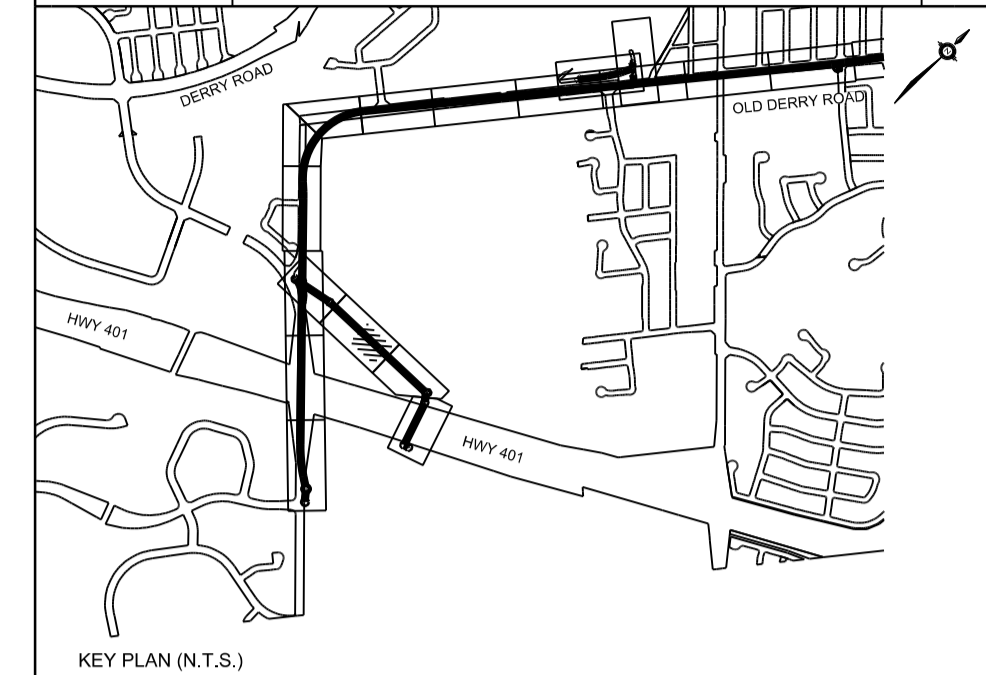
PROFILE ALONG SEWER - PHASE 1



PROFILE ALONG SEWER - PHASE 2

SERVICE DATA					
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	NOV 6, 2018	C.K.	GAS MAINS	NOV 5, 2018	C.K.
STORM SEWERS	DEC 6, 2019	C.K.	BELL UIG CABLE	APR 23, 2019	C.K.
WATERMANS	MAR 6, 2019	C.K.	HYDRO UIG CABLE	OCT 29, 2018	C.K.
TRANSIT			HYDRO ONE	OCT 29, 2018	C.K.
PARKS & REC.	DEC 6, 2019	C.K.	CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES	APR 29, 2019	C.K.

REVISIONS		
DATE	DETAILS	INIT.
FEB 11, 2021	ISSUED FOR CVC APPROVAL	P.D.



- NOTES:**
- REFER TO DWG. CVC-C2-001 FOR CONSTRUCTION SEQUENCING AND GENERAL NOTES AND DETAILS.
 - SEDIMENTATION BASIN AS PER OPSD 219.240. DISCHARGE FOR DEWATERING LOCATION TO BE CONFIRMED WITH FIELD ENGINEER. BASIN TO BE 30m AWAY FROM WATERCOURSE BANK.
 - REFER TO DETAIL ON DWG. CVC-C2-005 FOR CONCRETE ENCASEMENT DETAILS.

General Notes

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 All Water And Sanitary Service Locations Are Approximate And Must Be Located Accurately In The Field
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 All Pipes Size In mm
 20C Existing Water Service, Size In mm
 WS25 Proposed Water Service, Size In mm
 B.M. No. Description Elev.
 Location
 The Contractor Is Responsible For Locating And Protecting All Existing Utilities Prior To And During Construction, Location Of Existing Utilities Approximate Only, To Be Verified In Field By Contractor.

