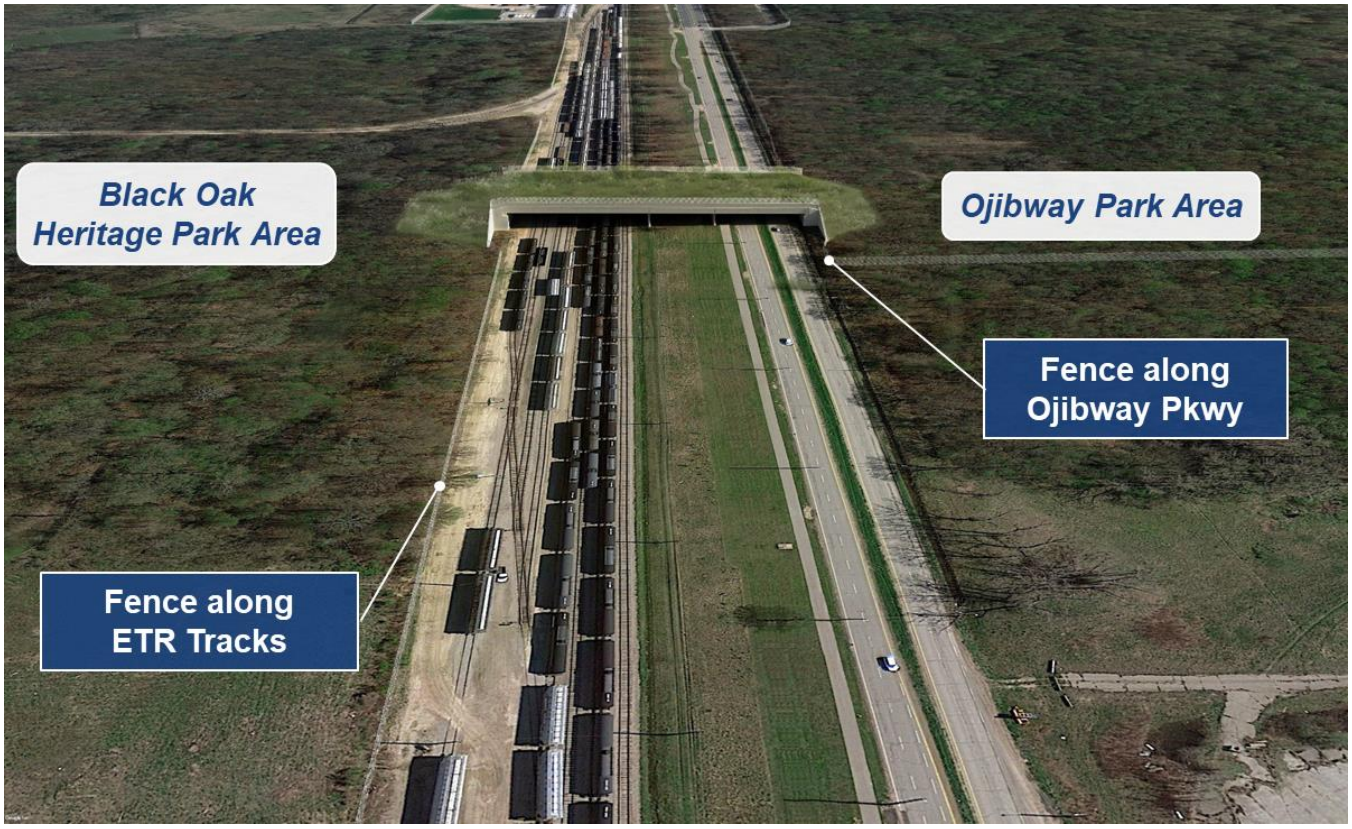
City of Windsor

Ojibway Parkway Wildlife Crossing Environmental Study Report

July 2024



Ojibway Parkway Wildlife Crossing Environmental Study Report

City of Windsor

Project No.: IM20104013
Date: July 2024

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City of Windsor

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WSP

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Geotechnical Engineering Lead	Dirka Prout, P.Eng.

Executive Summary

Introduction

The City of Windsor has completed an environmental assessment to consider the construction of a Wildlife Crossing across Ojibway Parkway and the Essex Terminal Railway (ETR) tracks, south of Broadway Boulevard, to re-establish an ecological connection between the natural areas associated with Black Oak Heritage Park and Ojibway Park. The Wildlife Crossing would provide a connection for local tallgrass prairie plant communities and safe passage opportunities for wildlife, including species at risk (SAR). The proposed Wildlife Crossing would thereby reduce landscape fragmentation through improvement of habitat connectivity in the Ojibway Prairie Complex. The Wildlife Crossing would also reduce wildlife-vehicle collisions and their threat to motorists.

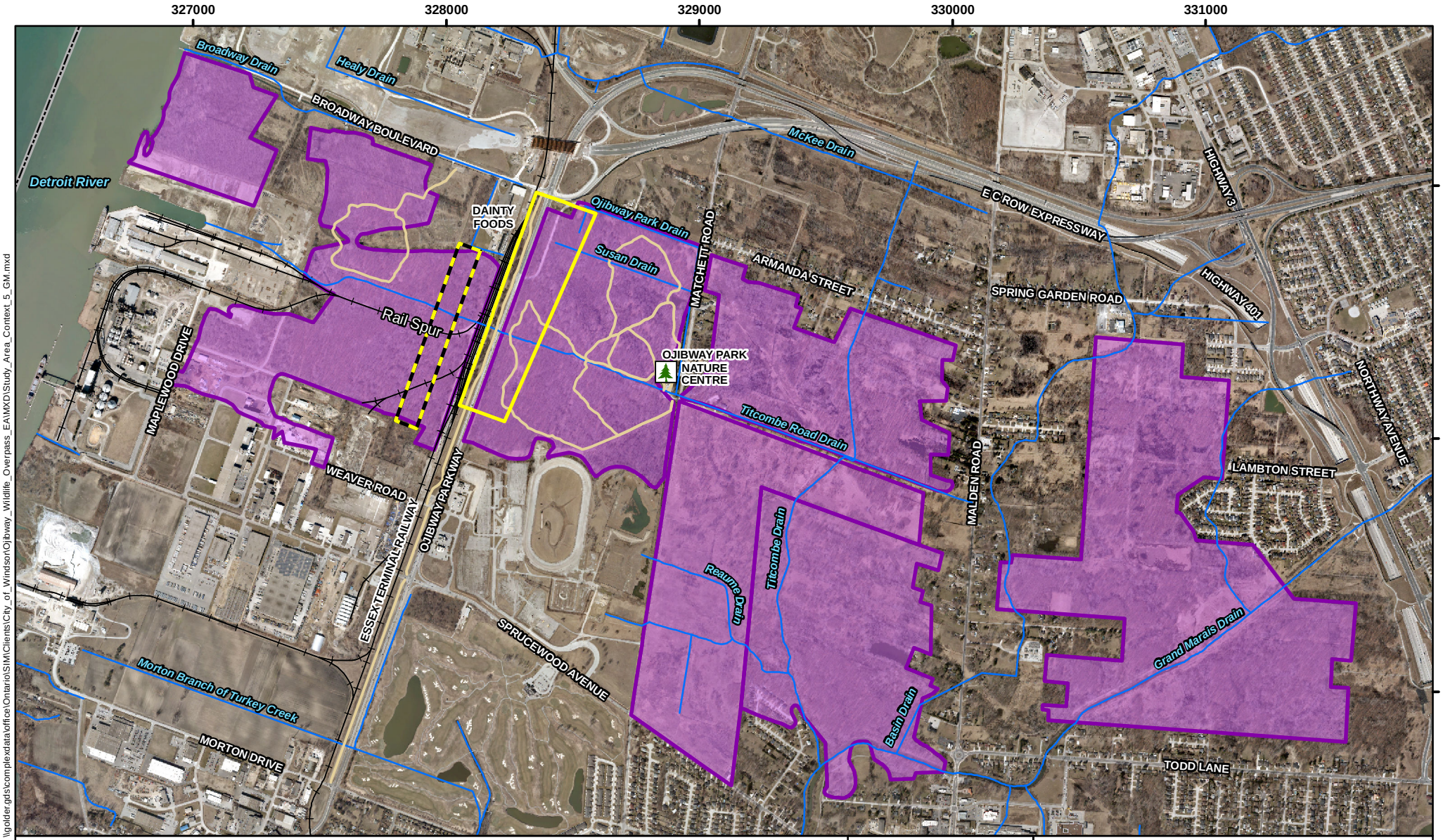
The 20 m wide Ojibway Parkway and the eight tracks operated by the ETR to the west of Ojibway Parkway inhibit wildlife movement and ecological functions. Approximately 20,000 vehicles per day travel along the Ojibway Parkway and E.C. Row Expressway, contributing heavily to wildlife mortality, driving hazards, and landscape fragmentation. In addition, traffic along Ojibway Parkway is expected to increase with the development of the nearby Gordie Howe International Bridge. Consequently, the Windsor-Detroit Bridge Authority (WDBA) is a funding partner for the commencement of the environmental assessment. The City's intent is to seek future funding from environmental organizations, provincial and federal levels of government and obtain approval for the remaining amount through the Capital Budget process.

The location and design of the Wildlife Crossing was selected as part of this environmental assessment after careful consideration of engineering requirements and existing site conditions, constraints related to land ownership, previous studies and literature and feedback obtained through a comprehensive consultation program, which was comprised of consultation with the Indigenous Nations, the public, government agencies, ETR, utilities, and key stakeholder groups. The preferred location and design of the Wildlife Crossing consider wildlife-related concerns, including habitat fragmentation and connectivity for several wildlife groups, as well as plants. The preferred location and design also consider the loss of habitat and secondary and cumulative impacts to the existing landscape.

This environmental assessment was completed following the Municipal Class Environmental Assessment (Class EA) process, for a Schedule 'C' project, which is outlined in the Municipal Engineering Association's document titled "Municipal Class Environmental Assessment," (amended 2023). The Class EA Study addressed Phases 1 through 4 of the Class EA process. The draft Environmental Study Report (ESR) was initially endorsed by the City of Windsor's Council (Council), by CR549/2021, on December 20, 2021. Subsequent to Council's endorsement, and before issuing the Notice of Study Completion, the draft ESR was circulated to the Indigenous Nations, relevant Government Agencies, and the ETR for their review. The feedback received prompted the continuation of the Class EA Study. Consequently, an updated preferred design for the Wildlife Crossing was selected. This crossing would extend over both Ojibway Parkway and the ETR tracks. At the time of finalization of this report, the Study Team had intended to present it to the City Council for endorsement at the Council Meeting of July 22, 2024.

Study Area

The general limits of the Study Area are shown in Figure E-1. It is important to note that the Study Area initially included a portion of the Ojibway Park and Ojibway Parkway south of Broadway Boulevard. However, following input from the Indigenous Nations, the public, government agencies, and key stakeholder groups, the Study Area was expanded to consider a Wildlife Crossing across Ojibway Parkway as well as the ETR tracks.



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LEGEND

- Ojibway Prairie Complex (Prairie Remanants) ANSI
- Ojibway Park Nature Centre

Project Area

- East Study Area
- West Study Area
- Official Park Trail (Ojibway Parkway Multi-use Trail, Ojibway Park Multi-use Trail and Black Oak Heritage Park Multi-use Trail)
- Watercourse / Drain
- Railway
- National Border

NOTES:
- Aerial imagery extracted from Essex County interactive map, 2019.

0 250 500 1,000 1,500 2,000 Metres

Datum: NAD83
Projection: UTM Zone 17N

N W E S

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OJIBWAY PARKWAY WILDLIFE CROSSING

Study Area Context

PROJECT N°: IM20104013	**FIGURE: E-1**
SCALE: 1:21,000	DATE: June 2024

Municipal Class Environmental Assessment Process

The Municipal Class EA process includes five phases. Schedule 'C' projects require that all five phases be conducted. Phases 1, 2, 3, and 4 are part of this study; the fifth phase would be initiated following completion of this study. A description of the Class EA planning phases is provided below.

- **Phase 1 – Problem or Opportunity Statement:** Identify the problem (deficiency) or opportunity.
- **Phase 2 – Alternative Solutions:** Identify and evaluate alternative solutions to address the problem or opportunity by taking into consideration the existing environment and establish the preferred solution considering public and review agency input.
- **Phase 3 – Alternative Design Concepts for the Preferred Solution:** Identify Alternative Design Concepts for the preferred solution by taking into consideration the existing environment and establish the preferred design concept by considering public and review agency input.
- **Phase 4 – Environment Study Report:** Document and file the Environmental Assessment including the design and consultation process in an ESR for public review.
- **Phase 5 – Implementation:** Complete detailed design and required additional investigations, obtain permits and approvals, and proceed to construction and operation. Monitor construction for adherence to environmental provisions and commitments. Where special conditions dictate, also monitor the operation of the completed facility.

Problem Statement

Phase 1 of the Class EA process requires developing a problem or opportunity statement. The following problem statement was developed for this Class EA Study:

The City of Windsor is undertaking a Municipal Class Environmental Assessment Study to consider the construction of a Wildlife Crossing across Ojibway Parkway and the ETR tracks, south of Broadway Boulevard, to begin to re-establish an ecological connection between the natural areas associated with Black Oak Heritage Park and Ojibway Park.

The 20 m wide Ojibway Parkway that carries approximately 20,000 vehicles per day, as well as the eight tracks operated by the ETR to the west of the Ojibway Parkway inhibit wildlife movement and ecological functions. The Wildlife Crossing would provide a connection for local tallgrass prairie plant communities and safe passage opportunities for wildlife, including SAR. The proposed Wildlife Crossing thereby reduces landscape fragmentation through improvement of habitat connectivity in the Ojibway Prairie Complex. In addition, the Wildlife Crossing would improve safety of the travelling public on Ojibway Parkway by reducing wildlife-vehicle interactions.

Existing Conditions

Several technical studies were completed to develop an understanding of existing conditions within the Study Area. The ESR discusses existing conditions in detail relating to transportation, social, cultural, natural and technical environments. A summary of existing conditions is provided below.

Transportation

- **Roadways:** Ojibway Parkway is a four-lane arterial road with a landscaped median that transitions into E. C. Row Expressway at Broadway Boulevard, which marks the Study Area's northern limit.
- **Trails:** The main trail within and adjacent to the Study Area is the Ojibway Parkway Trail, which runs in a north-south direction along the west side of Ojibway Parkway. In addition, the Ojibway Park to the east includes a series of loop trails.

- **Essex Terminal Railway:** A railway yard owned and operated by the ETR is located to the west of Ojibway Parkway in the Study Area. The ETR is a switching (or short line) railway that runs from the east side of Windsor through the Town of LaSalle and terminates in Amherstburg.
- **Land-use:** The lands on either side of Ojibway Parkway, within and adjacent to the Study Area, are primarily parkland and industrial uses. Ojibway Park is located to the east, and ETR tracks and lands, and Black Oak Heritage Park are located to the west of Ojibway Parkway. Dainty Foods' production is located to the northwest of the Study Area.

Cultural Environment

- **Archaeological Resources:** Stage 1 Archaeological Assessments identified that portions of the Ojibway Park and Black Oak Heritage Park within the Study Area have archaeological potential. Areas of archaeological potential that will be subject to disturbance as part of project construction, shall be assessed through a Stage 2 Archaeological Assessment (and any subsequent assessments, if required).
- **Built Heritage Resources and Cultural Heritage Landscapes:** Ojibway Park and Black Oak Heritage Park have potential for Cultural Heritage Value or Interest.

Natural Environment:

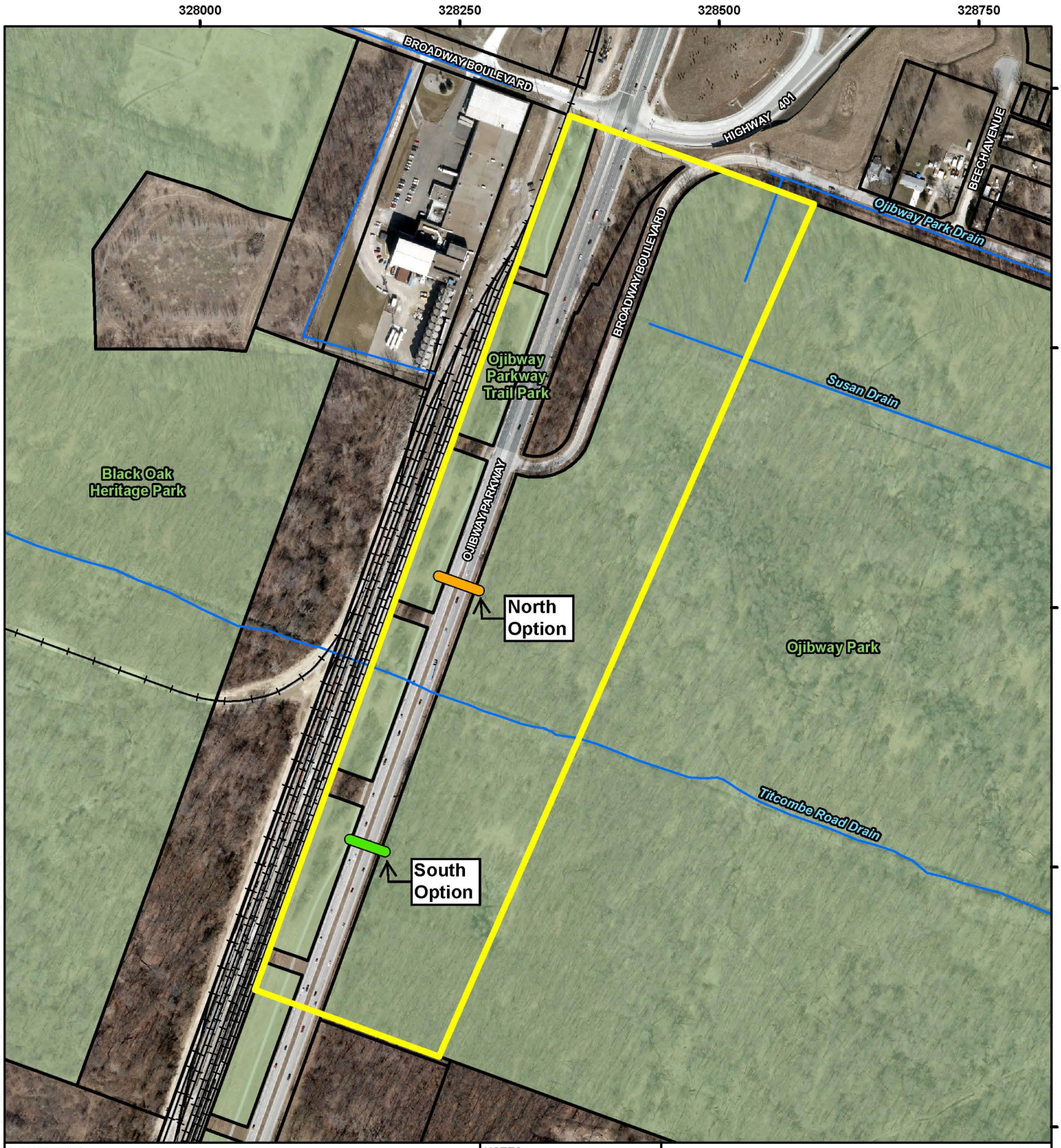
- **Natural Heritage:** The Study Area includes diverse oak-dominated forests, swamps, and savannahs, with mid-aged canopies, mixed understories, and ground layers hosting both native and non-native species, amidst ecological disturbances. There are a variety of birds, anurans, bats, and mammals, with some SAR. Five SAR have been confirmed in the Study Area, while several more have high or moderate probability of occurrence. Ojibway Park and Black Oak Heritage Park are part of an Area of Natural and Scientific Interest and include significant woodlands. Black Oak Wetland Complex is located in Black Oak Heritage Park.
- **Drainage:** There are three municipal drains within the Study Area (Ojibway Park Drain, Titcombe Road Drain, and Susan Drain), which are regulated by the Essex Region Conservation Authority.
- **Soil:** The subsurface soils in the region generally comprise silty sand/sandy silt deposits overlying an extensive silty clay layer, which is in turn underlain by limestone bedrock.
- **Contamination:** Two Areas of Potential Environmental Concerns were identified resulting from Potentially Contaminating Activities associated with known contaminants located adjacent to the Study Area (Salt applied to roadway surface and Rail Yards, Tracks and Spurs).
- **Source Water:** The Study Area is located within Surface Water Intake Protection Zone and Significant Groundwater Recharge Area (vulnerability score of 2).

Technical Environment:

- **Utilities:** Utilities along Ojibway Parkway include two Enbridge gas pipelines, Bell Canada line, ENWIN's hydro poles and distribution lines, Town of LaSalle's sanitary forcemain, Windsor Utilities Commission's watermain, and City of Windsor's street-lights and sanitary sewer.

Alternative Solutions

Phase 2 of the Class EA process requires that reasonable solutions shall be identified to address the problem statement. For this project, two alternative solutions were identified: Wildlife Overpass and Wildlife Underpass, with two alternative locations for each solution (Figure E-2). These solutions were evaluated using criteria related to natural, social, and cultural environments and technical and cost considerations to identify a preferred solution. Based on this evaluation, the Overpass Wildlife Crossing (North Option) was initially selected as the Preferred Solution. Subsequently, the Wildlife Crossing location was re-evaluated based on wildlife connectivity modelling, and the southern option was selected as the preferred location, where the Wildlife Crossing would cross Ojibway Parkway and ETR tracks.



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LEGEND

- Approximate Study Area
- Parks
- Watercourse / Drain
- Railway
- Property Boundaries

Alternative Wildlife Crossing Locations

- North Option
- South Option

0 50 100 200 300 400 500 Metres

NOTES:
- Aerial imagery extracted from Essex County interactive map, 2019.

Datum: NAD83
Projection: UTM Zone 17N

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OJIBWAY PARKWAY WILDLIFE CROSSING

Alternative Wildlife Crossing Locations

PROJECT N°: IM20104013	**FIGURE E-2**
SCALE: 1:5,000	DATE: October 2020

Alternative Solutions

Phase 3 of the Municipal Class EA process involves development and evaluation of alternative design concepts for the Preferred Solution. For this project, Wildlife Overpass was identified as the Preferred Solution. In accordance with the Phase 3 of the Municipal Class EA process, design options were identified and evaluated to determine a preferred design for the Wildlife Crossing (Overpass).

Design Options for Wildlife Crossing (Overpass)

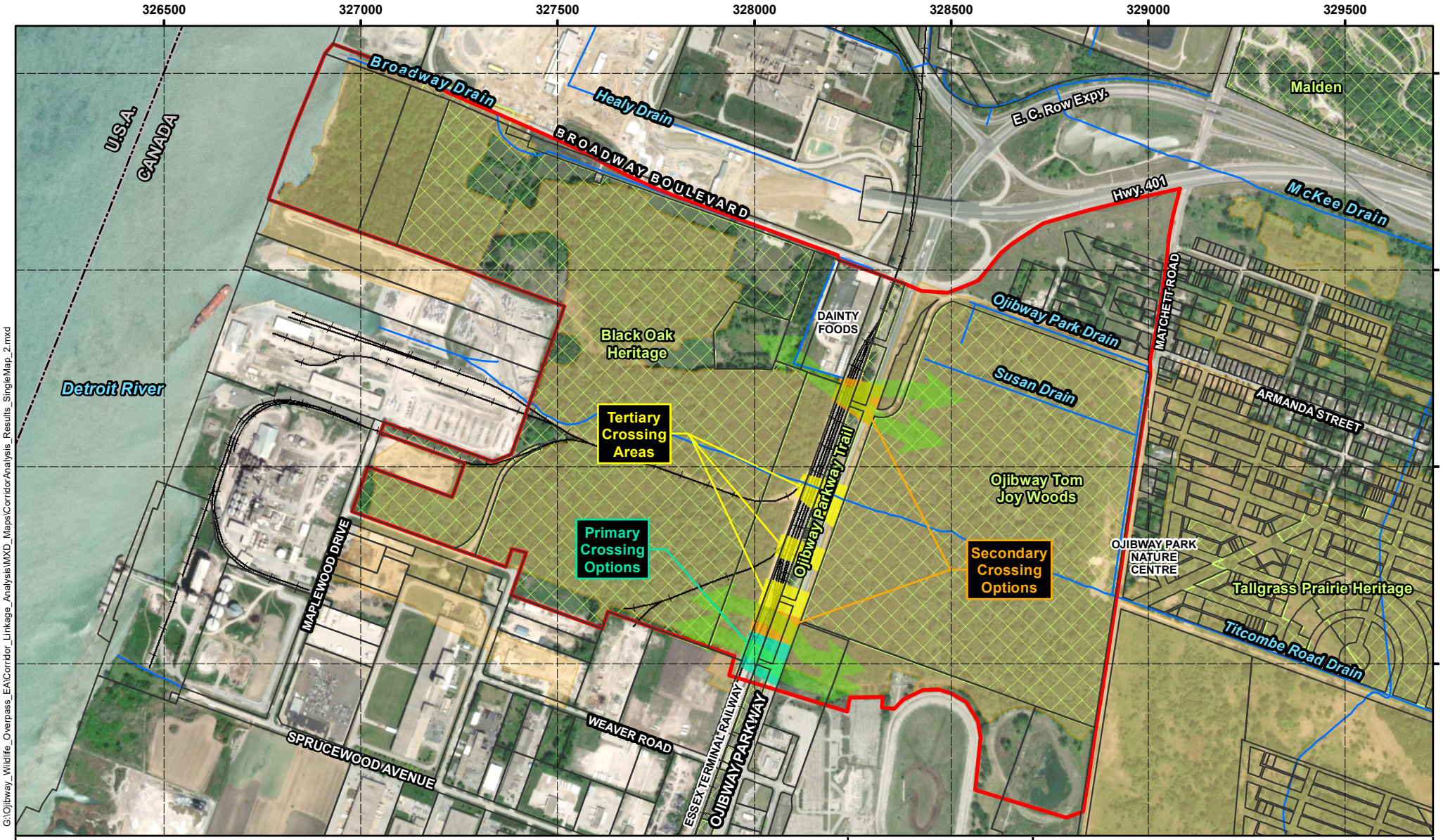
Phase 3 of the Municipal Class EA process involves development and evaluation of alternative design concepts for the Preferred Solution. For this project, an initial set of four design options was developed and evaluated to identify a preliminary design for the Wildlife Crossing. These design options were comprised of Wildlife Crossing options across Ojibway Parkway, connecting Ojibway Park Area with the median area between Ojibway Parkway and the ETR tracks.

The initial design options, along with their evaluation and preliminary preferred design were shared with Indigenous Nations, the public, government agencies, ETR, utilities owners, and key stakeholders through Public Information Centre #2 in April 2021. A key comment received was to extend the crossing across the ETR tracks to provide connectivity between the Ojibway Park Area and the Black Oak Heritage Park Area.

Following Public Information Centre #2, the draft ESR was presented to the City Council for endorsement. Subsequent to the Council endorsement, and prior to issuing the Notice of Study Completion, the draft ESR was circulated to the Indigenous Nations, relevant Government Agencies, and the ETR for their review. The feedback received prompted the continuation of the Class EA Study. Accordingly, the Study Team completed additional work to explore design options for the Wildlife Crossing across Ojibway Parkway and the ETR tracks. This involved reevaluating the location of the crossing and identifying potential design alternatives for connecting Ojibway Park Area with the natural areas associated with Black Oak Heritage Park. The additional, or modified, studies to support this work included:

- **Study Area Expansion:** The Study Area was expanded to include the natural area associated with Black Oak Heritage Park to allow for consideration of Wildlife Crossing Options across the ETR tracks.
- **Additional Field Studies:** Additional ecological field studies were completed within the expanded Study Area during 2023. The Study Team completed surveys on public lands only, as permission to access private lands was not provided. Relevant information from other studies performed by the City was reviewed and incorporated into the assessments and evaluation.
- **Connectivity Analysis:** Connectivity modelling was completed to identify additional locations for a Wildlife Crossing along Ojibway Parkway. The intent was to identify an alternative location for the crossing that would minimize impacts to the Black Oak Wetland Complex. Potential Wildlife Crossing locations identified through connectivity modeling are shown in Figure E-3.
- **Development of Revised Design Options:** Four new “revised” design options were developed and evaluated to identify a preferred design for the Wildlife Crossing over Ojibway Parkway and the ETR tracks.

Ultimately, the preferred design for the Wildlife Crossing over Ojibway Parkway and the ETR tracks was chosen through the development and evaluation of revised design options. These revised options and preferred design for Wildlife Crossing over Ojibway Parkway and ETR tracks was presented at the Public Information Centre #3.



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LEGEND

- Approximate Study Area
- National Border
- Railway
- Property Parcels
- Parks (labelled with name)
- Watercourse / Drain
- Natural Heritage Feature (ANSI, Provincially Significant Wetland, Environmentally Significant Area or Provincial Park)
- Primary and Secondary Wildlife Movement Corridors crossing Ojibway Parkway
- Primary Crossing Location
- Secondary Crossing Location
- Tertiary Crossing Area

NOTES:
- Aerial imagery extracted from ESRI basemap imagery service (scene date: May/June 2023)
- Property parcels and parks extracted from City of Windsor Open Data Catalogue, (https://opendata.citywindsor.ca/ 2023)

Datum: NAD83
Projection: UTM Zone 17N

0 250 500 1,000 1,500 2,000 Metres

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OJIBWAY PARKWAY WILDLIFE CROSSING

Potential Wildlife Crossing Locations

PROJECT N°: IM20104013	**FIGURE: E-3**
SCALE: 1:13,500	DATE: September 2023

Preferred Design for Wildlife Crossing

The refined preferred design for the Wildlife Crossing is a three-span bridge comprised of a 51.3 m span over the ETR tracks, a 21.62 m span over the boulevard area, and a 47.22 m span over Ojibway Parkway. The Wildlife Crossing features a sloped deck for water drainage and it is proposed to be supported by deep foundations with steel H-piles. The design includes wildlife-proof barriers to promote wildlife crossings at the location of the proposed bridge. Steel plate girders were chosen for ease of installation and to meet clearance requirements, while the bridge's longitudinal gradient and transverse crossfall ensure proper water flow. The existing Ojibway Parkway Trail to the west side of Ojibway Parkway would require realignment to pass under the new structure.

Vegetation is proposed on the Wildlife Crossing to create a natural environment with a mix of open areas and shrubs, using native plant species and soils. The design aims for a heterogeneous landscape that encourages wildlife use, with features like boulders and brush piles to deter human access.

Wildlife fencing, crucial for guiding animals to the crossing and preventing road intrusions, will be 8 feet (2.4 m) high and include escape features. The fencing will consist of a taller chain-link style fence with an attached segment of shorter fence with smaller openings. The fencing will connect seamlessly to the crossing, ensuring no gaps for wildlife to bypass the intended path. These design elements will be refined during the detailed design phase in consultation with local authorities and conservation agencies.

A conceptual rendering of the preferred Wildlife Crossing is provided in Figure E-4. An example of proposed wildlife fencing is provided in Figure E-5, whereas the alignment of the proposed wildlife fencing is shown in Figure E-6.

Figure E-4: Conceptual Rendering of Preferred Wildlife Crossing Design

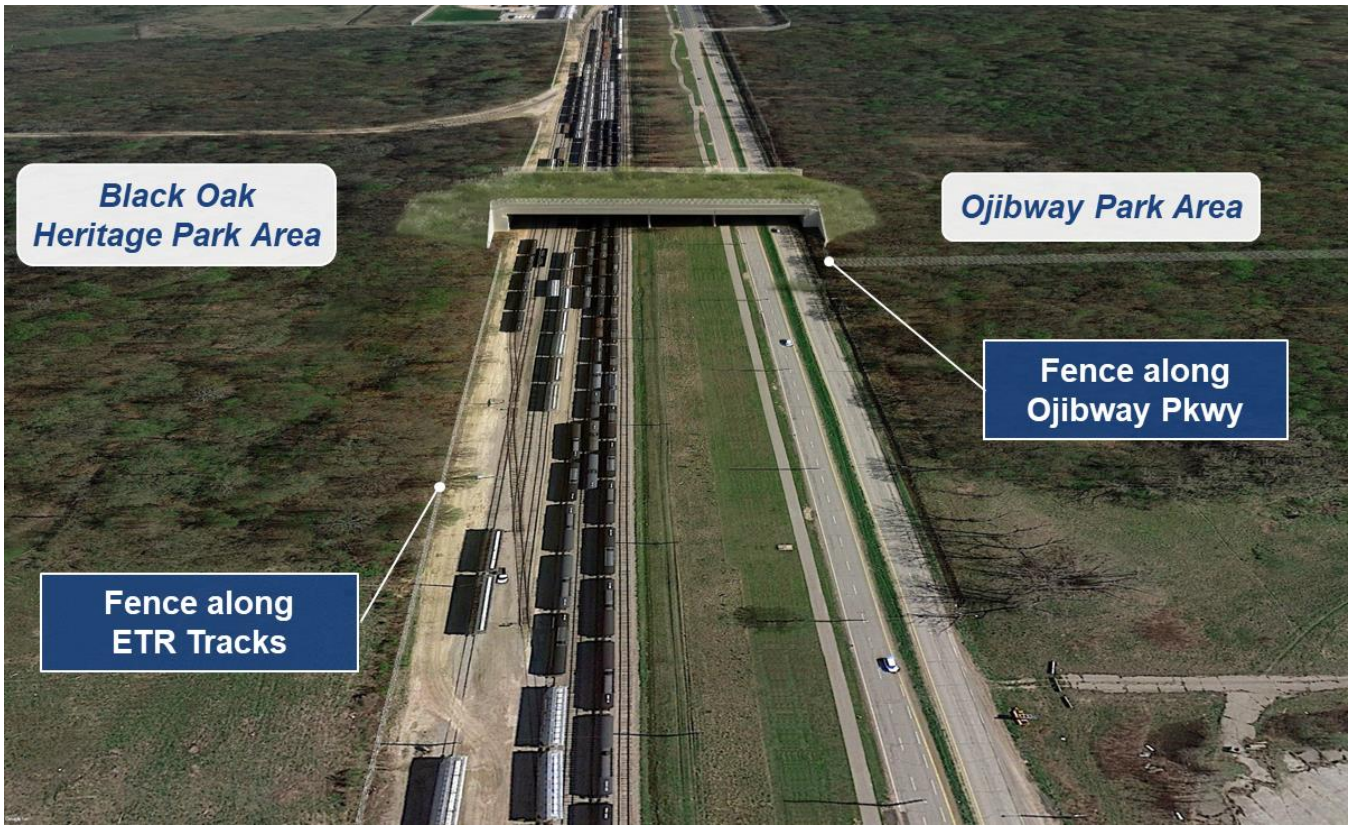
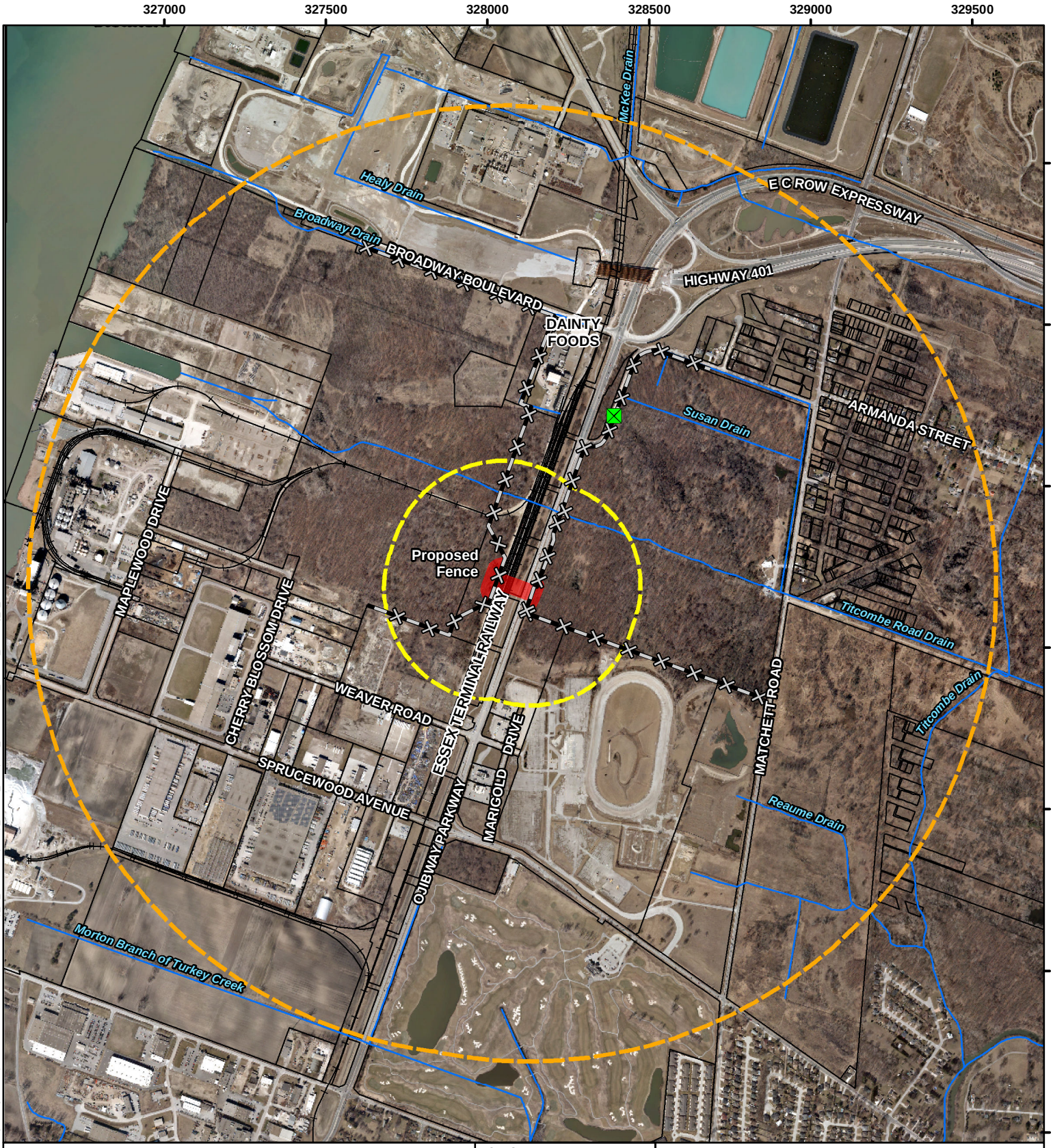


Figure E-5: Fence along the Herb Gray Parkway (Example)



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LEGEND

- Project Footprint
- Property Boundaries
- Chainlink Fence
- One-way Escape Gate (Approximate Location)
- Spacing for Small Animals and Herptiles Crossings (300 m)
- Spacing for White-tailed Deer Crossings (1.4 km)
- Watercourse / Drain
- Railway

0 100 200 400 600 800 1,000 Metres

NOTES:
- Aerial imagery extracted from Essex County interactive map, 2019.

Datum: NAD83
Projection: UTM Zone 17N

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OJIBWAY PARKWAY WILDLIFE CROSSING

Minimum Wildlife Fencing Requirements and Additional Crossings

PROJECT N°: IM20104013 | **FIGURE: E-6**

SCALE: 1:16,000 | DATE: June 2024

Potential Environmental Effects and Mitigation Measures

The ESR provides a detailed account of project's potential environmental effects and proposes avoidance and mitigation measures. Mitigation of negative effects was applied throughout the Class EA process, including selection of preferred design by identifying the alternative that has the least overall effects on the environment. Some negative effects cannot be totally avoided; therefore, mitigating measures are proposed to minimize effects. These measures will need to be further developed and finalized in the next phase of design and will need to be included in the contract documents for implementation during construction.

Monitoring Plan and Future Commitments

Monitoring and Management Recommendations

The Wildlife Crossing's success hinges on comprehensive monitoring to assess habitat connectivity and road mortality reduction, with a diverse focus beyond single species. The City is encouraged to collaborate with universities and NGOs for monitoring support, establishing benchmarks for adaptive management. The detailed design phase will include a Restoration and Planting Plan, emphasizing native species and ecological principles to foster a natural crossing environment and manage vegetation. This plan will feature routine inspections, photo-monitoring, and formal vegetation sampling to guide ongoing management, ensuring the crossing supports a rich biodiversity and addresses the needs of SAR while deterring human interference.

A multifaceted monitoring and management strategy is proposed, focusing on both vegetation and wildlife movement to ensure the crossing meets its goals of habitat connectivity and mortality reduction. Photo-monitoring and formal vegetation sampling will track ecological changes, while focal species monitoring will assess the crossing's effectiveness for wildlife. Adaptive management will play a crucial role, with ongoing evaluations leading to potential modifications in design, microhabitat elements, and fencing to optimize the crossing's functionality. Regular inspections, documentation of human interference, and invasive species control are integral to the plan, ensuring the crossing remains a vital and effective wildlife corridor.

Commitments for Additional Work and Permits and Approvals

While the Class EA process has been supported by various technical studies, the project's next phase will necessitate additional studies. This phase will involve enhanced consultation and coordination with key stakeholders to refine and advance the project design. Moreover, the acquisition of several permits and approvals will be a critical part of advancing the project. These future actions and the associated commitments are detailed in the ESR.

Consultation Program

Comprehensive consultation was a key component of the Class EA Study. The consultation process carried out during the Class EA study was designed to exceed the formal notice and consultation requirements of the Class EA process. Consultation was carried out with public, Indigenous Nations, government agencies, ETR, utilities owners, and key stakeholder groups. The following activities were completed as part of the consultation program:

- A project webpage was setup at the commencement of this project on the City of Windsor's website. Information related to the Class EA study was posted on this webpage throughout the study, including study notices, materials related to Public Information Centres, and study reports. The project webpage can be accessed from the following link: https://www.citywindsor.ca/residents/Construction/Environmental-Assessments-Master-Plans/Pages/Ojibway-Parkway-Wildlife-Crossing-Class-Environmental-Assessment.aspx

- A Study Contact List was developed at the commencement of this Class EA study to identify contacts that may have an interest in this study. This list included contacts from the local Indigenous Nations, provincial government agencies, Essex Region Conservation Authority, emergency services provider, Town of LaSalle, ETR, utilities owners, special interest groups, members of the public who expressed interest in the study and the area residents and businesses. The Contact List was updated throughout the study.
- Study notices were distributed via serval methods, including postings on the project webpage, the City's Twitter and Facebook pages; publication in the local newspapers; email circulation and mail distribution to the contacts on the Study Contact List.
- Meetings were held with the Essex Region Conservation Authority to solicit technical input at key project milestones in the Class EA Study.
- Study Notices and projects reports were shared with the Indigenous Nations for review. Where requested, meetings were also held with select Indigenous Nations.
- Three Public Information Centres were held to share the project updates and to solicit public input.
- Meetings were held with the ETR, a key stakeholder, to share project information and discuss their concerns for a Wildlife Crossing across ETR tracks.
- Meetings were held with select utilities owners to identify potential conflicts with utilities and to discuss protection and relocation measures.

Closure and Next Steps

The ESR has documented the planning, decision making and consultation process for Ojibway Parkway Wildlife Crossing in accordance with the Municipal Class EA process for a Schedule 'C' project. This report is being made available for review by the Indigenous Nations, the public, government agencies, ETR, utilities owners, and interested stakeholder groups. The location and timing of the review of this report is being identified in the Notice of Study Completion. Interested persons may provide written comments to the following contact in accordance with the timeline identified in the Notice of Study Completion:

Michael Todd, P.Eng.
Project Administrator
Engineering Department – Corporate Projects
mtodd@citywindsor.ca

Provided that no Section 16 Order Requests are received, this project can proceed to detailed design phase. Information on Section 16 Order Request process is provided in the ESR.

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Figures

Appendices

1 Introduction and Background

1.1 Study Introduction

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1.2 Study Area

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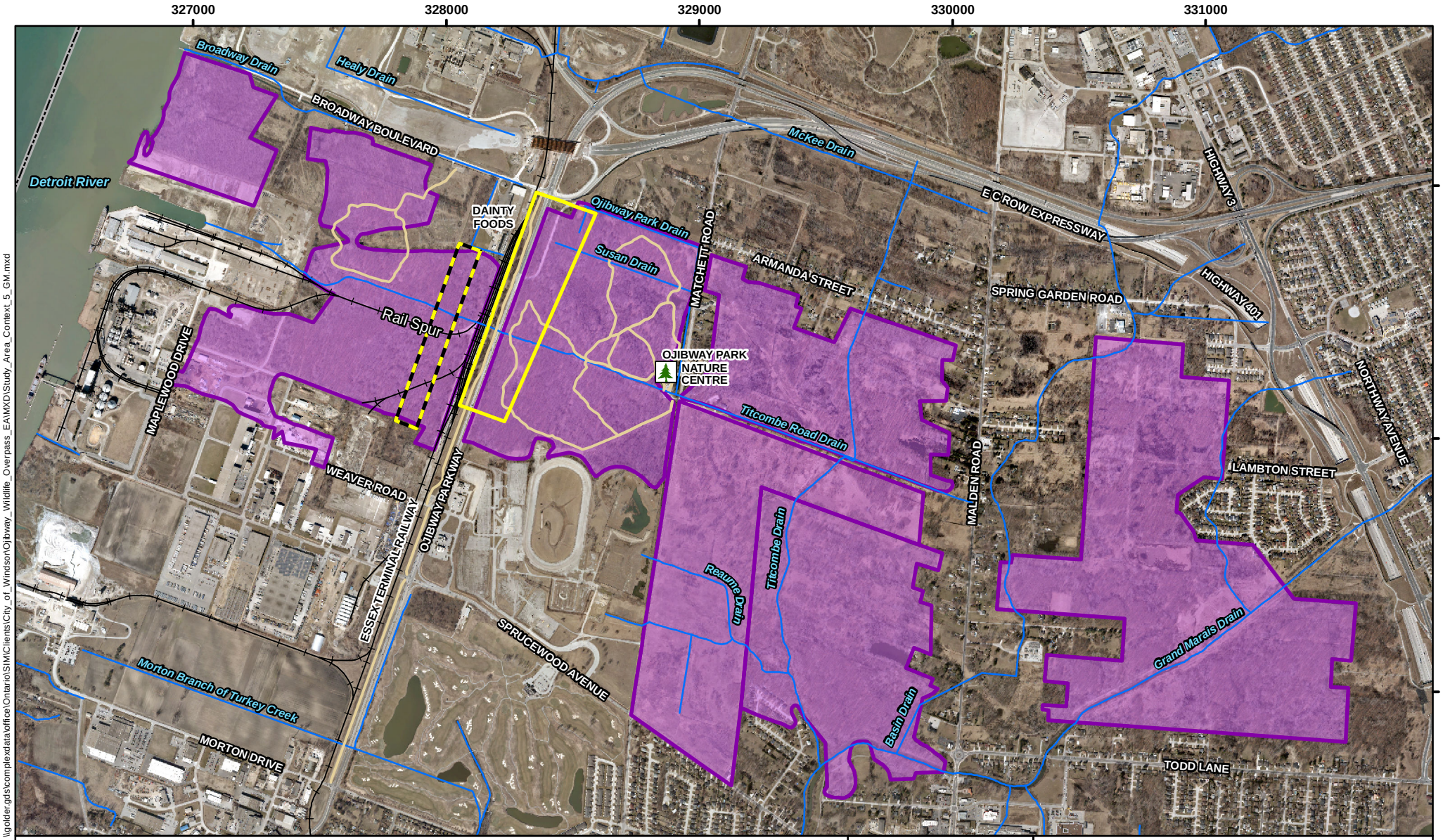

LEGEND

- Ojibway Prairie Complex (Prairie Remanants) ANSI
- Ojibway Park Nature Centre

Project Area

- East Study Area
- West Study Area

- Official Park Trail (Ojibway Parkway Multi-use Trail, Ojibway Park Multi-use Trail and Black Oak Heritage Park Multi-use Trail)
- Watercourse / Drain
- Railway
- National Border

NOTES:
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0 250 500 1,000 1,500 2,000 Metres

Datum: NAD83
Projection: UTM Zone 17N

N W E S

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OJIBWAY PARKWAY WILDLIFE CROSSING

Study Area Context

PROJECT N°: IM20104013	FIGURE: 1-1
SCALE: 1:21,000	DATE: June 2024

1.3 Description of Other Local Ecopassages and Crossings

There are currently two constructed ecopassages within the City, both associated with the Rt. Hon. Herb Gray Parkway (Parkway). Tunnel Top T5, located northwest of Todd Lane and Cabana Road West, is 160 meters (m) long by 120 m wide (575 m^2), spanning the below-grade portion of Highway 401. The outer edges of T5 are protected by parapet walls, fencing and dense vegetation to help safely guide wildlife across the structure. At the east end, a large concrete box culvert provides safe passage for small wildlife under the Parkway's integrated multi-use trail.

