



**Landscape Composition Report,
Highway 401, Nagle Road
Interchange Study
(GWP 4059-17-00)**

December 7, 2023

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Sign-off Sheet

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**LANDSCAPE COMPOSITION REPORT, HIGHWAY 401, NAGLE ROAD INTERCHANGE STUDY
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Introduction
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1.0 INTRODUCTION

1.1 BACKGROUND

The Ontario Ministry of Transportation (MTO) and the Town of Cobourg retained Stantec to undertake a Planning, Preliminary Design, and Class EA Study on Highway 401 for a new interchange at Nagle Road in the Town of Cobourg and the Township of Hamilton. For the purpose of this report, Nagle Road Interchange and the surrounding landscape will be the focus (refer to **Figure 1**).

This study includes a review of existing conditions, development and evaluation of alternatives, identification of appropriate improvements, and development of environmental protection and mitigation measures. A Recommended Plan will be confirmed and designated (protected) at the completion of the study.

This Landscape Composition Report has been prepared to support project planning, by identifying areas for potential vegetation retention, potential mitigation recommendations for habitat and visual impacts, and design recommendations to address potential impacts associated with this project. The study area for this project is considered to include the proposed highway right-of-way (ROW) and the surrounding viewshed.

1.2 PURPOSE

The *Environmental Reference for Highway Design* refers to landscape composition as the “aggregate of elements in a region or area, which include but are not limited to culturally significant vegetation, views and viewsheds, topography, landform, and land use” (Ministry of Transportation Ontario, 2006: pp.5). The purpose of this Landscape Composition Report is to:

- Document natural geomorphologic landforms, waterscapes, or vistas within the viewshed of the highway.
- Review pertinent background information produced by other disciplines.
- Assess impacts to the landscape vegetation.
- Assess impacts to views and vistas.
- Recommend mitigation to minimize impacts to the adjacent landscape.



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1.3 DESCRIPTION OF PROPOSED WORKS

1.3.1 Project Overview

Highway 401 is a controlled-access 400-series provincial highway that connects southwestern Ontario (Windsor) to Quebec, a total of 830 km. The highway, along with its associated structures, was built in the 1950s and 1960s. Locally, Highway 401 connects the communities of Cobourg, Grafton, and Port Hope.

The Class EA Study scope of work includes the following:

- Identifying a new interchange at Nagle Road.
- Establishing the Highway 401 future footprint for the ultimate 8-lanes.

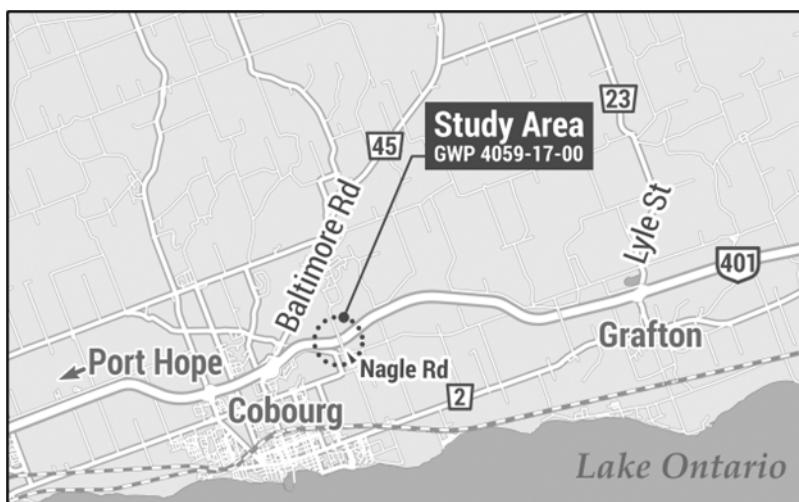


Figure 1: Study Area

The existing Nagle Road bridge is nearing the end of its service life and will require rehabilitation and/or replacement.

1.4 PREFERRED INTERCHANGE DESIGN

As part of the preferred interchange design for Nagle Road be assessed for landscape composition impacts. Please refer to **Figure 1** for the location of the interchange at Nagle Road.

1.4.1 Nagle Road

A total of eight interchange alternatives were developed to a conceptual design stage for further assessment. Four of these alternatives were initially screened out from further evaluation due to insufficient traffic volumes/capacity and significant environmental impacts. Through further design and stakeholder consultation, a preferred design was developed. Refer to **Figure 2** for an illustration of the preferred interchange design.



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Figure 2: Preferred Nagle Road Interchange



Field Investigation
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2.0 FIELD INVESTIGATION

2.1 METHODS

A field investigation was undertaken on December 18, 2019 by Stephanie Lapointe, BLA, and Landon Black, OALA, to identify potential landscape resources within the study area and to identify the presence or absence of significant tree species or specimens.

Potential landscape resources were visually reviewed from the nearest publicly accessible areas where they could safely be observed and cross-referenced with available GIS-based mapping tools to allow the assessment of potential landscape resources. The findings of the field investigation have been cross-referenced with the *Terrestrial Ecosystems Existing Conditions Report - Highway 401 Nagle Road Interchange Study (GWP 4059-17-00)* (Stantec, 2018) to confirm the presence or potential presence of rare and threatened species that could not be confirmed by the field investigations, and to provide suitable compensation and mitigation recommendations for the study area.

2.2 EXISTING CONDITIONS

2.2.1 Nagle Road

2.2.1.1 Geomorphic Landforms, Waterscapes, and Vistas

The most notable landform visible from the study area is the Oak Ridges Moraine, located to the north of the study area. The Oak Ridges Moraine is located at a distance of several kilometers from the Highway 401 corridor for the majority of the study area. At its closest, the *Natural Linkage Area* within the Alnwick/ Halton portion of the Oak Ridges Moraine is located at a distance of approximately 1 km from the study area. The Brook Creek Environmental Constraint Area is located between Nagle Road and this part of the Oak Ridges Moraine. The Nagle Road interchange has a strong visual connection to the Oak Ridges Moraine due to the proximity. **Figure 3** illustrates the prominence of the Oak Ridges north of the Highway 401 corridor.

Nagle Road gains elevation north of Highway 401 and waterscapes of Lake Ontario to the south become visible. The breadth of the waterscapes is limited by taller vegetation and some topographical features in the intervening land. **Figure 4** illustrates the available waterscapes of Lake Ontario from the north side of the Highway 401 corridor. These waterscapes may be modified by vegetation in leaf-on seasons.