JACOBS

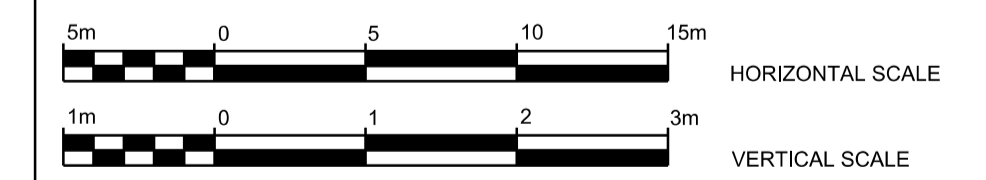
Approved by

P. S. DHILLON
 LICENSED PROFESSIONAL ENGINEER
 11 FEB 2021
 PROVINCE OF ONTARIO

NOTICE TO CONTRACTOR
 48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL
 CITY OF MISSISSAUGA WORKS DEPT.
 CITY OF BRAMPTON WORKS DEPT.
 TOWN OF CALEDON WORKS DEPT.
 BELL CANADA
 ENBRIDGE INCORPORATED-GAS DISTRIBUTION
 ONTARIO MINISTRY OF TRANSPORTATION
 ONTARIO CLEAN WATER AGENCY
 HYDRO ONE NETWORKS
 ENERSOURCE, HYDRO MISSISSAUGA
 HYDRO ONE BRAMPTON

CABLE TELEVISION/FIBROPTIC PROVIDERS:
 BELL CANADA
 ENERSOURCE TELECOM
 HYDRO ONE TELECOM
 ROGERS CABLE
 ALLSTREAM
 PSN (PUBLIC SECTOR NETWORK)
 FUTUREWAY (FCI BROADBAND)