Tunnel Top T5 is vegetated with native grasses, wildflowers and shrubs that provide suitable wildlife habitat on the structure and an effective ecological connection between Spring Garden Natural Area (SGNA) and Oakwood Natural Area. The T5 ecopassage is used by various wildlife, including deer, coyote, wild turkey and two SAR snakes. Ground-nesting birds and SAR plants have also been observed on the structure.

The other ecopassage is located at Matchett Road, just north of Chappus Street. This structure is a 16 m ACO Wildlife KT500 Slotted Tunnel. It fits flush to the roadway, and the slotted upper surface allows airflow in and out of the tunnel. The ecopassage was installed to facilitate movement of SAR snakes from protected habitat within the Chappus Street Restoration Area (east side of Matchett Road) to created habitat within the Parkway ecological landscape. To date, SAR snakes have approached the tunnel entrance on the east side of Matchett Road but have not yet travelled through the tunnel.

Lastly, there is a desire to provide ecological connection across Matchett Road and Malden Road, ultimately providing an ecological connection between Ojibway Park and the Spring Garden Natural Area. A study under separate cover has evaluated options for this aspiration.

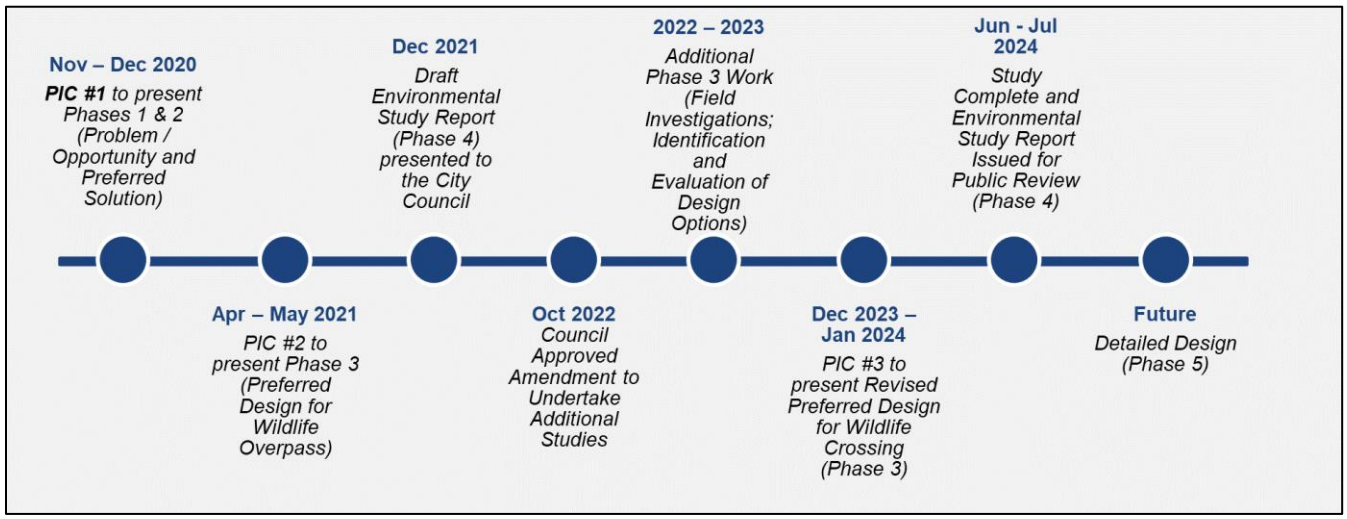
1.4 Study Timeline

The Study was initiated in 2020 with the release of Notice of Study Commencement and hosting of Public Information Centre (PIC) #1, where alternative solutions were shared. These alternative solutions included a Wildlife Overpass and a Wildlife Underpass across Ojibway Parkway, as well as options for their locations. The Wildlife Overpass over Ojibway Parkway was carried forward as the Preferred Solution. Following PIC #1, the Study Team developed and evaluated the alternative design options for the Wildlife Overpass over Ojibway Parkway to identify a Preliminary Preferred Design. PIC #2 was held in April – May 2021 to present the Preliminary Preferred Design for the Wildlife Overpass. Following this event, the draft ESR was prepared and presented to the Council for endorsement. Significant comments were received from the Indigenous Nations, the public, government agencies, and key stakeholder groups that the proposed Wildlife Crossing should extend across ETR tracks (in addition to Ojibway Parkway) to provide full connectivity between Ojibway Park Area and Black Oak Heritage Park Area. Accordingly, the Study Team expanded the Study Area, completed additional ecological field studies and connectivity analysis, and developed revised design options. These design options were evaluated to identify a preferred design for the Wildlife Crossing that crosses Ojibway Parkway and ETR tracks. This information was presented at PIC #3.

It is important to note that the draft ESR was initially endorsed by the City of Windsor's Council (Council), by CR549/2021, on December 20, 2021. Subsequent to Council's endorsement, and before issuing the Notice of Study Completion, the draft ESR was circulated to the Indigenous Nations, relevant Government Agencies, and the ETR for their review. The feedback received prompted the continuation of the Class EA Study. Consequently, an updated preferred design for the Wildlife Crossing was selected. This crossing would extend over both Ojibway Parkway and the ETR tracks. At the time of finalization of this report, the Study Team had intended to present it to the City Council for endorsement at the Council Meeting of July 22, 2024.

The chorological timeline of the Study progress is summarized in the graphic below.

Figure 1-2: Study Timeline



1.5 Background

The Ojibway Prairie Complex is a collection of six closely situated natural areas in the City of Windsor. The location of these natural areas is shown in Figure 1-1. From west to east, these natural areas are:

- Black Oak Heritage Park (formerly known as Black Oak Woods; Ojibway Black Oak Woods),
- Ojibway Park (locally also known as Ojibway Tom Joy Woods Park),
- Ojibway Prairie Provincial Nature Reserve,
- Tallgrass Prairie Heritage Park (formerly known as Titcombe Road North),
- Spring Garden Natural Area (formerly known as Springgarden Forest; Springgarden Road Prairie), and
- Oakwood Natural Area.

Because of a tremendous biodiversity of vegetation and animal life, the Ojibway Prairie Complex has received the designation of the Ojibway Prairie Remnants Area of Natural and Scientific Interest (ANSI), as well as being identified as a Carolinian Canada site (Government of Ontario, 2002). The Ojibway Prairie Complex includes wetlands, forest, savanna and prairie, which provide habitat for a significant number of rare plants, insects, reptiles, birds and mammals.

The tallgrass prairie and related plant communities, such as oak savannah, are the dominant feature in the Ojibway Prairie Complex . Tallgrass prairie and oak savannah communities are designated as critically imperilled in Ontario (Rodger, 1998). Altogether 533 flowering plant species have been documented in and around the Ojibway Prairie Complex, of which more than 60 are of prairie affinity (Government of Ontario, 2002). Animal species representative of prairie habitats and found in the Ojibway Prairie Complex include Butler's Gartersnake, Eastern Meadowlark, and False-foxglove Sun Moth, all of which are SAR (Government of Ontario, 2002).

The City has been working with Parks Canada to advance the creation of a national urban park (NUP) at the Ojibway Prairie Complex. The NUP project has progressed past the Pre-feasibility Assessment Phase, which included exploratory work to fully understand the natural and cultural values of the proposed NUP sites, including: vegetation communities (present and historical); flora and fauna; significant natural heritage features; significant wildlife habitat (SWH); SAR; and road ecology (WSP, 2023a; WSP, 2023b; WSP, 2023c; WSP, 2024). The natural areas included

in the study area are currently under a variety of jurisdictions, including municipal, provincial, federal, and private.

Important to the NUP program and other proposed projects in the City of Windsor is the maintenance and/or improvement of ecological connections between natural areas. The City has recently completed two wildlife crossing studies with the goal to: identify the species and their existing crossing locations along roads that bisect the Ojibway Prairie Complex and; identify potential movement corridors and/or connection points where ongoing monitoring can be used to inform crossing designs and placement locations (WSP 2023a and Wood 2021). Preliminary results of these studies indicate that wildlife in the Ojibway Prairie Complex use undeveloped rights-of-way, such as naturalized road easements and utility corridors, to move between the natural areas. Connection points where wildlife approach roadways also include openings in existing fences and where drainage features meet the roads.

Trail camera imagery shows that wildlife will use existing infrastructure such as culverts and bridges to facilitate their movements between natural areas (WSP 2023a). The most significant of these crossings is the Tunnel Top T5 constructed as part of the Rt. Hon. Herb Gray Parkway. This ecopassage stretches over Highway 401 and Highway 3 and has facilitated the movement of wildlife between Spring Garden Natural Area and Oakwood Natural Area, which were previously separated by the Huron Church Road (Ministry of Transportation, 2016). Populations of SAR snakes, both Butler's Gartersnake and Eastern Foxsnake, use this crossing to safely move between reconnected habitats. Other wildlife observed crossing the ecopassage include Wild Turkey, White-tailed deer, Coyote, Northern Raccoon, and Striped Skunk.

Ojibway Parkway carries approximately 20,000 vehicles per day, which contributes to the functional separation between Ojibway Park Area and Black Oak Heritage Park Area. Traffic along Ojibway Parkway is expected to increase with the development of the Gordie Howe International Bridge. The purpose of the Wildlife Crossing is to re-establish an ecological connection between Black Oak Heritage Park Area and Ojibway Park Area. The Crossing aims to improve ecological connectivity and provide safe passage for wildlife and SAR across the Ojibway Parkway as well as ETR tracks.

The WDBA was a funding partner for the commencement of the environmental assessment. The intent for the City is to seek future funding and obtain approval through the Capital Budget process. The location of the Crossing has been selected after careful consideration of engineering requirements, existing site conditions, and previous studies and literature.

The preferred location of the Crossing considers wildlife-related concerns, including habitat fragmentation and connectivity for several wildlife groups, as well as plants. The preferred location also considers the loss of habitat and secondary and cumulative impacts to the existing landscape.

The goal of the Crossing is to provide a safe, attractive, fiscally responsible, and minimally impactful ecological connection over Ojibway Parkway. The Crossing location considers that wildlife-vehicle collisions tend to occur where animals find it easier to cross roads and where there is habitat availability on either side of the road.

Monitoring would be implemented to determine whether the basic functions of the wildlife crossing are being met and to ensure that this crossing is permeable to wildlife.

2 Environmental Assessment Process

2.1 Ontario's Environmental Assessment Act

The Ontario *Environmental Assessment Act* (R.S.O. 1990, c. E.18; EA Act) (Ontario, 1990) was put into place to provide for the protection, conservation and wise management of the environment within the province. The EA Act applies to all projects being undertaken by provincial, municipal or other public bodies within the province (unless explicitly exempted). It defines the environmental assessment studies that must be completed prior to commencement of any undertaking, as well as the proponent's obligations to consult with all affected and/or interested parties.

Under the EA Act, projects are classified as exempted, subject to an approved Class EA process, or subject to a full Individual Environmental Assessment. This environmental assessment was conducted in accordance with the requirements of the Municipal Class EA process (Municipal Engineers Association, 2023).

The Class EA process is a mechanism by which planning, and approval of municipal infrastructure is provided in an efficient, timely, economical and environmentally responsible manner. It represents a consistent, streamlined and easily understood process for planning and implementing municipal infrastructure projects.

2.1.1 Municipal Class Environmental Assessment Process

The Municipal Class EA process is an approved process under Ontario' *EA Act*. All municipalities in Ontario are required to follow this approved process for the infrastructure planning projects. The Municipal Class EA process classifies projects according to their level of complexity and potential environmental impacts. These are termed "Schedules" and are summarized below.

Exempt Projects include various municipal maintenance, operational activities, rehabilitation works, minor reconstruction or replacement of existing facilities, and new facilities that are limited in scale and have minimal adverse effects on the environment. These projects were formerly classified as Schedule A and A+ projects. These projects are exempted from the requirements of the *Environmental Assessment Act* (Ontario, 1990).

Schedule B includes projects that involve improvements and minor expansion to existing facilities. There is a potential for some adverse environmental impacts and, therefore, the proponent is required to proceed through a screening process, including consultation with those affected. Schedule B projects are required to proceed through Phases 1, 2 and 5 of the Class EA process.

Schedule C includes projects that involve construction of new facilities and major expansion of existing facilities. These projects proceed through the environmental assessment planning process outlined in the Class EA document. These projects are required to fulfil the requirements of all five phases of the Class EA process.

The Municipal Class EA process includes five phases. Schedule 'C' projects require that all five phases be conducted. Phases 1, 2, 3, and 4 are part of this study; the fifth phase would be initiated following completion of this study. A description of the Class EA planning phases is provided below.

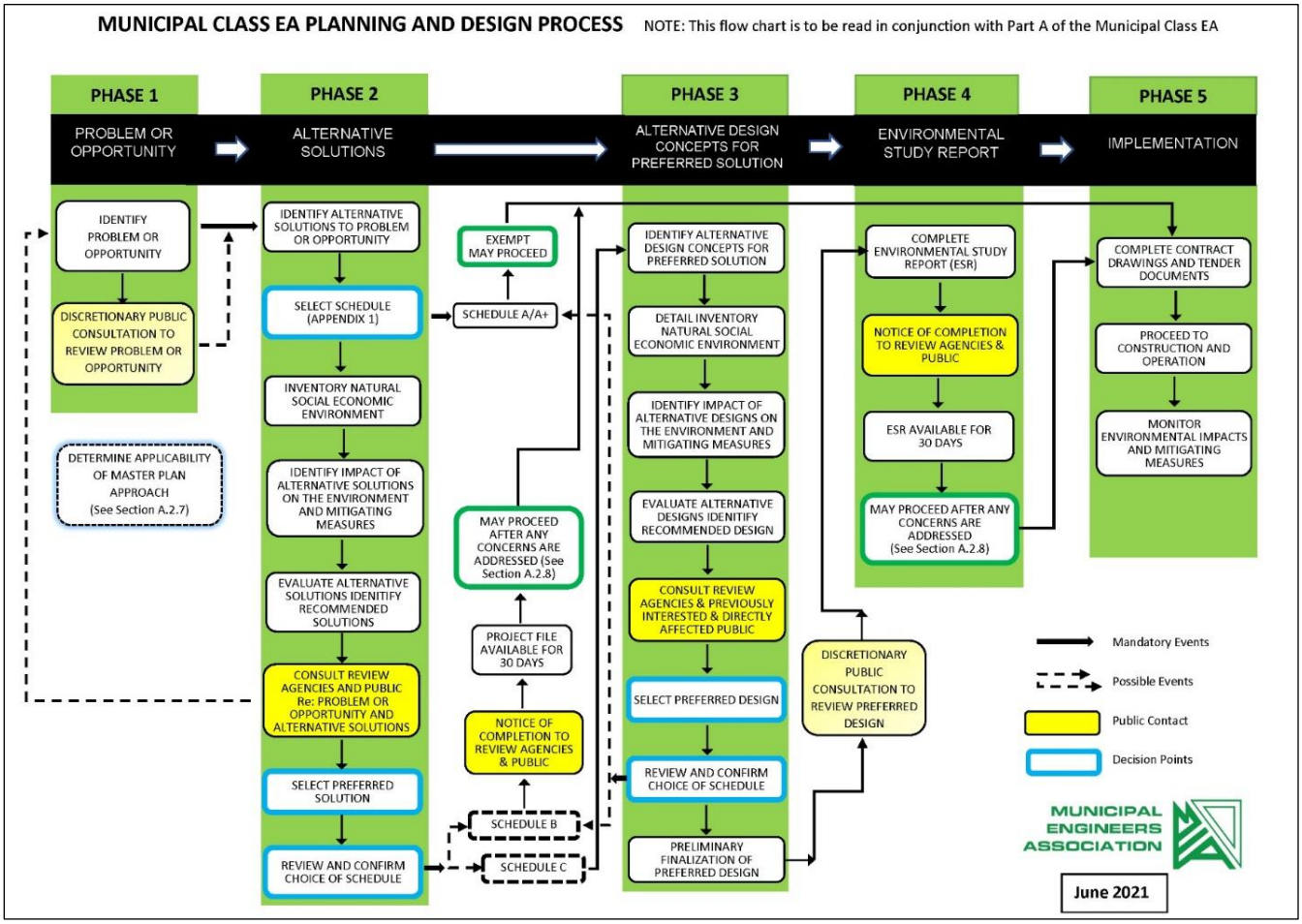
- **Phase 1 – Problem or Opportunity Statement:** Identify the problem (deficiency) or opportunity.
- **Phase 2 – Alternative Solutions:** Identify and evaluate alternative solutions to address the problem or opportunity by taking into consideration the existing environment and establish the preferred solution considering public and review agency input.
- **Phase 3 – Alternative Design Concepts for the Preferred Solution:** Identify Alternative Design Concepts for the preferred solution implementation by taking into consideration the existing

environment and establish the preferred design concept by considering public and review agency input.

- **Phase 4 – Environment Study Report:** Document and file the Environmental Assessment including the design and consultation process in an ESR for public review.
- **Phase 5 – Implementation:** Complete detailed design and required additional investigations, obtain permits and approvals, and proceed to construction and operation. Monitor construction for adherence to environmental provisions and commitments. Where special conditions dictate, also monitor the operation of the completed facility.

A graphical illustration of the Municipal Class EA process is provided in the following figure.

Figure 2-1: Municipal Class Environmental Assessment Process



2.2 Environmental Study Report

This report was developed to document Phases 1 – 4 of the Class EA process for this project. This report is divided into following sections:

Section 1 provides introduction to the study and the study process.

Section 2 discusses the environmental assessment process followed for this study.

Section 3 outlines the need for the project and provides justification for the Wildlife Crossing.

Section 4 summarizes the various federal, provincial, and municipal policies that are applicable to this project.

Section 5 provides a description of the existing conditions within the Study Area.

Section 6 outlines key road ecology concepts.

Section 7 discusses alternative solutions (Overpass Crossing vs Underpass Crossing) that were evaluated to identify the preferred solution.

Section 8 discusses design options for the Wildlife Overpass that were developed and evaluated to identify a preferred design option.

Section 9 provides a detailed description of the preferred design, including the preliminary cost estimate.

Section 10 identifies project's potential effects and proposed mitigation measures.

Section 11 outlines the monitoring plan and commitments for future work, including required additional investigations and permits/approvals.

Section 12 provides a summary of the consultation program completed for this project.

Section 13 outlines the Section 16 Order Request process.

Section 14 lists all the documents cited throughout the report.

3 Problem Statement

Phase 1 of the Class EA process requires that a clear statement be developed to outline the problem or opportunity statement to be addressed by an undertaking. For this project, the following problem and opportunity statement was developed:

The City of Windsor is undertaking a Municipal Class Environmental Assessment Study to consider the construction of a Wildlife Crossing across Ojibway Parkway and Essex Terminal Railway (ETR) tracks, south of Broadway Boulevard, to begin to re-establish an ecological connection between the natural areas associated with Black Oak Heritage Park and Ojibway Park.

The 20 m wide Ojibway Parkway that carries approximately 20,000 vehicles per day, as well as the 8 tracks operated by the ETR to the west of the Ojibway Parkway inhibit wildlife movement and ecological functions. The Wildlife Crossing would provide a connection for local tallgrass prairie plant communities and safe passage opportunities for wildlife, including species at risk. The proposed Wildlife Crossing thereby reduces landscape fragmentation through improvement of habitat connectivity in the Ojibway Prairie Complex. In addition, the Wildlife Crossing would improve safety of the travelling public on Ojibway Parkway by reducing wildlife-vehicle interactions.

As long linear features on the landscape, roads and railways are believed to be one of the main obstacles to movement and have impacts on wildlife and wildlife habitat; herein, both types of linear infrastructure are considered together as 'roads' (Jackson, 2000; Yanes, Velasco, & Suárez, 1995).

This Class EA Study was initially focused on identifying a Wildlife crossing across Ojibway Parkway. The draft ESR was initially endorsed by the City Council on December 20, 2021. Subsequent to Council's endorsement, and before issuing the Notice of Study Completion, the draft ESR was circulated to the Indigenous Nations, relevant government agencies, and the ETR for their review. As a result of input received from the Indigenous Nations, government agencies, and ETR, the scope of the Class EA Study was broadened to identifying a Wildlife Crossing across Ojibway Parkway as well as ETR tracks.

Roadways (local roads, rural highways, highways) are required to transport humans and goods. As the human population increases, the dependency on roadways and connectivity to family, friends, and workplaces increases. In the last couple of decades there has been increased recognition that road design and landscape ecology are intertwined. It has led to the heightened consideration of road effects on wildlife and corresponding wildlife mitigation strategies (Ministry of Transportation, 2016). In 2017 and 2018, 48,969 km of new roads were constructed in Canada, an average of 24,000 km per year (Statistics Canada, 2020). The average significantly increased from 9,000 km per year from 2000 to 2016 (Statistics Canada, 2020). Federal budgets for 2019, 2020, and 2021 committed to major municipal infrastructure investments. In the 2020-2021 budget, Infrastructure Canada aims to fund and support the WDBA in advancing the Gordie Howe International Bridge (Government of Canada, 2020). The infrastructure budget also will support communities in their efforts to add climate resilience considerations to their infrastructure planning processes, such as increasing focus on the adoption of natural infrastructure solutions to provide low-cost answers to climate challenges, while providing additional benefits in the form of carbon storage, increased wildlife habitats, food security, recreational opportunities and health benefits (Government of Canada, 2020).

Roadways and their associated infrastructure are a human-dominated need, and wildlife is often not considered. Roadways cut off natural areas, which reduces animals' and plants' access to resources required for the continued survival of the population. The network of roadways, infrastructure, and extensive agriculture in southern Ontario traps wildlife in a fragmented landscape (habitat fragmentation, barrier effects, and habitat loss and degradation). Animals will still attempt to access natural areas which are bisected by roadways resulting in wildlife road-kill or Wildlife-vehicle Collisions (WVCs). WVCs have long been understood to be of profound socio-economic, traffic safety, and environmental costs. Data from WVCs are often only reported when the wildlife causes death or significant property damage- i.e.

when a moose or deer is involved. Smaller animals, such as foxes, raccoons, and turtles, tend to be reported if drivers cause an accident while trying to avoid them.

Additionally, data sources are scattered and lacking; however, various monetary values of WVCs exist. The Wildlife-vehicle Collisions in Canada: A Review of the Literature and a Compendium of Existing Data Sources (Traffic Injury Research Foundation, 2012) estimates the minimal annual direct cost as $200 million (in 2012) and continuing to rise. In the Ontario Road Safety Annual Report (Ministry of Transportation, 2018), WVCs (which involved large animals) resulted in four fatalities, 329 personal injuries, and 11,721 WVCs which caused property damage. According to the Wildlife Collision Prevention Program (WCPP), it is estimated that there are 4 to 8 large animal WVCs every hour in Canada (Wildlife Collision Prevention Program, 2021). The WCPP also estimates that in British Columbia 18,300 large animal deaths go unrecorded per year and that the costs of clean-up and animal disposal were over $770,000 in 2012. Regarding under-reported small animals, a study was completed on the Thousand Islands Parkway in eastern Ontario over five months and found that 24,000 WVCs occurred (Eberhardt, 2008). Additionally, a local study estimated that SAR reptiles were killed on roads across the Ojibway Prarie Complex at a minimum average of 19 individuals a month (Choquette & Valliant, 2016). As no property damage or personal injuries are reported for small animal WVCs, there is no estimated 'human cost.' However, the potential mortality of tens of thousands of animals a year and approximately 20 SAR a month is an important issue and will have a wide range of spatial and temporal effects on the local wildlife populations (Eberhardt, 2008).

The short and long-term costs of wildlife crossings would be offset by the savings of reducing WVCs. Wildlife crossings have been proven effective in reducing WVCs and benefiting biodiversity. A variety of sources regarding road ecology were reviewed. Sources included journals, conference presentations and technical papers (grey literature), articles, and previous studies in Ontario and beyond. Information on preferred crossing types, crossing widths, ingress and egress locations and styles, fencing considerations, and crossing location preferences were noted and are included within this report.

4 Policy Context

This section elaborates on the current planning context by discussing current policy and regulations. The proposed solution was screened for compliance with plans, policies and legislation relating to the natural heritage which included the following:

4.1 Federal Policy Context

4.1.1 Species at Risk Act

The purpose of the *Species at Risk Act (SARA)* is to prevent wildlife species in Canada from disappearing, to provide for the recovery of wildlife species, and to manage species to prevent further risk to their status. Only species listed as Threatened, Endangered, or Extirpated under Schedule 1 are afforded both individual and habitat protection under *SARA*. The Act applies to federal lands (e.g., Canada's oceans and waterways, national parks, military training areas, national wildlife areas, some migratory bird sanctuaries, and First Nations reserve lands). Outside of federal lands, *SARA* legislation only applies to the following:

- Migratory birds (i.e., those species listed under Article I of the Migratory Birds Convention Act, 1994) that also fall under Schedule 1 of *SARA*. This does not include the species' critical habitat, and
- Aquatic species that fall under Schedule 1 of *SARA*.

Notably, SARA prohibitions can be applied if provincial legislation or voluntary measures do not adequately protect federally listed species and their residence. Generally, compliance with provincial legislation will satisfy the requirements under the *SARA*.

Applicability to the Project

The Project Site is not located within federal lands (e.g., Canada's oceans and waterways, national parks, military training areas, national wildlife areas, some migratory bird sanctuaries, and First Nations reserve lands). Additionally, this EA is a municipal undertaking, and no restrictions apply based on potential funding partners. Intermittent municipal drains occur onsite and are mapped as watercourses. These watercourses do not hold water and therefore are not fish habitat. *SARA* applies to this Project concerning federally listed migratory birds that may occur.

4.1.2 Migratory Birds Convention Act

The *Migratory Birds Convention Act (MBCA)* prohibits harming and/or killing most species of birds and/or destroying or collecting their eggs or nests. The *MBCA* does not permit the incidental take of a migratory bird or its nest, with some exceptions. Protected species are listed under Article I of the *MBCA*. These species are native or naturally occurring in Canada and are species that are known to occur regularly in Canada. Most birds found in the Project Site receive protection under the *MBCA*, and nearly all of the remaining species receive similar protection under the provincial *Fish and Wildlife Conservation Act*.

The *MBCA* and *Migratory Birds Regulations (C.R.C., c. 1035)* are federal legislative requirements that are binding on members of the public and all levels of government, including federal and provincial. The new MBR 2022, provides protection to migratory bird nests when they are considered to have a high conservation value for migratory birds (i.e., generally during the nesting period). The nests of 18 species, whose nests are reused or subsequently used by other species, continue to have year-round nest protection unless they have been shown to be abandoned. The "incidental take" of migratory birds and the disturbance, destruction or taking of the nest of a migratory bird is prohibited. No permit can be issued for the incidental take of migratory birds.

Bird species not regulated under the *MBCA* include Rock Dove, American Crow, Brown-headed Cowbird, Common Grackle, House Sparrow, Red-winged Blackbird, and European Starling. Some species are not protected under the MBCA but are listed under the ESA (e.g., Rusty Blackbird).

Environment and Climate Change Canada (ECCC) and the Canadian Wildlife Service have compiled nesting calendars that show the variation in nesting intensity by habitat type and nesting zone within broad geographical areas distributed across Canada. While this does not mean nesting birds will not nest outside of these periods, the calendars can be used to reduce the risk of encountering a nest.

Applicability to the Project

The *MBCA* applies to all of Canada. As such, the *MBCA* applies to the Project. Therefore, if a protected species or their nest is encountered during Project activities, the Project must comply with the prohibitions of the *MBCA* and Migratory Birds Regulations; this includes following appropriate timing windows or Best Management Practices for vegetation removals. The Project site occurs in nesting zone C1, which has a regional nesting period of late March to late August. The nesting period is developed based on the nesting history of species known to occur in the general habitat (open, wetland, forest habitats). In open habitats, it is predicted that nesting is likely to start around March 28th and continue to August 26th. In wetland habitats, it is predicted that nesting is likely to start around March 23rd and continue to August 15th. In forest habitats, it is predicted that nesting is likely to start around March 23rd and continue to August 26th. Given the climatic and species variables, vegetation removal should be avoided between March 23rd and August 26th in any given year.

Additionally, the nests of the Pileated Woodpecker, Great Blue Heron, and Green Heron (and 15 other species) have year-round protection from destruction. A mandatory wait period before the nest of these species must be observed. The nest must be proven abandoned before removal and registered, if documented.

4.1.3 Fisheries Act

The *Fisheries Act* provides protection to fish and fish habitats such that:

"No person shall carry on any work, undertaking or activity, other than fishing, that results in the death of fish.", and

"No person shall carry on any work, undertaking or activity that results in the harmful alteration, disruption or destruction of fish habitat"."

The *Act* defines fish habitat as:

"water frequented by fish and any other areas on which fish depend directly or indirectly to carry out their life processes, including spawning grounds and nursery, rearing, food supply and migration areas".

The *Fisheries Act* requires that any development project avoid the death of fish, as well as harmful alteration, disruption or destruction of fish habitat unless authorized by Fisheries and Oceans Canada. If mitigation measures cannot be applied, and residual effects will cause a harmful alteration, disruption or destruction of fish habitat, then provisions under the *Act* may apply (i.e., approval).

Applicability to the Project

This project does not involve work in or near potential fish habitat. As such, the Fisheries Act does not apply to this project. The Detroit River is 1.5 km west of the Study Area, with Black Oak Heritage Park located between the Study Area and the river.

4.2 Provincial Policy Context

4.2.1 Endangered Species Act

In Ontario, SAR are determined by the Committee on the Status of Species at Risk in Ontario (COSSARO). If a species is listed under the Ontario *Endangered Species Act (ESA)* as Extirpated, Endangered, or Threatened, Section 9 of the *ESA* prohibits killing, harming, harassing, capturing, taking, possessing, collecting, buying, selling, leasing, trading or offering to buy, sell, lease or trade a member of the species. Similarly, Section 10 of the *ESA* prohibits the damage or destruction of the habitat of all Endangered and Threatened species. Habitat is broadly characterized within the *ESA* as the area prescribed by regulation as the habitat of the species or an area on which the species depends directly or indirectly, to carry on its life processes, including reproduction, rearing of young, hibernation, migration or feeding. Habitat is specifically defined for some species. Species listed as Special Concern are not afforded protection under Section 9 and 10 of the *ESA*; however, they are protected under SWH.

Destruction of SAR and their habitats constitutes a contravention of the *ESA* unless authorized by the Ministry of the Environment, Conservation and Parks (MECP). The MECP may authorization damage to habitat or individuals by way of registration or permit.

Applicability to the Project

Protection under the ESA extends to both public and private lands. Any SAR ranked as Threatened or Endangered that may be impacted by any Project work requires consideration. If impacts on SAR or their habitat cannot be fully avoided, and an exemption does not apply (under the various regulations), a permit or registration would be required under the ESA. Based on fieldwork and secondary sources, a SAR screening was completed to document which SAR are confirmed or considered to have a high potential to occur.

4.2.2 Fish and Wildlife Conservation Act

The *Fish and Wildlife Conservation Act (FWCA)* applies to 'wildlife', which is defined as:

"an animal that belongs to a species that is wild by nature, and includes game wildlife and specially protected wildlife" (Section 1 (1))."

Those species considered "specially protected wildlife" include those specially protected amphibians, birds, invertebrates, mammals, and reptiles, as identified within Schedules 6 to 11 under the *FWCA*. The *Act* is managed by the Ministry of Natural Resources and Forestry (MNRF) and applies to all wildlife as defined under the *FWCA*. In instances where wildlife will require collection or relocation at any point in the project (i.e., through trapping/collection and relocation), permits and approvals under the *FWCA* may be required.

Applicability to the Project

The probability that wildlife is found in the Project footprint and do not leave on their own accord is low. As such, permits/approvals under the *FWCA* are not expected to be necessary.

4.2.3 Conservation Authorities Act

The *Conservation Authorities Act (CAA)* authorizes the formation of conservation authorities in Ontario and addresses their roles, responsibilities, and governance in resource management and environmental protection. The purpose of the CAA is:

"to provide for the organization and delivery of programs and services that further the conservation, restoration, development and management of natural resources in watersheds in Ontario."

Section 28 of the *CAA* sets out certain prohibited activities that include development in areas that could be unsafe for development because of natural processes associated with flooding or erosion, and interference with, or alterations to, watercourses, wetlands, or shorelines.

The core mandate of conservation authorities is to undertake watershed-based programs to protect people and property from flooding and other natural hazards and conserve natural resources for economic, social, and environmental benefits (Conservation Ontario, 2021). In the Project area, the *CAA* is applied by *Essex Region Conservation Authority (ERCA)*.

Applicability to the Project

The Project footprint falls just outside the ERCA regulated area (Figure 4-1). ERCA regulates the municipal drain watercourses on-site, and due to the proximity, ERCA has been consulted as a government agency. Negative impacts to the drains are not expected.

4.2.4 Provincial Policy Statement

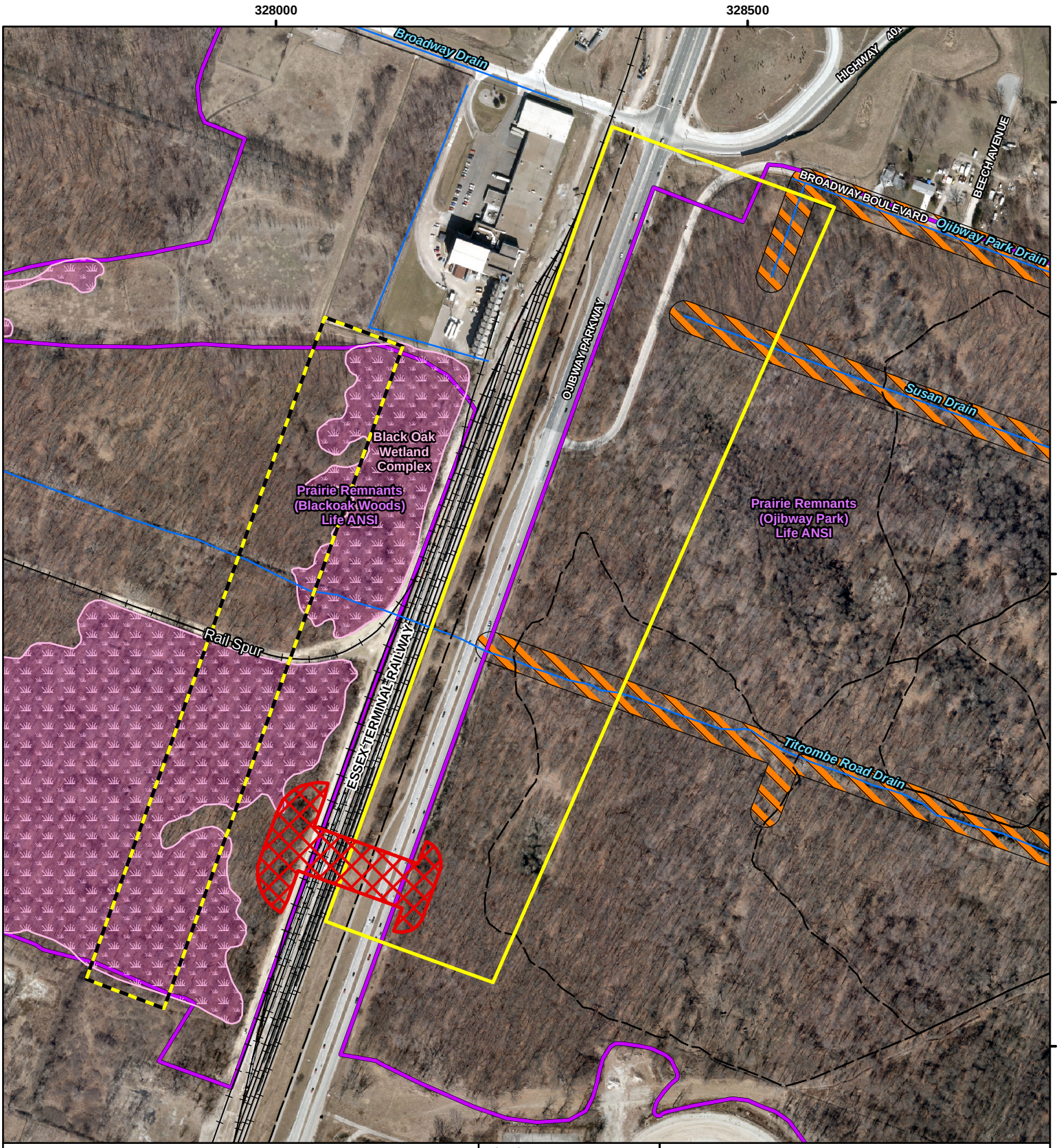
The Provincial Policy Statement (PPS), 2020 provides policy direction on matters of provincial interest related to land use planning and development (Ministry of Municipal Affairs and Housing, 2020). The PPS is comprised of various policies on development and land use patterns, resource protection and management, and public health and safety. The PPS provides policies specific to natural heritage and states that natural features must be protected for the long term. The following sections of the PPS are relevant to this project.

Section 2 of the PPS provides direction for the wise use and management of resources, including the protection of natural areas and features. Relevant natural heritage policies are in Section 2.1 of the PPS and generally states that the diversity and connectivity of natural heritage (including surface and groundwater features) should be maintained, restored or, where possible, improved. Section 2.2 of the PPS relates more specifically to water resources and supports planning authorities to protect, improve, and restore the quality and quantity of water.

The PPS provides overall policy direction and is informed by and should be read in conjunction with other provincial, regional, and municipal plans. The more stringent of policies apply unless otherwise explicitly stated.

Applicability to the Project

SWH was screened using the Significant Wildlife Habitat Technical Guideline (Ontario Ministry of Natural Resources, 2000) and Ecoregion 7E Criteria Schedules (Ontario Ministry of Natural Resources and Forestry, 2015). Fieldwork and secondary sources confirmed the presence of Significant Woodlands in Ecoregion 7E, SWH, and ANSIs (Figure 4-1). The Project must not have a negative impact on the feature and function of the natural features. The impact assessment provided in Section 10 provides a rationale for no negative impacts.



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LEGEND

- Project Footprint
- Project Area
- East Study Area
- West Study Area
- PSW Provincially Significant Wetland
- ANSI ANSI
- ERCA Regulation Area
- Watercourse / Drain
- Trails
- Railway

NOTES:
- Aerial imagery extracted from Essex County interactive map, 2019.
- ERCA regulation limits provided by Essex Region Conservation Authority.

THE CITY OF WINDSOR ONTARIO, CANADA

WSP

OJIBWAY PARKWAY WILDLIFE CROSSING

Provincial Policy Context

Datum: NAD83
Projection: UTM Zone 17N

0 50 100 200 300 400 500 Metres

N W E S

PROJECT N°: IM20104013 | **FIGURE: 4-1**

SCALE: 1:5,500 | DATE: May 2024

4.3 Municipal Policy Context

4.3.1 City of Windsor Official Plan

The City of Windsor Official Plan provides guidance for the City's development while taking into consideration important socio-economic and environmental matters and goals. Chapter 5 – Environment of the Official Plan outlines goals, objectives and policies for the environmental designations identified on Schedule B: Greenway System and Schedule C: Development Constraint Areas. Ojibway Park and Black Oak Heritage Park are identified as Natural Heritage on Schedule B, C and D of the Official Plan. Policy 5.3.2.12 of the Official Plan provides direction to Council to establish Linkages between the areas designated as Natural Heritage.

Applicability to the Project

Consistent with the Policy 5.3.2.12 of the Official Plan, this project aims to promote an ecological connection between the natural areas associated with Black Oak Heritage Park and Ojibway Park, both of which are designated as Natural Heritage.

4.3.2 Black Oak Heritage Park Management Plan

Black Oak Heritage Park Management Plan provides management recommendations for future restoration actions in the Black Oak Heritage Park. It focuses on enhancing or restoring diminished tallgrass woodland, savannah and prairie habitat for Provincially Significant or SAR flora and fauna. The plan's primary goal is to protect and restore the most productive and fragile ecosystems within Black Oak Heritage Park. To achieve this goal, three objectives must be met:

1. *Protect and restore sensitive areas of Black Oak Heritage Park identified within this Management Plan to encourage Provincially Significant species and SAR to expand their range or return to the Park;*
2. *Promote the re-establishment of connectivity through natural linkages between remnant patches of prairie, savannah and woodland to allow for undisturbed movement of SAR; and*
3. *Complete restoration activities in partnership with other organizations such as the Herb Gray Parkway, Ontario Parks, Gordie Howe International Bridge and Essex Region Conservation Authority (ERCA) projects to ensure the inclusivity of knowledge from regulatory agencies.*

Applicability to the Project

The Project intends to re-establish an ecological connection between the natural areas associated with Black Oak Heritage Park and Ojibway Park. A linkage between the two natural areas would allow for the east-west passage of SAR over Ojibway Parkway and the ETR tracks. Likewise, a connection over Ojibway Parkway and the ETR tracks would fulfil two of three objectives for Natural Heritage in the City; to protect, conserve and improve Windsor's most environmentally significant and sensitive natural areas and to link Natural Heritage areas to other components of the Greenway System.

5 Existing Conditions

5.1 Transportation

5.1.1 Existing Roadways

Ojibway Parkway is an arterial road that runs in a north-south direction from Morton Drive in the south, to Broadway Boulevard in the north, where it converts into E. C. Row Expressway. It is comprised of a total of four traffic lanes, two in each direction. Within the Study Area, the northbound and southbound lanes are separated by a landscaped median.

Broadway Boulevard forms the northern boundary of the Study Area. It is a collector road that runs in an east-west direction and is comprised of a total of two traffic lanes. Weaver Road is a collector road that runs in an east-west direction south of the southern limit of Study Area. The location of Ojibway Parkway and Broadway Boulevard in relation to the Study Area, is shown in Figure 1-1.

Existing traffic counts for Ojibway Parkway were provided by the City of Windsor. A review of traffic trends based on the Automatic Traffic Recorder (ATR) data conducted from July 15, 2019 to July 21, 2019 shows an annual average daily traffic (AADT) of 21,380 on Ojibway Parkway north of Sprucewood Avenue (Figure 5-1). The 24-hour variation in traffic trends in the northbound and southbound directions are illustrated in Figure 5-2 and Figure 5-3, respectively. The data indicates that the weekday AM peak hour occur from 7 a.m. to 8 a.m. in the northbound direction while the weekday PM peak hour occurs from 4 p.m. to 5 p.m. in the southbound direction.