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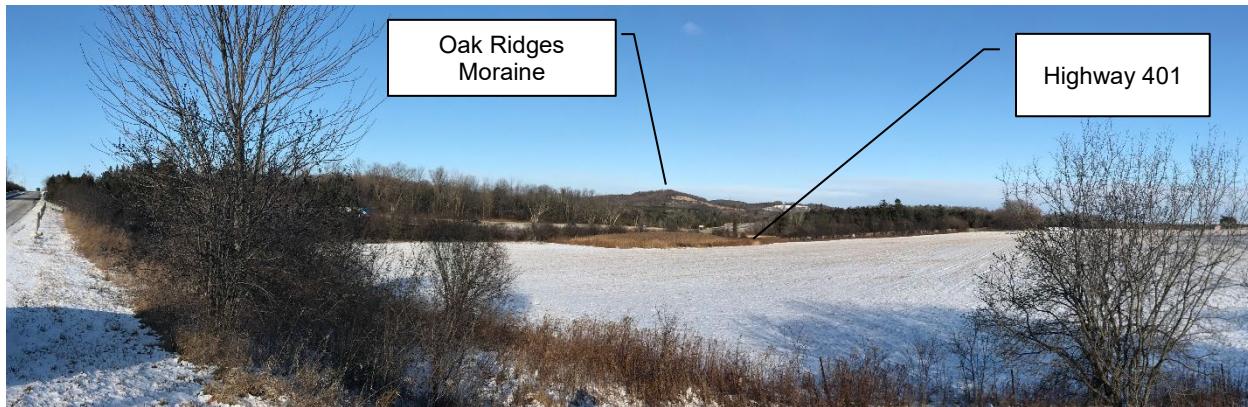


Figure 3: Alnwick/Haldimand Oak Ridges Moraine as viewed from Nagle Road south of Highway 401



Figure 4: Lake Ontario viewed from Nagle Road north of Highway 401

2.2.1.2 Natural and Anthropogenic Features

The area surrounding the Nagle Road overpass is a mixture of agricultural fields, fallow fields, woodlots, and rural residences. The extent of built features in the landscape is limited to roads and associated structures and residences. None of the built elements in the landscape are particularly prominent, and most would typically be considered aesthetic. **Figure 4** shows the lack of built elements on Nagle Road north of Highway 401. **Figure 5** shows the residences south of Highway 401 in context with the site of the proposed interchange.



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Figure 5: Residences along Nagle Road south of Highway 401

2.2.1.3 Density and Proximity of Surrounding Dwellers

The density of residential dwellings within the Nagle Road Interchange area is low with three agricultural properties observed north of Highways 401 and 14 rural residential dwellings clustered around the intersection of Nagle Road and Danforth Road south of Highway 401. An aerial photograph showing the relative locations of the nearest dwellings (two of the agricultural properties are not displayed) is located in **Appendix A**.



Impact Assessment
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3.0 IMPACT ASSESSMENT

The construction impacts associated with the proposed modifications include vegetation and terrestrial impacts, visual impacts, and cultural heritage impacts. Each potential impact has been presented separately for analysis with additional emphasis on the Nagle Road interchange area, as the concentration of built elements is typically greater in interchange locations. For the purpose of this assessment, we have assumed that all the natural areas within the ROW for each alternative will be removed to facilitate construction, except in isolated areas along the limits of the proposed modifications where preservation may be possible.

3.1 VEGETATION AND TERRESTRIAL IMPACTS

The development of any of the interchange alternatives and the future footprint of the highway corridor will result in the removal of natural vegetation cover providing habitat for plants and wildlife. A total of 212 species of vascular plants were observed within the study area, with none being identified as species at risk. The following classifications of vegetation communities were observed during the field work component of the *Terrestrial Ecosystems Existing Conditions Report - Highway 401 Nagle Road Interchange Study (GWP 4059-17-00)* (Stantec, 2018):

- Meadows
- Forest Communities
- Plantation Communities
- Swamp Communities
- Aquatic/Wetland
- Developed
- Cultural

The areas that would be impacted by the proposed interchanges were observed for significant specimen trees. Trees would be considered significant specimens in this context if they were of exceptional size, aesthetically formed, and positioned within the landscape in a manner that was visually impactful. Isolated trees and trees in hedgerows were the primary targets for assessment, while trees in woodlots were considered as a part of the larger vegetative community due to their lack of singular visual impact. No significant specimens were noted within the area of impacts at the Nagle Road interchange.

3.1.1 Vegetation Community Impacts

The anticipated area to be impacted for identified vegetative communities associated with the preferred design alternative, and study area, are detail in Table 1. For the purpose of the Landscape Composition



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Report, the terrestrial biologists have assumed that all natural areas within the construction limits, as determined by extent of regrading, will be removed for construction. The information summarized in Table 1 is from Stantec's *Terrestrial Ecosystems Preliminary Impact Assessment Report - Highway 401 Nagle Road Interchange Study (GWP 4059-17-00)* (Stantec, 2018). Precise limits of vegetation removal will be confirmed during detail design.

These areas of impact will be reassessed during the detail landscape design phase. Since the future footprint of the ultimate interchange configuration will likely result in a significant reduction of one or more vegetation communities, a more appropriate goal is an increase in the quality of the ecological functions of the vegetation communities. It may be possible to achieve this through strategic supplementation of forest edges, riparian corridors, and a focus on high value ecological communities. At a minimum any loss of areas of vegetation will be compensated on a 1:1 ratio.

Table 1: Vegetation Community Impacts

Total Impacted Area (ha)	Vegetation Community Impacted
5.6	Meadow: Dry - Fresh Mixed Meadow/ Fresh - Moist Mixed Meadow (MEMM3 / MEMM4)
1.8	Meadow: Dry - Fresh Mixed Meadow Ecosite/ Dry Low shrub Tallgrass Thicket Ecosite (MEMM3/THDM4)
0.6	Meadow: Graminoid Meadow (MEG)
1.4	Forest: Fresh – Moist White Cedar Coniferous Forest Ecosite (FOCM4)
0.04	Forest: Deciduous Forest (FOD)
0.8	Regeneration Thicket: Dry - Fresh Deciduous Regeneration Thicket Ecosite (THDM4)
1.5	Plantation: Coniferous (TAGM1)
0.7	Plantation: Hedgerows
0.8	Swamp: White Cedar Mineral Coniferous Swamp Ecosite (SWCM1)
8.3	Agriculture: Open Agriculture (OAG)

3.2 VISUAL IMPACTS

There will be visual impacts to the existing landscape resulting from the construction of the preferred design. Visual impacts have been assessed and summarized in the following sections. Our assessment of potential impacts considers the following:

- Views from the interchange to the surrounding area, features, and points of interest.
- Views to the interchange from the surrounding area, features, and points of interest.
- Types of potential visual impacts:



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- Permanent impacts based on the crossing structure, associated structures, and changes to site lighting.
- Temporary impacts such as those caused by vehicle lights, which will fluctuate based on usage.

3.2.1 Nagle Road

3.2.1.1 Views from the Preferred Interchange

A waterscape of Lake Ontario is expected to be visible in all seasons while approaching the interchange from the north. It is also expected that this waterscape will be visible from a portion of the interchange and from the overpass structure. Views of the Alnwick/Haldimand portion of the Oak Ridges Moraine are expected to be visible while approaching the interchange from the south and through a portion of the interchange. Ramps E-N/S and S-W are anticipated to provide views of the Brook Creek Environmental Constraint Area.

3.2.1.2 Views to the Preferred Interchange

The interchange would generally be considered a negative element in the landscape where sightlines are interrupted to more aesthetically desirable elements, or where more aesthetically desirable elements are displaced by interchange construction. The views to Lake Ontario from north of Highway 401 and views of the Alnwick/Haldimand portion of the Oak Ridges Moraine from south of Highway 401 are not expected to be significantly interrupted by the construction of the interchange. However, the construction of the interchange is anticipated to displace more aesthetically pleasing rural landscape elements such as residential properties, hedgerows, pasture lands, meadows, and woodlots. These impacts are anticipated because the residences of Danforth Road are built on land that slopes in a concave manner towards the current Highway 401 alignment providing natural sightlines into the project area.