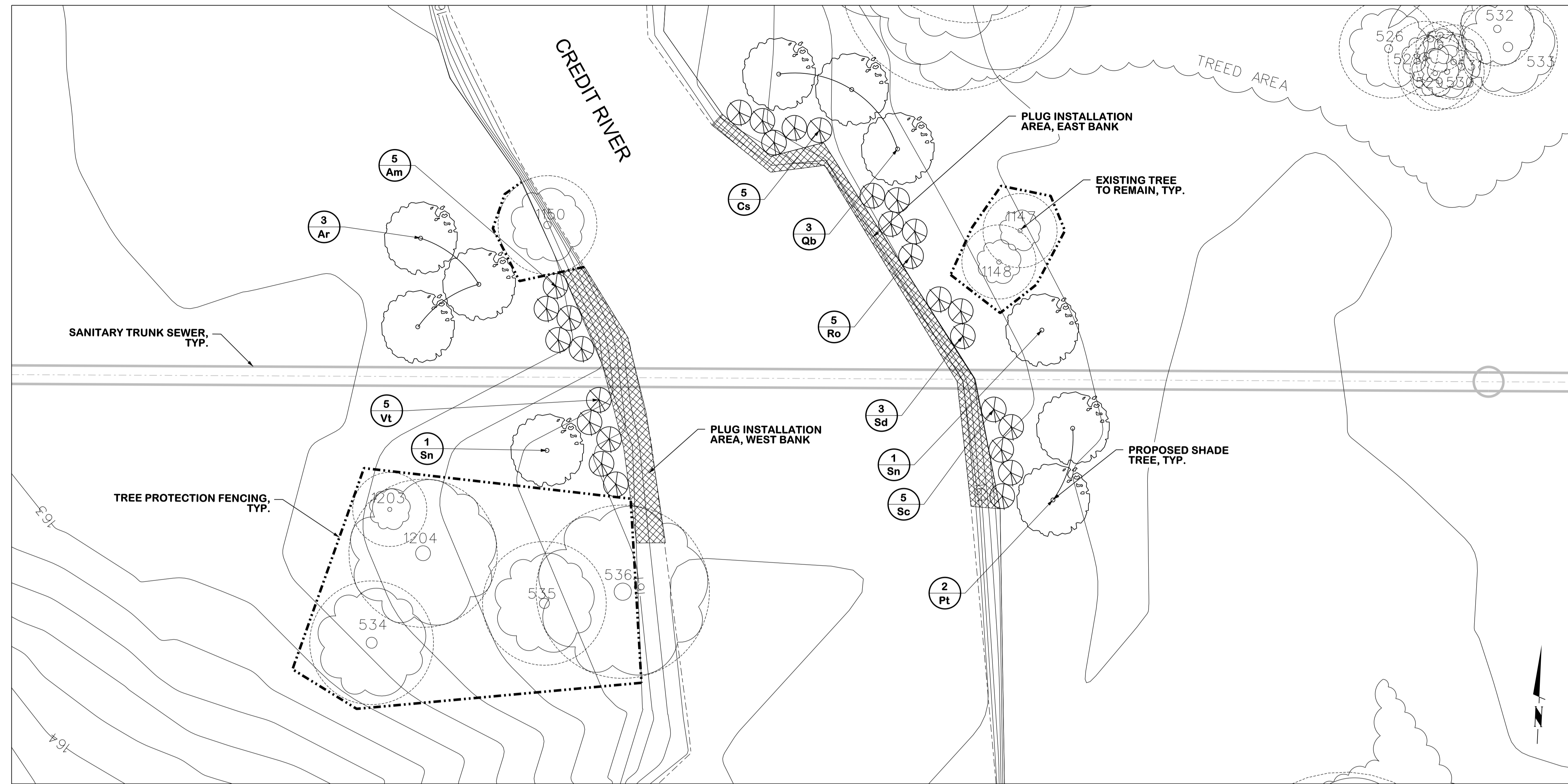


Region of Peel
 working with you

EAST TO WEST DIVERSION SANITARY TRUNK SEWER
 CONTRACT 2
 SITE NO. 1
 CREDIT RIVER DIVERSION PLAN

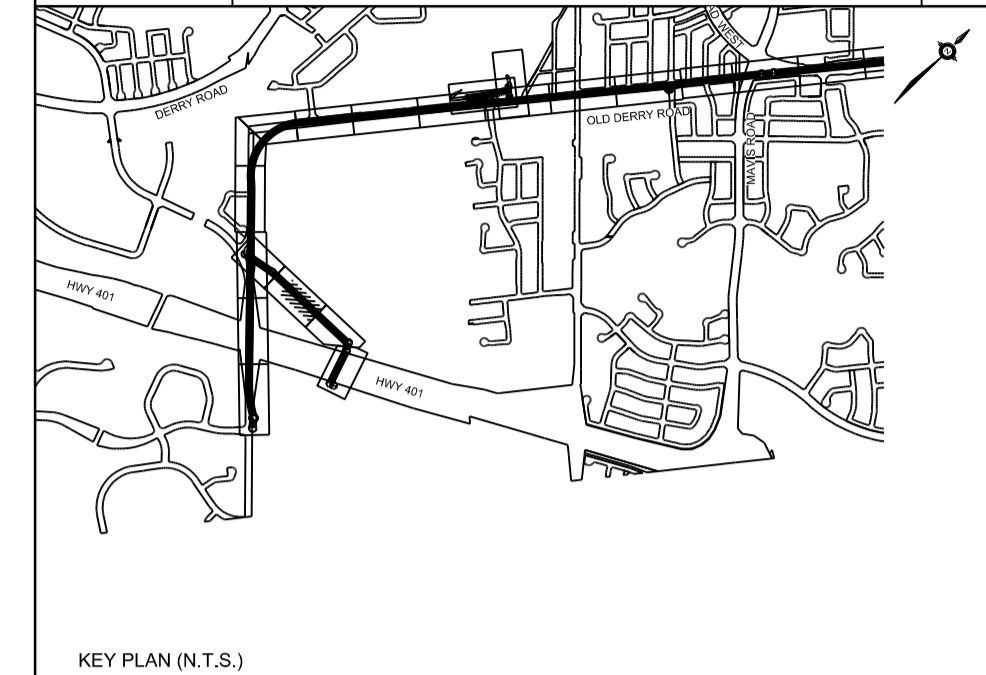
CAD Area	X-XX	Area	2-41 to 2-45 2-49 to 2-53	Project No.	16-2291
Checked by	P.D.	Drawn by	H.B.		
Date	FEB 2021	Sheet	21 of 24		

CVC-C2-002



PLAN VIEW
1:200

SERVICE DATA					
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	NOV 6, 2018	C.K.	GAS MAINS	NOV 5, 2018	C.K.
STORM SEWERS	DEC 6, 2019	C.K.	BELL UIG CABLE	APR 23, 2019	C.K.
WATERMANS	MAR 8, 2019	C.K.	HYDRO UIG CABLE	OCT 29, 2018	C.K.
TRANSIT			HYDRO ONE	OCT 29, 2018	C.K.
PARKS & REC.	DEC 6, 2019	C.K.	CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES	APR 29, 2019	C.K.