Figure 5-1: 24-hour Volumes Comparison by Day of Week (Both Directions)

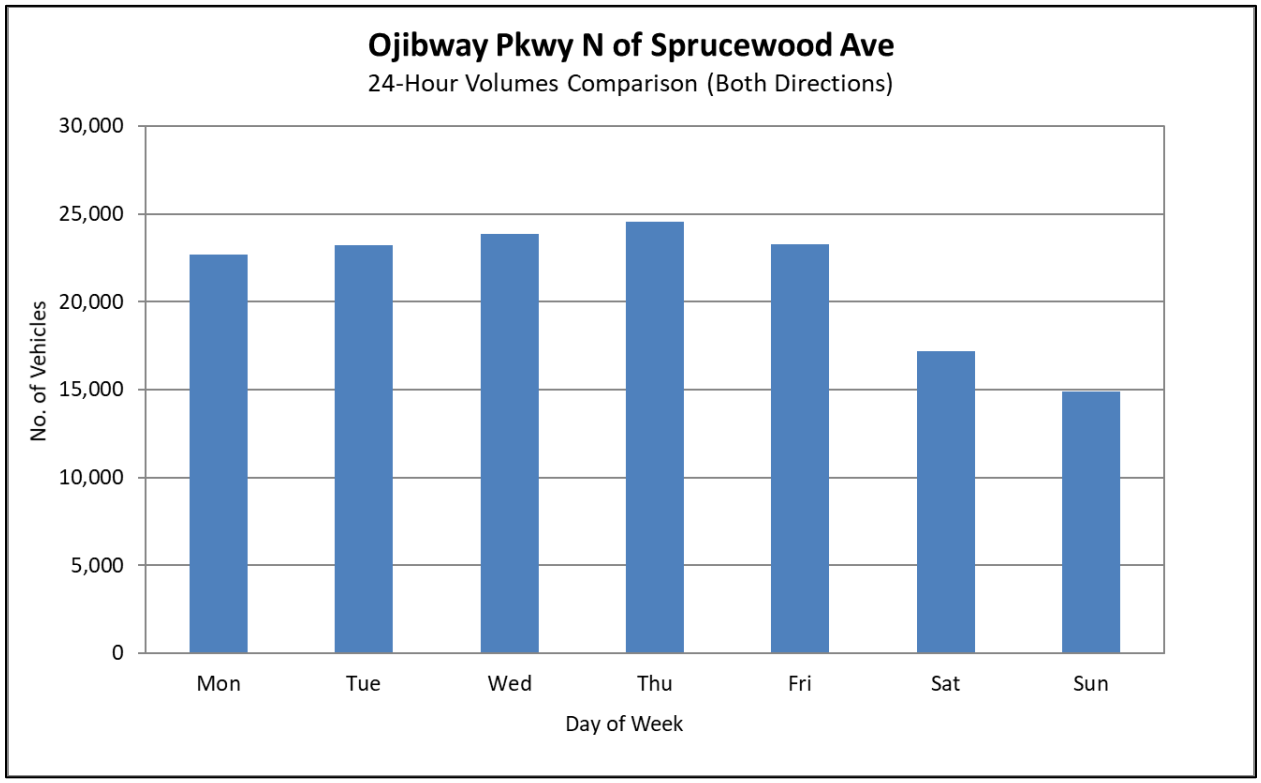


Figure 5-2: 24-hour Volumes Profile (Northbound)

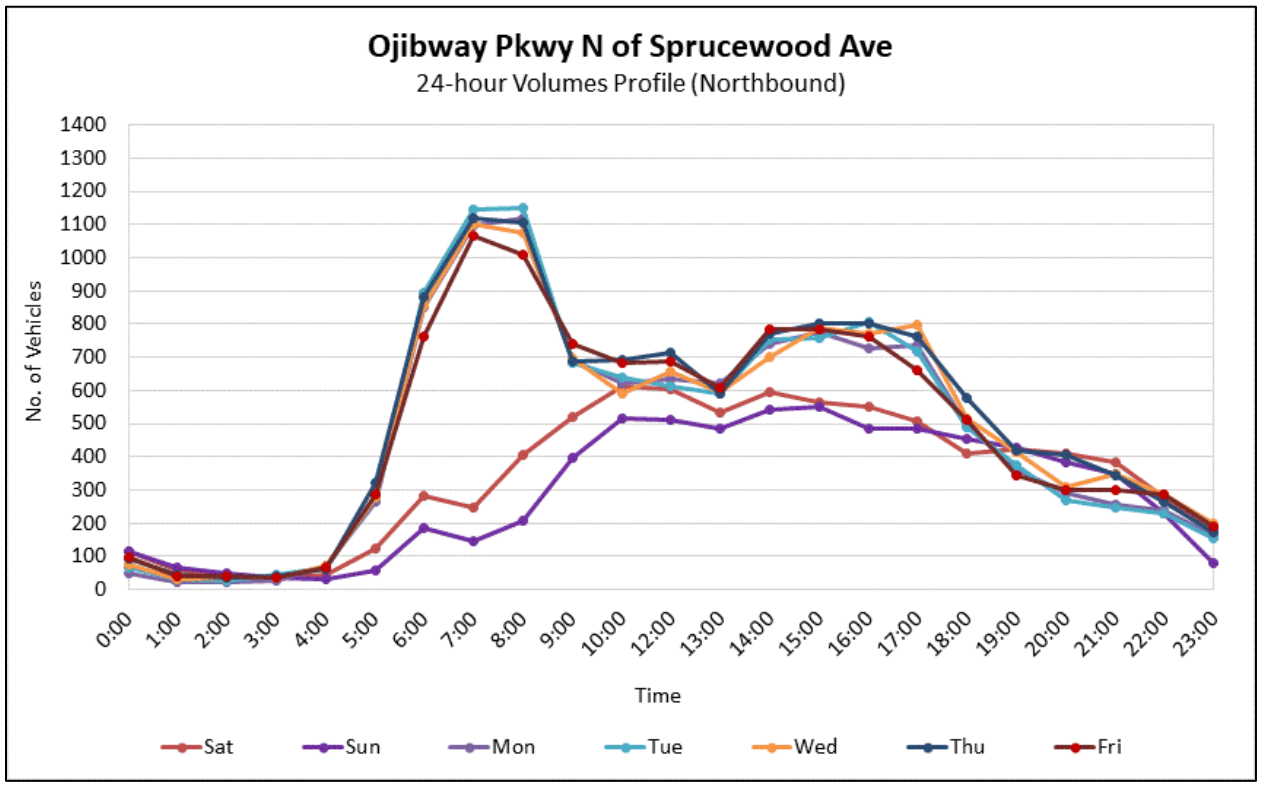
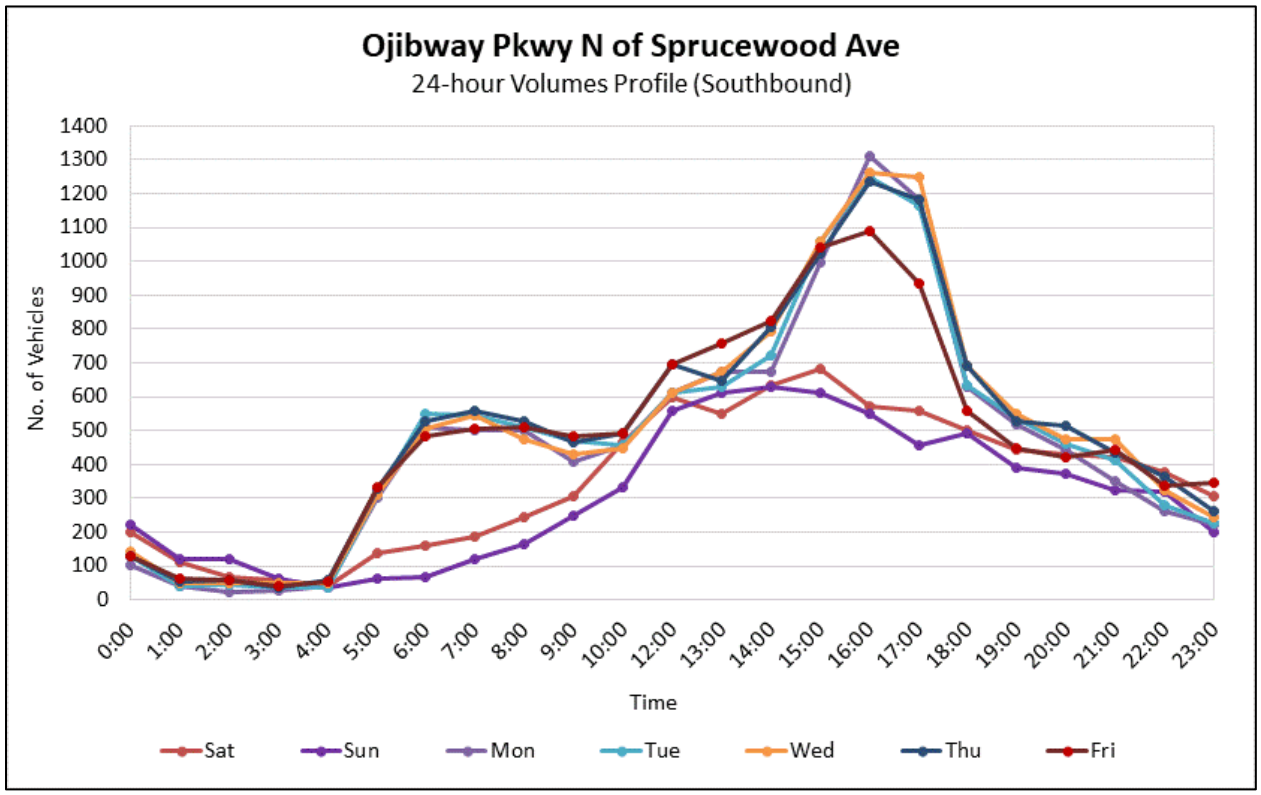


Figure 5-3: 24-hour Volumes Profile (Southbound)



5.1.2 Trails

The main trail within and adjacent to the Study Area is the Ojibway Parkway Trail. It runs in a north-south direction along the west side of Ojibway Parkway, from Morton Drive in the south to Broadway Boulevard in the north. In addition, the Ojibway Park to the east includes a series of loop trails. The location of trails is shown in Figure 1-1.

5.1.3 Essex Terminal Railway

A railway yard owned and operated by the ETR is located to the west of Ojibway Parkway in the Study Area. The ETR is a switching (or short line) railway that runs from the east side of Windsor through the Town of LaSalle and terminates in Amherstburg. The railway yard within the Study Area is connected by a single railway track, that runs in a north-south direction, and has a maximum rail operating speed of 16 kilometres per hour in both directions (Stantec Consulting Ltd., 2017). An approximately 90 metre wide strip of lands, located immediately to the west of the railway yard is also owned by the ETR. The location of railway yard and the lands owned by the ETR is shown in the following figure.

Figure 5-4: Essex Terminal Railway Yard and Lands

5.2 Social Environment

5.2.1 Land-use

The lands on either side of Ojibway Parkway, within and adjacent to the Study Area, are primarily parkland and industrial uses. Ojibway Park is located to the east, and ETR tracks and lands, and Black Oak Heritage Park are located to the west of Ojibway Parkway. Dainty Foods' production is located to the northwest of the Study Area (Figure 1-1). The Ojibway Park and Black Oak Heritage Park lands are designated as Natural Heritage and the railway corridor is designated as Industrial in City of Windsor's Official Plan (City of Windsor, 2020).

5.3 Cultural Environment

5.3.1 Built Heritage Resources and Cultural Heritage Landscapes

A Cultural Heritage Screening Memo was completed as part of the Ojibway National Urban Park project. To identify known and potential built heritage resources and cultural heritage landscapes in the Study Area, this memo followed guidance outlined in the Ministry of Citizenship and Multiculturalism (MCM) *Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes: A Checklist for the Non-Specialist* ("the Checklist").

The Checklist was completed through a combination of desktop data collection and municipal and agency information gathering conducted via phone and email. In addition, historical mapping and aerial photographs were reviewed to identify settlements, structures, and landscape features within and adjacent to the Study Area.

The Cultural Heritage Screening Memo determined that Ojibway Park and Black Oak Heritage Park have potential for Cultural Heritage Value or Interest (CHVI).

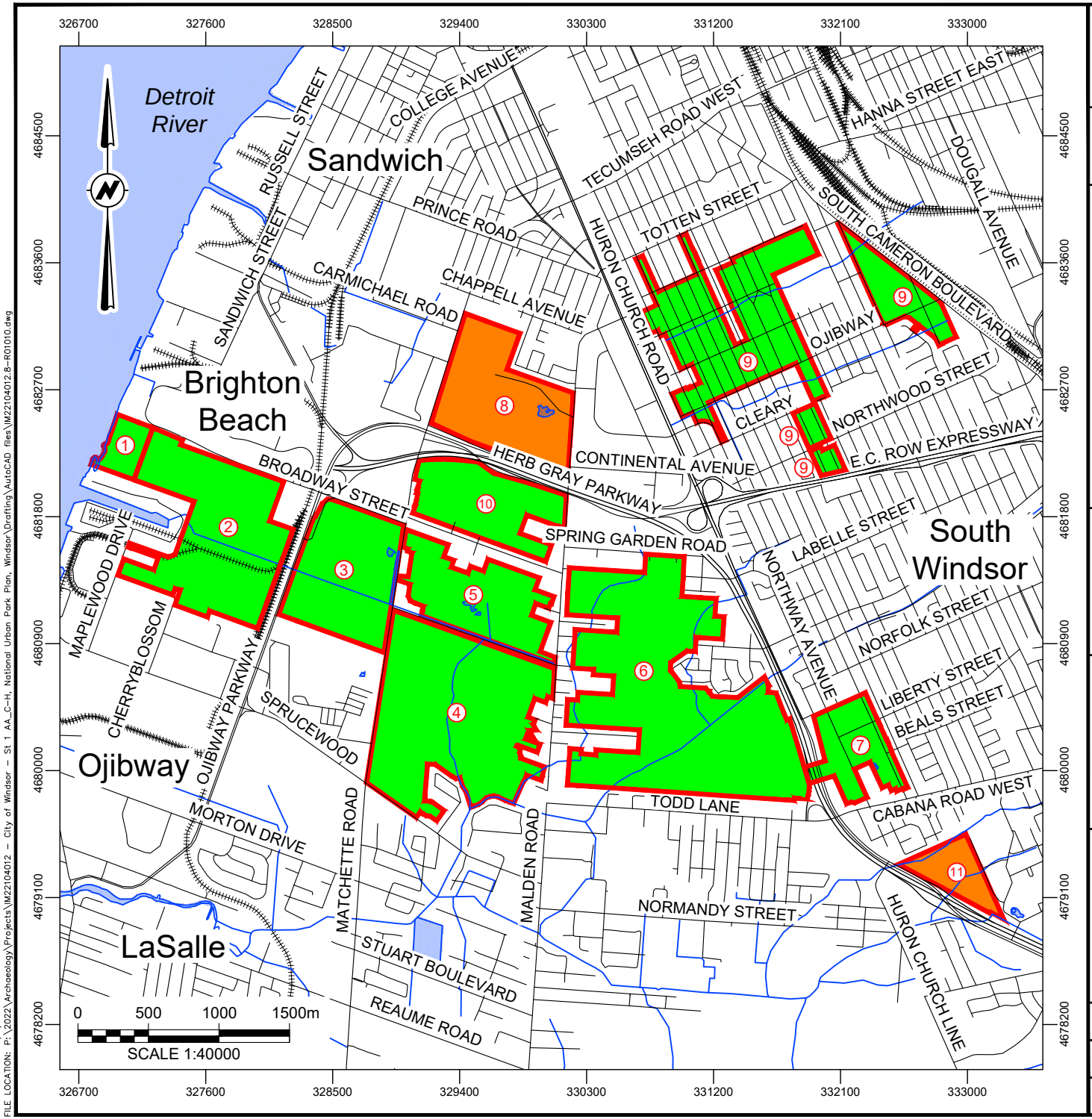
Results of Cultural Heritage Screening are provided in Figure 5-5, whereas the full memo is provided in Appendix A.

5.3.2 Archaeological Resources

The Study Area has been subject to two separate Stage 1 Archaeological Assessments:

- Stage 1 Archaeological Assessment Class Environmental Assessment for the Ojibway Parkway Wildlife Overpass (PIF # P348-0102-2020)
- Stage 1 Archaeological Assessment City of Windsor Proposed National Urban Park (PIF # P327 0024-2022)

Both assessments were completed in accordance with the MCM *2011 Standards and Guidelines for Consultant Archaeologists*. These Stage 1 Archaeological Assessments identified that portions of the Ojibway Park and Black Oak Heritage Park within the Study Area have archaeological potential. Areas of archaeological potential that will be subject to disturbance as part of project construction, shall be assessed through a Stage 2 Archaeological Assessment (and any subsequent assessments, if required). Results of Stage 1 Archaeological Assessments are shown in Figure 5-6 and Figure 5-7. The Stage 1 Archaeological Assessment Reports are provided in Appendix B and Appendix C.



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PROJECT:

CULTURAL HERITAGE SCREENING
CITY OF WINDSOR PROPOSED NATIONAL URBAN PARK
WINDSOR, ONTARIO

TITLE:

MHSTCI CHECKLIST RESULTS

LEGEND:

- STUDY AREA
- ① OJIBWAY SHORES
- ② BLACK OAK HERITAGE PARK
- ③ OJIBWAY PARK
- ④ OJIBWAY PRAIRIE PROVINCIAL NATURE RESERVE
- ⑤ TALLGRASS PRAIRIE HERITAGE PARK
- ⑥ SPRING GARDEN NATURAL AREA
- ⑦ OAKWOOD NATURAL AREA
- ⑧ MALDEN PARK
- ⑨ SOUTH CAMERON WOODLOT NATURAL AREA
- ⑩ ARMANDA/CHAPPUS - HERB GRAY PARKWAY AREA
- ⑪ ST. CLAIR COLLEGE PRAIRIE AND WOODS
- POTENTIAL CHVI - CHER RECOMMENDED
- NO POTENTIAL CHVI - NO FURTHER WORK RECOMMENDED

NOTES:

THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS REPORT No. IM22104012.8.

ALL LOCATIONS ARE APPROXIMATE.

ORIGINAL PAPER SIZE: 8½ x 11.

REFERENCES:
CANMAP STREETFILES V2008.4.

The Corporation of the City of Windsor
350 CITY HALL SQUARE WEST, P.O. BOX 1607
WINDSOR, ONTARIO, N9A 6S1

Wood
Environment & Infrastructure Solutions
201 KING STREET, 4TH FLOOR
LONDON, ONTARIO, N6A 1C9
519-681-2400

DWN BY:	CHK'D BY:	DATE:
SJL	HB	MAR. 21, 2022
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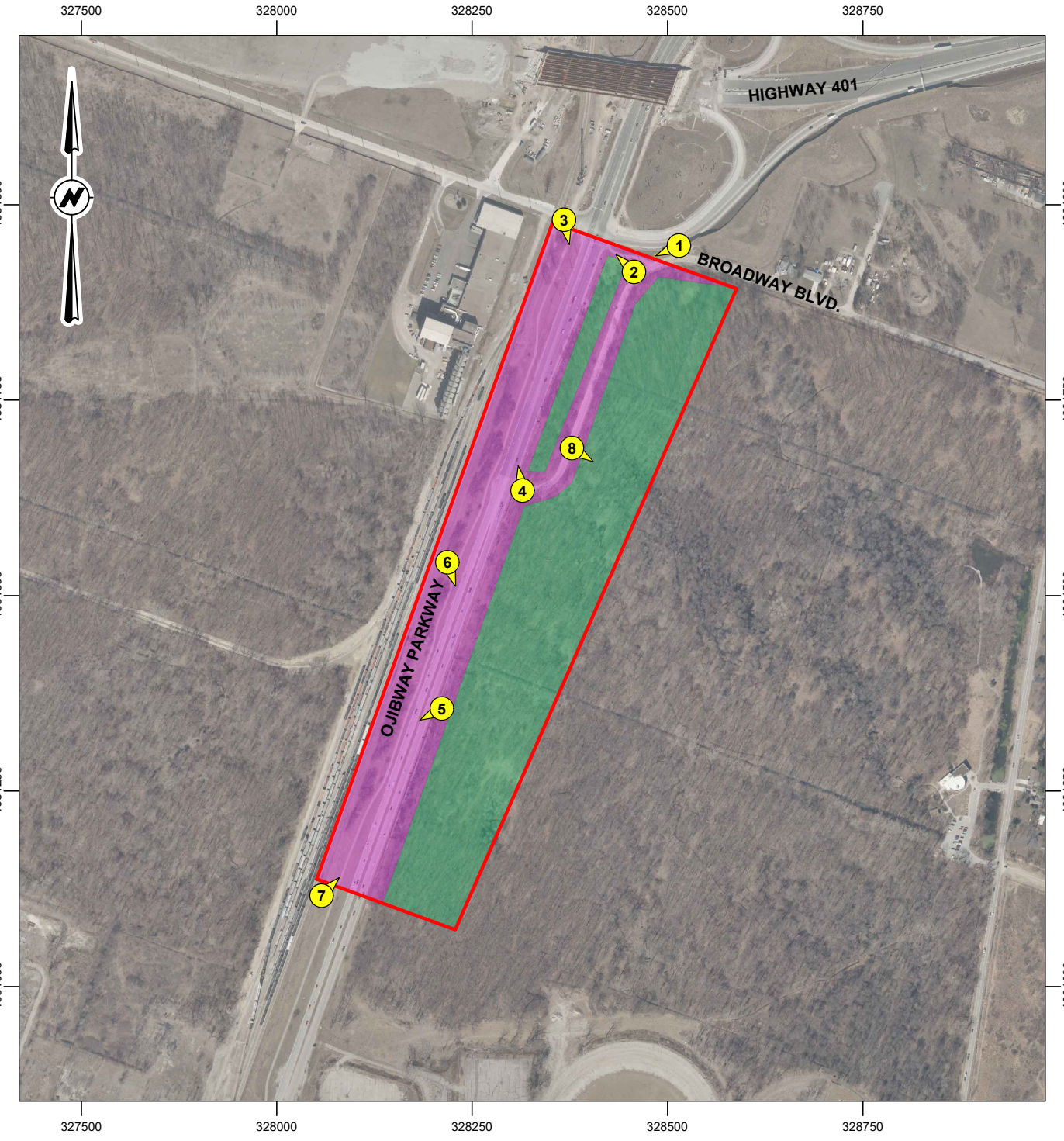

PROJECT:
STAGE 1 ARCHAEOLOGICAL ASSESSMENT
CLASS ENVIRONMENTAL ASSESSMENT FOR THE OJIBWAY PARKWAY WILDLIFE OVERPASS, OJIBWAY PARKWAY SOUTH OF BROADWAY BOULEVARD, IN THE CITY OF WINDSOR, PART OF LOTS 48 TO 55, CONCESSION 1 PETITE CÔTE, TOWNSHIP OF SANDWICH, COUNTY OF ESSEX, ONTARIO

TITLE:

STAGE 1 RESULTS WITH PHOTOGRAPH LOCATIONS AND DIRECTIONS

LEGEND:

- STUDY AREA

AREA OF ARCHAEOLOGICAL POTENTIAL:

- UNPLOUGHABLE LAND – TO BE TEST PIT SURVEYED AT 5 m INTERVALS

AREA OF NO OR LOW ARCHAEOLOGICAL POTENTIAL:

- DISTURBED: NO FURTHER ASSESSMENT REQUIRED
- 2 PHOTOGRAPH LOCATION, VIEWING DIRECTION, AND PLATE NUMBER

NOTES:
THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS REPORT No. IM20104013.

ALL LOCATIONS ARE APPROXIMATE.

REFERENCES:
2019 AERIAL IMAGE FROM THE COUNTY OF ESSEX INTERACTIVE WEB MAPPING SITE, BY PERMISSION.

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SCALE 1:7,500

CLIENT:

CITY OF WINDSOR
PARKS AND FACILITIES OPERATIONS
352450 MCDOUGALL AVENUE
WINDSOR, ONTARIO, N8X 3N6

Wood Environment & Infrastructure Solutions
201 KING STREET
LONDON, ONTARIO
N6A 1C3
519-681-2400

DWN BY:	CHK'D BY:	DATE:
LMK	KO	AUG. 14, 2020
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NAD83	UTM Zone 17	IM20104013
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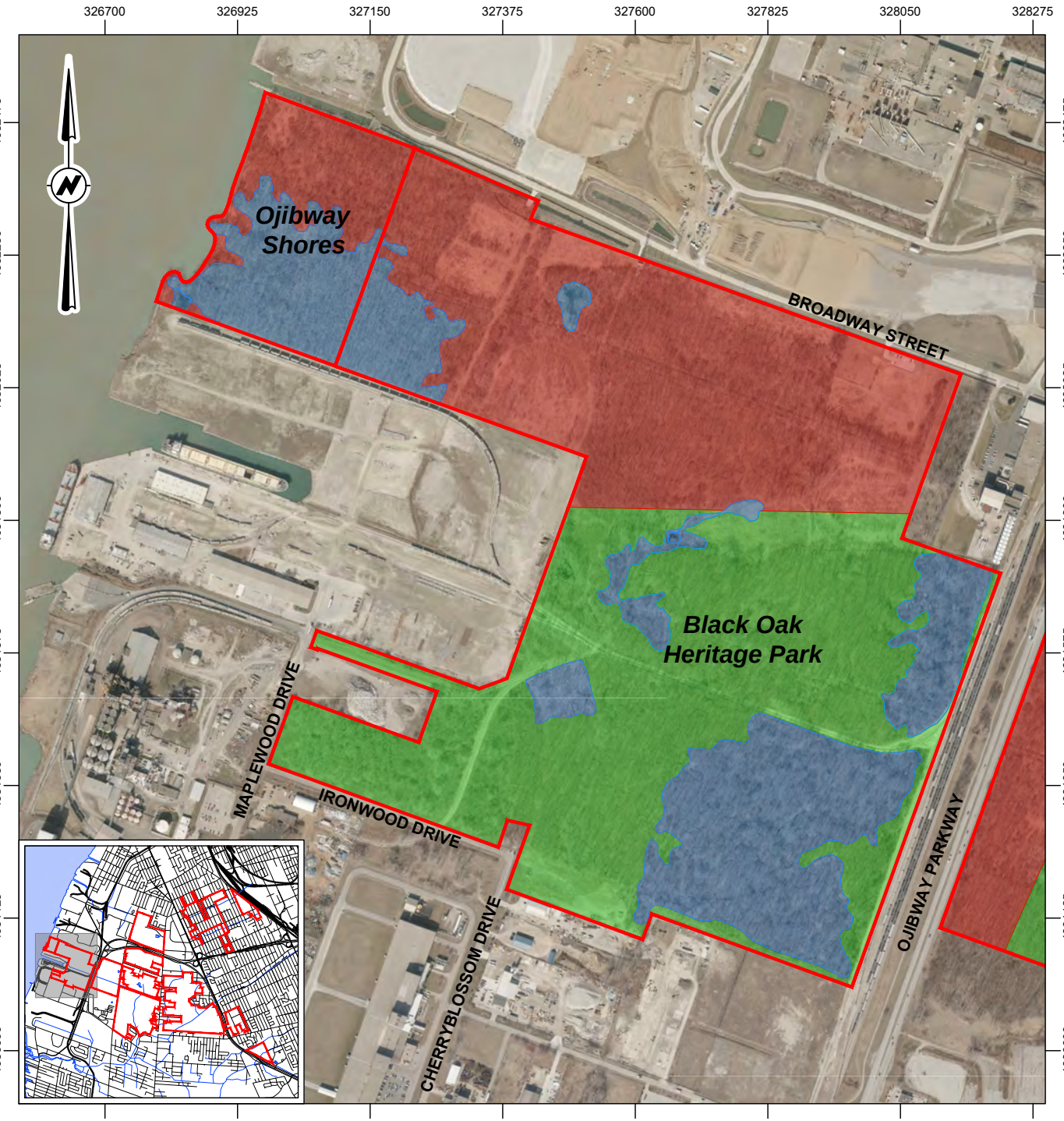

PROJECT:

STAGE 1 ARCHAEOLOGICAL ASSESSMENT
CITY OF WINDSOR PROPOSED NATIONAL URBAN PARK
WINDSOR, ONTARIO

TITLE:

STAGE 1 ARCHAEOLOGICAL ASSESSMENT RESULTS

LEGEND:

- STUDY AREA

AREA OF ARCHAEOLOGICAL POTENTIAL

- UNPLOUGHABLE LAND - TO BE TEST PIT SURVEYED AT 5m INTERVALS: FURTHER ASSESSMENT REQUIRED

AREA OF LOW OR NO ARCHAEOLOGICAL POTENTIAL

- WETLANDS (EXTENT TO BE CONFIRMED THROUGH ARCHAEOLOGICAL PROPERTY SURVEY)
- PREVIOUSLY ASSESSED: NO FURTHER ASSESSMENT REQUIRED

NOTES:

THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS REPORT No. IM22104012.9.

ALL LOCATIONS ARE APPROXIMATE.

ORIGINAL PAPER SIZE: $8\frac{1}{2}$ x 11.

REFERENCES:
2021 AERIAL PHOTOGRAPHS BY THE COUNTY OF ESSEX;
CANMAP STREETFILES V2008.4.

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SCALE 1:10000

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Environment & Infrastructure Solutions
201 KING STREET, 4TH FLOOR
LONDON, ONTARIO, N6A 1C9
519-681-2400

DWN BY:	CHK'D BY:	DATE:
SJL	HB	FEB. 1, 2023
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NAD83	UTM Zone 17	IM22104012.9
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5.4 Natural Environment

A natural environment assessment was completed to identify the existing natural environment conditions (vegetation and wildlife (birds, reptiles, mammals), including SAR), evaluate project's impacts on the natural environment, and propose avoidance, mitigation, and monitoring measures. A summary of existing conditions from the Natural Environment Report is provided below, and the complete report is provided in Appendix D.

For the purposes of natural environment assessment, the Study Area was divided into East Study Area and West Study Area. On the east side, the study area is within Ojibway Park, managed by the City's Department of Parks and Recreation's Ojibway Nature Centre. The East Study Area extends from Broadway Boulevard in the north to City property limits in the south. The West Study Area is a segment of Black Oak Heritage Park (Figure 1-1). Included in the East Study Area is a naturalized area and the Ojibway Parkway Trail between the ETR tracks and the Ojibway Parkway; the ETR and Dainty Foods are excluded from the West Study Area. The Study Team completed surveys on public lands only, as permission to access private lands was not provided. In addition to the above, the Project Area is also designated as Natural Heritage within the City's Official Plan and contains ERCA regulation area (Figure 4-1).

A background review of available Secondary Source information was completed and supplemented by observations made during field investigations to characterize the natural environment. The additional information gained through consultation was also incorporated as applicable.

Vegetation was surveyed to inform Ecological Land Classification (ELC) delineation and document plant SAR locations. A reconnaissance survey was conducted to determine animal corridors and wildlife camera placements. Wildlife cameras were set up and moved to maximize coverage, and detectors to document bat species in the area were deployed. Breeding bird surveys and Anuran call surveys were also conducted. Survey locations are presented in Figure 5-8. During each visit to the site, the length of Ojibway Parkway within the Study Area was walked to document road mortality. A record of surveys completed, including survey type, date and time, general weather conditions, and surveyors, is provided in Table 5-1. In addition to targeted surveys, opportunistic/incidental wildlife observations were collected during all surveys to record presence and habitat use. The methods used in conducting the field program components and dates for each survey type are outlined in their respective sections below. **The City has redacted specific species prone to poaching/harvesting where locations can be deduced.**

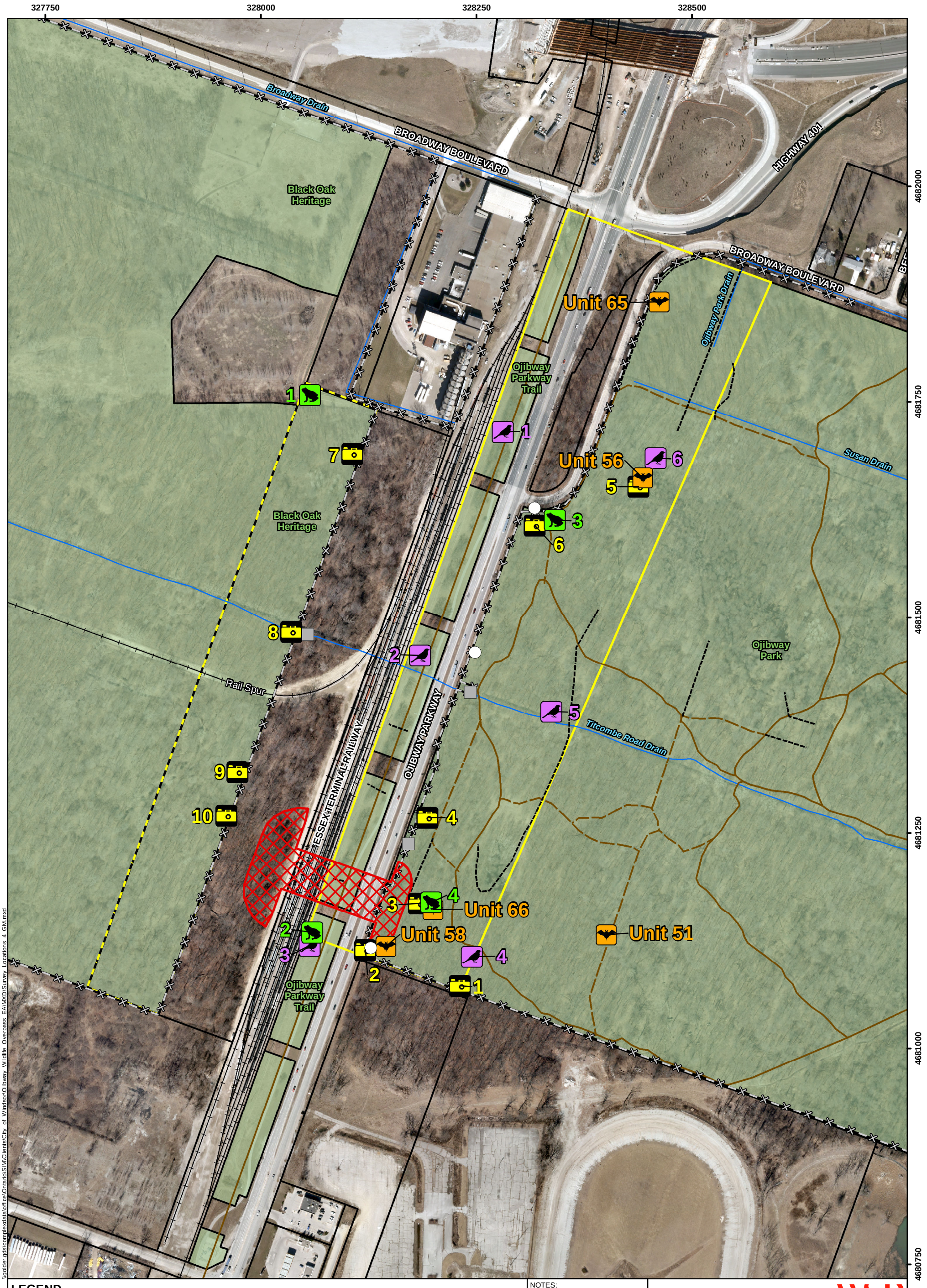
A connectivity analysis for Ojibway Parkway was also completed as described in Section 8.3.

Table 5-1: Field Survey Record

Survey Type	Date	Time	Weather[1]
Reconnaissance Survey (Animal Corridors and Camera Placements)	23 and 24 June 2020 26 April 2023	N/A	N/A
Bat Detector Placement	23 June 2020	08:00 – 18:00	Clear
Vegetation/ELC	29 July 2020 30 July 2020 31 July 2020 4 August 2020	N/A	N/A
Breeding Bird Surveys Round 1	22 June 2020	06:50 – 08:40	Temperature: 22-24°C Wind: 0 Precipitation: None Cloud Cover: 80-100%

Survey Type	Date	Time	Weather[1]
Breeding Bird Surveys Round 2	30 June 2020	06:47 – 08:35	Temperature: 20-22°C Wind: 1 Precipitation: None Cloud Cover: 0%
Anuran Call Surveys Round 1	8 April 2020	20:10 – 21:18	Temperature: 12-13°C Wind: 1 Precipitation: None Cloud Cover: 75-90%
Anuran Call Surveys Round 2	14 May 2020	22:14 – 21:38	Temperature: 15°C Wind: 1 Precipitation: None Cloud Cover: 50-100%
Anuran Call Surveys Round 3	4 June 2020	22:35 – 23:56	Temperature: 24°C Wind: 0 Precipitation: None Cloud Cover: 50-80%
Vegetation / ELC Wetland Delineation (North side of West Study Area)	12-13 June 2023	12:00 – 16:00 08:00 – 12:00	N/A

[1]Wind is recorded on the Beaufort Scale 0=Calm, 1=Light Air, 2=Light Breeze, 3=Gentle Breeze



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LEGEND

- Project Footprint
- Property Boundaries
- Parks

Project Area

- East Study Area
- West Study Area

- Den / Burrow
- Deer Trail
- Unauthorized Footpath
- Official Park Trail
- Chainlink Fence
- Watercourse / Drain
- Railway

- Gap in Fence

- Amphibian Survey Location
- Bat Dectector Location
- Breeding Bird Survey Location
- Camera Location

NOTES:
- Aerial imagery extracted from Essex County interactive map, 2019.

Datum: NAD83
Projection: UTM Zone 17N

0 50 100 200 300 400 Metres

THE CITY OF WINDSOR ONTARIO, CANADA

wsp

OJIBWAY PARKWAY WILDLIFE CROSSING

Survey Station Locations

PROJECT N°: IM20104013 | **FIGURE: 5-8**

SCALE: 1:4,000 | DATE: June 2024

5.4.1 Flora and Ecological Land Classification

5.4.1.1 East Study Area

The area is comprised of a vegetated strip between Ojibway Parkway and the ETR tracks and a portion of the Ojibway Park. A total of four ELC community types were identified within the East Study Area (Figure 5-9), with a total of 81 species of plants observed. Of the plant species recorded in the East Study Area, eight (<10%) are non-native to the region. Non-natives were widespread and occasional.

The General Natural Areas Report (Ministry of Natural Resources and Forestry, 2021a) defines Ojibway Park as dominated by Swamp Pin Oak swamp with an area of prairie and Black Oak woodland present. The prairies are defined as wet-mesic on moderate to poorly-drained coarse outwash, and Prairie Cordgrass, Canada Goldenrod, Bluejoint Reedgrass, Culver's Root, Virginia Mountain-mint, and Wild Bergamot are dominant in various degrees.

The characteristics of vegetation communities within the East Study Area are summarized below:

Dry Black Oak Woodland Vegetation Type (WODM3-2): This vegetation community is located between Ojibway Parkway and ETR tracks. It's a mid-aged community with a canopy of Black Oak trees that are over 25m tall and cover 25-60% of the area. The area is disturbed by human and animal activity, and non-native species are common. The sub-canopy, 10-25m high, is made up of Black Oak, Sassafras, and Pignut Hickory. The understory, 1-2m high, consists of regenerating Black Oak, Sassafras, and Autumn Olive. The ground layer is covered by non-native grasses like Smooth Brome and Tall Fescue. The soil is sandy loam with undefined horizons and a depth to bedrock greater than 120 cm.

Dry-Fresh Black Oak Deciduous Forest Type (FODM1-3): This vegetation community is a mid-aged forest with a canopy of Black Oak trees that are over 25m tall and cover more than 60% of the area. The sub-canopy and understory have variable coverage and are made up of species like Black Cherry, Pignut Hickory, White Oak, Red Maple, and others. The ground layer is covered by vegetation like Gray Dogwood, Virginia Creeper, Northern Dewberry, and Pennsylvania Sedge. The soil is sandy loam with distinct horizons and a depth to bedrock greater than 120 cm. The area has some disturbances and non-native species are common.

Pin Oak Mineral Deciduous Swamp Type (SWD1-3; SWDM1-3): This vegetation community is a mid-aged forest with a canopy of Pin Oak trees that are over 25m tall and cover 60-80% of the area. The sub-canopy and understory have variable coverage and are made up of species like Silver Maple, Eastern Cottonwood, Bur Oak, and others. The ground layer is covered by vegetation like Virginia Creeper, Northern Dewberry, and ferns. The soil varies from fine sand to sandy clay loam with distinct horizons and a depth to bedrock greater than 120 cm. The area has some disturbances and non-native species are common.

Dry Black Oak Tallgrass Savannah Type (SVDM1-1): This vegetation community is a small, ecologically significant community in the East Study Area. It's a semi-open treed community with a canopy of Black Oak trees that are over 25m tall and cover less than 10% of the area. The understory, 0.5-1m high, consists of regenerating Black Oak, Pignut Hickory, and Autumn Olive. The ground layer is dominated by prairie grasses like Little Bluestem, Big Bluestem, and others. The soil is loamy sand with distinct horizons and a depth to bedrock greater than 120 cm. The area has some disturbances and non-native species are common.

Flora Characteristics: There were ten provincially rare (S1-S3) species present during surveys, 11 locally rare species, and ten locally uncommon species (Oldham, 2017). Twenty-two species are prairie and savannah indicator species present throughout the ELC communities (SOFIA, 2020). Additionally, five plant SAR are confirmed in the Project Area:

5.4.1.2 West Study Area

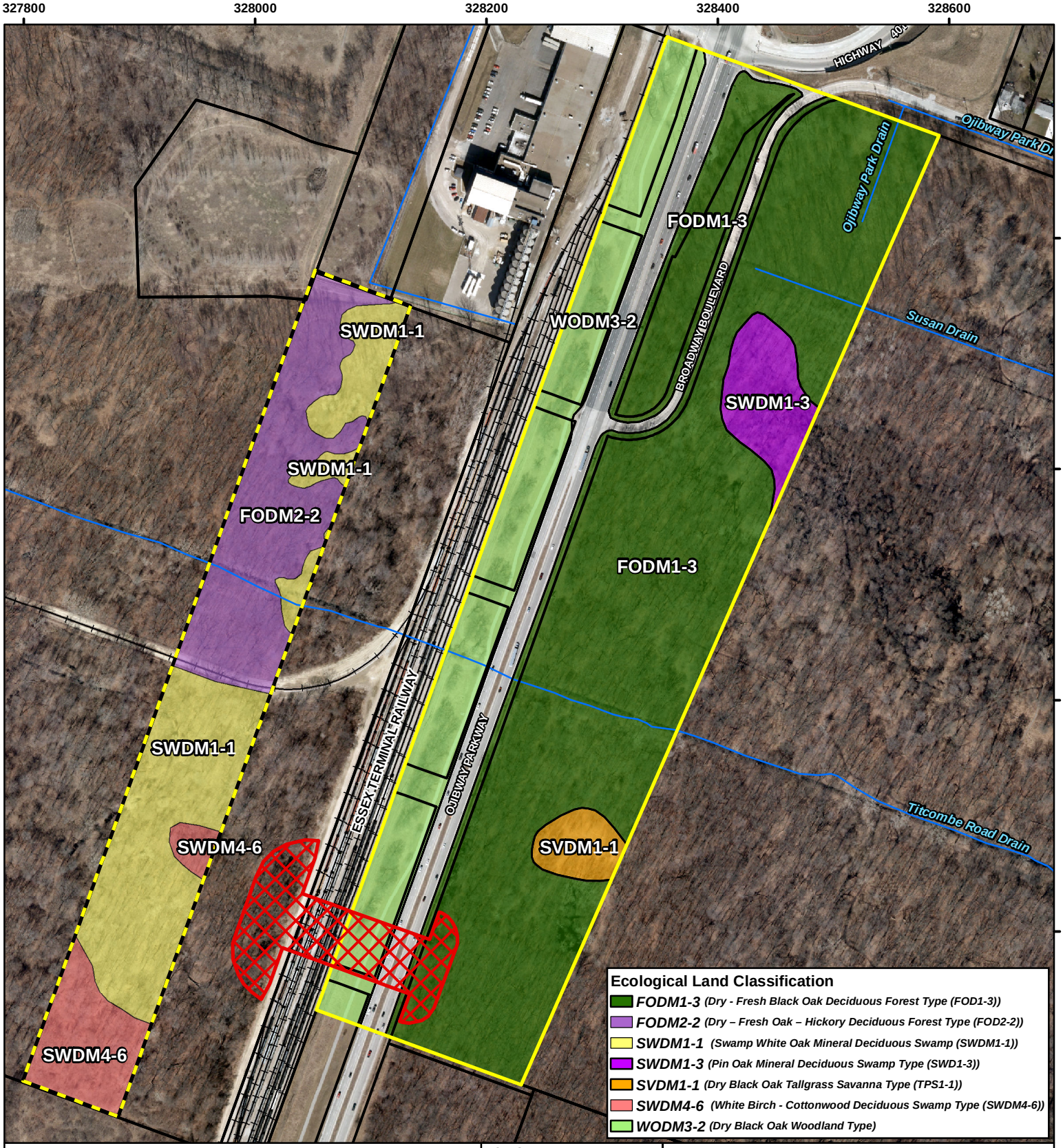
Ecological Land Classification (ELC) vegetation communities were delineated using aerial photography and ground-truthing during field surveys (Figure 5-9). Field surveys were undertaken on public property only. The Study Team completed surveys on public lands only, as permission to access private lands was not provided.

The characteristics of vegetation communities within the West Study Area are summarized below:

Dry – Fresh Oak – Hickory Deciduous Forest Type (FODM2-2): This vegetation community is located north of the ETR tracks within the boundaries of Black Oak Heritage Park. The forest is disturbed by numerous active tracks and trails, leading to the spread of invasive species. The canopy is dominated by Black Oak, Black Cherry, and Pignut Hickory, with a similar composition in the subcanopy. The understory is abundant with Gray Dogwood, Herbaceous Greenbrier, and young Black Cherry. The ground cover features a variety of plants including Wild Sarsaparilla, American Hog-peanut, Bracken Fern, Flat-topped White Aster, Interrupted Fern, and Black Snakeroot.

Swamp White Oak Mineral Deciduous Swamp (SWDM1-1): This vegetation community is a provincially rare swamp community in the West Study Area. It's been assessed multiple times and is similar to the description provided in the Black Oak Heritage Management Plan. The wetland has a sand substrate with a depth to mottles of 20 to 30 cm. The canopy is abundant with Black Oak, Swamp White Oak, Red Maple, Pin Oak, and Bitternut Hickory. The subcanopy and understory contain a variety of species including Sassafras, White Mulberry, Manitoba Maple, Downy Hawthorn, and Black Cherry. The groundcover layer is dominated by Thicket Creeper, Poison Ivy, Wild Geranium, and a variety of native Ferns. The wetland is divided by chain-link fencing, with the majority occurring on ETR lands.

White Birch - Cottonwood Deciduous Swamp Type (SWDM4-6): This is a wetland community in the West Study Area. It's located along the south edge of Black Oak Heritage Park and is characterized by disturbance. The canopy is dominated by Black Walnut and Eastern Cottonwood, with an abundant presence of Bitternut Hickory. The subcanopy and understory contain a variety of species including Black Walnut, White Mulberry, Manitoba Maple, Downy Hawthorn, and Black Cherry. The groundcover layer is dominated by a variety of plants including Black Snakeroot, Blue-Joint Reedgrass, Devil's Beggar's Ticks, and others. The soil substrate is sand with a depth to mottles of 20 to 30 cm and a water table reached at 70 cm.



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LEGEND

- Project Footprint
- Property Boundaries
- Watercourse / Drain
- Railway

Project Area

- East Study Area
- West Study Area

NOTES:
- Aerial imagery extracted from Essex County interactive map, 2019.

0 50 100 200 300 400 Metres

Datum: NAD83
Projection: UTM Zone 17N

THE CITY OF WINDSOR ONTARIO, CANADA

WSP

OJIBWAY PARKWAY WILDLIFE CROSSING

Ecological Land Classification Delineation

PROJECT N°: IM20104013 | **FIGURE: 5-9**

SCALE: 1:4,500 | DATE: May 2024

5.4.2 Breeding Birds

Breeding bird surveys were conducted to characterize the nature, extent, and significance of avian usage within the Project Area. During surveys, a total of 20 species of birds were documented from six point-counts (Table 5-2). Four additional birds were observed incidentally during other surveys. The majority of species documented are associated with wooded and successional habitats, and no SAR birds were documented during the field investigations. One species, House Wren, was confirmed breeding and was seen carrying nesting material to a nest during incidental surveys. An additional eight bird species were considered probable breeders, five were possible breeders, and 11 were observed with no evidence of breeding noted (Table 5-2).

Table 5-2: Species Documented During Fieldwork

	Scientific Name	Common Name	Incidental	Highest Breeding Evidence
	Agelaius phoeniceus	Red-winged Blackbird		PO
	Cardinalis	Northern Cardinal		PR
	Cyanocitta cristata	Blue Jay		PO
	Dumetella carolinensis	Gray Catbird	x	PR
	Melanerpes carolinus	Red-bellied Woodpecker	x	O
	Melospiza melodia	Song Sparrow		O
	Mniotilta varia	Black-and-white Warbler		O
*	*Passer domesticus*	House Sparrow		PR
	Passerina cyanea	Indigo Bunting	x	PR
	Picoides pubescens	Downy Woodpecker	x	PO
	Picoides villosus	Hairy Woodpecker	x	O
	Quiscalus quiscula	Common Grackle		O
	Sayornis phoebe	Eastern Phoebe	x	O
	Setophaga pensylvanica	Chestnut-sided Warbler		O
	Setophaga petechia	Yellow Warbler		PR
	Setophaga ruticilla	American Redstart		PO
	Sitta carolinensis	White-breasted Nuthatch	x	O
	Spinus tristis	American Goldfinch		O
*	*Sturnus vulgaris*	European Starling		O
	Thryothorus ludovicianus	Carolina Wren		PR
	Troglodytes aedon	House Wren	x	C
	Turdus migratorius	American Robin		O
	Vireo gilvus	Warbling Vireo		PO
	Vireo olivaceus	Red-eyed Vireo		PR

Note(s)
1*=Introduced Species
2C= Confirmed, PR= Probable, PO= Possible, O= Observed/ no evidence of breeding]

A review of secondary sources identified 193 additional species of birds (See Appendix A of Natural Environment Report provided in Appendix D). The majority of which are found in sources that extend beyond the Study Area. Within secondary sources, there are 20 provincially rare (S1-S3) species; 11 provincially endangered or threatened species; 12 provincial species of special concern; and four locally significant species (SOFIA). Given the range of successional habitat and vegetation communities present, there is a moderate probability for SAR birds to occur in the Study Area.

5.4.3 Anurans and Herptiles

Anuran call surveys were conducted to characterize the nature, extent, and significance of Anurans (frogs and toads) usage within and adjacent to the Study Area. During surveys, a total of two species of Anurans were documented from four-point counts (Figure 5-8). American Toad and Western Chorus Frog were documented calling from suitable habitat at appropriate breeding times, and it is assumed both species successfully breed at Station 1, 3, and 4 (Table 5-3). American Toad and Green Frog were documented in the Black Oak Wetland Complex PSW report.

Table 5-3: Species Documented During Anuran Call Surveys

Station Number	April Survey	May Survey	June Survey
1	American Toad Western Chorus Frog	American Toad Western Chorus Frog	None
2	Western Chorus Frog at Station 4 were heard	None	None
3	Western Chorus Frog	American Toad Western Chorus Frog	None
4	Western Chorus Frog	American Toad Western Chorus Frog	None

No SAR, provincially rare (S1-S3), or locally significant Anurans occur in the Study Area (the two SAR anurans in Ontario do not have ranges that overlap the Study Area).

An inventory of habitat features on-site determined that the swamp community and vernal pools are suitable breeding habitat (seasonal standing water) for some amphibians (frogs, toads, salamanders). Other features such as large downed trees, debris piles, and rock piles present suitable habitat for snakes although no snake species were observed during surveys. Secondary sources, including previously completed work in the Windsor area by the City and others (Choquette & Valliant, Road Mortality of Reptiles and Other Wildlife at the Ojibway Prairie Complex and Greater Park Ecosystem in Southern Ontario, 2016) documented the presence of eight snake species, some of which were historical occurrences only. Common snake species present includes Eastern Gartersnake, Red-bellied Snake, and Dekay's Brownsnake. Northern Watersnake was also documented from the 10 x 10 km Ontario Reptile and Amphibian Atlas, but is likely to occur along the Detroit River (not in the Study Area). The four other snake species potentially present are listed as Endangered or Threatened in Ontario and are provincially rare and locally significant. These four snake species also prefer prairie and savannah habitats and includes Butler's Gartersnake, Eastern Foxsnake, and Massassauga Rattlesnake (Carolinian population).