It is recommended that visual screening be incorporated into the detail design phase of this project in order to mitigate any negative visual impacts caused by construction of the interchange. A mix of locally significant deciduous and coniferous trees and understory plants should be considered to provide year-round screening while reflecting the ecological context of the site. It is recommended that the affected residents be involved in the design process of any screening and mitigation measures.

3.3 CULTURAL HERITAGE CONSIDERATIONS

Highway 401 from Canadian Forces Base Trenton to Toronto has been dedicated as the *Highway of Heroes* in commemoration of the route fallen soldiers take after repatriation. There are many aspects to the commemoration of the Highway of Heroes including the Highway of Heroes Tree Campaign which endeavors to create a living tribute to the Canadian Armed Forces by planting trees along Highway 401 from Windsor to Cornwall. As part of this campaign, it is understood that the Highway of Heroes organization seeks to design commemoration sites with the appropriate mix of native species; increase wildlife habitat, and; positively impact the pollinator populations along Highway 401 and associated



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interchanges. MTO will continue to engage with this organization to guide the trees selection and planting design process during detail design of this project. Refer to the Preliminary Restoration Planting Plans, Appendix B L-466 for potential planting sites. As noted, precise locations and composition will be determined at the detail design phase as additional information, such as limits of grading will be determined at that time. Preliminary grading limits have been identified but will be confirmed during detail design. Should it be determined that existing Highway of Heroes (HOH) plantings will be impacted during the detail design phase, these plantings will either be relocated or reinstated if feasible in close proximity to their original locations or extending the natural canopy cover.

3.3.1 Cultural Heritage Resource Assessment

In regard to sites of cultural heritage value or interest within the study area, an evaluation was conducted and can be found in the *Nagle Road Interchange Study (GWP 4039-17-00)*, *Cultural Heritage Resources Assessment* (Stantec, 2019). The report evaluated each potential heritage resource according to O. Reg. 9/06, the criteria for determining CHVI. Where CHVI was identified, a resource was assigned a BHR or CHL number.

The study identified four potential heritage resources. Of the four potential heritage resources three were determined to contain heritage resources. One of the identified properties, 9234 Danforth Road East, contains structures that date prior to 1878 and their presence on historic mapping warranted their evaluation against O. Reg. 9/06, however an additional assessment is required to determine the heritage integrity of its structures if impacts are anticipated for the property. The study mapped out where the heritage attributes were located to determine the position of the heritage attributes in relation to the Study Area. The study found that heritage attributes for one property was determined to be situated within the Study Area, 2241 Nagle Road (CHL-1).

An evaluation of potential impacts was conducted for the CHL found within the study area. Disruption, displacement, isolation, non-sympathetic and encroachment were impacts that were evaluated. Disruption was found to be the only potential impact. The study concluded with a recommendation that heritage resources should be avoided during proposed construction activities, specifically 2241 Nagle Road (CHL-1) and heritages attributes associated with this heritage resource.

3.3.2 Cultural Heritage Evaluation Report

A Cultural Heritage Evaluation Report was conducted for the Nagle Road Underpass, Site 21-248, to determine its cultural heritage value or interest, *Cultural Heritage Evaluation Report – Nagle Road Interchange Study (GWP 4059-17-00)* (Stantec, 2018). The report concluded that Nagle Road Underpass does not have CHVI when evaluated against the O. Reg. 10/06 and the OHBG. Accordingly, a statement of CHVI was not required for the bridge.



Mitigation and Landscape Planting Recommendations
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4.0 MITIGATION AND LANDSCAPE PLANTING RECOMMENDATIONS

Based on the assessment of existing conditions and potential impacts, the following mitigation and landscape planting recommendations should be considered for implementation as part of detail design for the preferred alternative. The following mitigation and landscape planting recommendations have also referenced the Erosion and Sediment Overview Risk Assessment (ESORA) (October 13, 2020 Stantec) and the Fisheries Impact Assessment and the Terrestrial Impact Assessment Reports.

4.1 RESTORATION AND COMPENSATION

The vegetation communities impacted by the preferred interchange and future highway footprint of the ultimate 8 lane configuration are discussed below, including challenges and recommendations regarding restoration. Strategic coordination of the restoration communities is encouraged for consideration in the detail design phase, such as focusing forest and woodlot compensation around watercourses to increase their benefit to cold water streams. Conceptual landscape plans are available in Appendix B.

4.1.1 Watercourse Restoration

All disturbed watercourses should be revegetated to the extent possible with the intent of providing a 30-metre-wide buffer of woody vegetation (including understory) on both sides of the watercourse. Where possible, watercourse restoration efforts should be combined with woodlot and forest expansion efforts facilitated through edge planting. The intent of these recommendations is to provide shade and floodplain stability to the watercourses as many are considered cold water communities. More detail watercourse restoration/mitigation measures are described in the Fisheries Impact Assessment and the Terrestrial Impact Assessment Reports.

Industry best practices for environmental reclamation including planting and seeding of locally significant native (higher ecologically functioning) species where existing infrastructure is being removed. Where possible, revegetation designs should attempt to connect with and enhance adjacent vegetation communities. The possibility of saline soils and salt spray should be considered as an important species selection constraint during the design development of possible vegetative screens.

Vegetation removal should be minimized to the extent possible where construction impacts cannot be avoided. Topsoil and organic matter should also be salvaged and reintroduced to any areas disturbed during construction, as appropriate. It is recommended that new seed should be introduced to disturbed substrates as soon as feasible following construction (within 15 days for areas less than 200 m from a watercourse, and 45 days for other areas). To minimize the risk of erosion, ESC measures and other best practices should remain in place until vegetation cover is re-established.



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4.1.2 Wetlands

The impacts to wetlands are difficult to compensate within the project sites due to the potentially significant impact of proposed grading changes. One of the most important characteristics of a wetland is a specific and sustained moisture regime. Grading and soil alterations can significantly impact the ability to sustain wetland features and functions through alterations to the moisture regime. It is recommended that the improvement of existing wetlands in the vicinity of the project site be prioritized over the creation of new wetlands within the project site, should it be required.

4.1.3 Forests, Woodlands, and Thickets

Given the age of the potentially impacted forest trees and the complex processes involved in forest habitat development, it can take a significant amount of time to regenerate comparable conditions through compensation. Thickets, however, can be compensated within the lifecycle of the project. Typically, ROW areas are maintained to be free of large woody vegetation to limit the risk of obstructions, danger from falling limbs, and impeded sightlines. For this reason, it will be difficult to find the space to compensate for woodlands, forests, and thickets within the limited project ROW. It is recommended that compensation adjacent to the ROW and areas where the ROW is extended for culverts and bridges be explored in collaboration with landowners and the Highway of Heroes Tree Campaign. Where possible this compensation should be used to extend existing forested areas and be completed in coordination with watercourse restoration efforts as indicated above.

4.1.3.1 Canopy Cover Method

The canopy cover method utilizes a calculation of the overall canopy cover area of the trees on each of the sites. Using this data, it is possible to calculate the area of removal and subsequent compensation targets. The calculation of compensation trees should be based on an assessment of a canopy area equal to their projected coverage at five years post planting. The use of five years post planting size as a metric is appropriate as a representation of trees that are established and contributing to the landscape. It is important to note that the canopy will continue to increase in size as these trees grow and further increase the total canopy cover on each of the sites.