KEY PLAN (N.T.S.)

REVISIONS		
DATE	DETAILS	INIT.
FEB 11, 2021	ISSUED FOR CVC APPROVAL	P.D.

General Notes

All Driveways Are ASPHALT Unless Otherwise Noted
 All Water And Sanitary Service Locations Are Approximate And Must Be Located Accurately In The Field
 All Horizontal And Vertical Bends Are In Degrees
 All Pipes Size In mm
 20C Existing Water Service, Size In mm
 WS25 Proposed Water Service, Size In mm
 B.M. No. Description Location Elev.
 The Contractor Is Responsible For Locating And Protecting All Existing Utilities Prior To And During Construction, Location Of Existing Utilities Approximate Only, To Be Verified In Field By Contractor.

JACOBS

Approved by

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL	CABLE TELEVISION/FIBROPTIC PROVIDERS:
CITY OF MISSISSAUGA WORKS DEPT.	BELL CANADA
CITY OF BRAMPTON WORKS DEPT.	ENERSOURCE TELECOM
TOWN OF CALEDON WORKS DEPT.	HYDRO ONE TELECOM
BELL CANADA	ROGERS CABLE
ENBRIDGE INCORPORATED-GAS DISTRIBUTION	ALLSTREAM
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HYDRO ONE NETWORKS	
ENERSOURCE, HYDRO MISSISSAUGA	
HYDRO ONE BRAMPTON	

10m 0 10 20 30m HORIZONTAL SCALE
 2m 0 2 4 6m VERTICAL SCALE



**EAST TO WEST DIVERSION
 SANITARY TRUNK SEWER
 CONTRACT 2
 SITE NO. 11
 CREDIT RIVER DIVERSION PLANTING PLAN**

CAD Area	X-XX	Area	2.41 to 2.45 2.49 to 2.53	Project No.	16-2291
Checked by	P.D.	Drawn by	H.B.		
Date	FEB 2021	Sheet	22 of 24		

GENERAL NOTES:

- THESE NOTES AND LEGEND REFER TO THE LANDSCAPING DRAWINGS. FOR ADDITIONAL NOTES AND LEGEND REFER TO CIVIL DRAWINGS
- DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL RELEVANT DRAWINGS AND SPECIFICATIONS.
- CONTRACTOR TO REVIEW DRAWINGS AND REPORT ANY ERRORS, OMISSIONS, OR DISCREPANCIES TO THE CONTRACT ADMINISTRATOR IN WRITING.
- ALL DIMENSIONS MUST BE CHECKED ON SITE PRIOR TO CONSTRUCTION. ALL QUERIES AND DISCREPANCIES SHALL BE DIRECTED TO THE CONTRACT ADMINISTRATOR FOR CLARIFICATION PRIOR TO PROCEEDING WITH WORK.
- CONTRACTOR SHALL VERIFY EXISTING GRADES AND SITE CONDITIONS BEFORE PROCEEDING WITH ANY WORK.
- ALL WORK TO BE PERFORMED SHALL CONFORM TO ALL APPLICABLE CODES AND ORDINANCES OF GOVERNMENTAL AGENCIES HAVING JURISDICTION OVER THE PROJECT.

LAYOUT NOTES:

- CONTRACTOR TO VERIFY LOCATIONS OF ALL PERTINENT SITE IMPROVEMENTS INSTALLED UNDER OTHER SECTIONS OF THIS CONTRACT. IF ANY PART OF THIS PLAN CANNOT BE FOLLOWED DUE TO SITE CONDITIONS CONTACT CONTRACT ADMINISTRATOR FOR INSTRUCTIONS PRIOR TO COMMENCING WORK.
- PLANTING BED LAYOUTS AND TREE PLANTING LOCATIONS TO BE STAKED BY CONTRACTOR AND APPROVED BY THE CONTRACT ADMINISTRATOR. CONTRACT ADMINISTRATOR RESERVES THE RIGHT TO ADJUST PLANTS TO EXACT LOCATIONS IN FIELD.
- ALL LOCATES FOR UNDERGROUND UTILITIES SHALL BE SECURED PRIOR TO MOBILIZATION.
- PROPERTY LINES TO BE VERIFIED PRIOR TO INITIATING CONSTRUCTION.
- CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH TRANSPLANTING PLANT MATERIAL THAT IS DEEMED TO HAVE BEEN PLANTED IN CONFLICT WITH UTILITIES OR SETBACK REQUIREMENTS.