Various sources and reports identify seven turtles species that could be found in the Study Area. Common and urban adapted turtle species that may be present include Snapping Turtle, Midland Painted Turtle, and pond sliders (non-native turtles). Four other turtle species documented in secondary sources are listed as Endangered of Threatened in Ontario and are provincially rare and locally significant; all four have been determined to have a low or no chance of occuring. The Study Area has no permanent bodies

of water, limiting the ability for some species to persist on site throughout the year. However, some turtles travel long distances over land to find mating and nesting opportunities. This seasonal travel may occur through the Study Area. During field surveys, one nesting Midland Painted Turtle was documented outside the Study Area.

5.4.4 Mammals

5.4.4.1 Bats

Ultrasonic recording detectors were installed in the East Study Area to capture bat calls (Figure 5-8). Analysis of documented calls were conducted to determine the presence of bat species in the East Study Area. Five species of bats were identified within the East Study Area: Little Brown Bat (SAR), Eastern Red Bat, Silver-haired Bat, Big Brown Bat, and Hoary Bat.

A total of 21,786 bat calls were recorded at four units. One unit experienced technical issues and its results were not included in the report. The unit with the fewest number of calls accounted for approximately 4% of the total. A minimal number of calls were classified as belonging to a SAR, suggesting these bats are not residents within the East Study Area and rarely forage within the area and/or surrounding habitats.

A significant number of calls were classified as an unknown high-frequency species, most likely the Eastern Red Bat, which accounted for approximately 11% of all recorded bat calls. This species was most active during the first hour of monitoring, indicating that the Study Area is of value to this species as a foraging or roosting habitat.

The Big Brown Bat exhibited the highest activity. Its activity followed a normal distribution, peaking in the middle of the night, suggesting that the East Study Area is an important foraging site for this species.

The Hoary Bat and Silver-haired Bat accounted for similar proportions of bat calls, but their activity was relatively low. Approximately 28% of bat calls were classified as an unknown low-frequency species, likely from the Big Brown Bat, but possibly also from the Silver-haired Bat and Hoary Bat.

5.4.4.2 Wildlife

Wildlife camera surveys, or camera traps, were used to characterize possible animal movement corridors and to document mammals on site. As a part of deploying camera traps, reconnaissance surveys were conducted to determine possible corridors throughout Ojibway Park and across Ojibway Parkway into Black Oak Heritage Park. Deer trails are abundant throughout the Study Area; with some trails being used much more frequently than others (Figure 5-10). In general, deer movement follows official and unauthorized park trails and drainage features (Figure 5-13). Where the Titcombe Drain exits the Ojibway Park, there is a large gap in the perimeter chain-link fence. It is an obvious movement corridor for animals, and likely humans, across Ojibway Parkway (Figure 5-11).

The existing chain-link fence delineates City-owned land and occurs at the south border of Ojibway Park, along Ojibway Parkway and Broadway Boulevard, and between Black Oak Heritage Park and ETR lands. The span of fencing was walked to document gaps and areas where trespass under the fencing was obvious (Figure 5-13). In addition to deer highways, obvious trespass and gaps in fencing, burrows and dens were also documented to inform camera locations. In the East Study Area, six locations were included in camera trap surveys (Figure 5-8; Figure 5-13). Four cameras (#1, 2, 3, and 4) were located at the south end of the area while two cameras (#5 and 6) were located at the north end. Camera 1 was located on an official park trail and captured the most human activity (users of the trail), and had low wildlife species diversity and abundance compared to north cameras. Similarly Camera 3 captured comparable human use along an unauthorized trail (Figure 5-13), and also had low wildlife species diversity and abundance compared to north cameras. Cameras 2 and 4 were in close proximity to Cameras 1 and 3; however, they did not record any humans but still had low wildlife species diversity and abundance compared to north cameras.

Cameras 5 and 6 were set up in the north portion of the East Study Area and had the highest number of wildlife photos and the highest species diversity. Camera 5 was set up in the swamp community (SWDM1-3 in Figure 5-13) along a deer trail, and no human use was documented. Camera 5 was the most productive camera, capturing photos of deer fawns, deer sleeping and resting for prolonged periods, and was the only camera to document coyotes. Small mammals using the same space as deer or on their own were also documented at Camera 5. Camera 6 was set up at animal burrow and confirmed the active burrow of a raccoon family.

Four locations in the West Study Area were included in camera trap surveys (Figure 5-8; Figure 5-13). Cameras 7 and 8 were located at the north end of the West Study Area, and Cameras 9 and 10 were located at the south end. Cameras 7 through 10 were all located along the chain-link fencing shared with ETR near gaps and areas of trespass. Camera 7 was positioned near a large brush pile (desirable habitat for many species), and Camera 8 was positioned at a gap in the fencing corresponding to the Drain; throughout May, the Drain held water. Cameras 7 and 8 both documented humans and off-leash dogs, while Cameras 9 and 10 did not. Cameras 9 and 10 were in locations with large gaps under the fencing, which documented species such as Coyote, Raccoons, Skunks, and Squirrels crossing under.

Figure 5-10: Deer Highway at Ojibway Park in the vernal pool south of the SVDM1-1/TPS1-1

White-tailed Deer was the most abundant species documented. Smaller and meso-mammals such as Raccoon, Striped Skunk, Groundhog, Eastern Cottontail, Opossum, and Eastern Gray Squirrel were also confirmed. Coyote and Wild Turkey were also documented several times. Less common and unexpected species included a species of bat and fireflys in Ojibway Park.

Eastern Chipmunk was observed during surveys but not documented in camera traps. Other mammals not captured in camera traps are likely still present in the Project Area or adjacent to the Project Area. Small mammals such as shrews (Northern Short-tailed Shrew), rats, mice, and voles (White-footed Mouse, Deer Mouse, Meadow Vole, Muskrat, House Mouse, Norway Rat, Meadow Jumping Mouse) have the potential to occur and be undocumented or underrepresented. Meso-and large mammals such as Red Fox, Gray Fox, and weasels (Ermine, Long-tailed Weasel, Mink) may also occur in the Project Area.

Figure 5-11: Movement Corridor at Titcombe Road Drain Looking East Across Ojibway Parkway

Figure 5-12: Areas of Trespass Under Chain-link Fencing

327750
328000
328250
328500
4682000
4681750
4681500
4681250
4681000

Broadway Drain
BROADWAY BOULEVARD
HIGHWAY 401
BROADWAY BOULEVARD
Ojibway Park Drain
Susan Dra
FODM1-3
SWDM1-3
SWDM1-1
FODM2-2
FODM1-3
ESSEX TERMINAL RAILWAY
OJIBWAY PARKWAY
WODM3-2
SVDM1-1
Titcombe Road Drain
SWDM1-1
SWDM4-6
1
2
3
4
5
6
7
8
9
10

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Ecological Land Classification

- *FODM1-3 (Dry - Fresh Black Oak Deciduous Forest Type (FOD1-3))*
- *FODM2-2 (Dry – Fresh Oak – Hickory Deciduous Forest Type (FOD2-2))*
- *SWDM1-1 (Swamp White Oak Mineral Deciduous Swamp (SWDM1-1))*
- *SWDM1-3 (Pin Oak Mineral Deciduous Swamp Type (SWD1-3))*
- *SVDM1-1 (Dry Black Oak Tallgrass Savanna Type (TPS1-1))*
- *SWDM4-6 (White Birch - Cottonwood Deciduous Swamp Type (SWDM4-6))*
- *WODM3-2 (Dry Black Oak Woodland Type)*

LEGEND

- Project Footprint
- Project Area
  - East Study Area
  - West Study Area
- Property Boundaries
- Deer Trail
- Unauthorized Footpath
- Official Park Trail
- Chainlink Fence
- Unauthorized Trail
- Watercourse / Drain
- Railway
- Gap in Fence
- Trespassing Under Fence
- Camera Location (Lebelled with ID)
- Gap in Fence
- Den / Burrow

NOTES:
- Aerial imagery extracted from Essex County interactive map, 2019.

0 50 100 200 300 400 Metres

Datum: NAD83
Projection: UTM Zone 17N

N W E S

THE CITY OF WINDSOR ONTARIO, CANADA

WSP

OJIBWAY PARKWAY WILDLIFE CROSSING

Deer Trails and Highways, Fencing Gaps and Trespass, Ojibway Park Trails and Camera Locations

PROJECT N°: IM20104013 | **FIGURE: 5-13**

SCALE: 1:4,000 | DATE: June 2024

5.4.4.3 Road Mortality

Road mortality data is collected and compiled by the City of Windsor for those WVCs reported by the public on highways and arterial roadways in the City, including Ojibway Parkway and Broadway Boulevard. The data represents only dead animals called in by the public for removal by the City. The City provided road mortality data from 10th October 2014 to 3rd September 2020. The location (sometimes provided by a center point for an address), species, and the year are provided in Figure 5-14. It is no surprise that only four species were documented overall: White-tailed Deer, Virginia Opossum, Raccoon, and Striped Skunk. These species are large, odorous, and/or are apparent in the field of view when driving or walking, which is why they are most frequently reported. Road mortality of smaller species, including amphibians, reptiles, and small mammals, is most likely under-reported. Collisions resulting in injury only, or where there is a near miss, are not currently compiled or reported in a publicly available database.

5.4.5 Other Wildlife Species

No additional targeted surveys were completed for wildlife species (e.g., butterfly or dragonfly surveys). However, several incidental sightings of common arthropods were recorded during fieldwork, all of which have been previously recorded for the area in secondary sources (Figure 5-15). No additional wildlife SAR were observed in the Study Area during field visits.

One provincially rare (S1-S3) gastropod, three provincially rare (S1-S3) spiders, and 43 provincially rare (S1-S3) insects (i.e., Lepidoptera, Odonata, Hymenoptera, Orthoptera) are known to occur in the general area as recorded in secondary sources. Several of these rare species are also considered provincial SAR, including Proud Globelet (Endangered), [redacted] and Yellow-banded Bumble Bee and Monarch (Special Concern). Wild Indigo Duskywing and [redacted] are also prairie and savannah indicator species.

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LEGEND

Dead Animal Locations

Species	Year
Deer	2016
Raccoon	2017
Skunk	2018
Unknown	2019
	2020

- Project Footprint
- Property Boundaries
- Watercourse / Drain
- Railway

Project Area

- East Study Area
- West Study Area

NOTES:
- Aerial imagery extracted from Essex County interactive map, 2019.
- Location of dead animals provided by City of Windsor.

0 50 100 200 300 400 500 Metres

Datum: NAD83
Projection: UTM Zone 17N

N W E S

THE CITY OF WINDSOR ONTARIO, CANADA

WSP

OJIBWAY PARKWAY WILDLIFE CROSSING

Locations of Dead Anminals by City Services

PROJECT N°: IM20104013 | **FIGURE: 5-14**

SCALE: 1:5,500 | DATE: June 2024


Figure 5-15: Twelve-spotted Skimmer female (left) Banded Hairstreak (right) at Ojibway Park

5.4.6 Species of Conservation Concern, Including Species at Risk

In Ontario, Species of Conservation Concern include SAR and rare and rapidly declining species. SAR are species whose individuals or populations are considered Extirpated (EXT), Endangered (END), Threatened (THR), or Special Concern (SC), as determined by the provincial COSSARO and the federal Committee on the Status of Endangered Wildlife in Canada (COSEWIC). SAR in the Project Area are regulated by the provincial ESA, 2007. The potential for SAR and rare species to occur within the Project Area was determined based on a review of secondary source information and the completion of field investigations. Information collected was then used to evaluate SAR occurrence potential based on habitat preferences for each species. Provincially rare species are those with a provincial rank (sub-national rank) of S1, S2, or S3 and are considered provincially vulnerable to imperilled. Provincially rare species are tracked by the NHIC, and provincial rarity does not automatically provide listing under the ESA. Species which are provincially rare and not SAR are considered in SWH.

WSP completed a screening of SAR to evaluate the probability of occurrence in the Study Area. The probabilities of SAR within the Study Area are based on an assessment of each species' habitat preferences/needs in conjunction with background information and other secondary source information.

Note that other SAR may come into the area, or species already occurring in the area may be up-listed at any time. Species that have a moderate or high potential to occur in the Project Area or have been confirmed in the Study Area were carried forward to the impact assessment.

Five SAR have been confirmed in the Study Area while several more have high or moderate probability of occuring: one confirmed species is listed as endangered and four are listed as threatened. Table 5-4 lists the SAR that are confirmed, have High, or Moderate, probability of occurrence of within the Study Area. Please note that this summary table does not list the SAR species with Low or No probability of occurance. **The City has redacted specific species prone to poaching/harvesting where locations can be deduced. Public versions of Table 5-4 and Figure 5-16 have been fully redacted.** For detailed SAR screening, please refer to the Natural Environment Report provided in Appendix D.

Table 5-4: Summary of SAR Probability of Occurrence within the Study Area (Public Version is Redacted)

Species Name, Status (SARA, ESA, S-Rank1), and Data Source	Potential for habitat/species occurrence in Project Site
Plants	
Smooth Yellow False Foxglove (*Aureolaria flava*) SARA: Threatened ESA: Threatened S-Rank: S2? Source: NHIC	**High** – NHIC EOs are directly in Project Area. Suitable habitat occurs in Project Area.
American Chestnut (*Castanea dentata*) SARA: Endangered ESA: Endangered S-Rank: S1S2 Source: NHIC, secondary sources	**Low –** Individuals have been confirmed elsewhere in Windsor, and suitable habitat could occur in the Project Area. Historically, an individual occurred; however, it has since died. Given low recruitment, in part, as few regenerating sprouts survive until reproductive age due to chestnut blight, it is unlikely more individuals will.
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]

Species Name, Status (SARA, ESA, S-Rank1), and Data Source	Potential for habitat/species occurrence in Project Site
[redacted]	
Climbing Prairie Rose (*Rosa setigera)* SARA: Special Concern ESA: Special Concern S-Rank: S2S3 Source: NHIC	**Moderate** – found elsewhere in Windsor and suitable habitat could occur in the Project Area. Ojibway Nature Center has not documented these species in the East Study Area.
Riddell's Goldenrod (*Solidago riddellii*) SARA: Special Concern ESA: Special Concern S-Rank: S3 Source: NHIC	**Moderate** – found elsewhere in Windsor and suitable habitat could occur in the Project Area. Ojibway Nature Center has not documented these species in the East Study Area.
[redacted]	[redacted]sidered [redacted]
White Colicroot (*Aletris farinosa*) SARA: Threatened ESA: Endangered S-Rank: S2 Source: NHIC, secondary sources	**Moderate** – found elsewhere in Windsor and suitable habitat could occur in the Project Area. Ojibway Nature Center has not documented these species in the East Study Area.
[redacted]	[redacted]

Species Name, Status (SARA, ESA, S-Rank1), and Data Source	Potential for habitat/species occurrence in Project Site
[redacted]	
Birds	
Cerulean Warbler (*Setophaga cerulea*) SARA: Endangered ESA: Threatened S-Rank: S3B Source: Secondary Sources	**Moderate** – Suitable habitat is present. This species was not observed during field investigations.
Eastern Wood-Pewee (*Contopus virens*) SARA: Special Concern ESA: Special Concern S-Rank: S4B Source: Secondary Sources	**High** – Suitable habitat is present. This species was not observed during field investigations. Documented within the Project Area on iNaturalist.
Red-headed Woodpecker (*Melanerpes erythrocephalus*) SARA: Threatened ESA: Endangered S-Rank: S4B Source: Secondary Sources, NHIC Amendments to Ontario Regulation 230/08 (Species at Risk in Ontario List) in response to COSSARO's 2019-2020 Annual Report re-classified this species from Special Concern to Endangered in January 2022	**High** – Suitable habitat is present. This species was not observed during field investigations. Documented within the Project Area on iNaturalist

Species Name, Status (SARA, ESA, S-Rank1), and Data Source	Potential for habitat/species occurrence in Project Site
Wood Thrush (*Hylocichla mustelina*) SARA: Threatened ESA: Special Concern S-Rank: S4B Source: Secondary Sources, NHIC	**Confirmed –** Suitable habitat is present. This species was not observed during field investigations. Documented in various sources and confirmed breeding by Ojibway Nature Centre.
Wood Thrush (*Hylocichla mustelina*) SARA: Threatened ESA: Special Concern S-Rank: S4B Source: Secondary Sources, NHIC	**Confirmed** – Suitable habitat is present. This species was not observed during field investigations. Documented in various sources and confirmed breeding by Ojibway Nature Centre.
Amphibians and Reptiles	
Eastern Foxsnake (*Carolinian population*) (Pantherophis gloydi pop. 2) SARA: Endangered ESA: Endangered S-Rank: S2 Source: Secondary Sources	**High** – Suitable habitat is present (Figure 5-16) and multiple records occur in Ojibway Park. This species was not observed during field investigations.
Butler's Gartersnake (*Thamnophis butleri*) SARA: Endangered ESA: Endangered S-Rank: S2 Source: Secondary Sources, NHIC	**Moderate** – Suitable habitat is present. This species was not observed during field investigations.
Invertebrates	
Monarch (*Danaus plexippus*)	**Moderate** – Several species of milkweed are present in Windsor but may be limited within the Project Area. This species may be found in any habitat with milkweed or nectar-producing flowers.

Species Name, Status (SARA, ESA, S-Rank1), and Data Source	Potential for habitat/species occurrence in Project Site
SARA: Special Concern ESA: Special Concern S-Rank: S2N,S4B Source: Secondary Source	
[redacted]	[redacted]
Yellow-banded Bumble Bee (*Bombus terricola*) SARA: N/A ESA: Special Concern S-Rank: S3S5 Source: Secondary Source	**Moderate** – Suitable habitat is present. This species was not observed during field investigations.

Note(s)

1 SARA = Species at Risk Act, 2002 Schedule 1 unless otherwise noted. The protection and/or conservation measures afforded by SARA apply only to species once they are on Schedule 1.

2 ESA = *Endangered Species Act, 2007*

3 S-Rank = S1 - Extremely rare throughout its range in the province; S2 - Rare throughout its range in the province; S3 - Uncommon or vulnerable species; S4 - Apparently Secure Species; S5 - Secure Species; SX - Extirpated; B - Breeding; N - Non-breeding; ? - Uncertainty

The figure has been redacted to protect specific plant species at risk from poaching/harvesting

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5.4.7 Natural Heritage Features

When developing the Greenway System (the natural heritage system in the City) the provincial natural heritage features of significance identified below were considered by the City. Based on the assessment described below, the designation and mapping provided in Schedule B, C, and D are accurate.

5.4.7.1 Areas of Natural and Scientific Interest (ANSI)

ANSI are defined in the PPS as "areas of land and water containing natural landscapes or features that have been identified as having life science or earth science values related to protection, scientific study or education." Life science ANSI are significant representative segments of Ontario's biodiversity and natural heritage. Provincially significant life science ANSI include the most significant and best examples of the natural heritage features in the province (Ontario Ministry of Natural Resources, 2010). Ojibway Park and Black Oak Heritage Park are part of a Life Science ANSI of provincial significance (Figure 4-1).

5.4.7.2 Significant Wetlands and Other Wetlands

In the West Study Area, the PSW Black Oak Wetland Complex (ER40), has been delineated and evaluated by the province (Figure 4-1). The PSW was evaluated in 2014 and wetland unit numbers 5 and 6 occur in the West Study Area. The evaluation notes that the PSW aids in maintaining the existing wetland habitat within the City of Windsor, of which is an uncommon to rare feature within the city limits. This wetland complex is entirely designated as coastal wetland, comprising of one riverine and a series of palustrine wetlands that feed into a connective drain system that ultimately influences the Detroit River Area of Concern.

The province has not delineated any wetlands within Ojibway Park. However, during fieldwork, it was determined that a swamp wetland community type does occur within Ojibway Park (Figure 5-9). The MNRF has not identified this area as provincially significant. Therefore, in accordance with PPS definitions, the swamp wetland identified within the East Study Area is not considered significant for the purposes of this report.

5.4.7.3 Significant Woodlands

In the East Study Area, the province has mapped wooded areas in the boulevard between Broadway Boulevard and Ojibway Parkway (Figure 5-17). The area mapped by the province is referred to as a hedgerow1 (GeoHub, 2019) and included as FODM1-3 ELC delineation. According to the Natural Heritage Reference Manual (Ontario Ministry of Natural Resources, 2010), woodland areas are considered to be generally continuous even if intersected by narrow gaps 20 m or less in width between crown edges. The crown gap over Broadway Boulevard is approximately 10 m; therefore, this wooded area is considered an extension of the forest within Ojibway Park. The wooded area (delineated FODM1-3) in the East Study Area, as described above, is considered a significant woodland.

Woodlands are treed areas that offer a host of environmental and economic benefits such as erosion prevention, nutrient cycling, clean air provision, carbon storage, wildlife habitat, recreational opportunities, and the sustainable harvest of woodland products (Ministry of Municipal Affairs and Housing, 2020). Woodlands may be delineated according to the *Forestry Act* definition or the Province's Ecological Land Classification system definition for "forest" (Ministry of Municipal Affairs and Housing, 2020). A Significant Woodland is one that is ecologically, functionally, or economically important due to factors like species composition, tree age, stand history, location, size, forest cover in the planning area,

[1] Identified features that meet the Treed Area[2] description and are not a plantation. These features must be linear in nature with no feature wider than 30 metres and yet with a minimum width of 10 metres. Hedgerows are captured as separate features from connected treed areas (GeoHub, 2019).

[2] Interpreted feature > 2 metres in height, >60% canopy coverage (GeoHub, 2019).

site quality, or past management history. The MNRF has established criteria to determine the significance of woodlands, which include Woodland Size, Ecological Functions, Uncommon Characteristics, and Economic and Social Functional Values.

The Woodland Size Criteria considers a woodland significant based on the size of the 'parcel' in the context of forest cover in the region/county. Essex County and Chatham-Kent County have less than 5 percent forest cover (Ontario Ministry of Natural Resources, 2010), and therefore any 'parcel' over 2 ha in size should be considered significant. Ojibway Park is approximately 68 ha in size.

Ecological Functions Criteria include factors such as woodland interior, proximity to other woodlands or habitats, linkages, water protection, and woodland diversity. Any 'parcel' with any interior habitat in a county with less than 15% forest cover is considered significant. Interior habitat is measured as the area within a 'parcel' 100 m from the edge. Ojibway Park has approximately 36 ha of interior wooded area. A 'parcel' is also considered significant if it is close to other significant natural areas. The Ojibway Park would be considered significant based on proximity to Ojibway Prairie Provincial Nature Reserve, Tallgrass Prairie Heritage Park, and Black Oak Heritage Park.

Woodlands should be considered significant if they are located within a defined natural heritage system or provide a connecting link between two other significant features. Ojibway Park is located within the City of Windsor's natural heritage system; however, it does not directly link other parks as roadways bisect the larger area. In some locations, specifically, the area between Ojibway Park and the Ojibway Prairie Provincial Nature Reserve and Tallgrass Prairie Heritage Park the crown gap is approximately 20 m and, therefore, can be considered linked (Ontario Ministry of Natural Resources, 2010).

Woodlands should be considered significant if they are located within a sensitive or threatened watershed or in proximity to sensitive groundwater discharge, sensitive recharge, sensitive headwater area, watercourse, or fish habitat. ERCA mapping places Ojibway Park within a level 2 Significant Groundwater Recharge Area (Figure 5-17). Ojibway Park would be considered significant based on its location within a groundwater recharge area.

Woodland habitat loss is one of the most serious threats to biological diversity. Woodlands should be considered significant if they have a naturally occurring composition of native forest species that have declined significantly or have a high native diversity through a combination of composition and terrain. Black Oak Heritage Park has several SAR plants and should be considered significant. Likewise, under Uncommon Characteristics Criteria, woodlands should be considered significant if they have a unique species composition; a vegetation community with a provincial ranking; habitat of rare, uncommon, and/or restricted plant species; and are characterized as older communities.

Lastly, the Economic and Social Functional Values Criteria considers woodlands with high-value ecosystem services, such as air-quality improvement or recreation, to be significant if those services exist at a sustainable level. Ojibway Park and the Ojibway Nature Centre provide significant recreational and educational opportunities to the public.

In the West Study Area, wooded areas are mapped by the province in Black Oak Heritage Park and ETR lands. The area mapped by the province is referred to as treed, the definition of which is > 2 m in height, >60% canopy coverage (GeoHub, 2019). The Black Oak Heritage Park Management Plan (Sage Earth, 2019) delineates these wooded areas as various forest communities of differing ages. Based on the same level of evaluation as above, the woodland in the West Study Area Black Oak Heritage Park is likewise considered significant based on the following.

The Woodland Size Criteria bases significance based on the size of the 'parcel' in the context of forest cover in the region/county. Essex County and Chatham-Kent County have less than 5 percent forest cover (Ontario Ministry of Natural Resources, 2010), and therefore any 'parcel' over 2 ha in size should be considered significant. The wooded areas are approximately 31 and 36 ha in size. The wooded areas

are divided by the ETR tracks, however, the crown gap is approximately 20 m and, therefore, can be considered linked (Ontario Ministry of Natural Resources, 2010).

Under the woodland interior section, any ‘parcel’ with any interior habitat in any county with less than 15% forest cover is considered significant. Interior habitat is measured as the area within a ‘parcel’ 100 m from the edge. Black Oak Heritage Park has approximately 36 ha of interior wooded area.

Under proximity to other woodlands or other habitats section considers the ‘parcel’ significant if it is close to other significant natural areas. The Black Oak Heritage Park would be considered significant based on proximity to Ojibway Park.

Woodlands should be considered significant if they are located within a defined natural heritage system or provide a connecting link between two other significant features. Black Oak Heritage Park is located within the City of Windsor’s natural heritage system; however, it does not directly link other parks as roadways bisect the larger area.

Woodlands should be considered significant if they are located within a sensitive or threatened watershed or in proximity to sensitive groundwater discharge, sensitive recharge, sensitive headwater area, watercourse, or fish habitat. ERCA mapping places the Park within a level 2 Significant Groundwater Recharge Area. Black Oak Heritage Park would be considered significant based on its location within a groundwater recharge area.

Woodland habitat loss is one of the most serious threats to biological diversity. Woodlands should be considered significant if they have a naturally occurring composition of native forest species that have declined significantly or have a high native diversity through a combination of composition and terrain. Black Oak Heritage Park has several SAR plants and should be considered significant. Likewise, under Uncommon Characteristics Criteria, woodlands should be considered significant if they have a unique species composition; a vegetation community with a provincial ranking; habitat of rare, uncommon, and/or restricted plant species; and are characterized as older communities.

Lastly, the Economic and Social Functional Values Criteria considers woodlands with high-value ecosystem services, such as air-quality improvement or recreation, to be significant if those services exist at a sustainable level. Black Oak Heritage Park provides significant recreational and educational opportunities to the public.

328000 328250 328500 328750

4682250 4682000 4681750 4681500 4681250 4681000 4680750

Broadway Drain
BROADWAY BOULEVARD
HIGHWAY 401
BEECH AVENUE
BROADWAY BOULEVARD
Ojibway Park Drain
Ojibway Park Drain
FODM1-3
SWDM1-3
Susan Drain
SWDM1-1
FODM2-2
SWDM1-1
WODM3-2
FODM1-3
Titcombe Road Drain
ESSEX TERMINAL RAILWAY
OJIBWAY PARKWAY
SWDM4-6
SWDM1-1
SVDM1-1
Ojibway Park Nature Centre
SWDM4-6

Ecological Land Classification

- *FODM1-3* (Dry - Fresh Black Oak Deciduous Forest Type (FOD1-3))
- *FODM2-2* (Dry – Fresh Oak – Hickory Deciduous Forest Type (FOD2-2))
- *SWDM1-1* (Swamp White Oak Mineral Deciduous Swamp (SWDM1-1))
- *SWDM1-3* (Pin Oak Mineral Deciduous Swamp Type (SWD1-3))
- *SVDM1-1* (Dry Black Oak Tallgrass Savanna Type (TPS1-1))
- *SWDM4-6* (White Birch - Cottonwood Deciduous Swamp Type (SWDM4-6))
- *WODM3-2* (Dry Black Oak Woodland Type)

LEGEND

- Project Footprint
- Project Area
  - East Study Area
  - West Study Area
- Watercourse / Drain
- Railway
- Ojibway Park Nature Centre
- Significant Ground Water Recharge Area (Level 2)

NOTES:
- Aerial imagery extracted from Essex County interactive map, 2019.
- Wooded area extracted from LIO, NDMNRF.
- Significant groundwater recharge area (level 2) provided by Essex Region Conservation Authority,

Datum: NAD83
Projection: UTM Zone 17N

0 50 100 200 300 400 Metres

N W E S

THE CITY OF WINDSOR ONTARIO, CANADA

wsp

OJIBWAY PARKWAY WILDLIFE CROSSING

Significant Woodland Evaluation

PROJECT N°: IM20104013 | **FIGURE: 5-17**

SCALE: 1:4,500 | DATE: May 2024

\\golder.gds\complexdata\office\Ontario\SIM\Clients\City_of_Windsor\Ojibway_Wildlife_Overpass_EA\MXD\Significant_Woodland_Evaluation_3_GM.mxd

5.4.7.4 Significant Valleylands

Valleylands are a natural area that occurs in a valley or other landform depression that has water flowing through or standing for some period of the year. Based on the results of the Natural Environment Assessment, there are no valleylands in the Study Area.

5.4.7.5 Fish Habitat

Fish habitat is defined in the *Fisheries Act*, and under the PPS means spawning grounds and any other areas, including nursery, rearing, food supply, and migration areas on which fish depend directly or indirectly in order to carry out their life processes. Based on the results of the Natural Environment Assessment, no fish habitat occurs in the Study Area.

5.4.7.6 Adjacent Lands

Adjacent lands are the lands relevant to which impacts must be considered and the compatibility of a development proposal must be addressed. The extent of adjacent lands may vary, depending on such factors as hydrology, topography, soil conditions, potential disruption of wildlife movement patterns, land use and other features (Ontario Ministry of Natural Resources, 2010). Planning authorities may also define adjacent lands. The City of Windsor OP states that the identification of adjacent lands will be determined on a site-specific basis by the Municipality, in consultation with the province and/or ERCA, and in accordance with policy 10.2.5.4 of this Plan. Policy 10.2.5.4 states that provincial policies will be fulfilled.

Adjacent lands typically encompass a distance of 120 m from a feature or area for which potential negative impacts are being assessed. To address potential negative impacts from this proposed project, field studies and review of secondary source information were completed within 120 m of the Project Area. This evaluation of significance includes any natural heritage features that occur within that 120 m (Figure 4-1).

5.4.7.7 Significant Wildlife Habitat

SWH is considered of provincial significance in Ontario. Development in SWH is prohibited unless it can be demonstrated that development will have no negative impact on features and functions. Wildlife habitat is considered “significant” if it is deemed ecologically important in terms of feature, function, representation or amount, and contributing to the quality and diversity of an identifiable geographic area or Natural Heritage System (Ministry of Municipal Affairs and Housing, 2020). Within Ecoregion 7E, criteria for evaluating SWH are provided in MNRF Ecoregion schedules for Ecoregion 7E (Ontario Ministry of Natural Resources and Forestry, 2015). Other provincial documents used to identify and assess SWH are the *Natural Heritage Resource Manual* (Ontario Ministry of Natural Resources, 2010), the *Significant Wildlife Habitat Technical Guide* (Ontario Ministry of Natural Resources, 2000), and the *Significant Wildlife Habitat Mitigation Support Tool* (SWHMiST) (Ontario Ministry of Natural Resources and Forestry, 2014).

SWH has been evaluated for the Study Area and seven have been evaluated as candidate and four as confirmed. Habitats not discussed below were evaluated as not present as either habitat requirements or species are not present. The following ten SWH were determined to be either candidate or confirmed. Please refer to the Natural Environment Assessment Report in Appendix D for detailed information on these SWH.

Seasonal Concentration Areas

- Raptor Wintering – Candidate
- Bat Maternity Colonies – Candidate
- Reptile Hibernaculum – Candidate

Rare Vegetation Communities or Specialized Habitat for Wildlife

- Savannah – Confirmed
- Other Rare Vegetation Communities – Confirmed
- Woodland Raptor Nesting Habitat – Candidate
- Amphibian Breeding Habitat: Woodland – Candidate
- Amphibian Breeding Habitat: Wetland – Confirmed
- Woodland Area-Sensitive Bird Breeding Habitat – Candidate

Habitats of Species of Conservation Concern

- Special Concern and Rare Wildlife Species

Animal Movement Corridors

- Amphibian Movement Corridors (Figure 5-18)

328000 328500 329000 329500 330000

4682000 4681500 4681000

BROADWAY BOULEVARD
BEECH AVENUE
CHAPPUS STREET
Ojibway Park Drain
Susan Drain
ARMANDA STREET
Tittombe Drain
WERNER AVENUE
MATCHETTE ROAD
MALDEN ROAD
ORIOLE BOULEVARD
TITCOMBE ROAD
Tittombe Road Drain
OJIBWAY PARKWAY
ESSEX TERMINAL RAILWAY
WEAVER ROAD

\\golder.gds\complexdata\office\Ontario\SIM\Clients\City_of_Windsor\Ojibway_Wildlife_Overpass_EA\MXD\Approx_Amphib_Movement_Corridors_2_GM.mxd

LEGEND

- Project Footprint
- Project Area
- East Study Area
- West Study Area
- Approximate Wetlands and Vernal Pools
- Approximate Amphibian Movement Corridor
- Approximate Woodland Limit
- Property Boundaries
- Watercourse / Drain
- Railway

NOTES:
- Aerial imagery extracted from Essex County interactive map, 2019.

0 100 200 400 600 800 1,000 Metres

Datum: NAD83
Projection: UTM Zone 17N

N W E S

THE CITY OF WINDSOR ONTARIO, CANADA

wsp

OJIBWAY PARKWAY WILDLIFE CROSSING

Approximate Amphibian Movement Corridors

PROJECT N°: IM20104013 | **FIGURE: 5-18**

SCALE: 1:6,500 | DATE: May 2024

5.4.8 Drainage

The available storm servicing information provided for use in this study indicates that there are three municipal drains in the Study Area (Ojibway Park Drain, Titcombe Road Drain, and Susan Drain). These drains are understood to be regulated by ERCA. The available elevation data indicates that the study area and the surrounding region is fairly flat (i.e., overland slopes less than 2%). The City's open data for the storm sewers and municipal drains indicate multiple open drains crossing Ojibway Parkway from east to west before merging near the intersection with Broadway Street. A review of available aerial imagery indicates the presence of roadside ditches on both sides of Ojibway Parkway in select locations within the Study Area limits, which route the stormwater in the road right-of-away to one of the drains, as shown in Figure 1-1.

5.4.9 Climate Change Considerations

In 2017, the MECP issued a guide that provides information for proponents to consider impacts of climate change on proposed undertaking and vice versa when carrying out the environmental assessments (Ministry of the Environment, Conservation and Parks, 2017). The guide requires proponents to take into account the following:

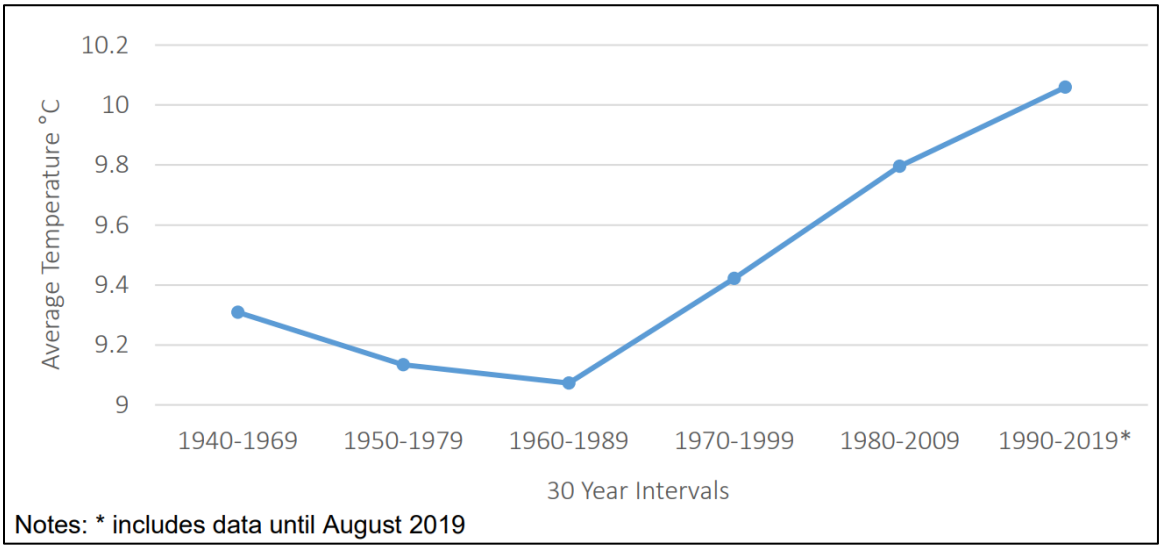
- the project's expected production of greenhouse gas emissions and impacts on carbon sinks (climate change mitigation)
- resilience or vulnerability of the undertaking to changing climatic conditions (climate change adaptation)

City of Windsor's Climate Change Adaptation Plan (2020) is a key document that discusses Windsor's historical climate trends and future climate projections, identifies climate change impacts and issues, and outlines targets and actions to prepare for climate future by creating a more resilient city to the effects of a changing climate (City of Windsor, 2020). The information from City's Climate Change Adaptation Plan (2020) is provided below as it relates to this project.

5.4.9.1 Windsor's Historical Climate

Temperature: The 30-year mean temperature in Windsor has increased from 9.1°C in 1960-1989 to 10.1°C in 1990-2019, indicating a 1°C increase in the average annual temperature (City of Windsor, 2020) (Figure 5-19).

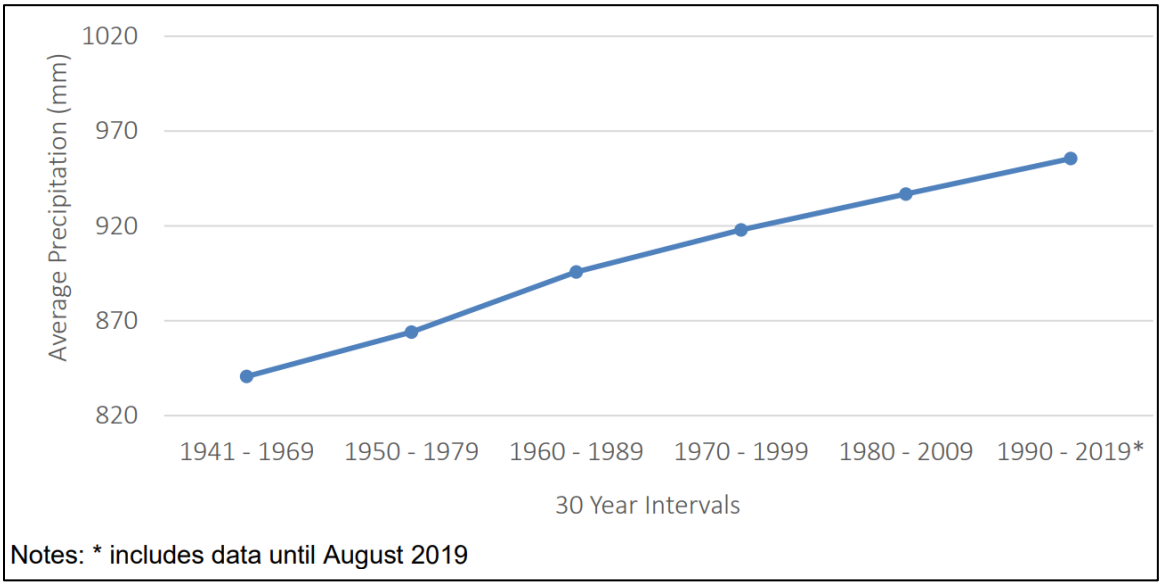
Figure 5-19: Windsor's Historical 30 Year Mean Annual Temperatures*



Notes: * includes data until August 2019

Precipitation: Windsor's 30-year mean annual rainfall has increased from 840mm in 1941- 1969 to 955mm in 1990-2019, indicating an increase of approximately 7%. (City of Windsor, 2020) (Figure 5-20).

Figure 5-20: Windsor's Historical 30 Year Mean Annual Precipitation*



* Source: City of Windsor Climate Change Adaptation Plan (2020)

5.4.9.2 Windsor's Climate Projections

Future climate projections were completed for the City of Windsor as part of the development of the Climate Change Adaptation Plan (2020). These future projects were completed using climate data based on global climate models and emission scenarios defined by the Intergovernmental Panel on Climate Change, drawing from both the Fourth Assessment Report for temperature and precipitation data and the Fifth Assessment Report for extreme weather data (City of Windsor, 2020). In addition, localized climate projections were retrieved from the Canadian Climate Data and Scenarios Network. A summary of future climate projections for the City of Windsor from City's Climate Change Adaptation Plan (2020) is provided below:

Temperature

- Average annual temperature will increase by up to 4.4°C by the 2080s;
- Average number of days above 30°C will more than double by the 2050s and more than triple by the 2080s.

Precipitation

- Average precipitation expected to increase, particularly in winter and spring;
- Summer may eventually see a slight decrease in precipitation, coupled with increasingly warm seasonal temperatures.

Extreme Precipitation

- More intense precipitation events are expected to occur more frequently;
- 25% increase in 10-year storms;
- 40% increase in 100-year storms;

- On average, more rain is expected to fall (in mm/h) during periods of precipitation.

Water Temperature

- Temperature of Erie basin (includes wetlands and tributaries) continues to Increase.

Water Levels

- Water levels have been above average since 2013;
- In 2019 the Detroit River reached a high water level of 176.08 meters;
- In the near climate future water levels are expected to continue to be high;
- In the distant climate future, water levels are projected to decrease in Great Lakes partially due to warmer temperatures (i.e. more evaporation) and changing precipitation patterns.

5.4.9.3 Objectives and Actions for Climate Change Mitigation and Adaptation

City of Windsor's Climate Change Adaptation Plan (2020) identified a total of seven objectives for creating a more resilient city to the effects of a changing climate (City of Windsor, 2020):

1. Integrate Climate Change Thinking and Response
2. Protect Public Health and Safety
3. Reduce Risk to Buildings and Property
4. Strengthen Infrastructure Resilience
5. Protect Biodiversity and Enhance Ecosystem Functions
6. Reduce Community Service Disruptions
7. Build Community Resilience

This project advances the following action of Objective 5:

- Action 5.3: Enhance linkages between and among natural heritage features
  - Investigate increased land connectivity options including land acquisition and landscaped or below grade Eco passages to enhance natural areas linkages.

5.4.10 Soil and Groundwater

A desktop-based Geotechnical Memo was completed to provide a summary of the subsurface conditions within the Study Area based on the previous geotechnical investigations carried out in the area, and a comparison of the different structural alternatives for the proposed Wildlife Crossing. The comparison accounted for the geotechnical constraints that may affect each structure type. The findings from the geotechnical memo are summarized below. The following findings are based on the borehole information available in the previously completed geotechnical investigation within and in the vicinity of the Study Area. The geotechnical review memo is provided in Appendix E.

5.4.10.1 Regional Surficial Geology

According to the Ontario Geological Survey, Map 2556, the site is located within an area of coarse textured lacustrine deposits comprising glaciolacustrine deposits of silt and clay with minor sand as well as basin and quiet water deposits (Henry et al., 1991).

According to Map 2441, the Palaeozoic (bedrock) geology of this area consists of Detroit River Group referred to as the Onondaga Formation in the Niagara Peninsula. The most common deposit associated with the bedrock unit in the area is limestone and dolostone (Freeman, 1979).

5.4.10.2 Subsurface Conditions

The subsurface soils in the region generally comprise silty sand/sandy silt deposits overlying an extensive silty clay layer, which is in turn underlain by limestone bedrock. The geologic mapping indicates that the surficial soils are the same across the entire Study Area.

5.4.10.3 Topsoil

Topsoil was encountered at the surface of some of the previously drilled boreholes within the Study Area. The thickness of this topsoil ranged from 100 to 760 mm. In one of the boreholes, the fill in was underlain by 0.7 m of buried topsoil.

5.4.10.4 Fill

The concrete at one borehole location and the pavement structure at two other borehole locations within the Study Area were found to be underlain by granular fill, with thicknesses ranging from 20 mm to 0.5 m.

5.4.10.5 Sands and Silts

Beneath the surficial topsoil, deposits of silty sand, sand, sandy silt, silt and sand and gravel were noted at some of the boreholes, extending to depths of 2.3 to 4.4 m below the ground surface (mbgs). Where fully penetrated, the sands and silts were 1.7 m to 3.7 m thick. The measured 'N' values from Standard Penetration Test ranged from 4 blows to 26 blows per 0.3 m penetration, indicating a very loose to compact state. The moisture content of these deposits ranged from approximately 9% to 30%.

5.4.10.6 Silty Clay/Clayey Silt

Silty clay/clayey silt deposits were found beneath the sands and silts in majority of the boreholes within the Study Area. These deposits were discovered to extend to depths of 23.3 to 23.5 mbgs in the deepest locations. The remaining locations were terminated in the silty clay/clayey silt.

In situ field shear vane tests completed in the firm to very stiff clayey deposits indicate the undrained shear strength ranges from approximately 35 to greater than 144 kPa, typically decreasing with depth to an approximate elevation. Below this elevation, the shear strength generally increases from 50 to greater than 95 kPa. SPT N values in the silty clay/clayey silt ranged from 0 (weight of hammer) to 9 blows per 0.3 m penetration, indicating very soft to stiff consistencies.

5.4.10.7 Limestone Bedrock

Two boreholes encountered limestone bedrock underlying silty clay till at depths of 23.5 and 23.7 mbgs, respectively. The composition was described as grey, medium strong, very fine to fine grained limestone with whitish, light grey and brown zones. The measured 'RQD' values in the bedrock ranged from 62 to 100 indicating fair to excellent quality rock.

5.4.10.8 Groundwater Conditions

Details of the water levels observed in the open boreholes at the time of drilling are presented on the Record of Borehole sheets in the original investigation reports and summarised in the Geotechnical Memo (Appendix E). Groundwater conditions will vary subject to weather and seasonal fluctuations.

It should be noted that previous geotechnical studies in the area have encountered hydrogen sulphide and methane dissolved in the groundwater. Where encountered, hydrogen sulphide was typically found near the overburden/bedrock interface and in boreholes where artesian groundwater conditions exist. Flowing artesian conditions were encountered at the overburden-bedrock interface during drilling for some boreholes along Herb Gray Parkway and during rock coring for of one of the boreholes.

5.4.11 Contamination

An Environmental Contamination Overview Report was completed by WSP (previously Wood E&I) to identify any contaminants of potential concern within the Study Area. It is important to note that this report was completed before expanding the Study Area, and it had focused only on the initial Study Area (i.e., Ojibway Park and Ojibway Parkway). This report is provided in Appendix F. The scope of work for the environmental contamination overview included the following tasks:

- Reviewing available archived and relevant (in Wood's opinion) municipal and business directories, fire insurance plans, chain of title; historical plans (if applicable), and aerial photographs to identify past or present uses and/or PCAs and/or land uses that may have impacted its environmental condition and to document the history of the Project Area to its first development or 1875, whichever is earlier;
- Completing a preliminary reconnaissance visit to take photographs of the Project Area and surrounding properties (from publicly accessible areas) and assess current on-site conditions;
- Evaluating the findings obtained through the tasks identified to determine if Areas of Potential Environmental Concerns that may be impacting the quality of soil exist within the Project Area through observations about current and past uses and Potentially Contaminating Activities on, in or under the Project Area and, as practicable, current and past uses and activities and Potentially Contaminating Activities in the Study Area; and,
- Preparing an environmental contamination overview to support future Environmental Excess Soil Sampling and Testing required by Ontario Regulation 406/19 (O. Reg. 406/19).