The total proposed woodland screen planting area is 2.4 ha. It is assumed that replacement trees will be planted at 50 mm caliper or 250 cm height and will have a canopy area of 7 m² based on a 1.5 m canopy radius. After 5 years growth it is assumed that the canopy radius will be 19.6 m² based on a 2.5 m canopy radius. Based on the 5-year canopy assumption, the total combined canopy area of the woodland screen planting would be achieved with the planting of 1224 trees.

4.1.4 Meadows

Meadow compensation is well suited for reinstatement within a roadway ROW. Meadow re-establishment can also be accomplished quickly. It is recommended that wherever possible graded areas and all areas



Mitigation and Landscape Planting Recommendations
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of disturbed soil be rehabilitated as meadow habitat. It is likely that the total area meadow habitat may exceed the existing conditions, both for area and quality of meadow plant species.

4.2 VISUAL SCREENING

Visual screening is recommended for the Nagle Road interchange, as visual impacts are expected for residents on both sides of Highway 401. Refer to Appendix B for preliminary design considerations for screening. Visual screening plantings should be carried out in coordination with the affected residents and maintain positive landscape viewsheds where possible. The possibility of saline soils and salt spray should be considered as an important species selection constraint during the design development of possible vegetative screens.

4.3 CULTURAL HERITAGE

Collaboration with the Highway of Heroes Tree Campaign is recommended where trees are being planted for visual screening or naturalization. The design of commemoration sites with native species, wildlife habitat, and pollinator populations along Highway 401 and associated interchanges are goals of the Tree Campaign which are consistent with the ecological recommendations of this report. Furthermore, the development of commemoration sites may develop cultural connections to the landscape in this area.

It is recommended by the Stantec 2019, *Nagle Road Interchange Study (GWP 4039-17-00), Cultural Heritage resources Assessment*, that heritage resources should be avoided during proposed construction activities, specifically 2241 Nagle Road (CHL-1) and heritages attributes associated with this heritage resource.



Conclusions
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5.0 CONCLUSIONS

The MTO and the Town of Cobourg retained Stantec to undertake a Planning, Preliminary Design, and Class EA Study on Highway 401 for a new interchange at Nagle Road in the Town of Cobourg and the Township of Hamilton. This report focused on the proposed new interchange and the surrounding landscape at Nagle Road.

A field and desktop analysis of the preferred interchange design was completed to assess potential landscape related impacts to the adjacent properties, the surrounding communities, and users of Highway 401. A summary of the results are as follows:

- The field and desktop analysis found that the associated structures have some connections to the surrounding landscape features of the Oak Ridges Moraine and Lake Ontario.
- The assessed impact categories for this report included visual, natural environment, and cultural heritage.
- Mitigation of the visual impacts caused by the construction of the preferred Nagle Road interchange is anticipated to require consideration in the detail design phase. Consideration should be given to mitigating the visibility of the interchange structures and the associated vehicles from the adjacent residences by using vegetative screening methods. Consideration will also be given to the potential involvement of the Highway of Heroes Tree Campaign.
- Mitigation of the natural environment impacts are focused on the net expansion of existing woodlot and forest areas, especially where they will provide a vegetative buffer for cold water watercourses.



References
December 7, 2023

6.0 REFERENCES

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Ministry of Transportation, Ontario. (2015). Environmental Reference for Highway Design.

Stantec, (2018), Terrestrial Ecosystems Existing Conditions Report – Highway 401 Planning, Nagle Road Interchange Study (GWP 4059-17-00). Stantec Consulting Ltd.

Stantec, (2018), Terrestrial Ecosystems Preliminary Impact Assessment Report – Highway 401 Planning Nagle Road Interchange Study (GWP 4059-17-00). Stantec Consulting Ltd.



APPENDIX A:

Field Photograph Log



NAGLE ROAD



Notes
#0 Photo Location

Client/Project
MINISTRY OF TRANSPORTATION
ONTARIO EASTERN REGION
HIGHWAY 401 PLANNING STUDY
NAGLE ROAD

Project No.
165001160

Title
APPENDIX A
PHOTO LOCATION MAP
Revision
0
Date
2023.03.09
Reference Sheet
Figure No.
1 of 3



Photo Location #1- Nagle Road

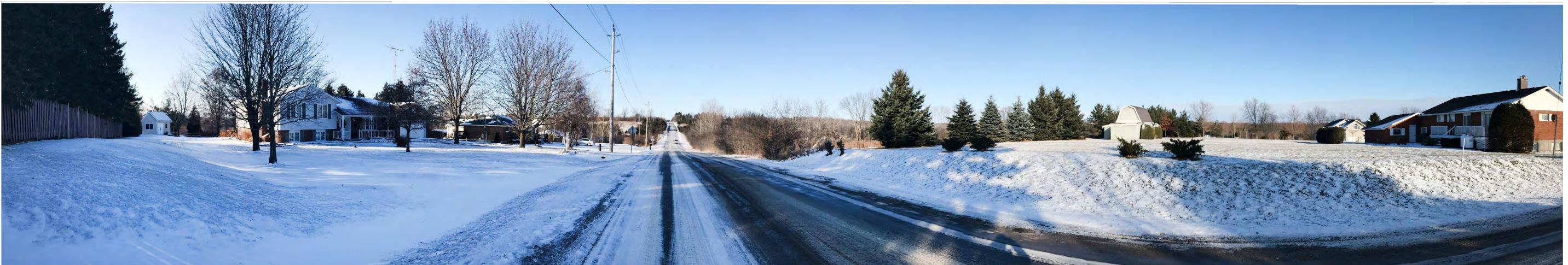


Photo Location #2- Nagle Road



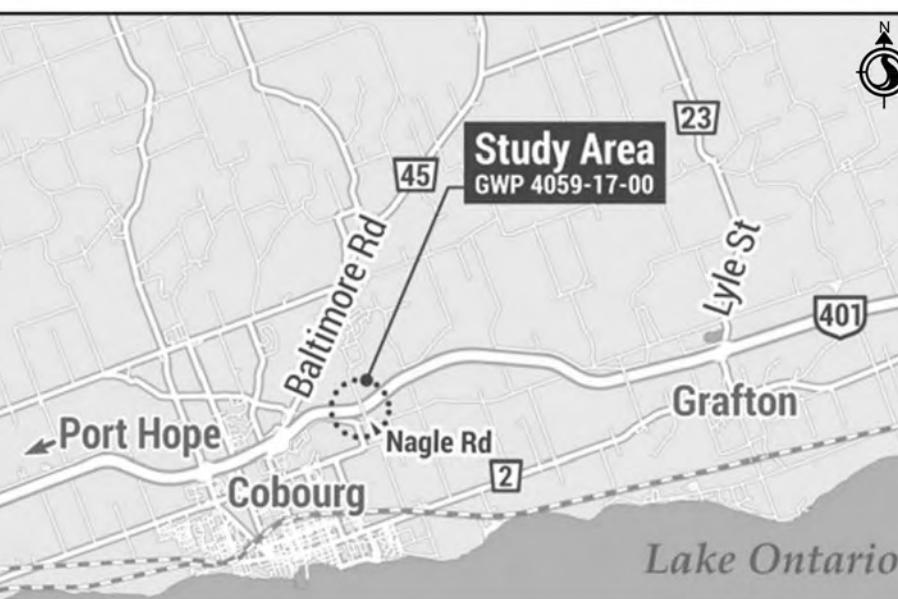
Photo Location #3- Nagle Road



Photo Location #4- Nagle Road

APPENDIX B:

Conceptual Landscape Plan



Legend

- Existing MTO Right-of-Way
- Property Required - Ultimate (Future 8-lanes)
- Proposed Woodland Screen Planting
- HOH Proposed Highway of Heroes Planting

Notes

- Highway of Heroes Planting locations are approximate and may change due to grading and other factors. Precise locations and composition will be determined at the detail design phase when additional information is available.