TOPSOIL NOTES:

- TOPSOIL SHALL BE AS PER SPECIFICATION SECTION 02911 'TOPSOIL AND FINISHED GRADING'.
- SOIL DEPTH REQUIREMENTS:
 a. ALL HERBACEOUS PLUG AREAS TO HAVE A MINIMUM PLANTING TOPSOIL DEPTH OF 200mm.
 b. ALL DISTURBED AREAS TO BE RESTORED WITH SOD OR SEED TO HAVE A MINIMUM TOPSOIL DEPTH 150 mm.

PLANTING BED PREPARATION NOTES:

- PREPARE PLANTING BEDS PRIOR TO ARRIVAL OF PLANT MATERIAL ON SITE.

PLANT MATERIAL NOTES:

- CONTRACTOR TO VERIFY PLANT COUNTS AND SQUARE FOOTAGES AND REPORT ANY DISCREPANCIES TO THE CONTRACT ADMINISTRATOR IN WRITING. THE QUANTITIES INDICATED ON THE PLAN SUPERSEDE THE TOTALS OF THE PLANT LIST.
- OBTAIN CONTRACT ADMINISTRATOR'S APPROVAL ON ALL PLANT MATERIAL AT SOURCE OR UPON DELIVERY, PRIOR TO COMMENCEMENT OF PLANTING OPERATIONS.
- APPROVAL OF PLANT MATERIAL PRIOR TO PLANTING SHALL NOT IMPAIR THE RIGHT OF THE CONTRACT ADMINISTRATOR TO REJECT PLANTS AFTER PLANTING WHICH HAVE BEEN DAMAGED, OR WHICH IN ANY WAY DO NOT CONFORM TO SPECIFICATIONS.
- ALL MATERIAL MUST CONFORM TO THE SIZES SHOWN ON THE PLANT LIST, EXCEPT WHERE LARGER PLANT MATERIAL IS USED WHEN APPROVED BY CONTRACT ADMINISTRATOR. USE OF LARGER PLANTS WILL NOT INCREASE THE CONTRACT PRICE. UNDERSIZED MATERIAL WILL BE REJECTED.
- SUBSTITUTIONS OF SIZE OR WITH OTHER PLANT MATERIAL WILL ONLY BE ALLOWED WITH THE WRITTEN APPROVAL OF CONTRACT ADMINISTRATOR.
- ALL SHRUBS AND TREES SHALL CONFORM TO THE CURRENT STANDARDS OF CANADIAN NURSERY LANDSCAPE ASSOCIATION FOR SIZE AND SPECIES.

PLANTING OPERATIONS NOTES:

- TREES TO BE INSTALLED AS PER REGION'S STANDARD PLANTING DETAIL.
- PLANTING SHALL BE DONE WITHIN THE FOLLOWING DATES:
 a. DECIDUOUS TREES: MAY 1 TO JUNE 31 OR SEPTEMBER 1 TO NOVEMBER 1
 b. CONIFEROUS TREES: MAY 1 TO JUNE 31
 c. EXCEPTIONS: SEASONS MAYBE SHORTER THAN EXPECTED DEPENDING ON WEATHER CONDITIONS.

SEEDING NOTES:

- IN SEEDING AREAS TOPSOIL SHALL BE EVENLY SPREAD OVER SUBGRADE AND LOOSELY COMPACTED TO 150 mm MINIMUM DEPTH.
- SEED MIXTURE AS PER SEED SCHEDULE.

TREE PRESERVATION NOTES:

- FOR TREE PRESERVATION NOTES REFER TO CIVIL DRAWINGS.

LEGEND:

DECIDUOUS CALIPER TREE

SHRUB

RIPARIAN EDGE PLUG MIX & RIPARIAN EDGE SEED MIX