The following table lists the Areas of Potential Environmental Concerns were identified resulting from Potentially Contaminating Activities associated with known contaminants located adjacent to the Study Area. Detailed contamination studies (such as, Phase I and II Environmental Site Assessments) may be required during detailed design or construction phase to assess the entire project area and make recommendations to manage the contamination as part of project construction.

Table 5-5: Area of Potential Environmental Concern

Area of Potential Environmental Concern	Location of APEC on Project Area	Potentially Contaminating Activity*	Location of PCA	Contaminants of Potential Concern	Media Potentially Impacted
APEC-1: Ojibway Parkway (on-site, at least 1930s-present)	Central portion of Project Area	Other. Salt applied to roadway surface (current)	On-Project Area	EC, SAR	Soil
APEC-2: ETR tracks (west adjacent property, at least 1930s-present)	Western portion of Project Area	46. Rail Yards, Tracks and Spurs	On-Project Area	PAHs, BTEX, PHCs, ICP Metals	Soil

*Potentially Contaminating Activity (PCA) described specifically for the Phase One Property with reference to the applicable item number in the Table of Potentially Contaminating Activities provided in Schedule D of O. Reg. 153/04 as amended, where applicable.

PHCs : Petroleum Hydrocarbons. **PAHS:** Polycyclic Aromatic Hydrocarbons.

BTEX: Benzene, Toluene, Ethylbenzene, Xylenes. **SAR:** Sodium Adsorption Ratio

EC: Electrical Conductivity

5.4.12 Source Water

The *Clean Water Act* was developed to protect existing and future sources of drinking water. Under this legislation, various 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 (Government of Ontario, 2006). Source Protection Plans have been developed to contain policies to address the significant drinking water threats.

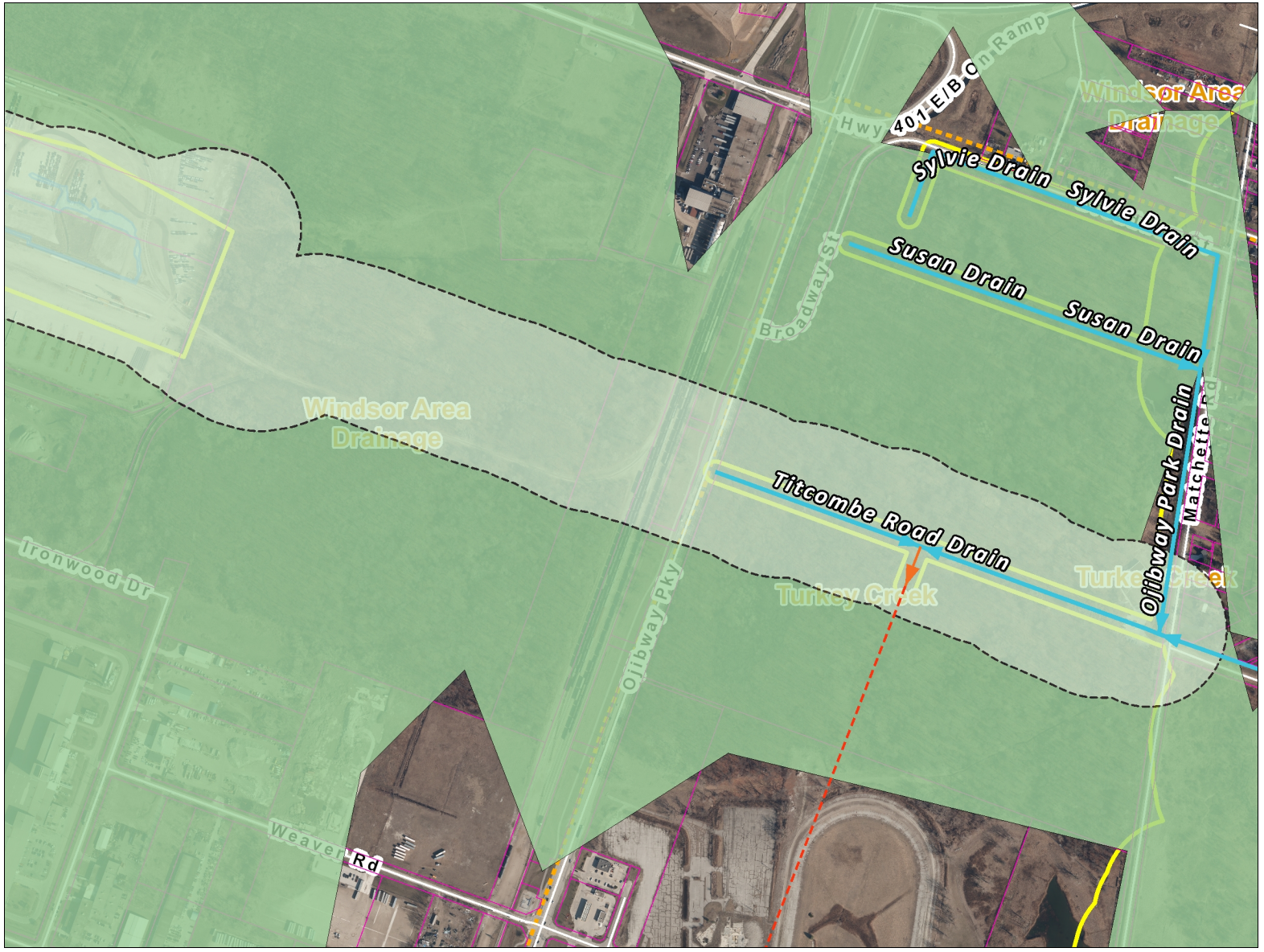
The City of Windsor is located within the Essex Region Conservation Source Protection Area. The municipal drinking water in the Essex Region comes from lakes and rivers (i.e., Lake St. Clair, Lake Erie and the Detroit River). These sources of drinking water are accessed through municipal drinking water intakes. Drinking water sources can be easily contaminated from human activities and natural processes. Source water protection planning help ensures that these municipal supplies of drinking water are protected.

The Essex Region Source Protection Plan identifies the potential threats to existing and future sources of water supply and outlines actions and programs to reduce or eliminate these risks. The Essex Region Source Protection Plan builds on the findings of the Assessment Report.

The Essex Region Source Protection Plan identifies Vulnerable Areas where special care may need to be taken in the use and handling of chemicals and other potential contaminants. Vulnerable Areas are areas where certain types of activities may pose a threat to drinking water quality or quantity. In the Essex Region, the drinking water comes from surface water intakes and the Vulnerability Areas are called Intake Protection Zones and Event Based Areas. Intake Protection Zones are areas of land and water where run-off from streams or drainage systems could carry contaminants that could impact the source water at the municipal drinking water intakes. The Essex Region Source Protection Plan includes mandatory policies that apply in Windsor's IPZ-1 and IPZ-2 as well as the Belle River's IPZ-1 and Amherstburg's IPZ-1. The Source Protection Plan also identifies Highly Vulnerable Aquifers and Significant Groundwater Recharge Areas. These are areas where groundwater would be susceptible to contamination.

A review of source water protection mapping indicate that the Study Area is located within Surface Water Intake Protection Zone and Significant Groundwater Recharge Area (vulnerability score of 2) (Essex Region Conservation Authority, 2022) (Figure 5-21).

ERCA - Source Water Protection Map



Essex Region Conservation Authority

Public Interactive Mapping

Legend

Municipal Drains (ERCA)
- Natural
- Municipal Drain (Open)
- Municipal Drain (Closed)
- Unknown/Other Status (Open)
- Unknown/Other Status (Closed)
- Private/Roadside (Open)
- Private/Roadside (Closed)

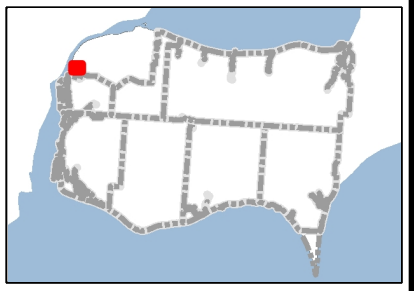
Surface Water Intake
- A
- B
- D

Surface Water Intake Protection Zone
- 1
- 2
- 3

Highly Vulnerable Aquifer (HVA)

Significant Groundwater Recharge Ar
- 2

Location



0 206.82 413.6

Meters

1: 9,306

3/28/2024

ERCA Geomatics **THIS MAP HAS BEEN PRODUCED BY THE GENERAL PUBLIC AND NOT BY QUALIFIED ERCA STAFF.**

Notes

5.5 Technical Environment

5.5.1 Utilities

The following utilities were identified along Ojibway Parkway, within the Study Area:

- Two Enbridge Gas Pipelines: a federally regulated (12 inch) and a locally regulated (16 inch). These pipelines are maintained by two separate Enbridge departments.
- Bell Canada fibreoptics and telephone lines.
- Hydro Poles and associated distribution lines owned by ENWIN Utilities Ltd.
- Street lights owned by the City.
- Sanitary forcemain owned by the Town of Lasalle.
- Watermain owned by the Windsor Utilities Commission and operated and maintained by ENWIN Utilities Ltd.
- Sanitary Sewer owned by the City of Windsor.

Utilities owners were contacted to provide information about the project and discuss potential conflicts. A summary of consultation with utilities owners is provided in 12.5 of this report.

6 Road Ecology Concepts

6.1 Road Ecology Literature

A variety of sources regarding road ecology were reviewed. Sources included journals, conference presentations and technical papers, articles, and previous studies in Ontario and beyond. Information on preferred crossing types, crossing widths, ingress and egress locations and styles, fencing considerations, and crossing location preferences were noted and are included within this report. As long linear features on the landscape, roads and railways are believed to be one of the main obstacles to movement and have impacts on wildlife and wildlife habitat; herein, both types of linear infrastructure are considered together as 'roads' (Jackson, 2000; Yanes, Velasco, & Suárez, 1995). This Class EA Study was initially focused on identifying a Wildlife crossing across Ojibway Parkway, however, as a result of input received from the public, Indigenous Nations, government agencies, and key stakeholders, the scope was broadened to identifying a Wildlife Crossing across Ojibway Parkway as well as ETR tracks.

Road Ecology aims to understand roadways and the impacts on wildlife and motorist safety, resources, habitat connectivity, and environmental values. In the 21st century, the impact of roads on wildlife is seen as a significant and growing worldwide issue. The main threats include:

- direct mortality (roadkill or WVCs),
- habitat fragmentation and loss and degradation, which results in inaccessibility to critical resources, and
- the sub-division of populations (barrier effects), which renders populations more susceptible to local extinction or extirpation.

Wildlife crossing structures are intended to increase habitat permeability and connectivity across roads and reduce the negative effects of roadways on wildlife and populations. Wildlife crossing structures can be above-grade (overpasses) or below-grade (underpasses) structures designed to facilitate the movement of animals and connections among populations. Several handbooks and guides exist to summarize literature and provide technical guidelines for the planning, designing, and evaluating of wildlife crossing structures. Handbooks and guides specific to Ontario include:

- Environmental Guide for Mitigating Road Impacts to Wildlife (Ministry of Transportation, 2016)
- Best Management Practices for Mitigating the Effects of Roads on Amphibian and Reptile Species at Risk in Ontario (Ontario Ministry of Natural Resources and Forestry, 2016)
- A Guide to Road Ecology in Ontario (Ontario Road Ecology Group, Toronto Zoo, 2010)

The Wildlife Crossing Structure Handbook Design and Evaluation in North America (U.S. Department of Transportation, 2011) is also a staple in wildlife crossing guides. Additionally, many conservation authorities throughout Ontario have summarized the information from the above guides and created their own handbooks.

6.1.1 Location of Wildlife Crossing Structure

Mitigating roads for wildlife conservation is most economical during road expansion or upgrade projects (U.S. Department of Transportation, 2011). Therefore, funding for wildlife crossing structures is most likely to originate from specific transportation projects. When funding for mitigation measures, such as wildlife crossings, originates from a specific project, the mitigation is a Project-level Approach. The Project-level Approach is concerned with the transportation corridor and directly adjacent lands. Indeed, Project-level Approaches may not automatically consider how the wildlife crossing structures fit into the larger landscape and regional wildlife corridor network. However, the Ojibway Wildlife Crossing has been considered in the larger context of the City's natural areas and aims to reconnect Black Oak Heritage Park Area to Ojibway Park Area and beyond. Additionally, the City has identified Ojibway Parkway as a

wildlife conflict zone. Wildlife conflict zones are road segments where animals are most likely to interact with the road and therefore where mitigation efforts (e.g., wildlife crossings) should be considered (Ministry of Transportation, 2016).

Ultimately, wildlife crossings should not lead to an ecological dead-end and should allow for dispersal and free movement to areas which wildlife requires for biological processes. The Ojibway Parkway wildlife corridor considers the larger landscape and projected land use. A landscape connection from the Detroit River, through Ojibway Shores and Black Oak Heritage Park Area to Spring Garden Natural Area and the existing Rt. Hon. Herb Gray Parkway connection to Oakwood Natural Area is the ultimate goal from an ecological perspective. The funding opportunity currently present allows for the first phase of this goal; completion of Municipal Class EA Study to identify a preferred alternative to re-establish an ecological connection between Black Oak Heritage Park Area and Ojibway Park Area.

Habitat linkage assessments at the landscape level (i.e., the entire city) are not suitable for identifying specific locations for wildlife crossings due to differences in design considerations such as local conditions and engineering concerns (U.S. Department of Transportation, 2011). Determining the specific placement of wildlife crossings is generally done at the project level, and considerations of wildlife crossing placement begin by determining the wildlife species or groups of concern (U.S. Department of Transportation, 2011). Ideally, crossing structures should be placed where animals naturally approach the road, but crossing locations should be selected based on habitat availability (Ontario Road Ecology Group, Toronto Zoo, 2010). The Environmental Guide for Mitigating Road Impacts to Wildlife (Ministry of Transportation, 2016) outlines a general approach for locating wildlife crossings. The approach uses both the landscape and features of the road itself. Landscape features focus on where natural heritage systems intersect with roads while road features focus on where infrastructure design and human use intersect. Along the west side of Ojibway Park, a chain-link fence occurs, with gaps within and under in specific places (Figure 9-1). The fencing likely funnels animals to these gaps and creates areas of higher concentration of crossings (Ministry of Transportation, 2016), and therefore, increased chances for WVCs. Additionally, the Titcombe Road Drain bisects Ojibway Park and outlets at Ojibway Parkway (Figure 9-1). The occurrence of culverts is important in assessing wildlife conflict zones as they represent drainage corridors that animals often use (Ministry of Transportation, 2016).

Field-based assessments can help verify and refine where wildlife crossings are required. Field-based assessments are typically conducted during an EA at the preliminary design stage (Ministry of Transportation, 2016). The strategy for field-based assessments, as documented in The Environmental Guide for Mitigating Road Impacts to Wildlife (Ministry of Transportation, 2016) includes:

- Reviewing relevant biophysical information;
  - As noted above and below, the biophysical characteristics of the Study Area have been documented, including existing fencing and gaps, road features, and ELC of adjacent lands and the ROW.
- Integration of data from local naturalists, agencies, and conservation authorities;
  - Local observation records and consultation have been gathered and included in the findings and analysis.
- Employing road ecologists to evaluate wildlife conflict zones for the species on-site and to devise mitigation strategies;
  - As documented throughout this report road, ecology experts have evaluated the site and project constraints to determine the ideal location of a wildlife crossing and fencing.
- Locating and mapping features likely to be associated with wildlife conflict zones such as drainage areas, jersey barriers, habitat features, and the distance to cover.
  - Figure 5-13 documents existing fencing and gaps as well as drainage areas. Habitat features and ELC are documented in Figure 5-9.

– Collect systematic on-road observations and additional field sampling, as applicable.

One method to determining the site-specific location of a wildlife crossing is often road mortality surveys (i.e., roadkill surveys). However, the use of road mortality data alone provides a very limited scope of wildlife movement areas. Low road-kill levels do not necessarily mean that wildlife road mortality is not a concern (Ministry of Transportation, 2016). Basing crossing locations on wildlife sightings (road mortality) alone is problematic as road mortality may be responsible for the current diminished populations (Ontario Road Ecology Group, Toronto Zoo, 2010 and Ministry of Transportation, 2016). In some animal groups, the locations where wildlife are struck by vehicles may not be the same area where they safely cross the road. Smaller, slow-moving animals (e.g., amphibians) benefit from crossings in locations with high amounts of mortality. In contrast, larger or fast-moving animals may be crossing safely elsewhere, and the road mortality hotspot may have many other factors associated with it (e.g., poor sightlines) (U.S. Department of Transportation, 2011).

Combining road mortality data with habitat linkage or movement models (U.S. Department of Transportation, 2011) can support the understanding of wildlife movement as models should be tested with empirical field data (e.g., road-kill locations). Telemetry has been commonly used to gather field data on successful road crossing locations, usually through intensive monitoring of wildlife movements. Other field methods for movement tracking include mark-recapture studies, animal tracking (in snow or track beds), camera detection, and genetic sampling. These programs are often effort and cost heavy and require multiple years to complete. Likewise, habitat linkage or movement models require research and specialists to conduct GIS-based movement models. It is ideal to use both theoretical and empirical data in pre-construction activities to determine the site-specific location of wildlife crossings when possible. However, crossings are often required reactively instead of proactively and decisions regarding crossing location and design are necessary without preconstruction studies (U.S. Department of Transportation, 2011).

In cases where preconstruction studies are not available, habitat models (verse site-specific), rapid assessments, local knowledge, and compatibility of adjacent land use can be used to determine crossing location and type.

6.1.1.1 Habitat Models and Rapid Assessments

Habitat models and rapid assessments may consist of the opinion of experts or qualitative models based on the best available information obtained from the literature. The advantages of habitat models are that the validity can be high if a consensus model is used in conjunction with GIS software and readily available secondary source date (i.e. photogrammetry). Limitations of modelling are that it works best when having a narrow taxonomic focus, and like all models, they are best when validated with field data. A rapid assessment differs from the habitat model in that there is no quantitative analysis of expert opinion or modelling. Experts delineate where they believe key corridors are located on a given section of roadway. The advantages are that rapid assessments are quick and easy to carry out, and if a consensus among specialists is achieved, the legitimacy can be high. Rapid assessments have the added ability to be of a broad taxonomic focus, including plants (Ruediger & Lloyd, 2003). The limitations of rapid assessments are a lack of qualitative criteria. For both methods, it is also important to consider who is determined as an expert and how transparent the process is when it comes to finding broader support for the model's findings.

Road mortality studies for reptiles and spatial analysis studies were completed on the east side of Ojibway Park (along Matchette Road and Malden Road) by others (Choquette & Valliant, Road Mortality of Reptiles and Other Wildlife at the Ojibway Prairie Complex and Greater Park Ecosystem in Southern Ontario, 2016). The suggests that reptiles moved in a southeast-northwest route along the utility right-of-way and therefore providing a potential function as a corridor connecting LaSalle Woods to Spring Garden Natural Area, Ojibway Prairie Provincial Nature Reserve, Tallgrass Prairie Heritage Park, and the northeast corner of Ojibway Park. A connection between Black Oak Heritage Park to Ojibway Park

would help connect reptile movement from the east side of the complex west towards Black Oak Heritage Park. No other habitat models for other taxa exist for the Ojibway Park area.

The rapid assessment approach was completed for the Crossing; however, it was supplemented through the EA process with alternatives assessment. Fieldwork was completed to determine where animals were already crossing, which were determined by trampled vegetation paths. Existing gaps in the chain-link fence were also documented as it is likely the location of crossings. Road mortality data from the City was received, and during field visits, road mortality was also noted.

6.1.1.2 Local Knowledge

Long-term residents can provide valuable information about where and how wildlife move across the landscape. In areas where potential crossing locations are limited, local knowledge can help guide the planning of wildlife crossings. It has been communicated from residents and recreational users that White-tailed Deer are frequently hit by traffic along Ojibway Parkway in the Study Area. Other information obtained from PICs (Section 12.2) indicate reptiles (snakes and turtles) actively use the area. The area is also said to be a refuge for mid and large mammals such as Coyote, Red Fox, and Gray Fox. Data indicating several Red Fox and Coyote road-kills from various locations around southwest Windsor were provided.

6.1.1.3 Coordination and Compatibility of Adjacent Land Use

One of the most important factors in site selection for wildlife crossings is adjacent land use compatibility (current and future). When the property for the wildlife crossing, areas for mitigation measures (e.g., post-construction rehabilitation), and fencing is not owned by the proponent (e.g., the municipality, region, conservation authority) which builds the crossing, an agreement and understanding on long-term responsibilities and financial investments must be understood by all parties. Additionally, an adjacent landowner may have a long-term plan for their property which would negate the crossing. Therefore, the planning of a wildlife crossing must consider adjacent owners and long-term land use.

Likewise, coordination between internal departments (e.g., operations, engineering, parks) must be forecasted to understand how to proactively integrate concerns around growing infrastructure and changing landscapes (U.S. Department of Transportation, 2011). Wildlife crossings can only be as effective as the management strategies developed and the funding and ability to implement them. For wildlife corridors to fulfil their function as habitat connectors, impacts from development and human disturbance must be mitigated. Long-term planning and landscape connectivity must be understood to ensure that the local-scale connection is effective.

As part of the Class EA Study, the Study Team consulted with the ETR to discuss the possibility of incorporating an overpass over the railway tracks and request information that may be of use to describe potential railway impacts on wildlife. During earlier conversations, ETR identified that it would consider accepting an overpass over the railway tracks. However, prior to issuing the Notice of Study Completion, ETR expressed several concerns, noting that they wish to avoid any crossing over its rail yard whether by span over its rail yard, by grade separated crossing or otherwise. Detailed consultation with the ETR is discussed in Section 12.4.

6.1.1.4 Spacing of Crossings

The spacing of wildlife crossings varies based on the variability of landscape, terrain, population densities, home ranges, and the section of available roadway. Wildlife crossings are permanent structures within a changing landscape. The lifespan of wildlife crossing structures is around 70–80 years (U.S. Department of Transportation, 2011). Therefore, the location and design of the crossings need to accommodate the changing dynamics of habitat and climatic conditions and their wildlife populations over time (U.S. Department of Transportation, 2011). Generally, in fragmented landscapes, fewer crossings are required compared to non-fragmented landscapes. At the landscape level, crossings can be placed

with dominant topographic features (watercourses) or avoid unsuitable areas such as steep terrain. The spacing of crossings should also consider that home range size varies over time, species, and resource availability and distribution. Wildlife crossings must connect to and form an integral part of the larger landscape. Additional crossings may not need to be placed on a linear stretch of road but on other roadways within the regional movement corridor. Crossing of various types and sizes can also be considered, along with microhabitat elements that will enhance movement.

When roads bisect large expanses of continuous habitat, it is thought that crossing structures for smaller animals, including amphibians, turtles, and snakes, be spaced 300 m apart (Ministry of Transportation, 2016 and Ontario Ministry of Natural Resources and Forestry, 2016). For White-tailed Deer, it is recommended that crossings be spaced 1.4 km apart (Bissonette & Adair, Restoring habitat permeability to roaded landscapes with isometrically-scaled wildlife crossings, 2008).

6.1.2 Type of Wildlife Crossing Structure

Ojibway Parkway is predicted to transport 870 to 1,065 vehicles during peak hours (pm and am, respectively) between Black Oak Heritage Park Area and Ojibway Park Area in 2035 (Canada-United States-Ontario-Michigan Border Transportation Partnership, 2008); thus, modifying motorist behaviour is not feasible. Therefore, the City aims to modify animal behaviour to reduce WVCs and provide an effective landscape connection. Crossing structures and fencing have been shown to be effective measures in reducing WVCs and providing connections between fragmented habitats (Ministry of Transportation, 2016). To address structure type, species-specific behaviours should be incorporated into the crossing structure design. However, sometimes these concerns are offset by other project constraints, including the cost of the structure, available material and expertise, and physical limitations of the site, e.g., soil, terrain, hydrology (U.S. Department of Transportation, 2011). Ultimately, wildlife crossings have two purposes; to 1) connect habitats and populations and 2) reduce road mortality. When facilitating connections, overpasses and underpasses are discussed, while specific measures and habitat and infrastructure adaptations are considered for reducing WVCs. Habitat and infrastructure adaptations can include signage, lighting, ROW maintenance (removing habitat to increase sightlines a reduce WVCs), and road infrastructure (e.g., curbs, drainage grates, jersey barriers, the width of road median).

6.1.2.1 Overpass vs. Underpass Crossings

Wildlife crossings come in a variety of shapes and sizes, depending on their specific objective. Overpass designs are landscape bridges, wildlife overpasses, multi-use overpasses, canopy crossings. Underpass designs are viaducts, large mammal underpasses, multi-use underpasses, underpasses with waterflow, small and medium mammal underpasses, modified culverts, and herptile tunnels. Determining the type of wildlife crossing structure most suitable for a given location will depend on several criteria. Selection begins by identifying a general wildlife crossing type that conforms to the wildlife habitat connectivity potential for the target species and topography of the site chosen (U.S. Department of Transportation, 2011). When selecting wildlife crossing types where a roadway bisects habitat of high conservation value, mixed-use (wildlife-human) crossings should not be used (U.S. Department of Transportation, 2011 and Ministry of Transportation, 2016). Additionally, landscape bridges and large wildlife overpasses have been proven to be the most effective structures for multiple species (U.S. Department of Transportation, 2011 and Ministry of Transportation, 2016).

Previous research indicates that larger animals prefer 50 m wide overpasses compared to underpasses and European standards aim for this width. In Ontario, the first wildlife overpass had a width of 30 m but was a straight deck, which means animals had a straight view across (Ministry of Transportation, 2016). Generally, wildlife crossings should not be greater than 230–260 ft (70–80 m) in length except in special situations, such as spanning highways (U.S. Department of Transportation, 2011).

Wildlife crossings will often be focused on a species of conservation interest (e.g., threatened or endangered), a species-specific group (e.g., amphibians or reptiles), or they can be implemented to

reduce threats to motorist safety (e.g., deer). Preferably wildlife crossings will be designed to allow for movement of the greatest diversity of wildlife species. Ojibway Park Area and Black Oak Heritage Park Area have large mammals-ungulates (deer); high-mobility medium-sized mammals- carnivores (coyote, fox); low mobility medium-sized mammals (raccoon, skunk, groundhog); small mammals (voles, mice); amphibians; and reptiles.

6.1.2.2 Openness Ratio

Openness Ratio (OR) was used early in the field of road ecology to describe and measure the stimulus of a given underpass to approaching deer by calculating height times width and then dividing by length (U.S. Department of Transportation, 2011). The thought is that, in theory, an underpass could be so long and confining that it could preclude deer use and that deer prefer underpasses with a clear view of the horizon (Reed & Ward, 1985). OR has gained popularity and has been applied to all animal groups, likely because it is a simple metric. However, simply relying on a 'magic metric' is short-sighted and does not consider other factors that could influence use. OR is not provided within this report as the preferred alternative is an overpass design, and OR does not apply for an entirely open structure.

The line of sight is considered an important crossing feature, and it is thought that wildlife should be able to see suitable habitats on the other side of the structure (Ontario Road Ecology Group, Toronto Zoo, 2010). An overpass that creates a landscape connection will provide this line of sight and even provides suitable habitat.

6.1.3 Fencing Type

Wildlife fencing is the most effective and preferred method to guide wildlife to the structure and prevent intrusions onto the roadway (Ontario Road Ecology Group, Toronto Zoo, 2010; U.S. Department of Transportation, 2011; and Ministry of Transportation, 2016). Thereby, effective wildlife fencing and crossing structures can significantly reduce many harmful impacts of roads on wildlife populations. Fences need to be impermeable to wildlife to keep WVCs to a minimum and ensure that wildlife crossings are used. In general, both sides of the roadway must be fenced in equal lengths (symmetric) (U.S. Department of Transportation, 2011), and fencing must be designed for target species (U.S. Department of Transportation, 2011 and Ministry of Transportation, 2016). Fencing is a key part of a mitigation plan and needs to consider what happens for wildlife that becomes trapped on the road. Escape ramps, gates, or doors must be used to allow for one-way movement off the road (U.S. Department of Transportation, 2011 and Ministry of Transportation, 2016).

Fencing may be continuous or disconnected, and there are various strategies to bridge the gaps. The literature summary was reviewed for suggested design details for all wildlife. Fencing material ranges in material, gauge, and size. A similarity for permanent fencing is that fencing material should be attached to the back-side (non-roadway side) of posts, so impacts from accidents or plows will only impact the fence material and not the posts.

Metal fencing material (paige wire, chain link) is longer lasting when galvanized (Class III) and installed with steel posts. For smaller animals, solid materials are preferred as a larger gauge chain link would allow passage, and a smaller gauge can cause some animals to get stuck. When choosing to fence for smaller animals, fence bottoms should be buried with a lip to prevent digging under fences, and the tops of fences should have a lip to prevent climbing or jumping over. Fencing for small and medium mammals is joined to large mammal fencing and is placed on the non-roadway side.

The fence ends must consider animal behaviour. If animals encounter a fence and cannot go over or under, they tend to follow the fencing until they can pass. Hopefully, an animal has found the crossing and will cross over safely. However, if an animal finds the fence end, they can find themselves crossing the road. Alternatively, some animals will choose to graze or nest inside the fence. To prevent undesirable fence ends, fencing should end at a wildlife crossing or terminate in unsuitable habitat. When fencing cannot terminate at a crossing, fencing should extend beyond suitable habitat and be 'looped' or angled.

The terminus should consist of a curve away from the roadway to redirect animals that may have followed the fence to the terminus back towards the crossing. One note is that in areas of continuous non-fragmented habitat, fencing will not extend the entire road length as it poses a barrier to wildlife movement (Ministry of Transportation, 2016). Another consideration for fence ends is motorists (Ontario Road Ecology Group, Toronto Zoo, 2010). If signage and motorist speed can be reduced at fence ends, WVCs may be reduced. At the very least, maintaining motorist sightlines at the fence end may reduce WVCs.

Generally, fencing for large mammals should be a minimum of 8.0 ft (2.4 m) high with post-separation on average every 14-18 ft (4.2-5.4 m) (U.S. Department of Transportation, 2011 and Ministry of Transportation, 2016). For small and medium mammals, the standard height of fencing is 2 ft (0.6 m) above the ground with a lined or buried bottom and top lip (U.S. Department of Transportation, 2011 and Ministry of Transportation, 2016). Fencing must physically connect to the crossings to ensure no gaps or holes exist. Maintenance costs for fencing may be 1% of fencing construction costs per year (Ministry of Transportation, 2016).

6.1.3.1 A Note on Predation

It is a concern that wildlife crossings and fencing increase the risk of predation. However, this has not been substantiated in studies (Ontario Road Ecology Group, Toronto Zoo, 2010 and U.S. Department of Transportation, 2011). While some studies find a predation event, it is unknown if the event was natural or observed because of the increased monitoring. Likewise, predation is so low that fencing and crossings are still considered beneficial as road mortality is significant (Ontario Road Ecology Group, Toronto Zoo, 2010).

6.1.4 Gates and Escape Ramps

If wildlife becomes trapped on the roadway, they need to be able to exit safely. The most effective means of escape is through a steel swing gate, hinged metal door or earthen ramp (U.S. Department of Transportation, 2011). The number, type and location of escape structures will depend on the target species, terrain, and habitat adjacent to the highway fence.

Earthen ramps or jump-outs allow wildlife (large and small) to safely exit right-of-ways on their own. The outside walls of the escape ramp must be smooth and high enough to discourage wildlife from jumping up onto the ramp and access the right-of-way but not too high to prevent wildlife from jumping off. Jump-outs range in height from 1.5-2.2 m for deer and are spaced at about 0.5 km (Ministry of Transportation, 2016). The landing spot around the outside wall must consist of loose soil or other soft material to prevent injury to animals. It is also recommended for large animals that escape ramps are positioned in a setback in the fence, so animals can assess the situation before deciding to use the jump out or continue walking along the roadway. For small- and medium-sized mammals, natural objects (for climbing species) or small, hinged doors at ground level allow them to escape the roadway on their own.

One-way gate designs require special considerations, so they swing back into place when moved but also allow animals to push through (Ministry of Transportation, 2016). Jump-outs require maintenance to remove vegetation from the ramp and the jump-out floor (Ministry of Transportation, 2016).

6.1.5 Monitoring

The criteria used to measure the effectiveness will depend on the intended purpose of the wildlife crossings. Monitoring can range from a single-species approach focused on the population within the roadway to more complex monitoring of ecological processes and functions within regional landscapes of conservation importance. As mentioned above, there are ultimately two purposes for wildlife crossings 1) connect habitats and populations and 2) reduce mortality on roads. Whether the crossings are functional for local populations will largely depend on how well the crossing is planned and designed. Monitoring should determine whether the basic functions of wildlife crossings are being met and provide

demographic information on the number of individuals using the crossing structure and their gender (U.S. Department of Transportation, 2011).

As the project is to target all area wildlife and all species from a project area cannot be monitored, the selection of focal (or a few) species will occur. Species selected for monitoring will serve as an indicator of change and maintenance of ecological processes and a focal species that will provide a large enough dataset to analyze effectiveness. It is also beneficial if the focal species is the most sensitive in adapting to the wildlife crossing. A variety of wildlife survey methods exist, which range from cost-effective and simple to complex and expensive.

Monitoring will focus on both the crossing structure and fencing. Each type of monitoring has advantages and disadvantages. Monitoring the effectiveness of crossings and fencing should set performance objectives and goals, establish baseline conditions, determine the best methods to monitor/study design, and resolve management questions associated with the project objectives. Monitoring should continue for a period of time in which the target species experiences one population cycle or more if the target species is short-lived. Monitoring of wildlife crossing structures has shown that an adaptation period and learning curve does exist (U.S. Department of Transportation, 2011; Ontario Road Ecology Group, Toronto Zoo, 2010; and Ministry of Transportation, 2016). The adequate length of a monitoring program must allow time for wildlife to adapt and the change in the surrounding habitat.

Monitoring should document three levels of biological organization;

- genetic connectivity, predominantly adult male movement across road barriers;
- demographic connectivity, genetic connectivity with confirmed adult female movement across road barriers; and
- functional connectivity, genetic and demographic connectivity with confirmed dispersal of young females that survive and reproduce.

These three levels form the basis for developing natural resource management and conservation plans and should be applied to long-term monitoring of wildlife crossings to determine if mitigation systems have an overall benefit for wildlife populations (U.S. Department of Transportation, 2011 and Ministry of Transportation, 2016). Monitoring that measures population-level effectiveness, such as before-after-control-impact (BACI) studies, is required to evaluate and optimize mitigation dollars. Ideally, pre-construction monitoring would take place for some years before the construction of the crossing. Pre-construction monitoring would allow for a BA study design- before (B) and after (A). A BA study could demonstrate crossing effectiveness. Depending on the availability to complete studies before the construction of the crossing, the monitoring may have to rely on a CI design-control (C) impact (I) design. In a CI study, the only data collected is for the period after the mitigation (crossing) construction. The inference made is that if the control and impact sites differ in some environmental variable, this difference is (in part) due to the mitigation. However, CI studies are only applicable if control and impact sites are identical in the absence of mitigation. The Natural Environment Report (Appendix D) provides types of monitoring measures based on purpose and provides a high-level summary of details regarding target species, timing and frequency, location, and cost.

Additionally, specific benchmarks and thresholds should be agreed to by the stakeholders and agencies involved to trigger adaptive management. For example, a target of five WVCs a year is acceptable, but WVCs exceeding five would require further fencing considerations. As landscape conditions and population dynamics vary over time, short- and long-term monitoring and performance targets should be assessed periodically and readjusted accordingly. The lead agency and other stakeholders need to know how their mitigation investment dollars are being spent and how the technology can be transferred to future projects. Taxpayers will also want to know whether the measures are effective.

7 Alternative Solutions for Wildlife Crossing (Underpass vs Overpass)

Phase 2 of the Class EA process requires that various reasonable solutions shall be identified to address the problem and opportunity identified in Phase 1. The potential solutions are then evaluated against environment, social and technical factors. Based on the evaluation, the preferred solution is presented to the Indigenous Nations, the public, government agencies, and key stakeholders for input and review. This section discusses the evaluation of alternative solutions process for this project.

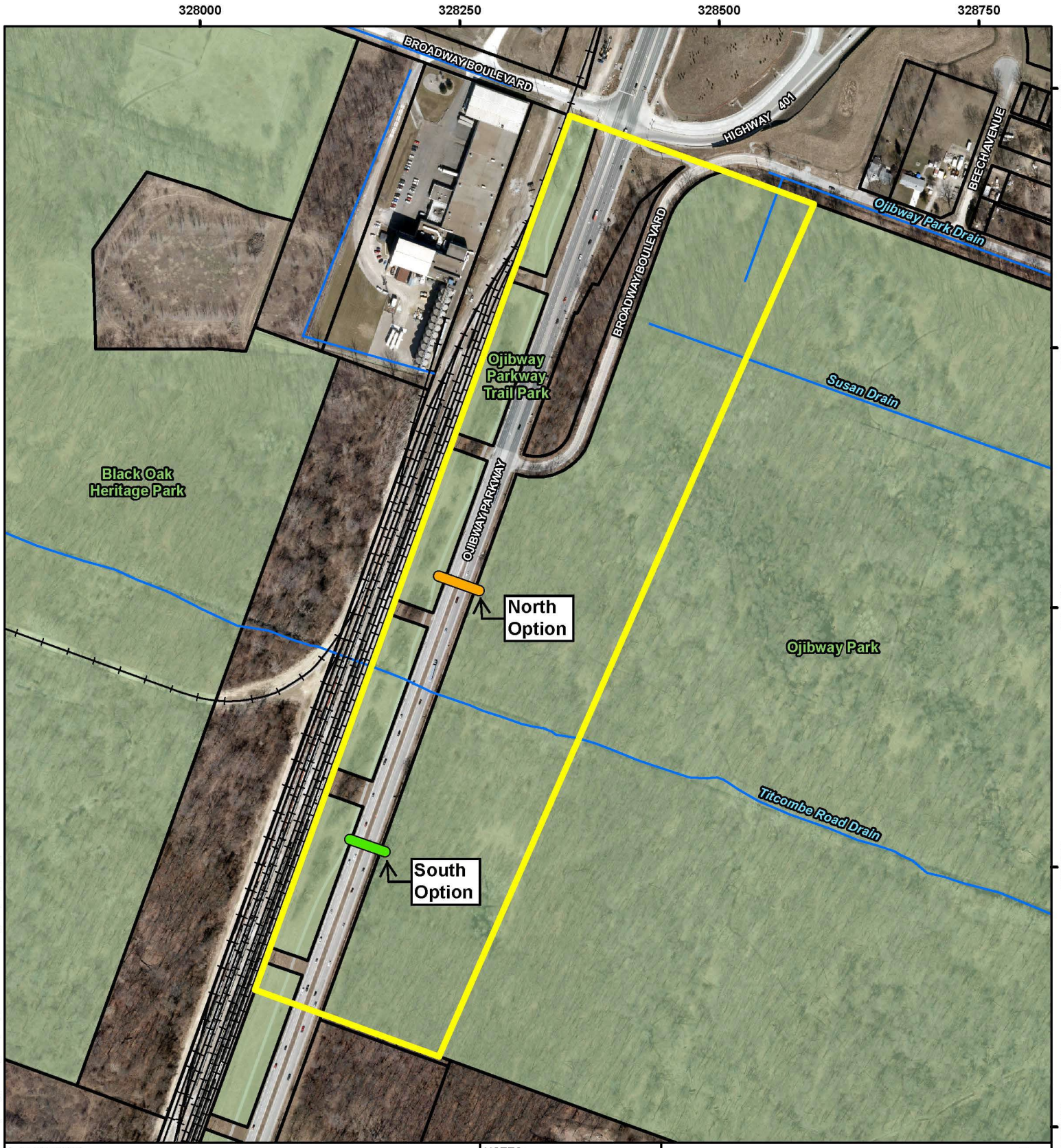
7.1 Identification of Alternative Solutions

The following alternative solutions were identified for this project:

Alternative 1: Do Nothing: The “Do Nothing” alternative maintains existing conditions and does not involve a Wildlife Crossing. It is used as a baseline against which other alternative solutions are compared.

Alternative 2: Underpass Wildlife Crossing: This alternative would involve construction of a Wildlife Crossing under Ojibway Parkway. The underpass would be in the form of a large mammal underpass tunnel 4.0 m in height and 7.0 m in width to allow for the passage of a variety of wildlife. These dimensions were determined in accordance with minimum dimensions required for a large wildlife underpass as outlined in the Wildlife Crossing Structure Handbook Design and Evaluation in North America (U.S. Department of Transportation, 2011). Two sub-alternatives were developed, based on the location of the structure: Alternative 2A (North Option) and Alternative 2B (South Option). The locations of these sub-alternatives are illustrated in Figure 7-1. A conceptual rendering of the Underpass Wildlife Crossing Alternative is illustrated in Figure 7-2.

Alternative 3: Overpass Wildlife Crossing: This alternative would involve construction of a Wildlife Crossing over Ojibway Parkway. The overpass would be in the form of a large wildlife overpass 5.5 m in height and 50 m in width to allow for the passage of a variety of wildlife (small and large). A 50 m wide overpass structure was considered as the base case scenario as it meets the minimum recommended width for wildlife overpasses based on the Wildlife Crossing Structure Handbook Design and Evaluation in North America (U.S. Department of Transportation, 2011). The height of the wildlife overpass (5.5 m) is slightly greater than the 5.0 m vertical clearance required by the Ontario Ministry of Transportation for structures over roads (Ontario Ministry of Transportation, 2020). This dimension was determined based on the input received from the City and is consistent with the vertical clearance of the overpass over Ojibway Parkway that leads to the Gordie Howe Bridge. Detailed design criteria is provided in Table 7-1. Two sub-alternatives were developed, based on the location of the structure: Alternative 3A (North Option) and Alternative 3B (South Option). The locations of these sub-alternatives are illustrated in Figure 7-1. A conceptual rendering of the Overpass Wildlife Crossing Alternative is illustrated in Figure 7-3.



G:\Ojibway_Wildlife_Overpass_EA\MXD\Alternative_Overpass_Locs_3.mxd

LEGEND

- Approximate Study Area
- Parks
- Watercourse / Drain
- Railway
- Property Boundaries

Alternative Wildlife Crossing Locations

- North Option
- South Option

0 50 100 200 300 400 500 Metres

NOTES:
- Aerial imagery extracted from Essex County interactive map, 2019.

Datum: NAD83
Projection: UTM Zone 17N

N W E S

THE CITY OF WINDSOR ONTARIO, CANADA

wood.

OJIBWAY PARKWAY WILDLIFE CROSSING

Alternative Wildlife Crossing Locations

PROJECT N°: IM20104013	**FIGURE: 7-1**
SCALE: 1:5,000	DATE: October 2020

Figure 7-2: Wildlife Underpass Alternative (Conceptual Rendering)

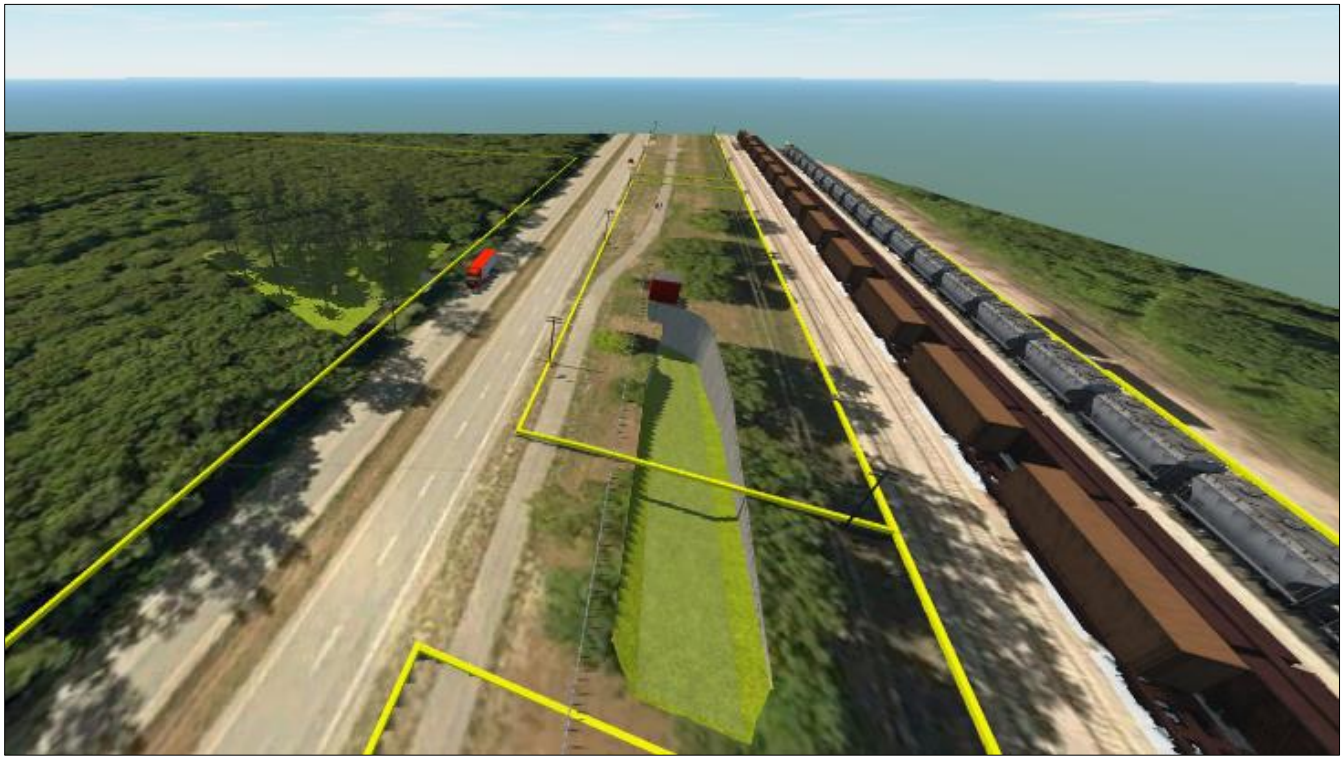
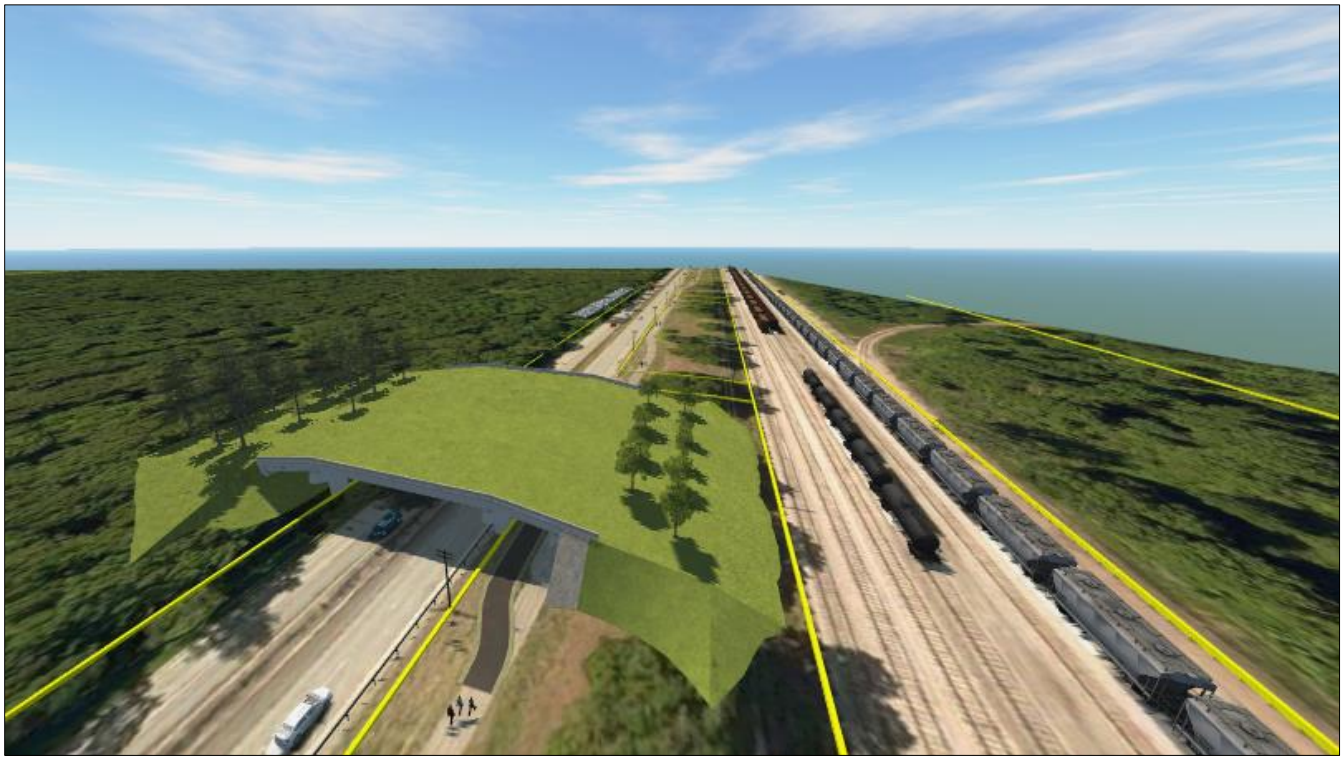


Figure 7-3: Wildlife Overpass Alternative (Conceptual Rendering)



7.2 Design Criteria for Alternative Solutions

A design criteria table was developed for the underpass and overpass alternatives in accordance with the Wildlife Crossing Structure Handbook Design and Evaluation in North America (U.S. Department of Transportation, 2011) and MTO Design Supplement for TAC Geometric Design Guide for Canadian Roads (Ontario Ministry of Transportation, 2020), and input from the City staff (Table 7-1).