4. REVISED AS PER CLIENT COMMENTS (2023.05.25) KB LG 2023.05.25
 3. REVISED AS PER CLIENT COMMENTS (2023.05.03) KB LB 2023.05.03
 2. REVISED AS PER CLIENT COMMENTS (2020.10.07) JJ DW 2020.11.09
 1. REVISED AS PER DRAFT LCR COMMENTS JJ DW 2020.07.23
 ISSUED FOR LCR
 ISSUED FOR DRAFT LCR JJ LB 2020.05.11
 Revision/Issue By Appd YYYY.MM.DD

File Name: 165001090_L-PS_Nagle JJ Dwn. LB 2020.05.05
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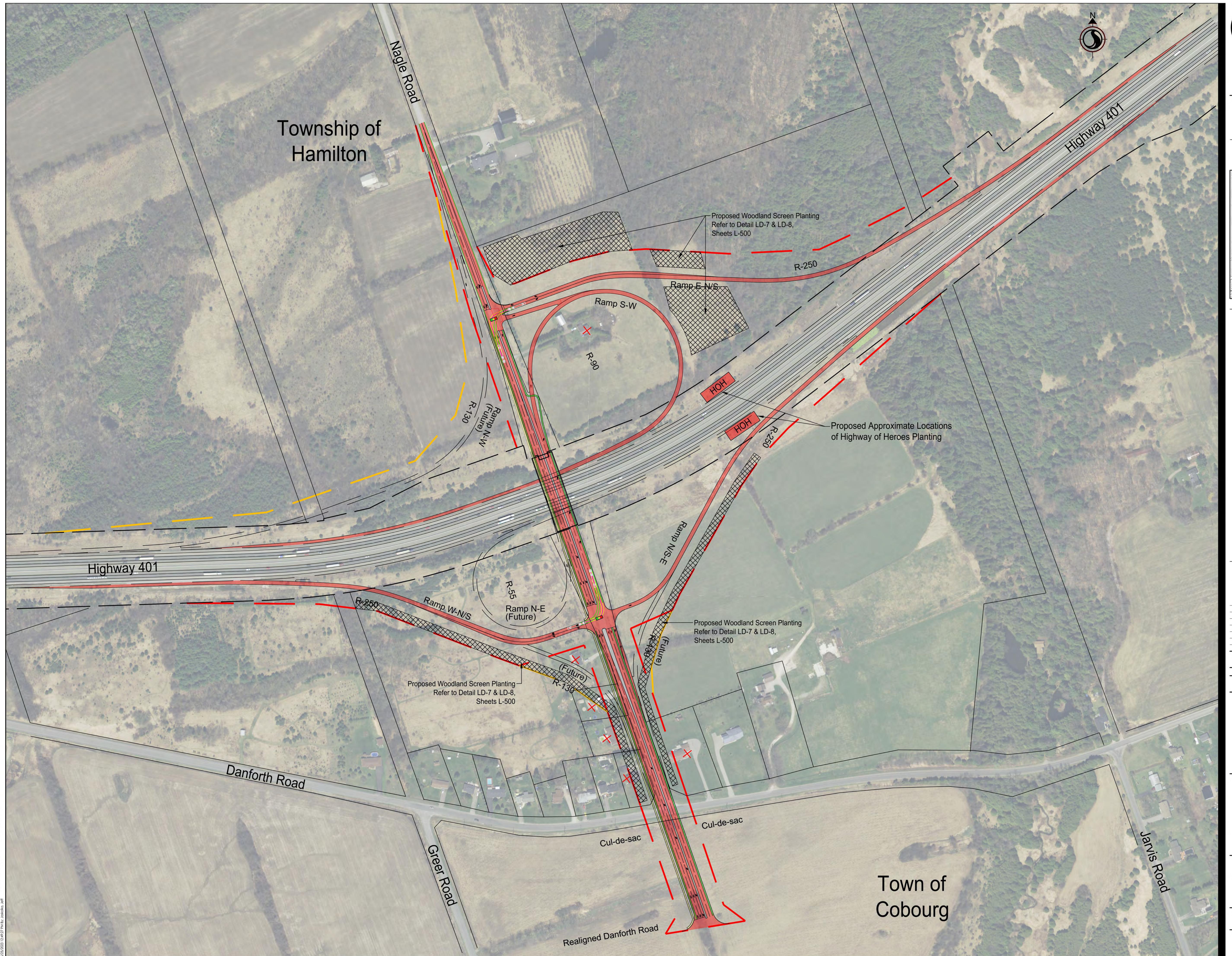
Permit-Seal

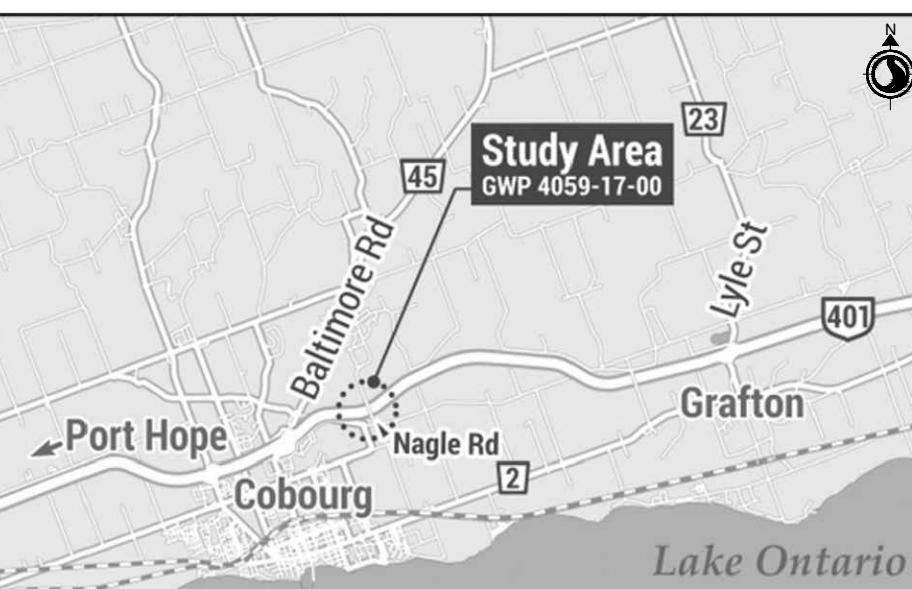
Client/Project
 MINISTRY OF TRANSPORTATION ONTARIO (MTO)