Table 7-1: Design Criteria

Design Criteria	Recommended Dimension and Source		Proposed
Overpass - Width	Minimum width: 40-50 m Recommended width: 50-70 m	U.S. Department of Transportation, 2011[2]	50 m
Overpass - Minimum Vertical Clearance	5.0 m vertical clearance for structures over roads	Ontario Ministry of Transportation, 2020[3]	5.5 m
Underpass - Width	Minimum width: 7.0 m Recommended width: >10 m	U.S. Department of Transportation, 2011	7.0 m
Underpass - Minimum Vertical Clearance	Minimum Height: 4.0 m Recommended Height: >4.0 m	U.S. Department of Transportation, 2011	4.0 m
Maximum Approach Grade	5:1 (20%) or flatter	U.S. Department of Transportation, 2011	5:1 (20%)
Preferred Slide Slopes	3:1	N/A	3:1

7.3 Evaluation of Alternative Solutions

To identify the impacts and advantages of each alternative solution, evaluation criteria were developed within each of the categories related to natural, social, and cultural environments and technical and cost considerations. The evaluation criteria provided in Table 7-2 were developed based on the existing characteristics/features within the Study Area. These criteria were chosen based on their ability to identify potential environmental effects of each alternative and distinguish the advantages and disadvantages between them. Detailed evaluation of alternative solutions is presented in Table 7-3.

[2] Wildlife Crossing Structure Handbook Design and Evaluation in North America, March 2011

[3] MTO Design Supplement for TAC Geometric Design Guide for Canadian Roads, April 2020

Table 7-2: Evaluation Criteria for Alternative Solutions

Component	Evaluation Criteria
Natural Environment	– Landscape connectivity – Wildlife behaviour / response to the crossing – Potential impact to natural environment
Social Environment	– Potential impact to community facilities and public parks
Cultural Environment	– Potential impacts on archaeological resources – Potential impacts on built heritage resources and cultural heritage landscapes
Technical Considerations	– Potential drainage and stormwater concerns – Continued bridge inspection requirements and ongoing maintenance – Potential impacts associated with implementation, construction access and staging
Financial Considerations	– Anticipated capital costs for construction and rehabilitation

Table 7-3: Evaluation of Alternative Solutions

Category & Criteria	Alternative Solution 1: Do Nothing	Score	Alternative Solution 2A: Underpass Wildlife Crossing (North Option)	Score	Alternative Solution 2B: Underpass Wildlife Crossing (South Option)	Score	Alternative Solution 3A Overpass Wildlife Crossing (North Option)	Score	Alternative Solution 3B Overpass Wildlife Crossing (South Option)	Score
Natural Environment										
Landscape connectivity	Do nothing alternative does not provide landscape connectivity.	○	These structures provide limited landscape connectivity. Underpass Crossing Alternative presents closed conditions which do not allow the same air flow, moisture, and light conditions as larger more open structures, resulting in limited vegetation growth. These structures allow opportunity to improve passage of small animals by incorporating microhabitat features, such as small stumps and vernal pools. Flooding and winter ice formation in closed bottom tunnels with water pools may discourage use by certain animals.	◑	These structures allow opportunity to improve passage of small animals by incorporating microhabitat features, such as small stumps and vernal pools. Flooding and winter ice formation in closed bottom tunnels with water pools may discourage use by certain animals.	◑	Overpass Crossing Alternative allows 100% openness. Greater openness may facilitate use by wildlife species that are not tolerant (or less tolerant) of confined areas for movement (the tunnel effect). These structures have been successful improving passage for multiple species (large mammals, birds, amphibians, and reptiles) and allow growth of brush, shrub and grass plantings along entire length of structure.	●	Overpass Crossing Alternative allows 100% openness. Greater openness may facilitate use by wildlife species that are not tolerant (or less tolerant) of confined areas for movement (the tunnel effect). These structures have been successful improving passage for multiple species (large mammals, birds, amphibians, and reptiles) and allow growth of brush, shrub and grass plantings along entire length of structure.	●
Wildlife behaviour / response to the crossing	Do nothing alternative does not provide a crossing structure for safe passage of wildlife.	○	Although wildlife does utilize underpass crossings, studies show that majority of wildlife prefer overpass crossings than underpass crossings (Ministry of Transportation, 2016; Eco-Kare International, 2017).	◑	Although wildlife does utilize underpass crossings, studies show that majority of wildlife prefer overpass crossings than underpass crossings (Ministry of Transportation, 2016; Eco-Kare International, 2017).	◑	Studies show that majority of wildlife prefer overpass crossings than underpass crossings (Ministry of Transportation, 2016; Eco-Kare International, 2017).	●	Studies show that majority of wildlife prefer overpass crossings than underpass crossings (Ministry of Transportation, 2016; Eco-Kare International, 2017).	●
Potential impacts on terrestrial species and habitats	No construction-related impacts to terrestrial species or habitat.	●	No impacts to SAR or their protected habitat. Minor construction-related impacts to terrestrial species and habitat at tunnel entrance/exit. Construction-related impacts could be mitigated by restoring these areas post-construction.	◑	Location of underpass entrance/exit and associated grading conflict with existing SAR plants and their associated habitat. Construction of underpass would result in direct negative impacts to SAR plants and their protected habitat	○	No impacts to SAR or their protected habitat. Minor construction-related impacts to terrestrial species and habitat within the footprint of the overpass approaches (ramps). Construction-related impacts could be mitigated by restoring these areas post-construction.	◑	Location of overpass approaches (ramps) and associated grading conflict with existing SAR plants and their associated habitat. Construction of overpass would result in direct negative impacts to SAR plants and their protected habitat	○
Social Environment										
Potential impact to community facilities	No impacts to the multi-use trail in the Ojibway Parkway Trail Park and the passive recreation trails within Ojibway Park.	●	Slight permanent displacement of the existing multi-use trail closer to the road, however the trail would still be maintained.	◑	Slight permanent displacement of the existing multi-use trail closer to the road, however the trail would still be maintained.	◑	Slight permanent displacement of the existing multi-use trail closer to the road, however the trail would still be maintained.	◑	Slight permanent displacement of the existing multi-use trail closer to the road, however the trail would still be maintained.	◑

Category & Criteria	Alternative Solution 1: Do Nothing	Score	Alternative Solution 2A: Underpass Wildlife Crossing (North Option)	Score	Alternative Solution 2B: Underpass Wildlife Crossing (South Option)	Score	Alternative Solution 3A Overpass Wildlife Crossing (North Option)	Score	Alternative Solution 3B Overpass Wildlife Crossing (South Option)	Score
Cultural Environment										
Potential impacts on archaeological resources	No archaeological impacts.	●	Potential impacts to lands identified to retain potential archaeological resources depending on the location of the structure. Stage 2 archaeological assessment would be required to determine impacts and potential mitigation measures.	◑	Potential impacts to lands identified to retain potential archaeological resources depending on the location of the structure. Stage 2 archaeological assessment would be required to determine impacts and potential mitigation measures.	◑	Potential impacts to lands identified to retain potential archaeological resources depending on the location of the structure. Stage 2 archaeological assessment would be required to determine impacts and potential mitigation measures.	◑	Potential impacts to lands identified to retain potential archaeological resources depending on the location of the structure. Stage 2 archaeological assessment would be required to determine impacts and potential mitigation measures.	◑
Potential impacts on built heritage resources and cultural heritage landscapes	No impacts are anticipated as there are no built heritage resources and cultural heritage landscapes.	●	Ojibway Park and Black Oak Heritage Park underwent a cultural heritage screening as part of the City of Windsor's Urban Parks Plan. This screening determined that both of the parks contain, or are part of, a cultural heritage landscape. It is recommended that a Cultural Heritage Evaluation Report (CHER) be completed during the detailed design phase to evaluate the property for Cultural Heritage Value or Interest.	◑	Ojibway Park and Black Oak Heritage Park underwent a cultural heritage screening as part of the City of Windsor's Urban Parks Plan. This screening determined that both of the parks contain, or are part of, a cultural heritage landscape. It is recommended that a Cultural Heritage Evaluation Report (CHER) be completed during the detailed design phase to evaluate the property for Cultural Heritage Value or Interest.	◑	Ojibway Park and Black Oak Heritage Park underwent a cultural heritage screening as part of the City of Windsor's Urban Parks Plan. This screening determined that both of the parks contain, or are part of, a cultural heritage landscape. It is recommended that a Cultural Heritage Evaluation Report (CHER) be completed during the detailed design phase to evaluate the property for Cultural Heritage Value or Interest.	◑	Ojibway Park and Black Oak Heritage Park underwent a cultural heritage screening as part of the City of Windsor's Urban Parks Plan. This screening determined that both of the parks contain, or are part of, a cultural heritage landscape. It is recommended that a Cultural Heritage Evaluation Report (CHER) be completed during the detailed design phase to evaluate the property for Cultural Heritage Value or Interest.	◑
Technical Considerations										
Potential drainage and stormwater concerns	Alternative does not require any measures to address stormwater management	●	Pumping likely required as there is no local receiver available for gravity drainage. Pumping, if required, would be necessary throughout the life of the structure.	○	Pumping likely required as there is no local receiver available for gravity drainage. Pumping, if required, would be necessary throughout the life of the structure.	○	Drainage by gravity available. Opportunities available to integrate stormwater management requirements within adjacent lands. Stormwater can be managed through design and initial construction and would not require active management throughout the life of the structure.	◑	Drainage by gravity available. Opportunities available to integrate stormwater management requirements within adjacent lands. Stormwater can be managed through design and initial construction and would not require active management throughout the life of the structure.	◑
Continued bridge inspection requirements and ongoing maintenance	No Impacts	●	Inspection of underpass could be completed from below parkway, with no disturbance to traffic. If properly waterproofed, maintenance can be completed from below parkway, with little disturbance to traffic. Major rehabilitation work would be expected approximately three times during lifetime of 75 years.	◑	Inspection of underpass could be completed from below parkway, with no disturbance to traffic. If properly waterproofed, maintenance can be completed from below parkway, with little disturbance to traffic. Major rehabilitation work would be expected approximately three times during lifetime of 75 years.	◑	Inspection could be completed from the top of the bridge and from edges of parkway, however close up inspections would need to be completed from parkway and may require short duration full lane closures. Similarly, maintenance or rehabilitation of the bridge would likely require full lane closures. Major rehabilitation work would be expected approximately two times during the lifetime of 75 years.	◑	Inspection could be completed from the top of the bridge and from edges of parkway, however close up inspections would need to be completed from parkway and may require short duration full lane closures. Similarly, maintenance or rehabilitation of the bridge would likely require full lane closures. Major rehabilitation work would be expected approximately two times during the lifetime of 75 years.	◑

Category & Criteria	Alternative Solution 1: Do Nothing	Score	Alternative Solution 2A: Underpass Wildlife Crossing (North Option)	Score	Alternative Solution 2B: Underpass Wildlife Crossing (South Option)	Score	Alternative Solution 3A Overpass Wildlife Crossing (North Option)	Score	Alternative Solution 3B Overpass Wildlife Crossing (South Option)	Score
Potential impacts associated with implementation (complexity of construction)	No Impacts	●	This could be completed either as a cast-in-place rigid frame structure or precast structure, both of which are standard construction methods with no unusual complexity. There would be additional consideration to be given to extensive excavation, shoring system, dewatering, underground utilities (2 Sanitary Sewers, 1 force main and 1 gravity and a watermain under the road), and material removal and disposal that would not be required to the same extent for the overpass.	○	This could be completed either as a cast-in-place rigid frame structure or precast structure, both of which are standard construction methods with no unusual complexity. There would be additional consideration to be given to extensive excavation, shoring system, dewatering, underground utilities (2 Sanitary Sewers, 1 force main and 1 gravity and a watermain under the road), and material removal and disposal that would not be required to the same extent for the overpass.	○	Can be completed with a precast concrete box girder bridge, or steel girders. These are not unusually complex superstructure types but are more complicated structure than a culvert/tunnel, with some work (girder fabrication) completed off site and delivered to site, and the level of precision required is somewhat higher.	◑	Can be completed with a precast concrete box girder bridge, or steel girders. These are not unusually complex superstructure types but are more complicated structure than a culvert/tunnel, with some work (girder fabrication) completed off site and delivered to site, and the level of precision required is somewhat higher.	◑
Potential impacts associated with construction access	No Impacts	●	Advanced construction staging would be required which may impact the traffic flow.	○	Advanced construction staging would be required which may impact the traffic flow.	○	Construction of the bridge would not significantly affect the traffic flow.	◑	Construction of the bridge would not significantly affect the traffic flow.	◑
Potential impacts associated with construction staging	No impacts	●	Advanced construction staging required to move traffic lanes around portions of structure under construction. Several construction stages are likely required.	○	Advanced construction staging required to move traffic lanes around portions of structure under construction. Several construction stages are likely required.	○	Construction of the bridge would not significantly affect the traffic flow for the most part, however, short term full lane closure(s) may be needed during nights to erect girders.	◑	Construction of the bridge would not significantly affect the traffic flow for the most part, however, short term full lane closure(s) may be needed during nights to erect girders.	◑
Financial Considerations										
Construction Cost	No cost	●	Lower construction cost compared to overpass options. Additional cost associated with the construction of pumping station for this alternative.	◑	Lower construction cost compared to overpass options. Additional cost associated with the construction of pumping station for this alternative.	◑	Higher construction cost compared to underpass option.	○	Higher construction cost compared to underpass option.	○
Rehabilitation Cost	No cost	●	Lower rehabilitation cost during the lifetime of 75 years, compared to overpass options. Rehabilitation would be required three times during lifetime of 75 years. Additional costs associated with the maintenance of pumping station.	◑	Lower rehabilitation cost during the lifetime of 75 years, compared to overpass options. Rehabilitation would be required three times during lifetime of 75 years. Additional costs associated with the maintenance of pumping station.	◑	Higher rehabilitation cost during the lifetime of 75 years, compared to underpass options. Rehabilitation would be required two times during the lifetime of 75 years.	○	Higher rehabilitation cost during the lifetime of 75 years, compared to underpass options. Rehabilitation would be required two times during the lifetime of 75 years.	○
Recommendation	Not Preferred		Not Preferred		Not Preferred		**Preferred**		Not Preferred	

7.4 Preferred Solution

The Alternative Solutions were comparatively and qualitatively evaluated in Table 7-3 based on criteria related to natural, social, and cultural environments and technical and cost considerations. Alternative 3A - Overpass Wildlife Crossing (North Option) was selected as the Preferred Solution due to several advantages compared to the other alternatives. A summary of the key impacts and benefits of the Preferred Solution (Overpass Wildlife Crossing - North Option) is provided below:

- This alternative allows 100% openness. Greater openness may facilitate use by wildlife species that are not tolerant (or less tolerant) of confined areas for movement (the tunnel effect).
- Overpass structures been successful as a multi-species strategy (large mammals, birds, amphibians, and reptiles) and allow growth of brush, shrub and herbaceous plantings along entire length of structure.
- The location of Alternative 3A has been carefully selected in order to avoid impacts to SAR plants and protected habitat.
- There are opportunities available to integrate stormwater associated with this structure within the adjacent lands and there will be no requirement for active stormwater management during operation.
- Being an above grade structure, this alternative can form a gateway feature, with opportunities to incorporate urban design elements.
- The construction of the Overpass structure would not significantly affect the traffic flow compared to the construction of an Underpass structure.
- Although an Overpass structure would be more costly than an Underpass structure, it would provide sufficient space for landscape connectivity while allowing for safe passage of a wide variety of wildlife.

8 Design Options for Wildlife Crossing (Overpass)

8.1 Approach to Identification of Preferred Design Option

Phase 3 of the Municipal Class EA process involves development and evaluation of alternative design concepts for the Preferred Solution. For this project, Wildlife Overpass was identified as the Preferred Solution. In accordance with the Phase 3 of the Municipal Class EA process, design options were identified and evaluated to determine a preferred design for the Wildlife Crossing (Overpass).

For this project, an initial set of four design options was developed and evaluated to identify a preliminary design for the Wildlife Crossing. These design options were comprised of Wildlife Crossing options across Ojibway Parkway, connecting Ojibway Park Area with the median area between Ojibway Parkway and the ETR tracks. These design options, along with their evaluation and preliminary preferred design were shared with Indigenous Nations, the public, government agencies, ETR, utilities owners, and key stakeholders through PIC #2 in April 2021. A key comment received was to extend the crossing across the ETR tracks to provide connectivity between the Ojibway Park Area and the Black Oak Heritage Park Area. Accordingly, following PIC #2, the Study Team completed the following additional work to identify and evaluate design options for the Wildlife Crossing across Ojibway Parkway and the ETR tracks:

- **Study Area Expansion:** The Study Area was expanded to include the natural area associated with Black Oak Heritage Park to allow for consideration of Wildlife Crossing Options across the ETR tracks. The Study Area is shown in Figure 1-1.
- **Additional Field Studies:** Additional ecological field studies were completed within the expanded study area during 2023. The Study Team completed surveys on public lands only, as permission to access private lands was not provided. Relevant information from other studies performed by the City was reviewed and incorporated into the assessments and evaluation. Findings of these additional studies are provided in Section 5.4.
- **Connectivity Analysis:** Connectivity modelling was completed to identify additional locations for a Wildlife Crossing along Ojibway Parkway. The intent was to identify an alternative location for the crossing that would minimize impacts to the Black Oak Wetland Complex. Connectivity Analysis is discussed further below in this section.
- **Development of Revised Design Options:** Four new “revised” design options were developed and evaluated to identify a preferred design for the Wildlife Crossing over Ojibway Parkway and the ETR tracks.

Ultimately, the preferred design for the Wildlife Crossing over Ojibway Parkway and the ETR tracks was chosen through the development and evaluation of revised design options. These revised options and preferred design for Wildlife Crossing over Ojibway Parkway and ETR tracks was presented at the PIC #3. The following sections discuss the identification and evaluation of **“initial”** and **“revised” design options**.

8.2 Initial Design Options (Wildlife Crossing over Ojibway Pkwy)

8.2.1 Initial Design Options

The following initial design options were identified for the Wildlife Crossing over Ojibway Parkway:

- Initial Design Option 1: Wildlife Overpass (3 Span Bridge)
- Initial Design Option 2: Wildlife Overpass (4 Span Bridge)
- Initial Design Option 3: Wildlife Overpass (2 Span Bridge)
- Initial Design Option 4: Wildlife Overpass (4 Span Arch Culvert)

Each of the design options would utilize a different type of girder system to support the bridge (overpass) deck. The height of the girders would affect the elevation of the fill placed atop the bridge deck. This would ultimately affect the grading of the approaches, especially the western approach along the railway which is constrained by the width of the road right of way, and the existing drainage feature paralleling the railway. The approach grading is anticipated to affect the ability, or willingness, of wildlife to utilize the structure and as such is discussed in detail within the following descriptions of the alternatives.

The initial design options were developed using the design criteria for an overpass provided in Table 7-1.

Initial Design Option 1: Wildlife Overpass (3 Span Bridge):

Key features of this design option are noted below:

- 3-span bridge, comprised of a 31 m main span and two 10 m end spans, with the main span constructed of NU 1800 concrete girders and the end spans of precast concrete hollow slabs.
- The 31 m main span bridges all lanes of the parkway, eliminating the need for a centre pier and resulting in a level overpass top.
- The ramps and their side slopes are graded at a 5:1 slope, identified as the recommended maximum for level ground approaches.
- On the western approach near the railway, the slope is steepened to 2:1 to meet existing ground within the road right of way. This steeper slope is 2.4 m high, 4.8 m long, and extends the 50 m width of the overpass structure.

This design option is shown in Figure 8-1 and Figure 8-2.

Figure 8-1: Initial Design Option 1 - Wildlife Overpass (3-Span Bridge) – Plan View

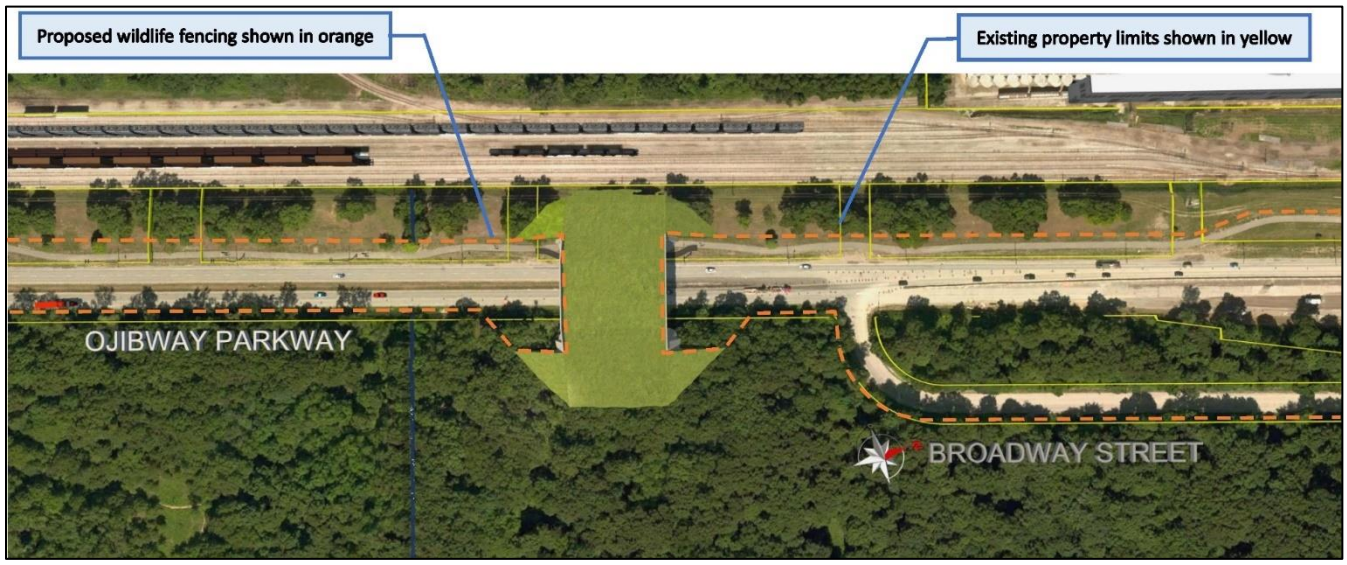


Figure 8-2: Initial Design Option 1 - Wildlife Overpass (3 Span-Bridge) – Profile View

Initial Design Option 2 - Wildlife Overpass (4 Span Bridge):

Key features of this design option are noted below:

- 4-span bridge, comprised of two 16 m middle spans and two 10 m end spans, with the middle spans constructed of B700 precast concrete box girders and the end spans of precast concrete hollow slabs.
- The middle spans have a 0.5% slope, creating a minor crest in the center of the overpass that is 0.1 m higher than the approach ramps.
- The ramps and their side slopes are graded at a 5:1 slope, with one exception on the western approach near the railway. This slope is steepened to 2:1, is 0.7 m high by 1.4 m long, and extends the 50 m width of the overpass structure, allowing for potential design refinements.

This design option is shown in Figure 8-3 and Figure 8-4.

Figure 8-3: Initial Design Option 2 - Wildlife Overpass (4-Span Bridge) – Plan View

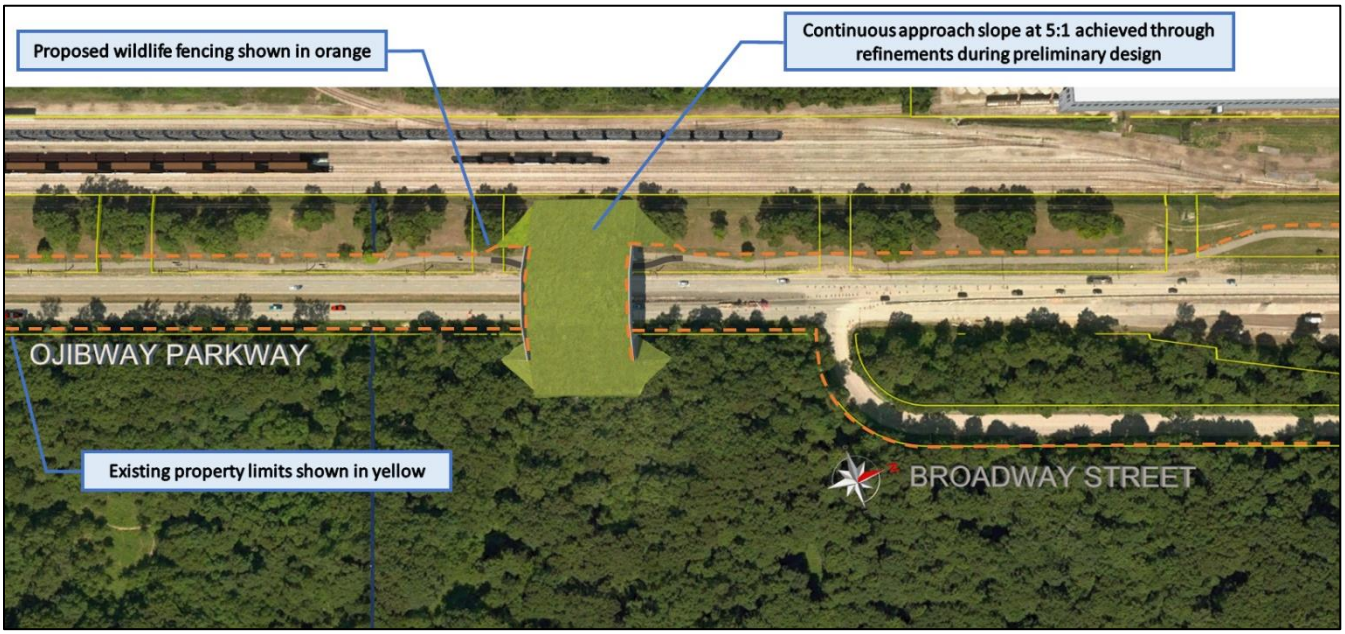


Figure 8-4: Initial Design Option 2 - Wildlife Overpass (4-Span Bridge) – Profile View

Initial Design Option 3 - Wildlife Overpass (2 Span Bridge):

Key features of this design option are noted below:

- 2-span bridge, comprised of two 27 m spans supported by a centre pier, constructed of B1000 precast concrete box girders.
- The spans rise from the end abutments to the centre pier, creating a crest approximately 1.5 m higher than the approach ramps.
- The ramps and their side slopes are graded at a 5:1 slope, with one exception on the western approach near the railway. This slope is steepened to 2:1, is 3.3 m high by 6.6 m long, and extends the 50 m width of the overpass structure. This allows for potential design refinements.

This design option is shown in Figure 8-5 and Figure 8-6.

Figure 8-5: Initial Design Option 3 - Wildlife Overpass (2-Span Bridge) – Plan View

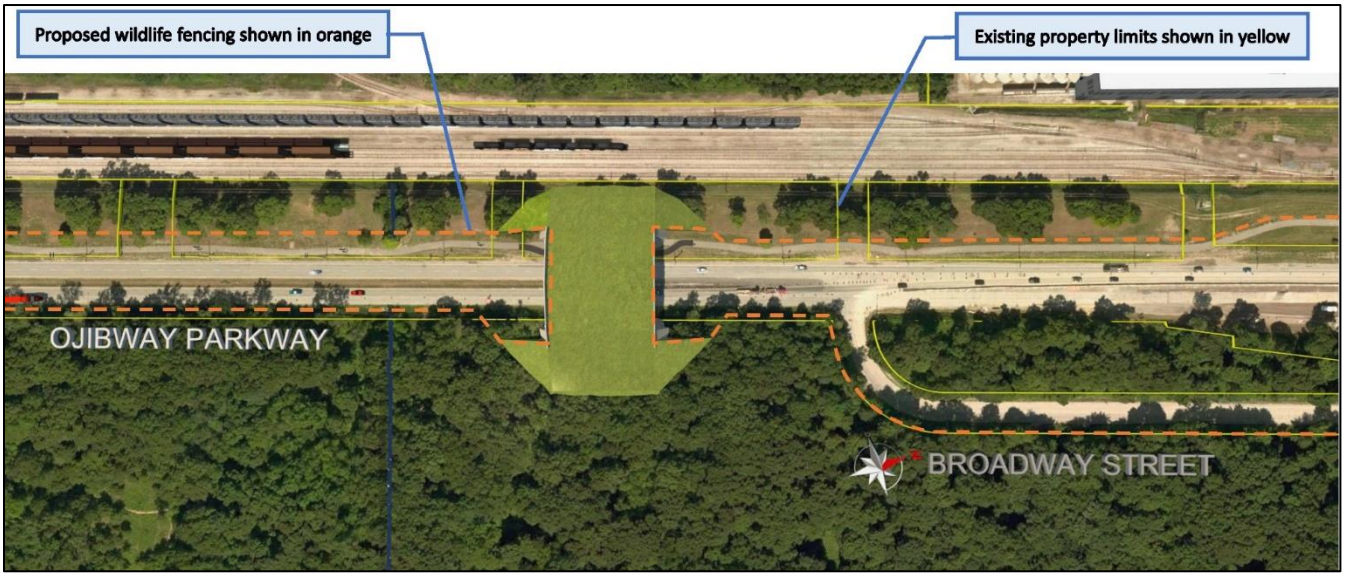


Figure 8-6: Initial Design Option 3 - Wildlife Overpass (2-Span Bridge) – Profile View

Initial Design Option 4 - Wildlife Overpass (4 Span Arch Culvert)

Key features of this design option are noted below:

- Four-span precast concrete arch structure, comprised of two larger 12.8 m middle spans over Ojibway Parkway, and two shorter 4.3 m span arches on the east and west side.
- One combined footing in the roadway median, with additional footings outside of the main span and at each side of the smaller spans.
- The structure allows for a minimum of 0.85 m deep soil above the crown of the main spans, with a level surface above.
- Concrete facing and parapet wall would extend between the different arches to retain the fill within the structure.
- The structure would allow for a continuous 5:1 slope on either approach within the constrained limits.

This design option is shown in Figure 8-7 and Figure 8-8.

Figure 8-7: Initial Design Option 4 - Wildlife Overpass (4 Span Arch Culvert) – Plan View

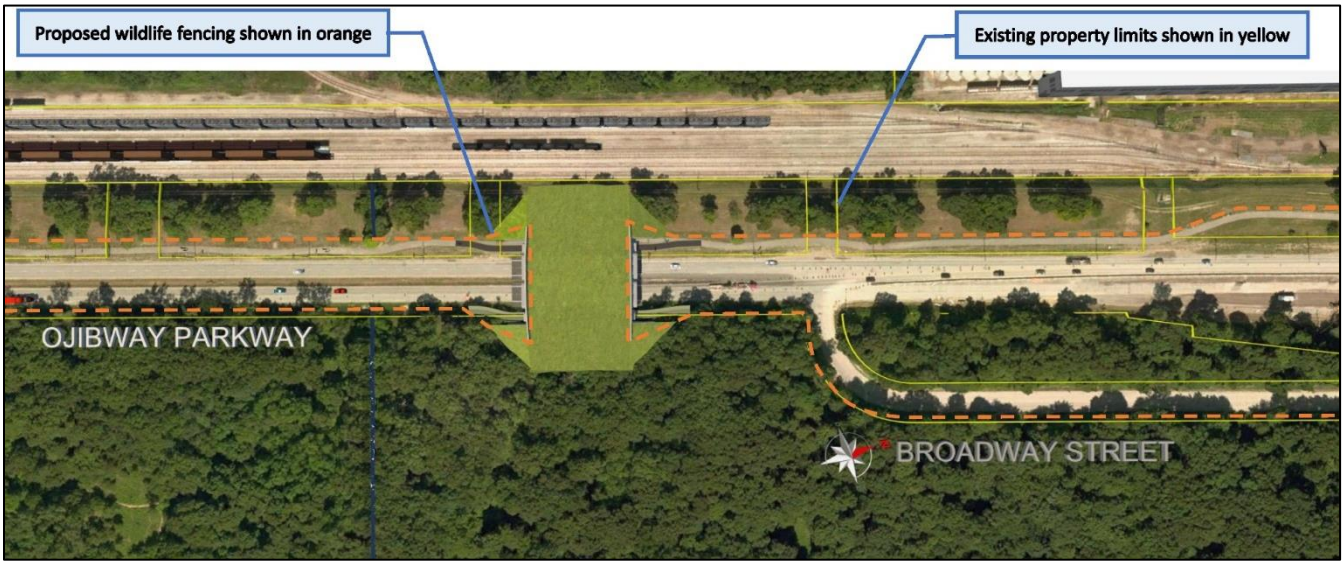


Figure 8-8: Initial Design Option 4 - Wildlife Overpass (4 Span Arch Culvert) – Profile View

8.2.2 Evaluation of Initial Design Options

The initial design options were evaluated using the criteria provided in Table 8-1. Detailed evaluation of initial design options is provided in Table 8-2.

Table 8-1: Evaluation Criteria for Initial Design Options

Component	Evaluation Criteria
Natural Environment	– Anticipated wildlife behaviour / response to the crossing – Potential impact terrestrial species and habitats
Social Environment	– Potential impact to community facilities – Public safety considerations
Cultural Environment	– Potential impacts on archaeological resources – Potential impacts on built heritage resources and cultural heritage landscapes
Technical Considerations	– Potential drainage and stormwater concerns – Potential impacts associated with implementation (complexity of construction) – Grading considerations – Complexity of geotechnical design considerations – Potential traffic impacts from construction – Roadside safety
Financial	– Anticipated capital costs for construction and maintenance

Table 8-2: Evaluation of Initial Design Options

Category & Criteria	Design Option 1 – Wildlife Overpass (3 Span Bridge)	Score	Design Option 2 – Wildlife Overpass (4 Span Bridge)	Score	Design Option 3 - Wildlife Overpass (2 Span Bridge)	Score	Design Option 4 – Wildlife Overpass (4 Span Arch Culvert)	Score
Natural Environment								
Wildlife movement deterrent – abrupt grade change	The 2.4 m high 2:1 slope may deter some wildlife from utilizing the crossing when approaching from the west. 55% of the western approach ramp is at a 2:1 slope.	○	The 0.7 m high 2:1 slope may deter some wildlife from utilizing the crossing when approaching from the west. 50% of the western approach ramp is currently at a 2:1 slope. The 2:1 slope can be eliminated by increasing the grade of the entire slope to slightly steeper (21%) than the current design criteria's maximum approach grade of 20% (5:1 slope).	●	The 3.3 m high 2:1 slope may deter some wildlife from utilizing the crossing when approaching from the west. 63% of the western approach ramp is at a 2:1 slope.	○	No specialized grading or deviations from the current design criteria's maximum approach slope is required on the western approach, which is anticipated to be optimal for wildlife.	●
Wildlife movement deterrent – sightlines	The bridge has a level deck over the road which would not impede the line of sight of medium sized mammals. Sightline of white-tailed deer nearing top of approach ramp is estimated to be 37 m.	●	The bridge has a nearly level deck over the road with a minor crest at the center pier which would not impede the line of sight of medium sized mammals. Sightline of white-tailed deer nearing top of approach ramp is estimated to be 34 m.	●	The bridge has a crest formed by the taller center pier. This crest would be approximately 1.5 m higher than where the approach ramps meet the bridge deck which would impede the line of sight of medium sized mammals. Sightline of white-tailed deer nearing the crest is estimated to be 14 m.	◑	The fill atop the arch culvert would be nearly level with a minor crest at the center pier which would not impede the line of sight of medium sized mammals. Sightline of white-tailed deer nearing top of approach ramp is estimated to be 28 m.	●
Direct impacts on terrestrial species and habitats	No impacts to SAR or their protected habitat are anticipated. Direct footprint impact to approximately 5,300 sq m of terrestrial habitat.	◑	No impacts to SAR or their protected habitat are anticipated. Direct footprint impact to approximately 4,100 sq m of terrestrial habitat.	●	No impacts to SAR or their protected habitat are anticipated. Direct footprint impact to approximately 5,000 sq m of terrestrial habitat.	◑	No impacts to SAR or their protected habitat are anticipated. Direct footprint impact to approximately 3,900 sq m of terrestrial habitat.	●
Social Environment								
Potential impact to community facilities	This alternative would require slight permanent displacement of the existing multi-use trail closer to the road, however the trail would still be maintained.	◑	This alternative would require slight permanent displacement of the existing multi-use trail closer to the road, however the trail would still be maintained.	◑	This alternative would require slight permanent displacement of the existing multi-use trail closer to the road, however the trail would still be maintained.	◑	This alternative would require slight permanent displacement of the existing multi-use trail closer to the road, however the trail would still be maintained.	◑
Safety Considerations	Wide and open configuration and orientation would optimize ongoing visibility of multi-use trail to guard against the prospect of suspicious behaviour/use to occur. Emergency responders can access Ojibway Parkway from either direction. The multi-use trail would be easily accessible to emergency responders. The open nature would make ongoing access for monitoring and maintenance activities easier. This would assist the City staff to more easily identify any unlawful activity that may be occurring – allowing for potential problems to be identified and mitigated more efficiently.	●	Wide and open configuration and orientation would optimize ongoing visibility of multi-use trail to guard against the prospect of suspicious behaviour/use to occur. Emergency responders can access Ojibway Parkway from either direction. The multi-use trail would be easily accessible to emergency responders. The open nature would make ongoing access for monitoring and maintenance activities easier. This would assist the City staff to more easily identify any unlawful activity that may be occurring – allowing for potential problems to be identified and mitigated more efficiently.	●	Wide and open configuration and orientation would optimize ongoing visibility of multi-use trail to guard against the prospect of suspicious behaviour/use to occur. Emergency responders can access Ojibway Parkway from either direction. The multi-use trail would be easily accessible to emergency responders. The open nature would make ongoing access for monitoring and maintenance activities easier. This would assist the City staff to more easily identify any unlawful activity that may be occurring – allowing for potential problems to be identified and mitigated more efficiently.	●	The 50m long section of the adjacent multi-use trail would be completely closed off visually from the adjacent roadway. This would greatly restrict ongoing natural surveillance capability and thus increase susceptibility to the occurrence of unlawful behaviour without easy detection. Emergency access to northbound and southbound lanes, as well as to the multi-use trail would be restricted. Emergency access and fire-fighting requirements to be determined during detailed design. An air quality assessment may be considered during detailed design to confirm the air quality within the tunnel would meet guidelines. Dedicated lighting and crime deterrent measures for the multi-use trail	○

Category & Criteria	Design Option 1 – Wildlife Overpass (3 Span Bridge)	Score	Design Option 2 – Wildlife Overpass (4 Span Bridge)	Score	Design Option 3 - Wildlife Overpass (2 Span Bridge)	Score	Design Option 4 – Wildlife Overpass (4 Span Arch Culvert)	Score
							would be required.	
Cultural Environment								
Potential impacts on archaeological resources	Potential impacts to lands identified to retain potential archaeological resources depending on the location of the structure. Stage 2 archaeological assessment would be required to determine impacts and potential mitigation measures.	◑	Potential impacts to lands identified to retain potential archaeological resources depending on the location of the structure. Stage 2 archaeological assessment would be required to determine impacts and potential mitigation measures.	◑	Potential impacts to lands identified to retain potential archaeological resources depending on the location of the structure. Stage 2 archaeological assessment would be required to determine impacts and potential mitigation measures.	◑	Potential impacts to lands identified to retain potential archaeological resources depending on the location of the structure. Stage 2 archaeological assessment would be required to determine impacts and potential mitigation measures.	◑
Potential impacts on built heritage resources and cultural heritage landscapes	Ojibway Park and Black Oak Heritage Park underwent a cultural heritage screening as part of the City of Windsor's Urban Parks Plan. This screening determined that both of the parks contain, or are part of, a cultural heritage landscape. It is recommended that a Cultural Heritage Evaluation Report (CHER) be completed during the detailed design phase to evaluate the property for Cultural Heritage Value or Interest.	◑	Ojibway Park and Black Oak Heritage Park underwent a cultural heritage screening as part of the City of Windsor's Urban Parks Plan. This screening determined that both of the parks contain, or are part of, a cultural heritage landscape. It is recommended that a Cultural Heritage Evaluation Report (CHER) be completed during the detailed design phase to evaluate the property for Cultural Heritage Value or Interest.	◑	Ojibway Park and Black Oak Heritage Park underwent a cultural heritage screening as part of the City of Windsor's Urban Parks Plan. This screening determined that both of the parks contain, or are part of, a cultural heritage landscape. It is recommended that a Cultural Heritage Evaluation Report (CHER) be completed during the detailed design phase to evaluate the property for Cultural Heritage Value or Interest.	◑	Ojibway Park and Black Oak Heritage Park underwent a cultural heritage screening as part of the City of Windsor's Urban Parks Plan. This screening determined that both of the parks contain, or are part of, a cultural heritage landscape. It is recommended that a Cultural Heritage Evaluation Report (CHER) be completed during the detailed design phase to evaluate the property for Cultural Heritage Value or Interest.	◑
Technical Considerations								
Potential drainage and stormwater concerns	This alternative has a 0.5% longitudinal grade and 0.5% cross-grade of the proposed surface atop the bridge deck.	●	This alternative has a 0.5% longitudinal grade and 0.5% cross-grade of the proposed surface atop the bridge deck.	●	This alternative has a 7% longitudinal grade from the center pier in the bridge as well as a 0.5% cross-grade of the proposed surface atop the bridge deck.	●	This alternative has a 0.5% longitudinal grade and 0.5% cross-grade of the proposed surface atop the arch culverts. The areas between the culvert walls would be prone to collecting water. Drainage design is higher complexity than the other alternatives.	◑
Potential impacts associated with implementation (complexity of construction)	Construction sequence includes construction of substructure, placement of bearings and girders, constructing deck and parapet walls, backfilling and grading approach ramps. Main girder placement would require heavy duty cranes and precise bearing placement for the main span. Substructure construction includes abutments and outside piers. Girders would be installed separately for each span, once they are in place, deck and parapet wall can be constructed in a continuous manner.	●	Construction sequence includes construction of substructure, placement of bearings and girders, constructing deck and parapet walls, backfilling and grading approach ramps. Girder placement would require heavy-duty cranes and precise bearing placement for two middle spans. Substructure construction includes abutments, central pier, and middle pier. Girders would be installed separately for each span, once they are in place, deck topping slab and parapet wall can be constructed in a continuous manner.	●	Construction sequence includes construction of substructure, placement of bearings and girders, constructing deck and parapet walls, backfilling and grading approach ramps. Girder placement would require heavy-duty cranes and precise bearing placement for both spans. Substructure construction includes abutments and middle pier. Girders would be installed separately for each span, once they are in place, deck topping slab and parapet wall can be constructed in a continuous manner.	●	Construction sequence includes construction of pedestal footings, placement of precast arch sections, construction of facing and parapet, backfilling over arches and grading approach ramps. No bearings are required, however heavy-duty cranes required to place main span arches. Some added complexity in forming and pouring concrete facing with architectural finish. Arches would be installed separately for each span, once they are in place, facing and parapet wall can be constructed in a continuous manner.	●
Complexity of geotechnical design considerations	While design and construction of the substructure (deep foundations, temporary shoring and dewatering) is considered generally to be straightforward, some moderately complex settlement mitigation may be required for the embankments, particularly on the west side to protect the railway and limit any potential impacts to buried infrastructure along Ojibway Parkway.	◑	While design and construction of the substructure (deep foundations, temporary shoring and dewatering) is considered generally to be straightforward, some moderately complex settlement mitigation may be required for the embankments, particularly on the west side to protect the railway and limit any potential impacts to buried infrastructure along Ojibway Parkway.	◑	While design and construction of the substructure (deep foundations, temporary shoring and dewatering) is considered generally to be straightforward, some moderately complex settlement mitigation may be required for the embankments, particularly on the west side to protect the railway and limit any potential impacts to buried infrastructure along Ojibway Parkway.	◑	While design and construction of the substructure (shallow foundations, temporary shoring and dewatering) is considered generally to be straightforward, some moderately complex settlement mitigation may be required for the embankments, particularly on the west side to protect the railway and limit any potential impacts to buried infrastructure along Ojibway Parkway. Shallow foundations (concrete pedestal	◑

Category & Criteria	Design Option 1 – Wildlife Overpass (3 Span Bridge)	Score	Design Option 2 – Wildlife Overpass (4 Span Bridge)	Score	Design Option 3 - Wildlife Overpass (2 Span Bridge)	Score	Design Option 4 – Wildlife Overpass (4 Span Arch Culvert)	Score
							footings) may not be feasible unless site specific boreholes reveal overconsolidated crust.	
Potential traffic impacts from construction	Construction of the bridge structure to be completed in a staged approach. Temporary traffic impacts are anticipated with potential for lane shifts, shoulder closures or lane closures for construction of outside piers. Full roadway closure (northbound and southbound) is required for main span girder placement.	◑	Construction of the bridge structure to be completed in a staged approach. Temporary traffic impacts are anticipated including long term lane closures or lane shifts are required for construction of center and outside piers. Placement of main span girders can be completed utilizing full roadway closure, closure of northbound and southbound separately, or potentially with a temporary traffic diversion using median crossovers, which would maintain single lane of traffic each direction along Ojibway Parkway.	◑	Construction of the bridge structure to be completed in a staged approach. Traffic impact not anticipated for outside abutments construction. Temporary traffic impacts are anticipated including long term lane closures or lane shifts are required for construction of center piers only. Placement of main span girders can be completed utilizing full roadway closure, closure of northbound and southbound separately, or potentially with a temporary traffic diversion using median crossovers, which would maintain single lane of traffic each direction along Ojibway Parkway.	●	Construction of the bridge structure to be completed in a staged approach. Temporary traffic impacts are anticipated including long term lane closures or lane shifts are required for construction of arch footing. Placement of main span arches can be completed utilizing full roadway closure, closure of northbound and southbound separately, or potentially with a temporary traffic diversion using median crossovers, which would maintain single lane of traffic each direction along Ojibway Parkway.	◑
Roadside Safety	No median pier required for protection. Outside piers placed adjacent to travel lanes would require protection. No impacts to turning sight lines from Broadway Boulevard are anticipated due to absence of median piers (to be confirmed during detailed design).	●	Protection of median pier would be required. Outside piers placed adjacent to travel lanes would require protection. Potential sight line impacts for turning movements from Broadway Boulevard due to median piers. Sight lines to be reviewed during detailed design.	◑	Protection of median pier would be required. Outside piers would be placed well away from outside travel lanes. Less roadside protection is anticipated to be required. Potential sight line impacts for turning movements from Broadway Boulevard due to median piers. Sight lines to be reviewed during detailed design.	●	Protection of median footing would be required. Outside footings and walls adjacent to travel lanes would require protection. Potential sight line impacts for turning movements from Broadway Boulevard due to culvert sidewalls. Sight lines to be reviewed during detailed design.	◑
Financial Considerations								
Construction Cost	Moderate construction cost.	◑	Highest construction cost.	○	Moderate construction cost.	◑	Lowest construction cost.	●
Maintenance and Rehabilitation Costs	Minor rehabilitation would be required at 25-year and 75-year points, consisting of concrete patch repair, crack injection, railing repairs. Major rehabilitation would be required at 50-year point with bearing replacement, concrete repairs, railing replacement. Estimated maintenance and rehabilitation cost comparable with most other alternatives.	◑	Minor rehabilitation would be required at 25-year and 75-year points, consisting of concrete patch repair, crack injection, railing repairs. Major rehabilitation would be required at 50-year point with bearing replacement, concrete repairs, railing replacement. Estimated maintenance and rehabilitation cost comparable with most other alternatives.	○	Minor rehabilitation would be required at 25-year and 75-year points, consisting of concrete patch repair, crack injection, railing repairs. Major rehabilitation would be required at 50-year point with bearing replacement, concrete repairs, railing replacement. Estimated maintenance and rehabilitation cost anticipated to be lower than other alternatives due to reduced substructure.	◑	Minor rehabilitation would be required for this alternative at 25-year and 75-year points, consisting of concrete patch repair, crack injection and railing repairs. Major rehabilitation would be required at 50-year point with joint repair/reconstruction, concrete repairs, railing replacement. This alternative's increased exposure to salt and chlorides, as well as greater quantity of joints is anticipated to offset maintenance savings associated with the lack of a bridge deck. Estimated maintenance and rehabilitation cost comparable with most other alternatives	●
Recommendation	Not Preferred		**Preferred**		Not Preferred		Not Preferred	

8.2.3 Preliminary Preferred Design

Initial Design Option 2 was originally identified as the Preliminary Preferred Design. This option included a 4-Span Wildlife Overpass Bridge crossing Ojibway Parkway, connecting Ojibway Park with the median area between Ojibway Parkway and the ETR tracks. The initial design options, along with their evaluation and preliminary preferred design were shared with Indigenous Nations, the public, government agencies, ETR, utilities owners, and key stakeholders through PIC #2 in April 2021. A key comment received was to extend the crossing across the ETR tracks to provide connectivity between the Ojibway Park Area and the Black Oak Heritage Park Area.

Following PIC #2, the draft ESR was presented to the City Council for endorsement. Subsequent to the Council endorsement, and prior to issuing the Notice of Study Completion, the draft ESR was circulated to the Indigenous Nations, relevant Government Agencies, and the ETR for their review. The feedback received prompted the continuation of the Class EA Study. Accordingly, the Study Team completed additional work to explore design options for the Wildlife Crossing across Ojibway Parkway and ETR tracks. This involved reevaluating the location of the crossing and identifying potential design alternatives for connecting Ojibway Park Area with the natural areas associated with Black Oak Heritage Park.

The following sections discuss the connectivity analysis and identification and evaluation of **"revised" design options**. Ultimately, the revised design option for Wildlife Crossing over Ojibway Parkway and ETR tracks was carried forward as the preferred design.

8.3 Connectivity Analysis

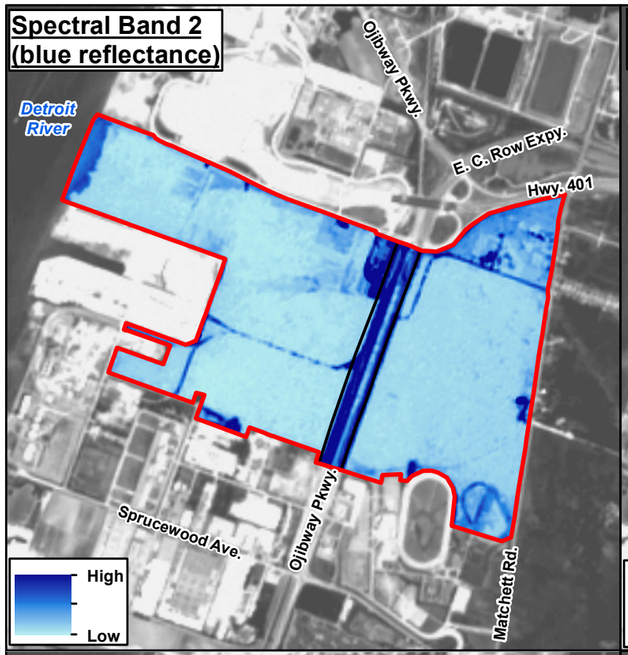
A connectivity analysis was completed to determine the preferred location and to identify potential and alternative locations for ecopassages on Ojibway Parkway. The goals and objectives of the Wildlifr Crossing is to re-establish an ecological connection between Black Oak Heritage Park Area and Ojibway Park Area. The ultimate goal of re-establishing the ecological connection between these natural areas and Oakwood Natural Area, could be achieved in combination with other proposed efforts in the City (e.g., Matchett, Malden, T5). The connectivity analysis was a desktop exercise and had a unique study area. The study area for this exercise focused on the permeable space area between the Detroit River on the west, Matchette Road on the east, the highways and development lands in the north, and the industrial lands in the south.

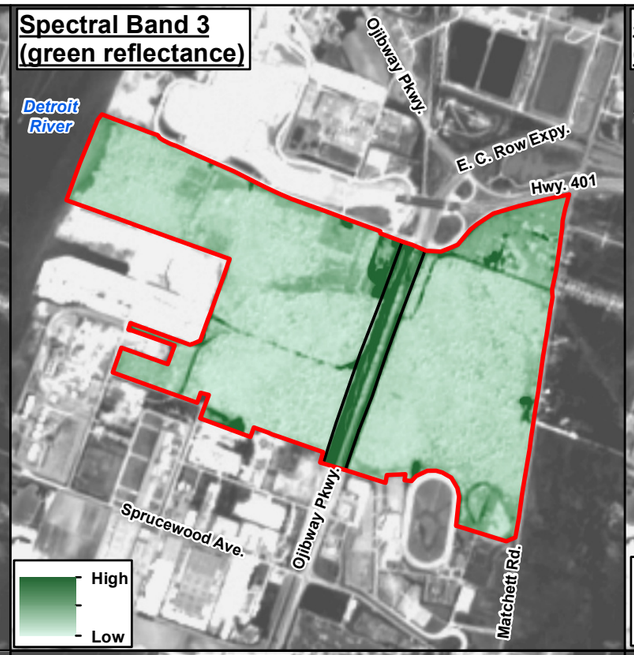
The connectivity analysis for the optimal ecopassage location used the least resistive (lowest impedance) wildlife movement corridor habitat patch GIS modelling. Sentinel 2A (European Space Agency) multi-spectral satellite imagery (10 m by 10 m spatial resolution), collected on June 18, 2020, was used as the raw data input for constructing the wildlife movement impedance surface. Various reflectance bands along with multi-spectral imagery derived index layers were combined into an eight-layer stacked data pool to be used in an unsupervised image classification procedure (Figure 8-9).

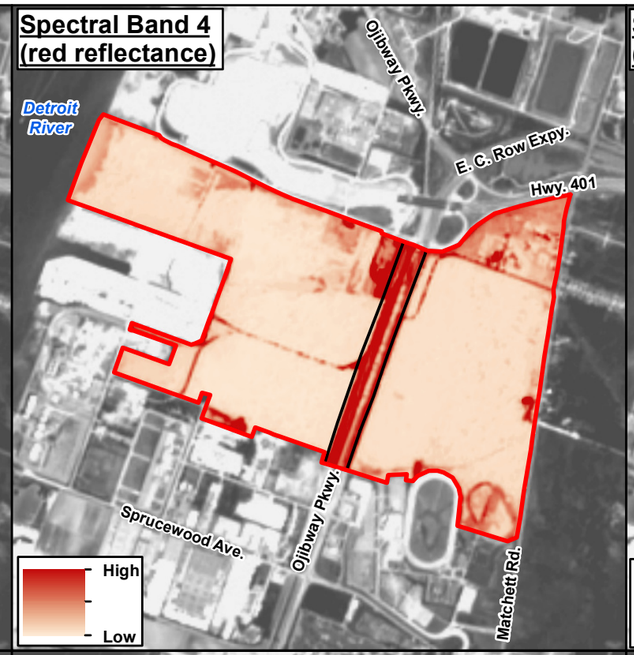
The ISODATA (k-means) clustering algorithm was used on this data pool to categorize every 10 m by 10 m pixel into specific clusters based on overall similarities of reflectance characteristics from the layer stack. The resulting classified imagery was further aggregated into ordinal categories using visual inspection and known landscape features, such as golf courses, existing ecopassage locations (e.g., T5), and vegetation communities within the study area. The ordinal categories were ranked from 1, low wildlife movement impedance/resistivity (i.e., most suitable wildlife habitat), to 5, high wildlife movement impedance/resistivity (i.e., least suitable wildlife habitat). These categories were combined to generate the wildlife movement impedance surface. This surface functioned as the basis for habitat connectivity and corridor identification across the study area (Figure 8-10 – MAP A for wildlife movement impedance surface).

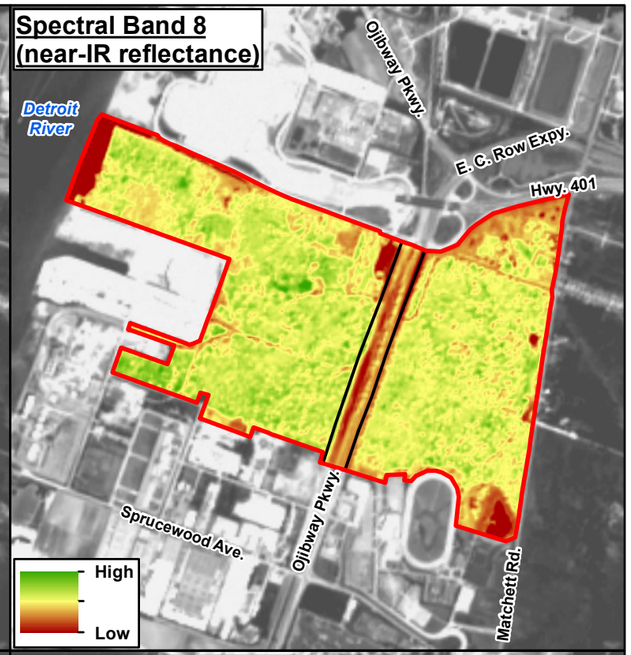
Patches of pixels categorized with the lowest impedance values from the wildlife movement impedance surface were isolated in areas in the western and eastern portions of the study area. These patches of land were considered “good” habitat fragments for general wildlife within the study area based on the image classification and category aggregation performed earlier. A cumulative landscape wildlife movement resistivity surface was generated extending outward from good habitat patches on the west and subsequently extending outward from good habitat patches east (Figure 8-10 - MAP B and C for information regarding the cumulative landscape wildlife movement resistivity surfaces).

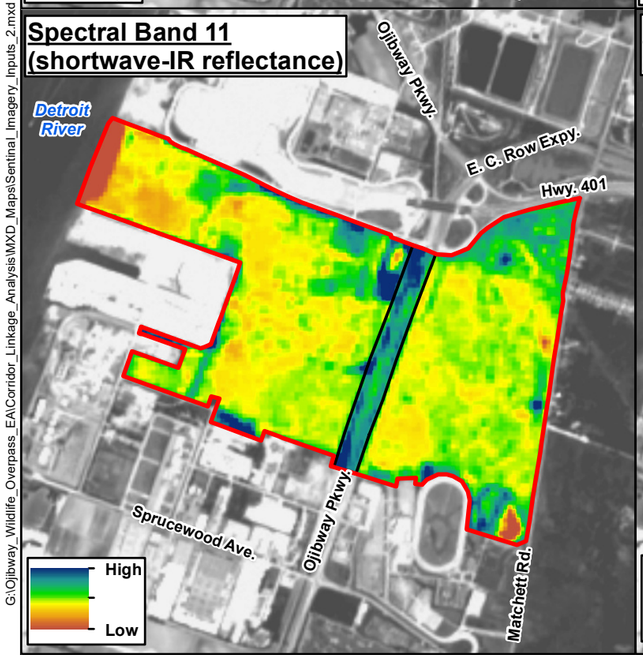
The two cumulative landscape wildlife movement resistivity surfaces (one extending from good habitat on the west side of Ojibway Parkway and one extending from good habitat east of Ojibway Parkway) were combined to identify the lowest cumulative impedance connective corridors crossing the study area, and therefore; crossing Ojibway Parkway. A density slicing technique was used on the combined cumulative landscape wildlife resistivity surface to highlight primary, secondary, and tertiary corridor areas connecting good habitat patches on one side of the study area to the other (Figure 8-11 – MAP A for information regarding the combined cumulative landscape wildlife resistivity surface and corridor areas). The results of the least resistive (lowest impedance) wildlife movement corridor habitat patch connectivity analysis was simplified to help illustrate generalized good wildlife crossing corridors. Also, segments of Ojibway Parkway were identified as Primary Crossing Areas, Secondary Crossing Areas, and Tertiary Crossing Areas based on the results from the analysis (Figure 8-11 – MAP B for information regarding the wildlife movement corridors and crossing locations/areas).

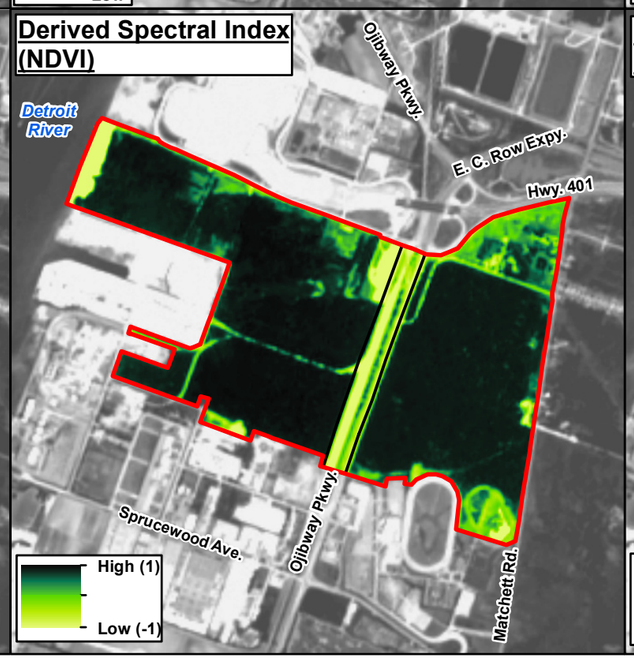


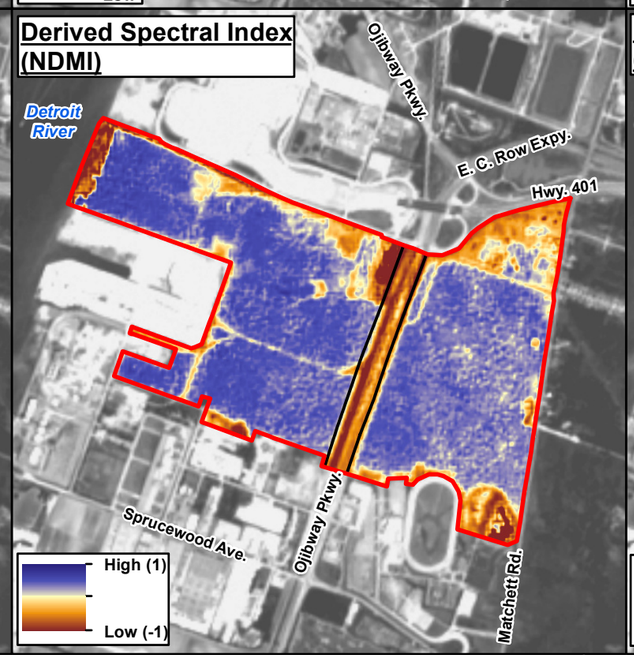


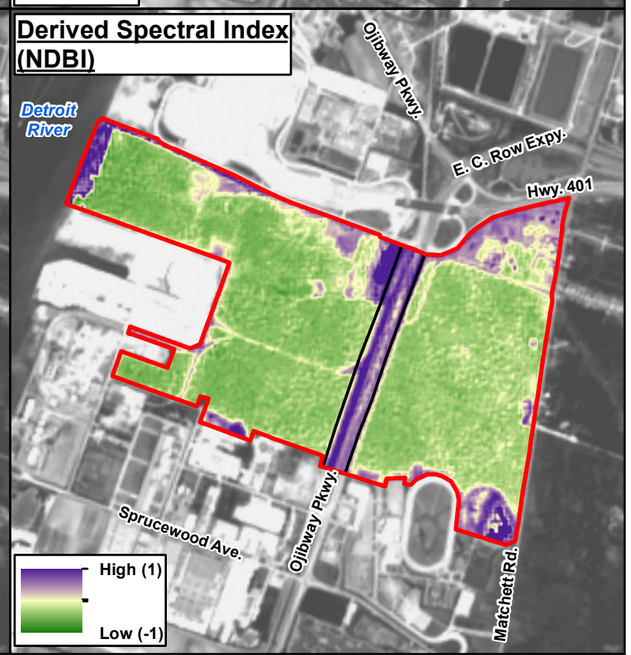












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LEGEND

Approximate Study Area

Ojibway Parkway and adjacent Rail Corridor Wildlife Crossing Area of Interest Boundary

Sentinel 2A Imagery and Imagery Derived Input Information:

- Spectral Band 2: Blue reflectance values. Ten metre resolution imagery with 16-bit scale reflectance ramp. Reflectance digital number values represent wavelength range 458-523 nm.
- Spectral Band 3: Green reflectance values. Ten metre resolution imagery with 16-bit scale reflectance ramp. Reflectance digital number values represent wavelength range 543-578 nm.
- Spectral Band 4: Red reflectance values. Ten metre resolution imagery with 16-bit scale reflectance ramp. Reflectance digital number values represent wavelength range 650-680 nm.
- Spectral Band 8: Near infrared reflectance values. Ten metre resolution imagery with 16-bit scale reflectance ramp. Reflectance digital number values represent wavelength range 785-899 nm.
- Spectral Band 11: Shortwave infrared reflectance values. Twenty metre resolution imagery with 16-bit scale reflectance ramp. Reflectance digital number values represent wavelength range 1565-1655 nm.
- Derived Spectral Index (NDVI): Normalized Difference Vegetation Index (band 8 - band 4 / band 8 + band 4). Derived spectral index indicating variation in vegetation growth and productivity.
- Derived Spectral Index (NDMI): Normalized Difference Moisture Index (band 8 - band 11 / band 8 + band 11). Derived spectral index indicating variation in vegetation water content and plant biomass.
- Derived Spectral Index (NDBI): Normalized Difference Built-up Index (band 11 - band 8 / band 11 + band 8). Derived spectral index indicating variation in urbanized, built-up or anthropogenic developed areas.

NOTES:
- Road and Municipal border info extracted from Ontario GeoHub, NDMNRF 2021
- Sentinel 2A satellite data extracted from Copernicus Open Access Hub, European Space Agency, Scene Date is June 18, 2020. L1C_T17TLG_A026063_20200618T162536

Datum: NAD83
Projection: UTM Zone 17N

0 1 2 4 6 Kilometres

THE CITY OF WINDSOR ONTARIO, CANADA

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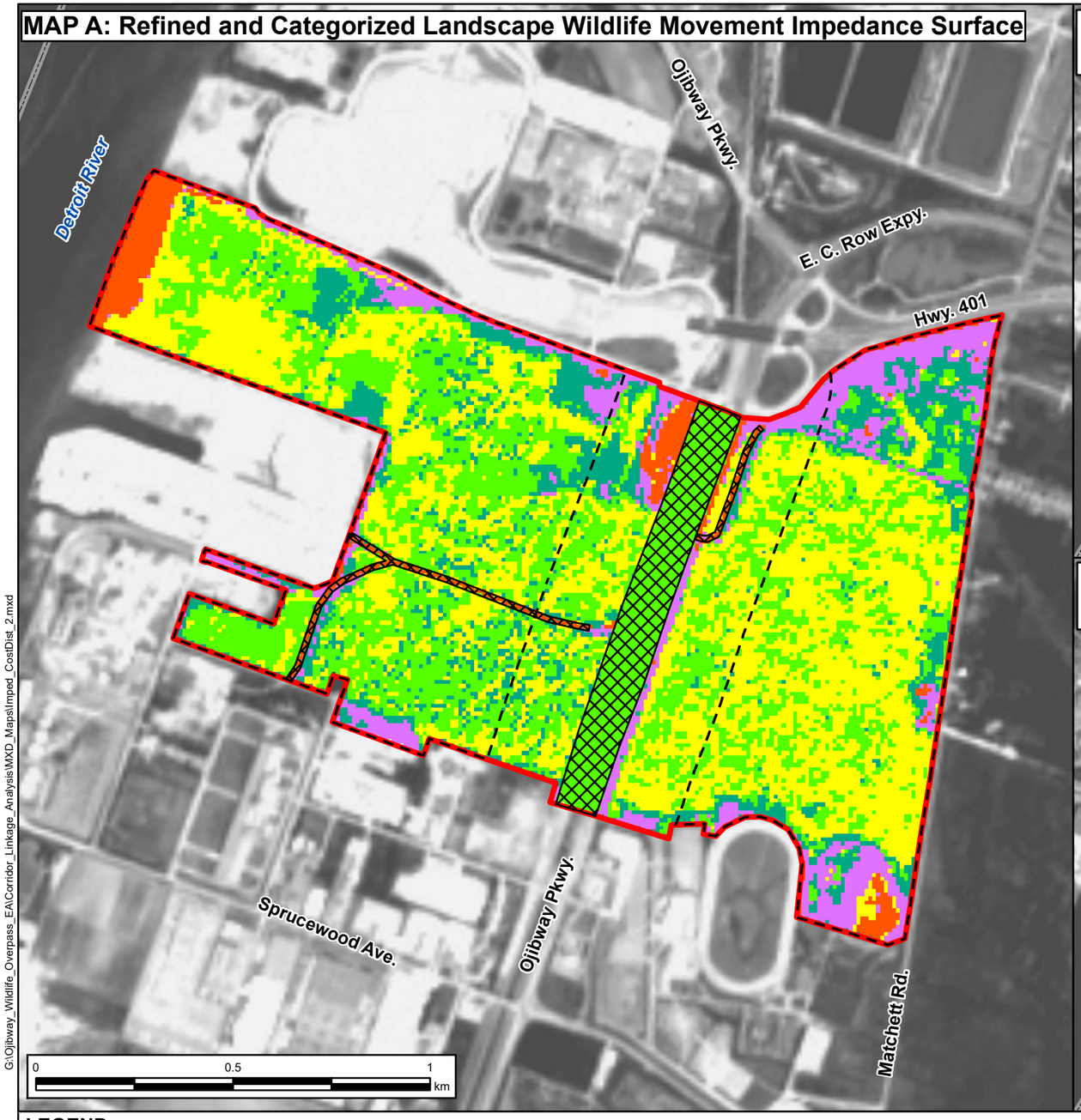
OJIBWAY PARKWAY WILDLIFE CROSSING

Sentinel 2A Satellite Platform Imagery and Imagery Derived Inputs for Inclusion in General Landscape Wildlife Movement Impedance Surface

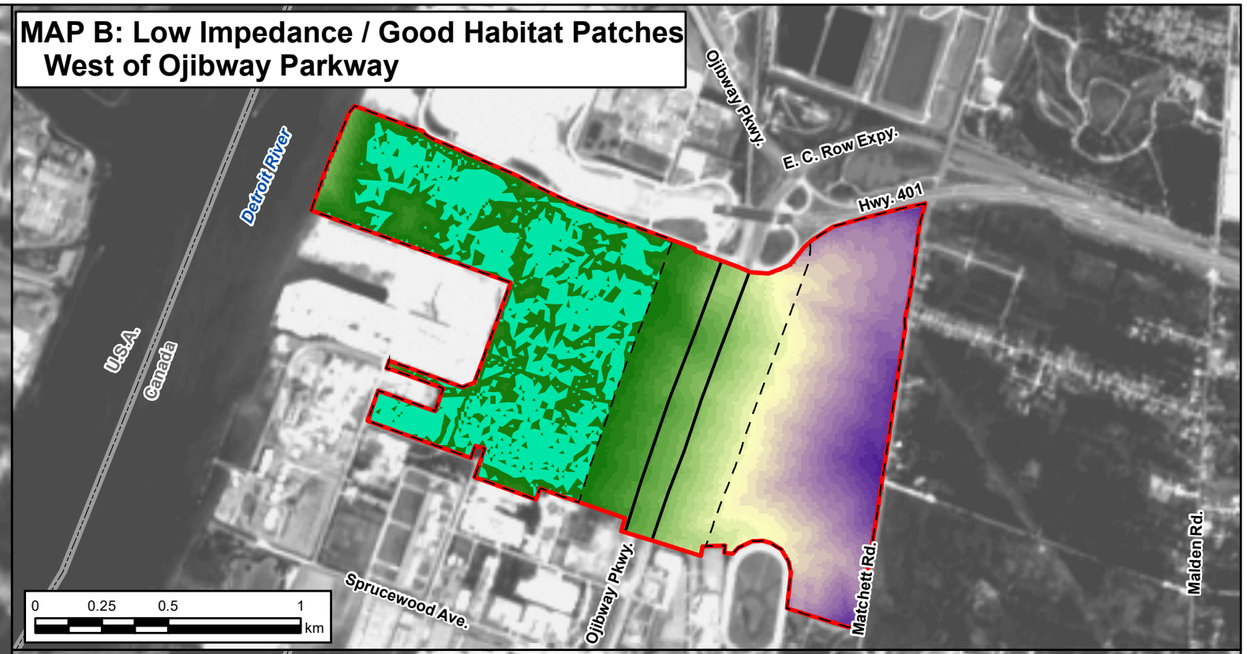
PROJECT N°: IM20104013 | **FIGURE: 8-9**

SCALE: 1:27,500 | DATE: September 2023

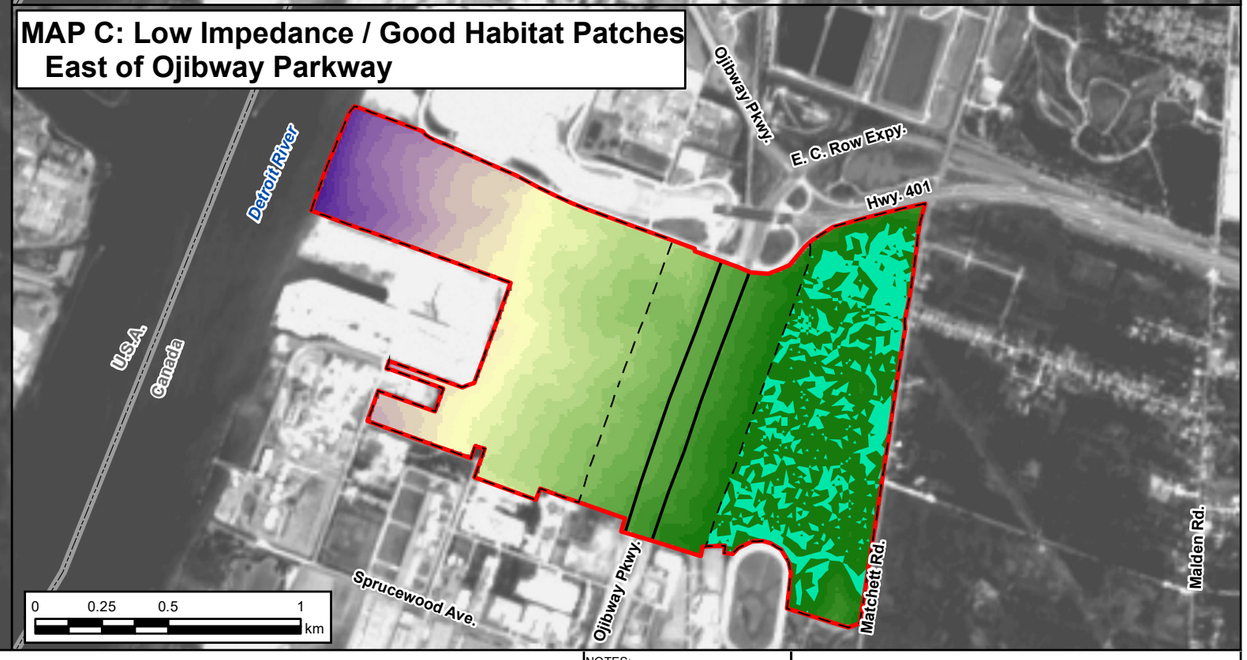
MAP A: Refined and Categorized Landscape Wildlife Movement Impedance Surface



MAP B: Low Impedance / Good Habitat Patches West of Ojibway Parkway



MAP C: Low Impedance / Good Habitat Patches East of Ojibway Parkway



LEGEND

- Approximate Study Area
- Ojibway Parkway and adjacent Rail Corridor Wildlife Crossing Area of Interest Boundary
- Habitat connectivity model areas east and west of Ojibway Parkway crossing area
- National Border

MAP A:

- Areas where Categories were refined due to visual inspection of anthropogenic influence and applying even impedance distribution across potential wildlife crossing area

Categorized Landscape Wildlife Movement Impedance Surface

- Low Impedance Area for general Wildlife Movement across the Landscape (good habitat: prairie, meadow, moderately treed natural area, etc.)
- High Impedance Area for general Wildlife Movement across the Landscape (not good habitat: urban infrastructure, anthropogenic structures, unvegetated areas, open water, etc.)

MAP B and C:

- Low Impedance / Good Habitat Patches isolated to the west side of Ojibway Parkway (Map B) and east side of Ojibway Parkway (Map C)

Cumulative Landscape Wildlife Movement Resistivity based on Wildlife Movement Impedance Surface Categories Extending outward from good habitat patches (west of Ojibway Parkway on Map B, east of Ojibway Parkway on Map C)

- High accumulated Impedance moving across the landscape from good habitat patches
- Low accumulated Impedance moving across the landscape from good habitat patches

NOTES:
- Road and Municipal border info extracted from Ontario GeoHub, NDMNRF 2021
- Sentinel 2A satellite data extracted from Copernicus Open Access Hub, European Space Agency, Scene Date is June 18, 2020. L1C_T17TLG_A026063_20200618T162536

Datum: NAD83
Projection: UTM Zone 17N

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OJIBWAY PARKWAY WILDLIFE CROSSING

Resultant Categorized Landscape Wildlife Movement Impedance Surface and Cumulative Landscape Wildlife Movement Resistivity Analysis from Good Habitat East and West of Ojibway Parkway

PROJECT N°: IM20104013 | **FIGURE: 8-10**

SCALE: MAP A: 1:13,000, MAP B, C: 1:22,500 | DATE: September 2023

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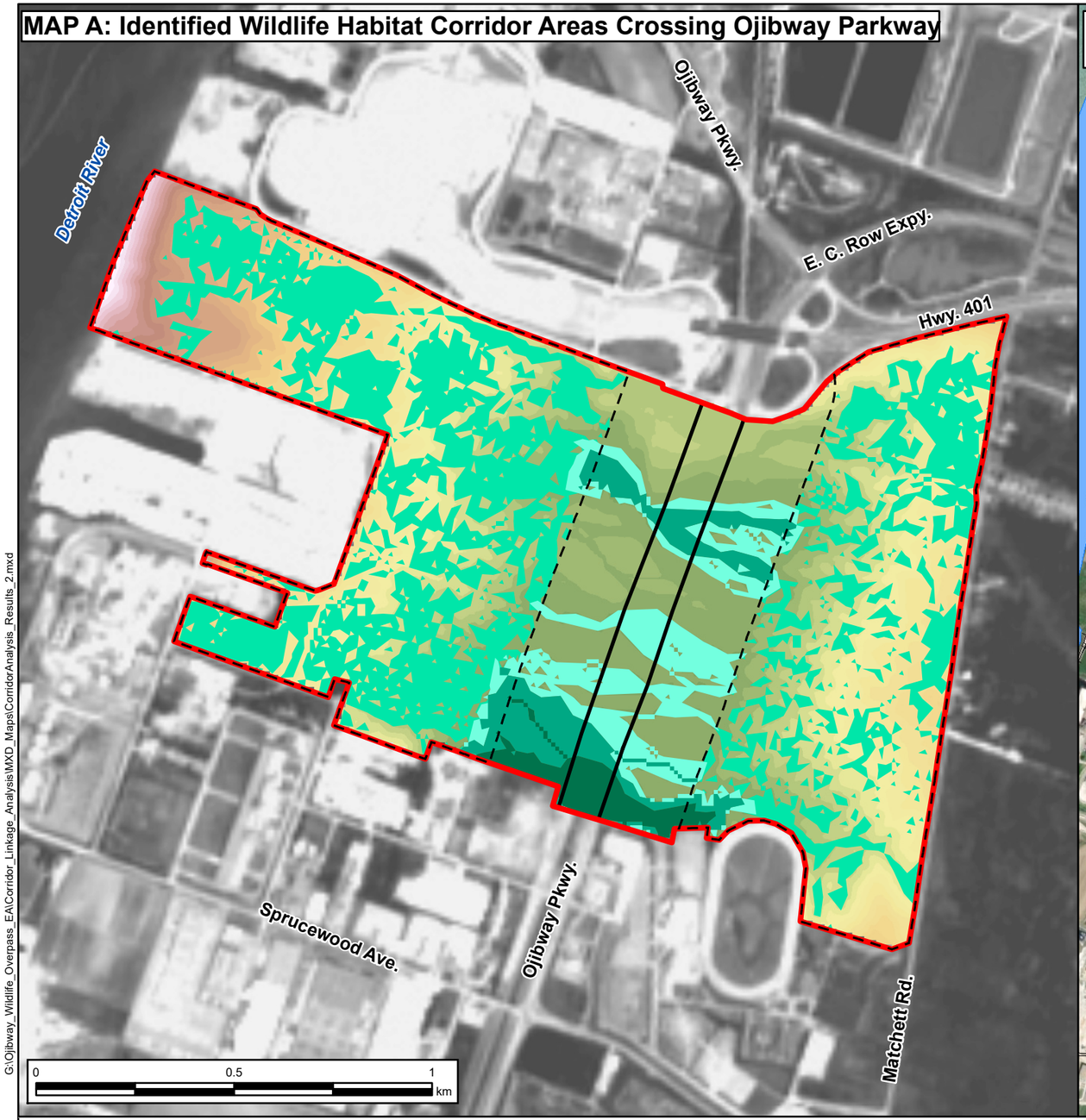
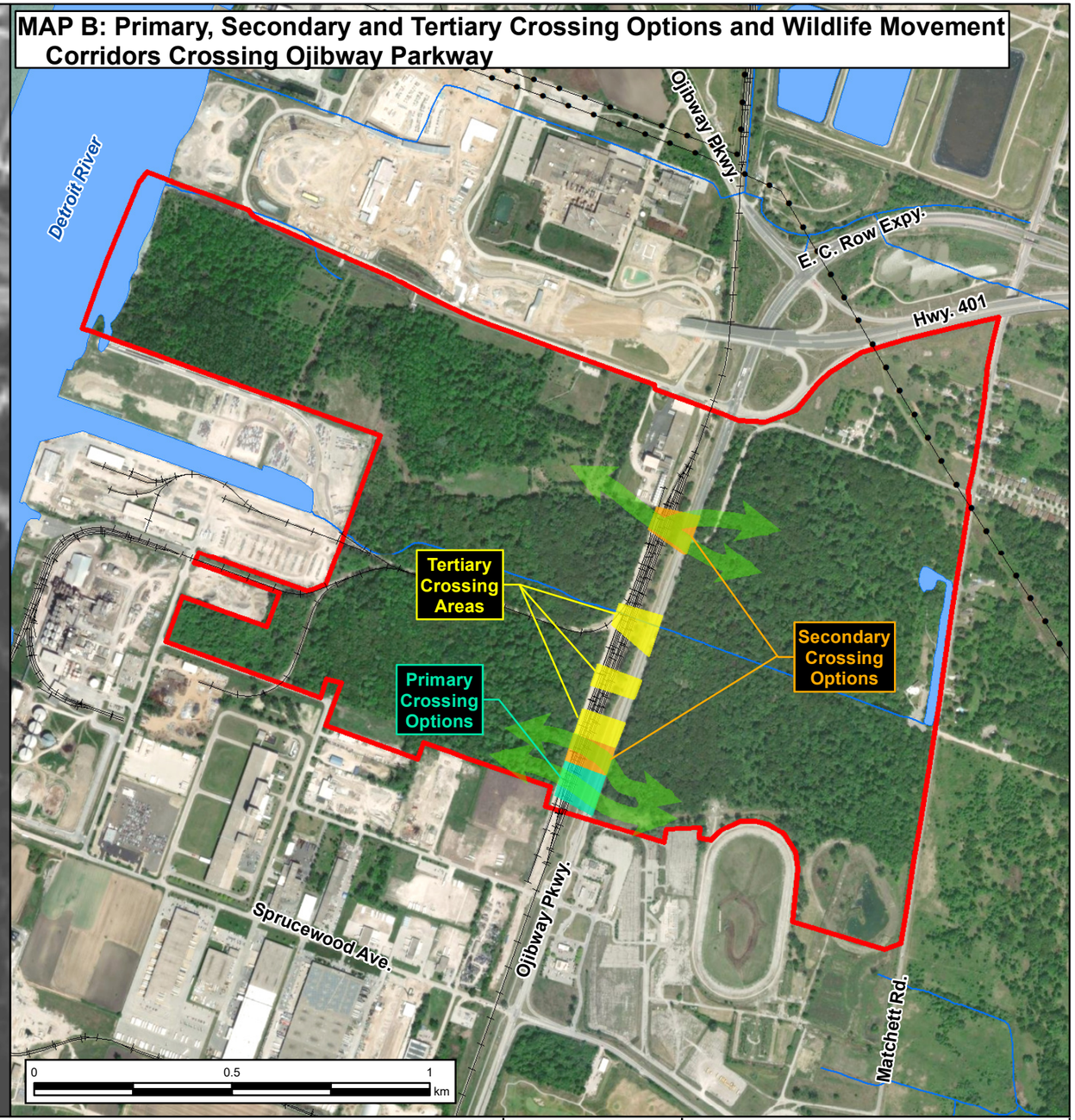
MAP A: Identified Wildlife Habitat Corridor Areas Crossing Ojibway Parkway



MAP B: Primary, Secondary and Tertiary Crossing Options and Wildlife Movement Corridors Crossing Ojibway Parkway



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LEGEND

- Approximate Study Area
- Ojibway Parkway and adjacent Rail Corridor Wildlife Crossing Area of Interest Boundary
- Habitat connectivity model areas east and west of Ojibway Parkway crossing area
- Railway
- Hydro Line

MAP A:

- Low Impedance / Good Habitat Patches isolated to the west side and east side of Ojibway Parkway

Identified corridor Areas Crossing Ojibway Parkway

- Primary Corridor Area (lowest wildlife movement resistivity from good habitat west of Ojibway Parkway and east of Ojibway Parkway)
- Secondary Corridor Area (lower wildlife movement resistivity from good habitat west of Ojibway Parkway and east of Ojibway Parkway)
- Tertiary Corridor Area (low wildlife movement resistivity from good habitat west of Ojibway Parkway and east of Ojibway Parkway)

Combined Cumulative Landscape Wildlife Movement Resistivity Surface Indicating Overall Low/High Impedance Corridors from Good Habitat Patches West of Ojibway Parkway and Good Habitat Patches East of Ojibway Parkway

- High Combined Cumulative Impedance Area moving across the landscape from good habitat patches
- Low Combined Cumulative Impedance Area moving across the landscape from good habitat patches

MAP B:

- Primary and Secondary Wildlife Movement Corridors crossing Ojibway Parkway
- Primary Crossing Location
- Secondary Crossing Location
- Tertiary Crossing Area

NOTES:
- Road and Municipal border info extracted from Ontario GeoHub, NDMNRF 2021
- Sentinel 2A satellite data extracted from Copernicus Open Access Hub, European Space Agency, Scene Date is June 18, 2020. L1C_T17TLG_A026063_20200618T162536
- Aerial imagery (Map B) extracted from ESRI basemap imagery service (scene date: May/June 2023)

Datum: NAD83
Projection: UTM Zone 17N

THE CITY OF WINDSOR ONTARIO, CANADA

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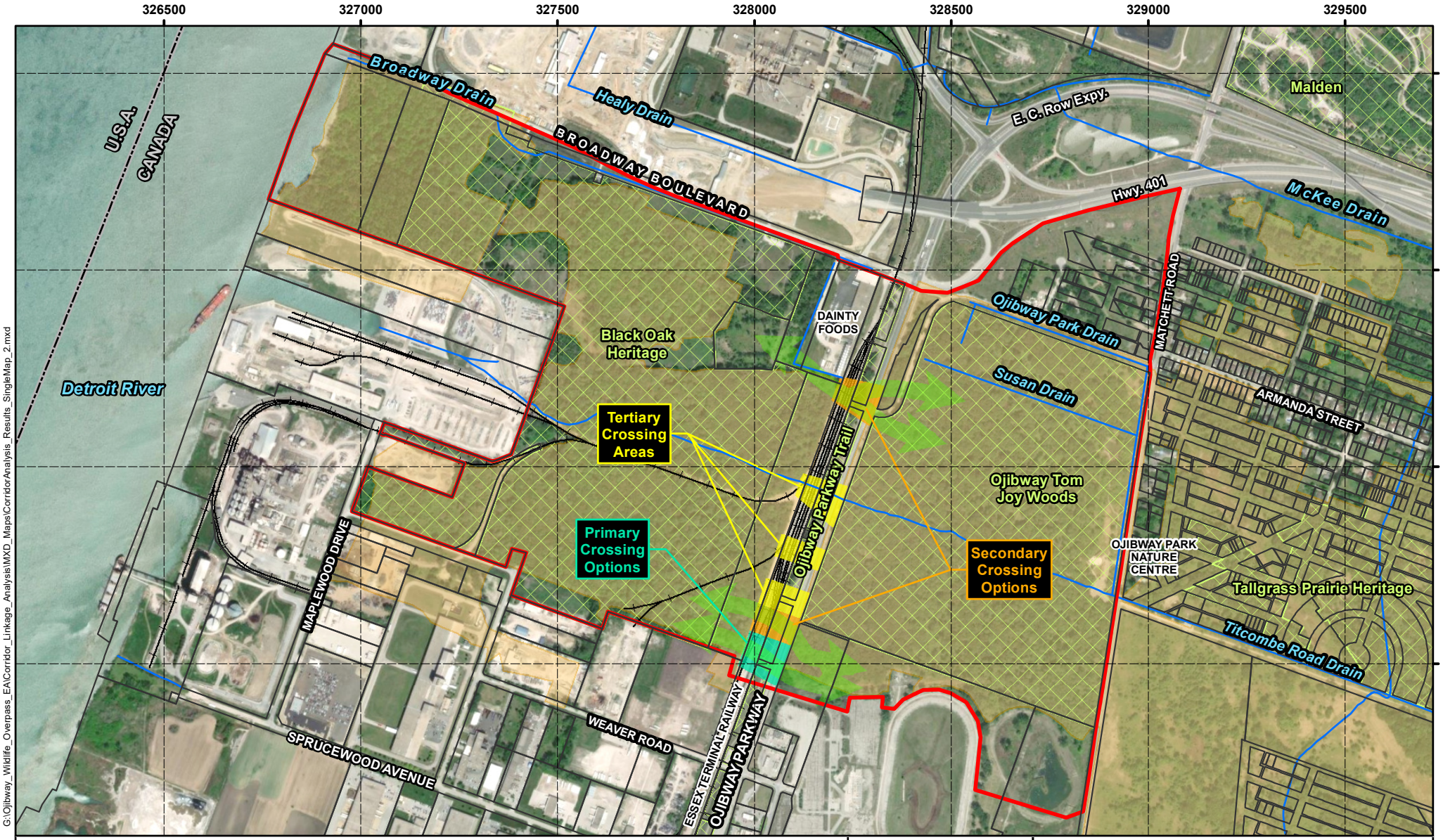
OJIBWAY PARKWAY WILDLIFE CROSSING

Resultant Wildlife Habitat Corridor Areas and Primary, Secondary and Tertiary Crossing Options and Wildlife Movement Corridors Crossing Ojibway Parkway

PROJECT N°: IM20104013	**FIGURE: 8-11**
SCALE: 1:13,000	DATE: September 2023



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LEGEND

- Approximate Study Area
- National Border
- Railway
- Property Parcels
- Parks (labelled with name)
- Watercourse / Drain
- Natural Heritage Feature (ANSI, Provincially Significant Wetland, Environmentally Significant Area or Provincial Park)
- Primary and Secondary Wildlife Movement Corridors crossing Ojibway Parkway
- Primary Crossing Location
- Secondary Crossing Location
- Tertiary Crossing Area

NOTES:
- Aerial imagery extracted from ESRI basemap imagery service (scene date: May/June 2023)
- Property parcels and parks extracted from City of Windsor Open Data Catalogue, (https://opendata.citywindsor.ca/ 2023)

Datum: NAD83
Projection: UTM Zone 17N

0 250 500 1,000 1,500 2,000 Metres

THE CITY OF WINDSOR ONTARIO, CANADA

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OJIBWAY PARKWAY WILDLIFE CROSSING

Potential Wildlife Crossing Locations

PROJECT N°: IM20104013 | **FIGURE: 8-12**

SCALE: 1:13,500 | DATE: September 2023

8.4 Natural Heritage Constraints on Location of Crossing

To inform possible locations of a wildlife crossing, the biophysical attributes and evaluation of significance were considered. First, confirmed Threatened and Endangered plant species were mapped, along with critical habitat setbacks, as recommended by habitat regulations or recovery strategies (Figure 5-16 – public version is redacted). The approximate protected habitat was determined as follows:

- Purple Twayblade: The ecosite and the surrounding areas that provide suitable habitat conditions OR a critical function zone of 50 m (radial distance), whichever is greater (Ministry of the Environment, Conservation and Parks, 2019).
- Slender Bush Clover: “it is recommended that the regulated habitat include the entire opening in which the plants occur, as well as a protective zone of 50 m around the outside of the open area, including any disturbed, human-made components such as scraped areas since light soil disturbance may be helpful to the species. Should any suitable openings extend beyond the 50 m, it is suggested that all of this open area also be prescribed. For this prescription, "open" or "opening" may be defined as the area in which total tree cover is less than 25 percent, with ground dominated (greater than 50%) by herbaceous plants, shrubs or exposed soil, and not shaded by trees.” (Jones, 2013).
- Spotted Wintergreen: should include the area occupied by all extant populations and the surrounding extent of the vegetation community (Ursic, Farrell, Ursic, & Stalker, 2010).
- Willowleaf Aster: continuously open area as well as a protective zone of 50 m around the outside of the open area. If the continuously open area is small, it is recommended that a minimum radial distance of 50 m around patches of Willowleaf Aster be prescribed even if some of the vegetation inside the circle does not meet the habitat criteria listed above (Jones, Recovery strategy for the Willowleaf Aster (Symphyotrichum praealtum) in Ontario. , 2013).
- Dense Blazing Star: extent of the ELC ecosite polygon OR a radial distance of up to 50 m from the Dense Blazing Star observations will be applied as the occupancy criterion when it occurs in small openings not well defined by ELC (Ontario Ministry of Natural Resources and Forestry, 2016).