HIGHWAY 401
 NAGLE ROAD
 NAGLE ROAD, ON

Title
 PRELIMINARY
 RESTORATION PLAN - NAGLE ROAD

Project No. 165001106 Scale 1:2000
 Revision 4 Sheet 1 of 2 Drawing No. L-466
 ORIGINAL SHEET ARCH D



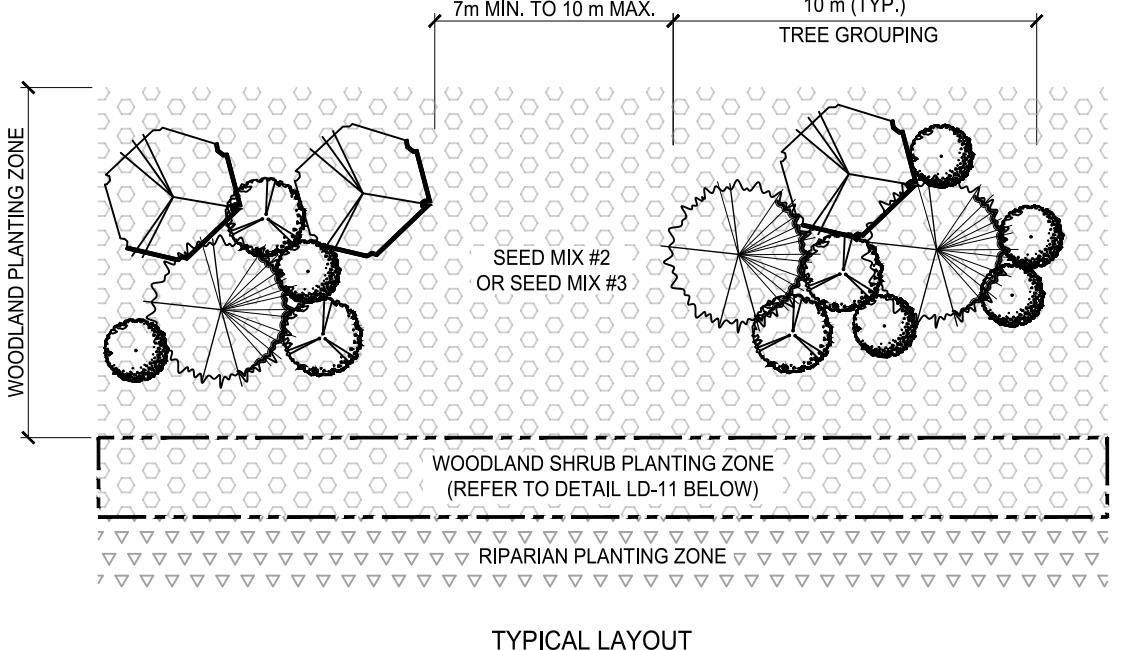


Legend

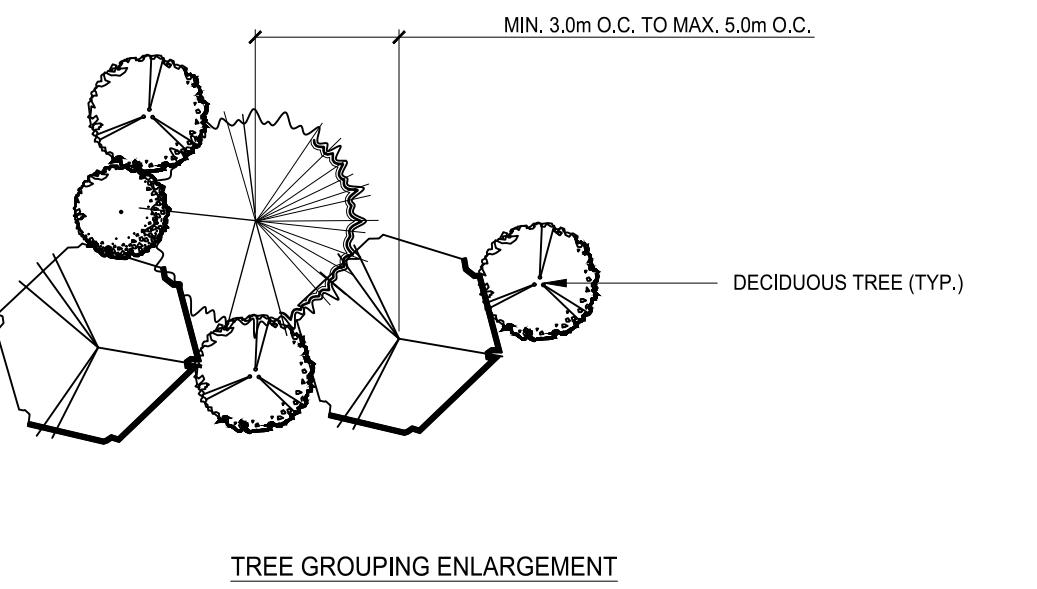
WOODLAND SCREEN PLANTING ZONE LAYOUT:

REFORESTATION HAS BEEN DESIGNED TO CREATE A MIXED AGE WOODLAND USING A COMBINATION OF EARLY SUCCESSIONAL AND UPLAND SPECIES. TREES WILL BE PLANTED IN A RANDOM PATTERN WITH A MIX OF SPECIES USING THE FOLLOWING CRITERIA:

- A. NO MORE THAN 35% OF ANY SINGLE GENUS AND 20% OF ANY SINGLE SPECIES SHALL BE THROUGHOUT THE ENTIRE WOODLAND PLANTING ZONE AT ALL SITES.
- B. TREES WILL BE PLANTED A MINIMUM OF 3.0 m APART UP TO A MAXIMUM OF 5.0 m ON CENTRE.
- C. TREES ARE TO BE PLANTED IN GROUPINGS OF FIVE TO SEVEN TREES, WITH A MINIMUM OF 3 DIFFERENT SPECIES PER GROUPING AND 50% CONIFEROUS. PLANTING TO MIMIC A NATURAL LAYOUT AND HAVE SOME GAPS BETWEEN TREES WITH VARIED SPACING THROUGHOUT.
- D. TREES SHOULD BE PLANTED IN APPROPRIATE MOISTURE REGIMES TO PROMOTE AND SUSTAIN HEALTHY GROWTH.
- E. OPEN AREAS (SUN EXPOSURE) TO BE SEDED WITH MIX #2 - OSC NATIVE UPLAND FORAGE AND MEADOW MIX (#B140).
- F. AREAS ADJACENT TO EXISTING VEGETATION (SHADE CONDITION) TO BE SEDED WITH MIX #3 - OSC WOODLAND MIX (#B275).
- G. REFER TO DRAWINGS L-463 TO L-465 FOR PROPOSED EXTENTS OF WOODLAND PLANTING ZONES AND SPECIES REQUIREMENTS.



TYPICAL LAYOUT



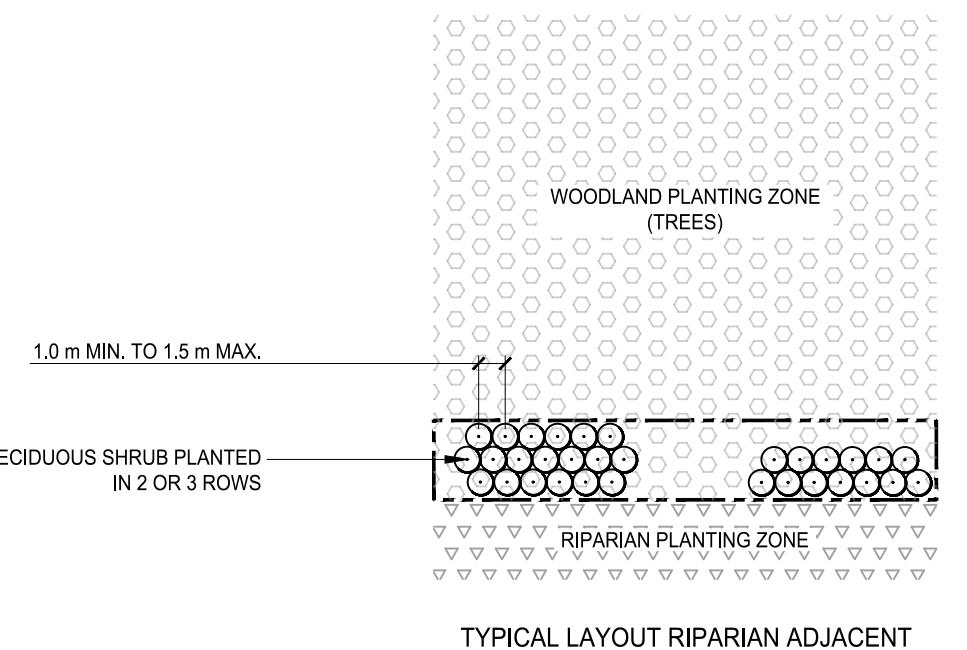
TREE GROUPING ENLARGEMENT

 TYPICAL WOODLAND NUCLEATION PLANTING ZONE LAYOUT
N.T.S.

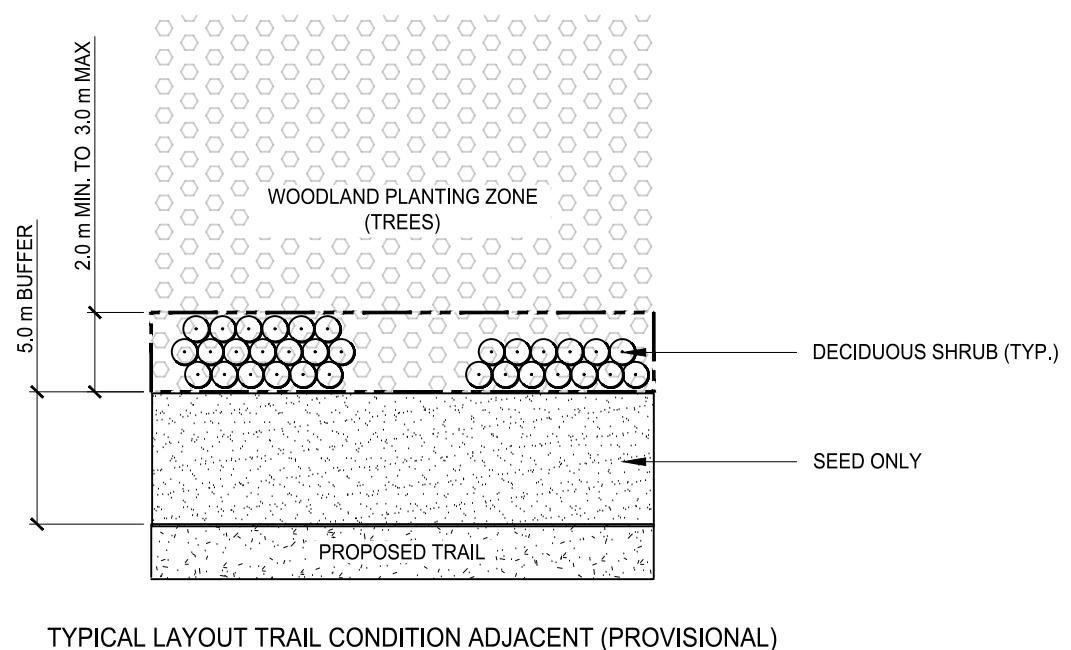
WOODLAND SHRUB PLANTING ZONE LAYOUT:

WOODLAND SHRUB PLANTING ZONE HAS BEEN DESIGNED TO CREATE A FOREST EDGE USING UPLAND SHRUB SPECIES. ALL SPECIES WILL BE NATIVE TO THE REGION AND SHALL BE SOURCED FROM LOCAL NURSERIES TO PROMOTE AND MAINTAIN THE LOCAL GENETIC STOCK.

- A. NO MORE THAN 35% OF ANY SINGLE GENUS AND 20% OF ANY SINGLE SPECIES SHALL BE THROUGHOUT THE ENTIRE WOODLAND SHRUB PLANTING ZONE.
- B. SHRUBS WILL BE PLANTED A MINIMUM OF 1.0 m APART UP TO A MAXIMUM OF 1.5 m ON CENTRE.
- C. SHRUBS ARE TO BE PLANTED IN GROUPINGS OF 5 TO 30 SHRUBS, WITH A MINIMUM OF 2 DIFFERENT SPECIES PER GROUPING. PLANTING TO MIMIC A NATURAL LAYOUT AND HAVE SOME GAPS BETWEEN SHRUBS WITH VARIED SPACING THROUGHOUT.
- D. WOODLAND SHRUBS TO BE PLANTED IN GROUPINGS OF 2 TO 3 ROWS WIDE.
- E. SHRUBS SHOULD BE PLANTED IN APPROPRIATE MOISTURE REGIMES TO PROMOTE AND SUSTAIN HEALTHY GROWTH.
- F. SEED MIX #2 - NATIVE UPLAND FORAGE AND MEADOW MIX (#B140) TO BE APPLIED THROUGHOUT THE WOODLAND SHRUB PLANTING ZONE.
- G. REFER TO DRAWINGS L-463 TO L-465 FOR PROPOSED EXTENTS OF WOODLAND PLANTING ZONES AND SPECIES REQUIREMENTS.



TYPICAL LAYOUT RIPARIAN ADJACENT



TYPICAL LAYOUT TRAIL CONDITION ADJACENT (PROVISIONAL)

 TYPICAL WOODLAND SHRUB PLANTING ZONE LAYOUT
N.T.S.

GENERAL NOTES

1. Any ambiguity in the drawings, specifications or details are to be reported to the Landscape Architect for direction. These drawings shall not be used for construction unless stamped and signed by the Landscape Architect. The Contractor is not to proceed in uncertainty. The limits of work are to be clearly understood by the Contractor prior to any work taking place on the site.
2. All dimensions are in meters unless otherwise noted. The drawings may be scaled for approximate layout. The Contractor is to verify all dimensions on the drawing(s) and report any discrepancies to the Landscape Architect.
3. The Contractor is to locate and mark all infrastructure and utilities prior to any excavation work or planting on the site. Do not plant directly above underground utilities or infrastructure unless approved by the Landscape Architect. The Contractor is responsible for the coordination and maintenance of all utility/infrastructure located for the duration of the Contract.
4. The Contractor shall supply all materials in quantities sufficient to complete work shown on these drawings. The Contractor is not to substitute materials, products or quantities without prior written consent of the Landscape Architect.
5. The Contractor is to take all necessary precautions to protect all existing site features unless specified for removal/demolition. This includes all survey bars, stakes, monuments and sediment barriers. The Contractor is responsible for any damages incurred during construction and must make all necessary restorations and repairs to original or better condition.
6. All existing trees, shrubs, and herbaceous plants beyond the limit of work are to be protected from construction damage. This includes but is not limited to: not storing construction materials or fuel within the drip-line of an existing tree, not altering existing grades or compacting soil around protected vegetation and taking care not to disturb or expose the roots of any existing trees. The Contractor is responsible for all protection or hoarding measures of all existing trees and vegetation to be preserved within or adjacent to construction work limits.
7. Contractor is responsible for the removal of all debris, garbage and surplus materials on site related to their contract or work and must keep the site in a clean, safe, useable condition at all times or as directed by the Contract Administrator.

SEEDING NOTES

1. Seed areas per OPSS 804 unless otherwise specified in Contract or on Contract drawings.
2. Single directional spreading of seed mix is not acceptable.
3. All seeding of disturbed areas must occur immediately upon completion of the grading work, weather permitting. Seeding operations must be completed between spring thaw and June 15th or between August 15th and October 15th unless otherwise approved by Landscape Architect.
4. Surface to be uniformly cultivated to a minimum depth of 100mm and shall not have surface stones greater than 25mm diameter.
5. All topsoil compacted during construction activities is to be scarified or tilled to a minimum depth of 100mm to the satisfaction of the Landscape Architect prior to seed application. Surface shall not have stones greater than 25mm diameter present.
6. Contractor shall be responsible for any damage to site during seed application or warranty works and shall restore damaged areas to original condition.
7. Contractor shall ensure adequate soil moisture levels to ensure proper germination and will provide watering as required per weather and seasonal conditions. Throughout the warranty period, seeding shall be watered as required to establish weed-free, healthy establishment of groundcover.
8. Contractor shall repair and reseed dead or bare spots prior to Final Acceptance. At Final Acceptance, seeded areas shall be uniform, free of ruts erosion and/or bare and dead spots, free of weeds, and have 90% cover minimum of germinated perennial seed for final acceptance.

NATURALIZED AREAS ONLY:

9. All seeding works will be warranted for a period of two years following inspection and written notice of start of warranty period as determined and provided by the Landscape Architect. Seeded areas to have a minimum of 90% permanent seed catch at the end of the warranty period.
10. Control invasive or noxious weeds throughout the warranty period. Do not apply herbicides or other chemical controls without the approval of the Contract Administrator. All chemical treatment to be completed by a Licensed Applicator in accordance with the Ontario Pesticide Act.

PLANTING NOTES

1. The Contractor must notify the Landscape Architect prior to the commencement of any planting. The Contractor shall supply all plants and materials in quantities sufficient to complete the work shown on this drawing. Any discrepancies between quantities shall be reported to the Landscape Architect.
2. All landscape works will be warranted for a period of two years following inspection and written notice of start of warranty period as determined and provided by the Landscape Architect. Plant material, which is not in a healthy, vigorous growing condition at the end of the warranty period, shall be replaced to the satisfaction of the Landscape Architect / Owner.
3. The Landscape Architect reserves the right to extend Contractor's warranty responsibilities for an additional year if, at the end of initial warranty period, leaf development and growth is not sufficient to ensure future survival as determined by the Landscape Architect.
4. The Contractor is to identify with Landscape Architect/Owner any maintenance requirements necessary for warranty purposes.
5. Plant materials specified for this project will conform to the Canadian Nursery Landscape Association (C.N.L.A.) for size, variety and condition as indicated on the plant schedule shown on these drawings. Any plant materials which do not conform will be promptly removed from the site and replaced by the Contractor at no additional cost to the project.
6. The Landscape Architect is to be contacted for inspection and written approval prior to plant material arriving on site. The Landscape Architect reserved the right to reject any plant materials that have not been inspected and approved.
7. The Landscape Architect reserves the right to refuse acceptance of any plant displaying poor growth habits, injury or disease. Any plant material that is rejected by the Landscape Architect will be promptly removed from the site and replaced with material of acceptable quality at no additional charge to the project.
8. Plant materials collected from wild sources will not be accepted without written approval of the Landscape Architect. The Landscape Architect reserves the right to require that supplier invoices be submitted for inspection and approval prior to acceptance.
9. On-site layout of the plant materials to be approved by the Landscape Architect prior to installation. Minor field adjustments to plant material locations may be necessary to respond to the locations of existing plants and site conditions. The Contractor to review with Landscape Architect where relocations are necessary. The Contractor must receive approval from Landscape Architect prior to installation.
10. Plants are not to be installed during extreme heat, drought, or other undesirable conditions. Thoroughly water all plants immediately after installation. The Contractor shall regularly monitor site conditions and water as required to ensure healthy growth conditions throughout the duration of the warranty period.
11. Do not plant directly in centering of drainage swales or depression areas. Where proposed planting locations conflict with constructed swales or low-lying wet areas, contact Landscape Architect for direction.
12. All trees and shrubs are to be planted in accordance with the planting details shown on this drawing.
13. Topsoil: Each source of topsoil, imported or native to be approved by Landscape Architect prior to use. Submit topsoil analysis/test results to Landscape Architect prior to order or delivery to site. Testing to be in accordance with Contract specifications.
14. Mulch: To be spread uniformly around the base of trees and shrubs to a minimum depth of 100 mm. Do not place mulch in direct contact with trunk or stem(s). Allow a 100 mm mulch free zone at trunk/stems. Shrubs to be in continuously mulched planting beds unless otherwise specified.
15. The Contractor is to remove dead or damaged branches on trees or shrubs. All pruning shall be performed in accordance with standard horticultural practices and appropriate timing for each species.
16. All stakes and associated ties are to be removed after the first full growing season. Rodent guards are to be removed at the conclusion of the warranty period.

Notes

- Highway of Heroes Planting locations are approximate and may change due to grading and other factors. Precise locations and composition will be determined at the detail design phase when additional information is available.

4. REVISED AS PER CLIENT COMMENTS (2023.05.25)	K8	LG	2023.05.25
3. REVISED AS PER CLIENT COMMENTS (2023.05.03)	LB	LG	2023.05.03
2. REVISED AS PER CLIENT COMMENTS (2020.10.07)	JJ	DW	2020.11.09
1. REVISED AS PER LCR COMMENTS (2020.07.22)	JJ	DW	2020.07.22
ISSUED FOR LCR	JJ	DW	2020.07.23
ISSUED FOR DRAFT LCR	JJ	LB	2020.05.11

Revision/Issue

By	Appd	YYYY,MM,DD
File Name: 165001090_L-DT_Nagle Road	JJ	LB

Dwn.	Dsgn.	Chkd.
		YYYY,MM,DD

Permit-Seal

Client/Project
MINISTRY OF TRANSPORTATION ONTARIO (MTO)
HIGHWAY 401
NAGLE ROAD
NAGLE ROAD, ON

Title
PRELIMINARY
RESTORATION DETAILS AND NOTES

Project No. 165001106 Scale AS NOTED
Revision Sheet Drawing No.
4 2 of 2 L-500