Second, animal SAR critical habitat and habitat defined in recovery strategies was also considered. Critical habitat is defined in the SARA as the habitat that is necessary for the survival or recovery of a SAR. Critical habitat is defined in federal recovery strategies for some species (or in an action plan); when defined there may be regulatory implications. Critical habitat located on nonfederal lands, is protected by provisions in or measures under SARA or other Acts of Parliament, including the laws of the province or territory. The discretion to protect critical habitat on non-federal lands that is not otherwise protected rests with the Governor in Council. Identification of critical habitat is not a component of a recovery strategy prepared under the ESA. However, it is recommended that the approach used to identify critical habitat in the federal recovery, along with any new scientific information, be considered when developing a habitat regulation under the ESA. The critical habitat for the folowing SAR fauna was considered:

- Eastern Hog-nosed Snake: Critical habitat has not yet been defined for the Eastern Hog–nosed Snake (Kraus, 2011). It is assumed that, like other SAR snake species, Ojibway Park and Black Oak Heritage Park will be considered critical habitat.
- Eastern Foxsnake: Critical habitat for Eastern Foxsnake is indicated with a 50 x 50 km UTM grid squares, which includes the City of Windsor. Critical habitat occurs when the description of critical habitat from the Recovery Strategy is met (Government of Canada, 2017). The recovery strategy describes critical habitat as the areas prescribed under O. Reg 242/08. The habitat regulation for Eastern Foxsnake protects sites used for nesting, hibernation, and communal shedding and basking, as well as areas within 1500 metres of an Eastern Foxsnake that are suitable for it to carry out its life processes (e.g. foraging and thermoregulation). The regulation applies where the snake occurs in the

City of Windsor (Government of Ontario, 2021). It is assumed that Ojibway Park and Black Oak Heritage Park are considered critical habitat.

- Massasauga: The three primary sites which provide critical habitat for the Massasauga, and in which the species has been observed in the 1971 to 2010 period, have been identified in the City of Windsor: Ojibway Prairie Provincial Nature Reserve, Spring Garden Natural Area, and in the Town of LaSalle Woodlot (Ontario Ministry of Natural Resources and Forestry, 2016). Ojibway Park is not mapped as critical habitat but may be supporting habitat as forest within 1.2 km of an occurrence of the species is defined as Category 3 habitat under the General Habitat Description (Government of Ontario, 2021) under the ESA.
- Butler's Gartersnake: Critical habitat for Butler's Gartersnake is documented within the 1 x 1 km standardized UTM grid squares (17LG2881) where habitat and biophysical attributes are met (Environment Canada, 2016 and Ministry of the Environment, Conservation and Parks, 2019). In the (COSEWIC, 2010) report it is identified that significant Butler's Gartersnake habitat is expected to be removed to allow for a multilane parkway expansion and new bridge in the City of Windsor (Gordie Howe International Bridge). The identification of Butler's Gartersnake critical habitat is based on three criteria: habitat occupancy, habitat suitability and habitat connectivity between local subpopulations. It is assumed that Ojibway Park and Black Oak Heritage Park are considered critical habitat.

As it is assumed or considered that Ojibway Park and Black Oak Heritage Park are critical habitat for various SAR snake species, the habitat is not specifically mapped, but potential impacts were considered when evaluating crossing locations. Several potential snake habitat features were found and mapped (Figure 5-16 – public version is redacted). The significance of natural heritage features in the Study Area was evaluated in Section 5.4.7 above. It was found that avoidance of ANSI, Significant Woodlands, and SWH was not possible when considering a crossing anywhere in the Study Area. Therefore, these elements are likewise not mapped, but they are considered in the impact evaluation. Alternatively, mapped PSW does occur in both the north and south options, but the removal of PSW can be avoided with the south option (Figure 4-1, which is in compliance with the PPS (PPS does not permit development and site alteration in significant wetlands). While options, such as a Minister's Zoning Order, exist to build in significant wetlands, a desktop connectivity analysis was also completed to determine the preferred location (Section 8.3). The South Option was ultimately determined to be the Preferred Option.

A study on the spatial and temporal patterns of reptile movement and road mortality completed on the east side of Ojibway Park, along Matchette Road and Malden Road, was reviewed, and the authors' recommendations were considered (Choquette & Valliant, Road Mortality of Reptiles and Other Wildlife at the Ojibway Prairie Complex and Greater Park Ecosystem in Southern Ontario, 2016). The study found that reptiles moved in a southeast-northwest route along the utility right-of-way located north of Ojibway Park. The authors of the study suggest a wildlife crossing at the industrial site, Dainty Foods, as well as closing Broadway Boulevard to vehicle traffic. However, for the purpose of this EA, a crossing at the industrial site is not supported as the property is not owned by the City or other agencies that can dedicate lands in perpetuity for long-term wildlife conservation. Lastly, a crossing north of the Broadway Boulevard and Ojibway Parkway intersection would require two structures if Broadway Boulevard is to remain open.

Based on the abovementioned constraints, both the North and South Options impact natural heritage features. The North Option would land in a PSW, while the South Option would require transplanting plant SAR. Ultimately, the South Option was selected as the connectivity analysis supported the location, impacts to the PSW can be avoided (remaining in compliance with the PPS), and the City has previous success in transplanting plant SAR and working with ESA permitting to provide overall benefit to SAR.

8.5 Revised Design Options (Wildlife Crossing over Ojibway Pkwy and ETR Tracks)

8.5.1 Revised Design Options

Following completion of the Connectivity Analysis, the following four revised design options were developed:

- Revised Design Option 1 - South Crossing, Single Span over ETR tracks, Four Span over Ojibway Parkway, Soil Fill between ETR tracks and Ojibway Parkway
- Revised Design Option 2 - South Crossing, Single Span over ETR tracks, Single Span over Ojibway Parkway, Soil Fill between ETR tracks and Ojibway Parkway
- Revised Design Option 3 - South Crossing, Three Span Bridge (bridge span over boulevard between ETR tracks and Ojibway Parkway)
- Revised Design Option 4 - Split Crossing, Single span over Ojibway Parkway (North), Single Span over ETR tracks (South)

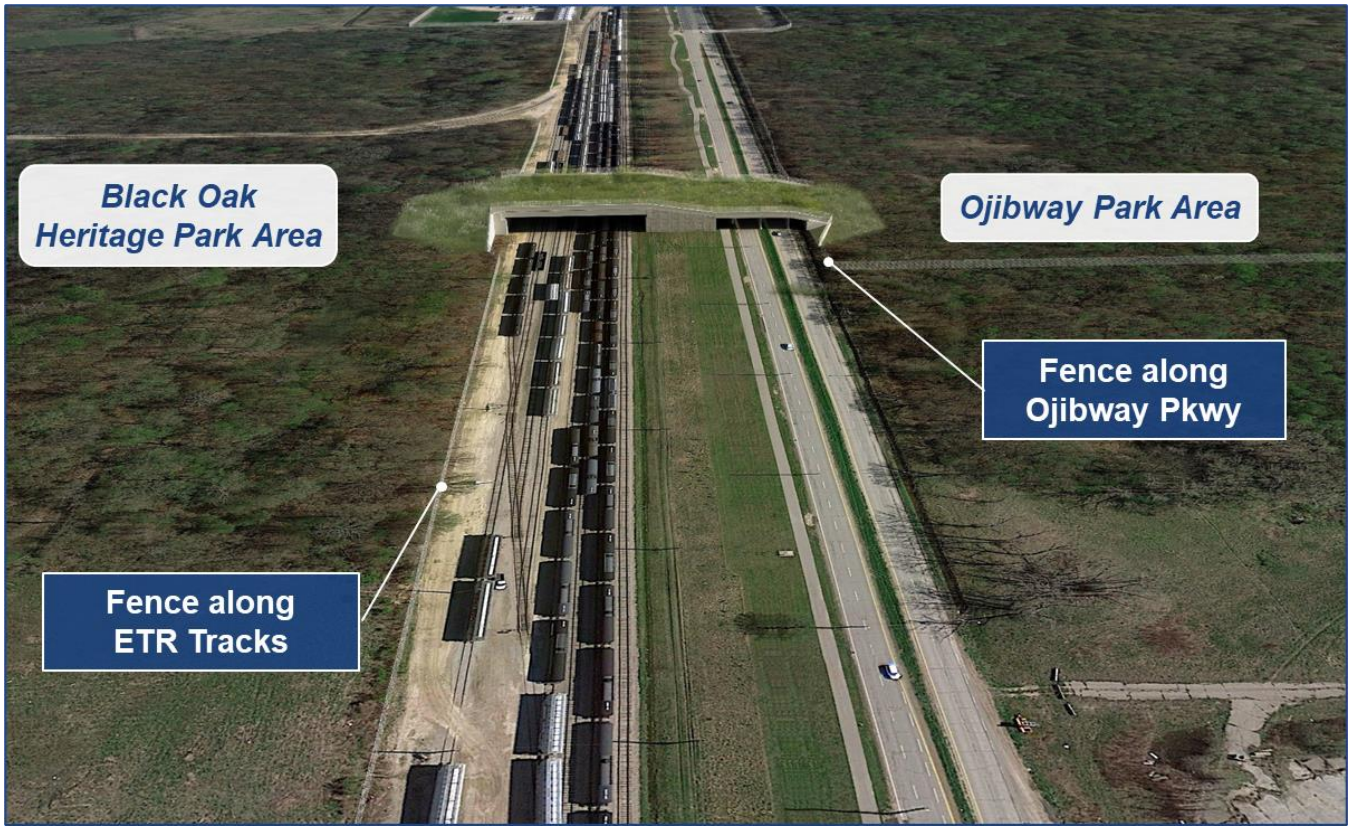
Revised Design Option 1 - South Crossing, Single Span over ETR tracks, Four Span over Ojibway Parkway, Soil Fill between ETR tracks and Ojibway Parkway

Key features of this design option are noted below:

- Four span structure over Ojibway Parkway with a single span structure over ETR tracks. Structures would be connected with an earth ramp retained by reinforced soil slope (RSS) retaining walls.
- 50 m wide wildlife crossing connecting Ojibway Park on the east and the natural areas associated with Black Oak Heritage Park on the west.
- 5.5 m vertical clearance over Ojibway Parkway and 7.49 m vertical clearance over ETR tracks.
- Fences along Ojibway Parkway and ETR tracks to keep the wildlife outside of roadway and railway tracks.

Conceptual rendering for this design option is shown in the following figure.

Figure 8-13: Revised Design Option 1 – Conceptual Rendering



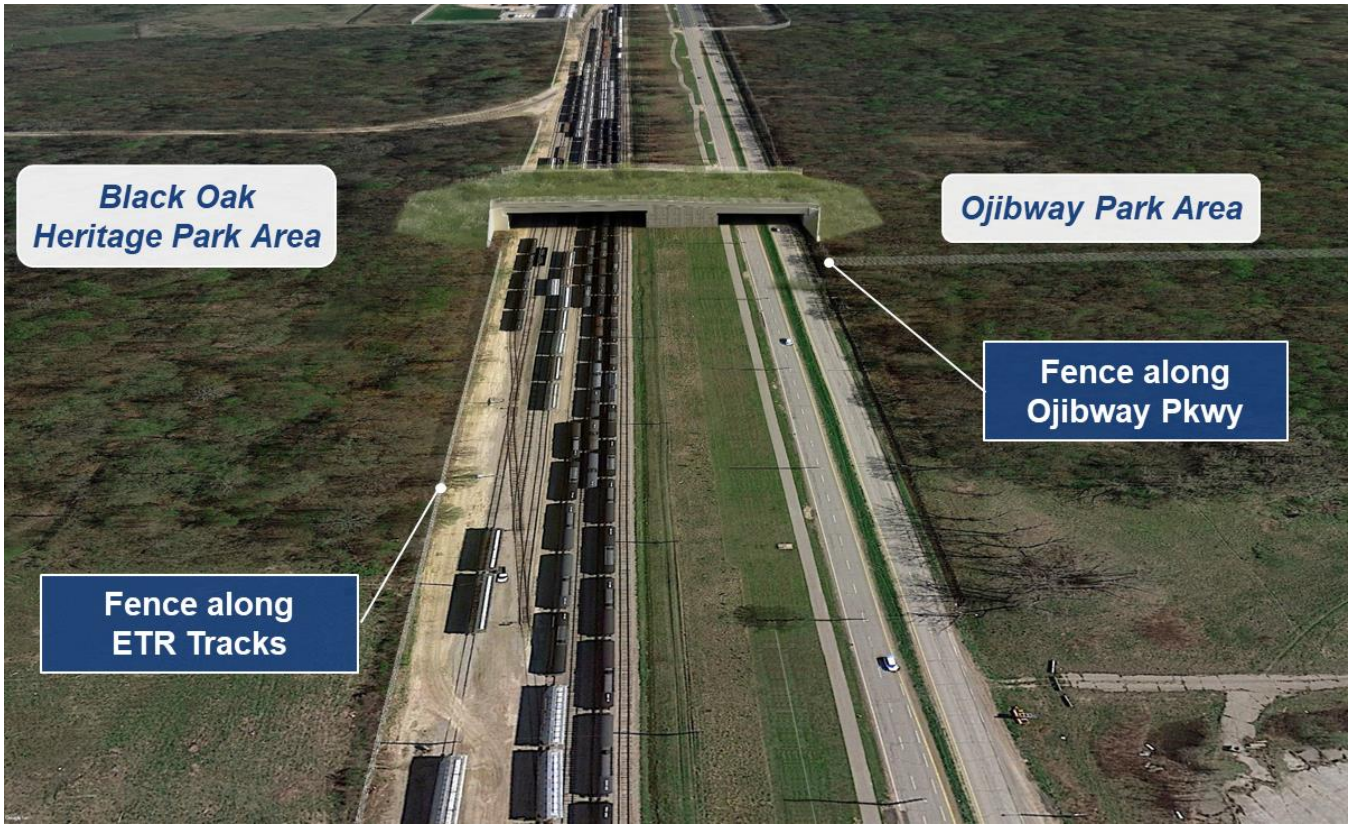
Revised Design Option 2 - South Crossing, Single Span over ETR tracks, Single Span over Ojibway Parkway, Soil Fill between ETR tracks and Ojibway Parkway

Key features of this design option are noted below:

- Single span structure over Ojibway Parkway with a single span structure over ETR tracks, connected with an earth ramp retained by RSS retaining walls.
- 50 m wide wildlife crossing connecting Ojibway Park on the and the natural areas associated with Black Oak Heritage Park on the west.
- 5.5 m vertical clearance over Ojibway Parkway and 7.49 m vertical clearance over ETR tracks.
- Fences along Ojibway Parkway and ETR tracks to keep the wildlife outside of roadway and railway tracks.

Conceptual rendering for this design option is shown in the following figure.

Figure 8-14: Revised Design Option 2 – Conceptual Rendering



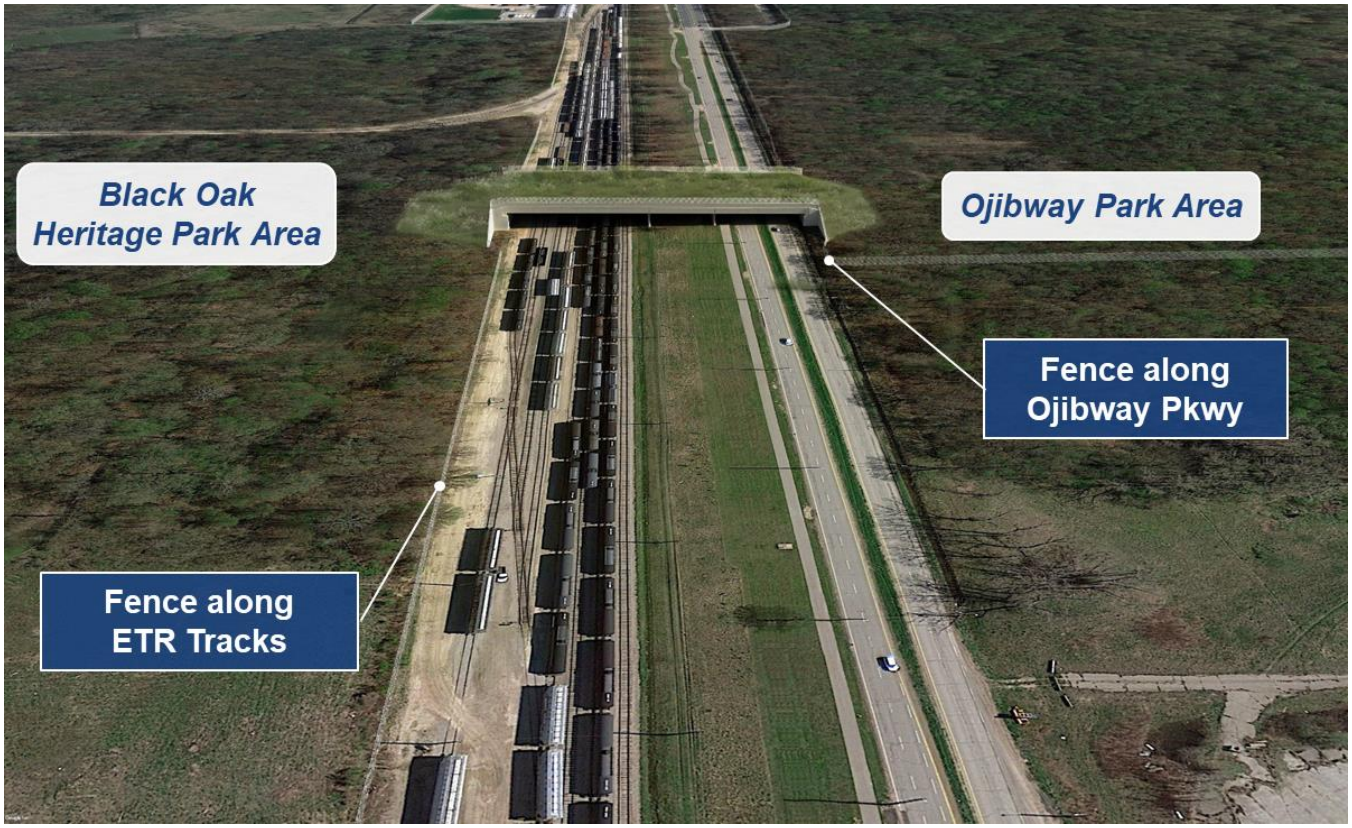
Revised Design Option 3 - South Crossing, Three Span Bridge (bridge span over boulevard between ETR tracks and Ojibway Parkway)

Key features of this design option are noted below:

- Three span structure (bridge spans over ETR tracks, span over boulevard between ETR tracks and Ojibway Parkway, and span over Ojibway Parkway).
- 50 m wide wildlife crossing connecting Ojibway Park on the east and the natural areas associated with Black Oak Heritage Park on the west.
- 5.5 m vertical clearance over Ojibway Parkway and 7.49 m vertical clearance over ETR tracks.
- Fences along Ojibway Parkway and ETR tracks to keep the wildlife outside of roadway and railway tracks.

Conceptual rendering for this design option is shown in the following figure.

Figure 8-15: Revised Design Option 3 – Conceptual Rendering



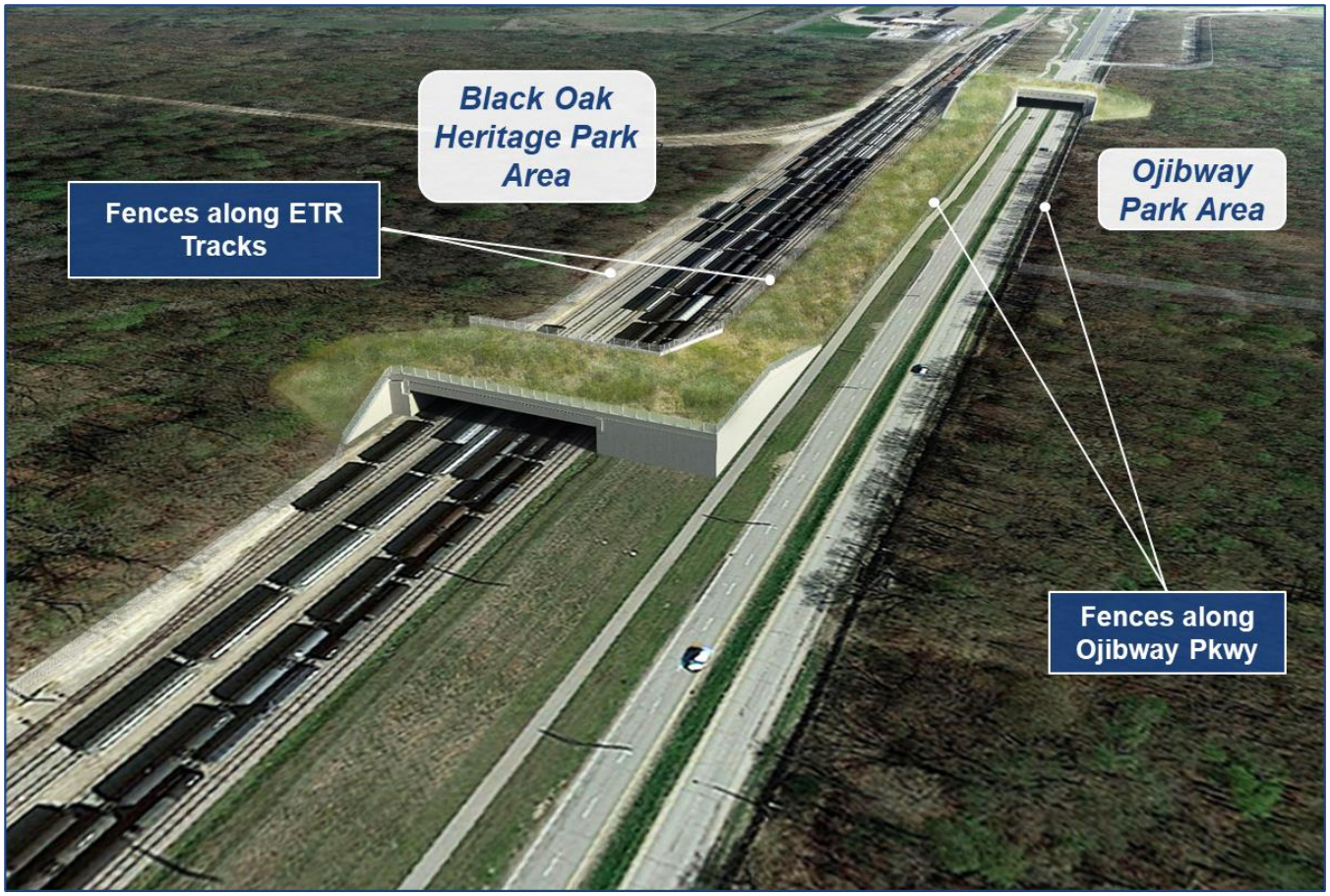
Revised Design Option 4 - Split Crossing, Single span over Ojibway Parkway (North), Single Span over ETR tracks (South)

Key features of this design option are noted below:

- Two separate crossings - single span over Ojibway Parkway and single span over ETR tracks.
- 40 m wide wildlife crossing connecting Ojibway Park on the east and the natural areas associated with Black Oak Heritage Park on the west.
- 5.5 m vertical clearance over Ojibway Parkway and 7.49 m vertical clearance over ETR tracks.
- Fences along Ojibway Parkway and ETR tracks to keep the wildlife outside of roadway and railway tracks.

Conceptual rendering for this design option is shown in the following figure.

Figure 8-16: Revised Design Option 4 – Conceptual Rendering



8.5.2 Updated Design Criteria

The design criteria provided in Table 7-1 was carried forward for the structural design over Ojibway Parkway. As the revised design options also included a Wildlife Crossing structure over the ETR tracks, the Study Team consulted with ETR to identify vertical clearance requirements for a structure over ETR tracks. ETR shared that the existing B1-B overpass structure for the Gordie Howe Bridge Customs Complex has a vertical clearance of 7.49 m. As such, the Wildlife Overpass would have to be at a minimum this height for railway operational purposes. Accordingly, the Study Team used a minimum vertical clearance of 7.49 m for the crossing over ETR tracks.

8.5.3 Evaluation of Revised Design Options

The evaluation criteria for design options were updated considering the design of the revised design options. The updated evaluation criteria are provided in Table 8-3. Detailed evaluation of revised design options is provided in Table 8-4.

Table 8-3: Evaluation Criteria for Revised Design Options

Component	Evaluation Criteria
Natural Environment	– Wildlife movement deterrent – crossing of ETR tracks – Wildlife movement deterrent – approach grades – Wildlife movement deterrent – sightlines – Wildlife movement deterrent – width of crossing – Wildlife movement deterrent – length and shape of crossing – Direct impacts on terrestrial species and habitats
Social Environment	– Potential impact to community facilities – Safety considerations
Cultural Environment	– Potential impacts on archaeological resources – Potential impacts on built heritage resources and cultural heritage landscapes
Technical Considerations	– Potential drainage and stormwater concerns – Complexity of construction – Potential impacts to Ojibway Parkway traffic from construction – Roadside safety – Complexity of geotechnical design considerations
Financial Considerations	– Construction cost – Maintenance and rehabilitation costs

Table 8-4: Evaluation of Revised Design Options

Evaluation Criteria	Previous Preliminary Preferred Design Concept (presented at PIC#2) North Crossing, 4 Span Bridge Only Crossing Ojibway Pkwy	Score	Revised Design Option 1 - South Crossing, Single Span over ETR tracks, Four Span over Ojibway Pkwy, Soil Fill between ETR tracks and Ojibway Pkwy	Score	Revised Design Option 2 - South Crossing, Single Span over ETR tracks, Single Span over Ojibway Pkwy, Soil Fill between ETR tracks and Ojibway Pkwy	Score	Revised Design Option 3 - South Crossing, Three Span Bridge (bridge span over boulevard between ETR tracks and Ojibway Pkwy)	Score	Revised Design Option 4 - Split Crossing, Single span over Ojibway Pkwy (North), Single Span over ETR tracks (South)	Score
Natural Environment										
Wildlife movement deterrent – crossing of ETR tracks	This alternative only provides a crossing of Ojibway Parkway. Wildlife would still have to navigate the ETR tracks before being able to cross.	○	This option crosses both Ojibway Parkway and the ETR tracks, enabling a full connection between the natural areas associated with Black Oak Heritage Park and Ojibway Park.	●	This option crosses both Ojibway Parkway and the ETR tracks, enabling a full connection between the natural areas associated with Black Oak Heritage Park and Ojibway Park.	●	This option crosses both Ojibway Parkway and the ETR tracks, enabling a full connection between the natural areas associated with Black Oak Heritage Park and Ojibway Park.	●	This option crosses both Ojibway Parkway and the ETR tracks, enabling a full connection between the natural areas associated with Black Oak Heritage Park and Ojibway Park.	●
Wildlife movement deterrent – approach grades	The grade for the approach slope on the west end of the crossing would be 21% (slightly steeper than (5H:1V), which is slightly above the design criteria of 20%. This minor increase is anticipated to still be suitable for wildlife.	●	The grades for the approach slopes on both the east and west ends of the crossing would be 20% (5H:1V), which meet the design criteria and would be suitable for wildlife.	●	The grades for the approach slopes on both the east and west ends of the crossing would be 20% (5H:1V), which meet the design criteria and would be suitable for wildlife.	●	The grades for the approach slopes on both the east and west ends of the crossing would be 20% (5H:1V), which meet the design criteria and would be suitable for wildlife.	●	The grades for the approach slopes on both the east and west ends of the crossing, as well as the slopes within the boulevard between Ojibway Parkway and the ETR tracks would be 20% (5H:1V), which meet the design criteria and would be suitable for wildlife.	●
Wildlife movement deterrent – sightlines	The bridge crossing over Ojibway Parkway has a nearly level deck with a minor crest at the center pier which is not anticipated to impede the line of sight for medium sized mammals or white-tailed deer.	●	The single span over the ETR tracks has a slope of 0.5% and the four span crossing over Ojibway Parkway has a slope which varies from 0.5% to 2%. The soil fill joining the two crossings has a slope of 13% which represents about a 3.7 m elevation increase. This elevation increase is expected to impede the line of sight for medium sized mammals as well as white-tailed deer such that they would only be able to see the length of one span of the crossing at a time.	◑	The single span over the ETR tracks has a slope of 0.5% and the single span crossing over Ojibway Parkway has a slope of 2%. The soil fill joining the two crossings has a slope of 5.5% which represents about a 1.6 m elevation increase. This elevation increase is expected to impede the line of sight for medium sized mammals as well as white-tailed deer such that they would only be able to see the length of one span of the crossing at a time.	◑	The single span over the ETR tracks, single span over the boulevard, and single span over Ojibway Parkway have a constant slope of 3%. The slopes across the bridge would not create an impediment to the line of sight for medium sized mammals or white-tailed deer.	●	The single span over the ETR tracks has a slope of 0.5% and the single span crossing over Ojibway Parkway has a slope of 2%. Wildlife using the crossing would have to turn 90° upon reaching the boulevard side of the crossing before descending into the boulevard. This 90° turn would cause the line of sight for both medium sized mammals and white-tailed deer to be impeded at both crossings.	◑
Wildlife movement deterrent – width of crossing	The width of the crossing would be 50 m which meets the design criteria and would be suitable for wildlife crossing.	●	The width of the crossing would be 50 m which meets the design criteria and would be suitable for wildlife crossing.	●	The width of the crossing would be 50 m which meets the design criteria and would be suitable for wildlife crossing.	●	The width of the crossing would be 50 m which meets the design criteria and would be suitable for wildlife crossing.	●	The width of the crossing would be 40 m, as this is the width within the existing boulevard between Ojibway Parkway and the ETR tracks. The 40 m crossing is within the range for the minimal crossing width.	●
Wildlife movement deterrent – length and shape of crossing	The length of the crossing excluding approach slopes is about 40 m; however, it does not span the ETR tracks. The crossing is direct, but wildlife would only be able to cross Ojibway Parkway using the crossing. Neither the length of the crossing, nor the shape / layout of the crossing are expected impact wildlife's ability to navigate it.	●	The length of the crossing, excluding approach slopes, is about 135 m. The crossing is direct, and wildlife would be able to cross over both Ojibway Parkway and the ETR tracks once they have climbed the approach slope. Neither the length of the crossing, nor the shape / layout of the crossing are expected impact wildlife's ability to navigate it.	●	The length of the crossing, excluding approach slopes, is about 130 m. The crossing is direct, and wildlife would be able to cross over both Ojibway Parkway and the ETR tracks once they have climbed the approach slope. Neither the length of the crossing, nor the shape / layout of the crossing are expected impact wildlife's ability to navigate it.	●	The length of the crossing, excluding approach slopes, is about 130 m. The crossing is direct, and wildlife would be able to cross over both Ojibway Parkway and the ETR tracks once they have climbed the approach slope. Neither the length of the crossing, nor the shape / layout of the crossing are expected impact wildlife's ability to navigate it.	●	The length of the crossing, excluding approach slopes, is about 581 m. The crossing involves two 90°, right angle, turns to direct wildlife through the boulevard between the crossing of Ojibway Parkway and the ETR tracks. The length of the crossing as well as the shape of the crossing which would require wildlife to navigate it make it the least desirable of the options. The portion of the crossing along	◑

Evaluation Criteria	Previous Preliminary Preferred Design Concept (presented at PIC#2) North Crossing, 4 Span Bridge Only Crossing Ojibway Pkwy	Score	Revised Design Option 1 - South Crossing, Single Span over ETR tracks, Four Span over Ojibway Pkwy, Soil Fill between ETR tracks and Ojibway Pkwy	Score	Revised Design Option 2 - South Crossing, Single Span over ETR tracks, Single Span over Ojibway Pkwy, Soil Fill between ETR tracks and Ojibway Pkwy	Score	Revised Design Option 3 - South Crossing, Three Span Bridge (bridge span over boulevard between ETR tracks and Ojibway Pkwy)	Score	Revised Design Option 4 - Split Crossing, Single span over Ojibway Pkwy (North), Single Span over ETR tracks (South)	Score
									the existing boulevard may be used by certain species for longer periods of time, which would increase the risk of wildlife finding gaps in the exclusion fencing and entering either Ojibway Parkway or the ETR tracks.	
Direct impacts on terrestrial species and habitats	No impacts to SAR or their habitat are anticipated. No impacts to the Black Oak Wetland Complex. Direct footprint impact to approximately 4,900 sq m of terrestrial habitat. Where possible natural vegetation would be transplanted / moved onto the overpass and its approaches.	●	Direct impacts to Willowleaf Aster (SAR) are anticipated but may be mitigated through species transplanting. Impacts to the habitat of at least one other SAR is anticipated but can be mitigated through exclusion measures during construction and post-construction restoration activities. Impacts to the Black Oak Wetland Complex are minimized. Direct footprint impact to approximately 11,500 sq m of terrestrial habitat. This includes 7,500 sq m at the approach to the ETR crossing, 2,600 sq m at the approach to the Ojibway Parkway crossing and 1,400 sq m within the boulevard. Where possible natural vegetation would be transplanted / moved onto the overpass and its approaches.	◑	Direct impacts to Willowleaf Aster (SAR) are anticipated but may be mitigated through species transplanting. Impacts to the habitat of at least one other SAR is anticipated but can be mitigated through exclusion measures during construction and post-construction restoration activities. Impacts to the Black Oak Wetland Complex are minimized. Direct footprint impact to approximately 14,300 sq m of terrestrial habitat. This includes 7,500 sq m at the approach to the ETR crossing, 5,400 sq m at the approach to the Ojibway Parkway crossing and 1,400 sq m within the boulevard. Where possible natural vegetation would be transplanted / moved onto the overpass and its approaches.	◑	Direct impacts to Willowleaf Aster (SAR) are anticipated but may be mitigated through species transplanting. Impacts to the habitat of at least one other SAR is anticipated but can be mitigated through exclusion measures during construction and post-construction restoration activities. Impacts to the Black Oak Wetland Complex are minimized. Direct footprint impact to approximately 14,500 sq m of terrestrial habitat. This includes 9,100 sq m at the approach to the ETR crossing, 5,400 sq m at the approach to the Ojibway Parkway crossing and none within the boulevard. Where possible natural vegetation would be transplanted / moved onto the overpass and its approaches.	◑	No impacts to SAR or their habitat are anticipated. Impacts to the Black Oak Wetland Complex are minimized. Direct footprint impact to approximately 19,100 sq m of terrestrial habitat. This includes 6,900 sq m at the approach to the ETR crossing, 5,000 sq m at the approach to the Ojibway Parkway crossing and 7,200 sq m within the boulevard. Where possible natural vegetation would be transplanted / moved onto the overpass and its approaches.	●
Social Environment										
Potential impact to community facilities	This alternative would require slight permanent displacement of the existing multi-use trail closer to the road for a length of approximately 50 m, however the trail would still be maintained. The boulevard between Ojibway Parkway and the ETR tracks would no longer be useable as public space because it would be filled at the crossing location (approximately 50m wide) to create the western approach to the crossing. The boulevard between Ojibway Parkway and the ETR tracks would not be useable for potential future road widening (if required).	◑	This alternative would require slight permanent displacement of the existing multi-use trail closer to the road for a length of approximately 50 m, however the trail would still be maintained. The boulevard between Ojibway Parkway and the ETR tracks would no longer be useable as public space because it would be filled at the crossing location (approximately 50m wide) with soil fill behind the reinforced soil slope retaining wall. The boulevard between Ojibway Parkway and the ETR tracks would not be useable for potential future road widening (if required).	◑	This alternative would require slight permanent displacement of the existing multi-use trail closer to the road for a length of approximately 50 m, however the trail would still be maintained. The boulevard between Ojibway Parkway and the ETR tracks would no longer be useable as public space because it would be filled at the crossing location (approximately 50m wide) with soil fill behind the reinforced soil slope retaining wall. The boulevard between Ojibway Parkway and the ETR tracks would not be useable for potential future road widening (if required).	◑	There would be no changes to the existing multiuse trail. The area within the boulevard between Ojibway Parkway and the ETR tracks would remain accessible as the overpass would bridge over it. The open area within the boulevard under the crossing would accommodate future road expansion (if required).	●	This alternative would require permanent displacement of the existing multi-use trail closer to the road for a length of approximately 490 m, however the trail would still be maintained. The boulevard between Ojibway Parkway and the ETR tracks would no longer be useable as public space for a length of approximately 490 m because it would contain retaining walls and approach ramps for the crossing and would be fenced with wildlife exclusion fencing. The boulevard between Ojibway Parkway and the ETR tracks would not be useable for potential future road widening (if required).	○

Evaluation Criteria	Previous Preliminary Preferred Design Concept (presented at PIC#2) North Crossing, 4 Span Bridge Only Crossing Ojibway Pkwy	Score	Revised Design Option 1 - South Crossing, Single Span over ETR tracks, Four Span over Ojibway Pkwy, Soil Fill between ETR tracks and Ojibway Pkwy	Score	Revised Design Option 2 - South Crossing, Single Span over ETR tracks, Single Span over Ojibway Pkwy, Soil Fill between ETR tracks and Ojibway Pkwy	Score	Revised Design Option 3 - South Crossing, Three Span Bridge (bridge span over boulevard between ETR tracks and Ojibway Pkwy)	Score	Revised Design Option 4 - Split Crossing, Single span over Ojibway Pkwy (North), Single Span over ETR tracks (South)	Score
Safety considerations	The boulevard between Ojibway Parkway and the ETR tracks would have the western approach to the crossing constructed within it. This would reduce visibility depending on the direction of travel along Ojibway Parkway. This would reduce the effectiveness of natural surveillance and thus increase susceptibility to the occurrence of unlawful behaviour without easy detection. The multi-use trail would be shifted closer to Ojibway Parkway for a length of approximately 50 m. The outside row of western piers and the option to install a barrier between the trail and road can minimize the potential for interactions between trail users and vehicles on Ojibway Parkway.	◑	The boulevard between Ojibway Parkway and the ETR tracks would have retaining walls constructed that would reduce visibility depending on the direction of travel along Ojibway Parkway. This would reduce the effectiveness of natural surveillance and thus increase susceptibility to the occurrence of unlawful behaviour without easy detection. The multi-use trail would be shifted closer to Ojibway Parkway for a length of approximately 50 m but would still be separated from it by the piers used to support the bridge. This would minimize the potential for interactions between trail users and vehicles on Ojibway Parkway.	◑	The boulevard between Ojibway Parkway and the ETR tracks would have retaining walls constructed that would reduce visibility depending on the direction of travel along Ojibway Parkway. This would reduce the effectiveness of natural surveillance and thus increase susceptibility to the occurrence of unlawful behaviour without easy detection. The multi-use trail would be shifted closer to Ojibway Parkway for a length of approximately 50 m. A barrier may be installed between the trail and road to minimize the potential for interactions between trail users and vehicles on Ojibway Parkway.	◑	The boulevard beneath the bridge would remain open which would optimize ongoing visibility throughout the area to guard against the prospect of suspicious behaviour/use. The open nature would make ongoing access for monitoring and maintenance activities easier. This would assist the City staff in more easily identifying any unlawful activity that may be occurring – allowing for potential problems to be identified and mitigated more efficiently. The multi-use trail would maintain its current separation distance from Ojibway Parkway, minimizing the potential for interactions between trail users and vehicles on Ojibway Parkway.	●	The boulevard between Ojibway Parkway and the ETR tracks would have retaining walls constructed that would reduce visibility depending on the direction of travel along Ojibway Parkway. This would reduce the effectiveness of natural surveillance and thus increase susceptibility to the occurrence of unlawful behaviour without easy detection. The multi-use trail would be shifted closer to Ojibway Parkway for a length of approximately 490 m. A barrier may be installed between the trail and road to minimize the potential for interactions between trail users and vehicles on Ojibway Parkway; however, the length of the trail realignment does represent an increased risk of interaction between trail users and vehicles compared to the other alternatives.	○
Cultural Environment										
Potential impacts on archaeological resources	Lands on both sides of Ojibway Parkway were assessed as part of Stage 1 Archaeological Assessments and lands on both sides of the Parkway were identified as having archaeological potential. A Stage 2 archaeological assessment would be required during detailed design phase to determine impacts on archaeological resources and potential mitigation measures.	◑	Lands on both sides of Ojibway Parkway were assessed as part of Stage 1 Archaeological Assessments and lands on both sides of the Parkway were identified as having archaeological potential. A Stage 2 archaeological assessment would be required during detailed design phase to determine impacts on archaeological resources and potential mitigation measures.	◑	Lands on both sides of Ojibway Parkway were assessed as part of Stage 1 Archaeological Assessments and lands on both sides of the Parkway were identified as having archaeological potential. A Stage 2 archaeological assessment would be required during detailed design phase to determine impacts on archaeological resources and potential mitigation measures.	◑	Lands on both sides of Ojibway Parkway were assessed as part of Stage 1 Archaeological Assessments and lands on both sides of the Parkway were identified as having archaeological potential. A Stage 2 archaeological assessment would be required during detailed design phase to determine impacts on archaeological resources and potential mitigation measures.	◑	Lands on both sides of Ojibway Parkway were assessed as part of Stage 1 Archaeological Assessments and lands on both sides of the Parkway were identified as having archaeological potential. A Stage 2 archaeological assessment would be required during detailed design phase to determine impacts on archaeological resources and potential mitigation measures.	◑
Potential impacts on built heritage resources and cultural heritage landscapes	Ojibway Park and Black Oak Heritage Park underwent a cultural heritage screening as part of the City of Windsor's Urban Parks Plan. This screening determined that both of the parks contain, or are part of, a cultural heritage landscape. It is recommended that a Cultural Heritage Evaluation Report (CHER) be completed during the detailed design phase to evaluate the property for Cultural Heritage Value or Interest.	◑	Ojibway Park and Black Oak Heritage Park underwent a cultural heritage screening as part of the City of Windsor's Urban Parks Plan. This screening determined that both of the parks contain, or are part of, a cultural heritage landscape. It is recommended that a Cultural Heritage Evaluation Report (CHER) be completed during the detailed design phase to evaluate the property for Cultural Heritage Value or Interest.	◑	Ojibway Park and Black Oak Heritage Park underwent a cultural heritage screening as part of the City of Windsor's Urban Parks Plan. This screening determined that both of the parks contain, or are part of, a cultural heritage landscape. It is recommended that a Cultural Heritage Evaluation Report (CHER) be completed during the detailed design phase to evaluate the property for Cultural Heritage Value or Interest.	◑	Ojibway Park and Black Oak Heritage Park underwent a cultural heritage screening as part of the City of Windsor's Urban Parks Plan. This screening determined that both of the parks contain, or are part of, a cultural heritage landscape. It is recommended that a Cultural Heritage Evaluation Report (CHER) be completed during the detailed design phase to evaluate the property for Cultural Heritage Value or Interest.	◑	Ojibway Park and Black Oak Heritage Park underwent a cultural heritage screening as part of the City of Windsor's Urban Parks Plan. This screening determined that both of the parks contain, or are part of, a cultural heritage landscape. It is recommended that a Cultural Heritage Evaluation Report (CHER) be completed during the detailed design phase to evaluate the property for Cultural Heritage Value or Interest.	◑

Evaluation Criteria	Previous Preliminary Preferred Design Concept (presented at PIC#2) North Crossing, 4 Span Bridge Only Crossing Ojibway Pkwy	Score	Revised Design Option 1 - South Crossing, Single Span over ETR tracks, Four Span over Ojibway Pkwy, Soil Fill between ETR tracks and Ojibway Pkwy	Score	Revised Design Option 2 - South Crossing, Single Span over ETR tracks, Single Span over Ojibway Pkwy, Soil Fill between ETR tracks and Ojibway Pkwy	Score	Revised Design Option 3 - South Crossing, Three Span Bridge (bridge span over boulevard between ETR tracks and Ojibway Pkwy)	Score	Revised Design Option 4 - Split Crossing, Single span over Ojibway Pkwy (North), Single Span over ETR tracks (South)	Score
Technical Considerations										
Potential drainage and stormwater concerns	This alternative would maintain a minimum 0.5% longitudinal slope along the length of the bridge and would have a 0.5% cross-grade of the proposed surface across the bridge deck. Drainage of the bridge deck is not a concern.	●	This alternative would maintain a minimum 0.5% longitudinal slope along the length of the bridge and would have a 0.5% cross-grade of the proposed surface across the bridge deck. Drainage of the bridge deck is not a concern. The retained soil system walls would require drainage to be incorporated into their design, but this is considered to be a straightforward design task.	●	This alternative would maintain a minimum 0.5% longitudinal slope along the length of the bridge and would have a 0.5% cross-grade of the proposed surface across the bridge deck. Drainage of the bridge deck is not a concern. The retained soil system walls would require drainage to be incorporated into their design, but this is considered to be a straightforward design task.	●	This alternative would maintain a minimum 3% longitudinal slope along the length of the bridge and would have a 0.5% cross-grade of the proposed surface across the bridge deck. Drainage of the bridge deck is not a concern.	●	This alternative would maintain a minimum 0.5% longitudinal slope along the length of the bridge and would have a 0.5% cross-grade of the proposed surface across the bridge deck. Drainage of the bridge deck is not a concern. The retained soil system walls would require drainage to be incorporated into their design, but this is considered to be a straightforward design task. The soil fill areas within the boulevard between Ojibway Parkway and the ETR tracks slopes down into the boulevard increasing runoff in these areas and requiring the design of additional drainage. This is a straightforward design task but does represent one additional consideration beyond those required for the other alternatives.	●
Complexity of construction	Construction sequence includes construction of substructure, placement of bearings and girders, constructing deck and parapet walls, backfilling and grading approach ramps. Girder placement would require heavy-duty cranes and precise bearing placement for both spans. Substructure construction includes abutments and middle pier. Girders would be installed separately for each span, once they are in place, deck topping slab and parapet wall can be constructed in a continuous manner.	●	Construction includes construction of substructure, placement of bearings and girders, constructing deck and parapet walls, backfilling and grading approach ramps, constructing median RSS walls. Settlement monitoring of ETR tracks would be required throughout construction. This option includes driving inclined H-piles for the Ojibway piers. As there are four short spans over Ojibway, there would be many girders to lift in place, but the shorter length allows a smaller crane to be used. The main girder placement over the ETR tracks requires heavy duty cranes.	◑	Construction includes construction of substructure, placement of bearings and girders, constructing deck and parapet walls, backfilling and grading approach ramps, constructing median RSS walls. Settlement monitoring of ETR tracks would be required throughout construction. Main girder placement for both the ETR and Ojibway Parkway crossings would require heavy duty cranes.	●	Construction includes construction of substructure, placement of bearings and girders, constructing deck and parapet walls, backfilling and grading approach ramps. This option includes a girder lift over the median. This option includes driving inclined H-piles for piers. Settlement monitoring of ETR tracks would be required throughout construction. Main girder placement for all three spans would require heavy duty cranes.	●	Construction includes construction of substructure, placement of bearings and girders, constructing deck and parapet walls, backfilling and grading approach ramps, constructing median RSS walls. Settlement monitoring of ETR tracks would be required throughout construction at both north and south crossing locations. This option includes a very large construction area, and additional grading for ramps down in median as well as approaches. Main girder placement for both the ETR and Ojibway Parkway crossings would require heavy duty cranes.	◑
Potential impacts to Ojibway Parkway traffic from construction	Construction of the bridge structure to be completed in a staged approach. Temporary traffic impacts are anticipated including long term lane closures (resulting in one travel lane in each direction) for construction of center and outside piers. Lane closures are expected	○	Construction of the bridge structure to be completed in a staged approach. Temporary traffic impacts are anticipated including long term lane closures (resulting in one travel lane in each direction) for construction of center and outside piers. Lane closures are expected	○	Construction of the bridge structure to be completed in a staged approach. Temporary traffic impacts are anticipated with potential long term shoulder closures and lane shifts for construction of RSS abutments and retaining walls. Shoulder closures and lane shifts	○	Construction of the bridge structure to be completed in a staged approach. Temporary traffic impacts are anticipated with potential long term shoulder closures and lane shifts for construction of RSS abutments and retaining walls. Shoulder closures and lane shifts	○	Construction of the bridge structure to be completed in a staged approach. Temporary traffic impacts are anticipated with potential long term shoulder closures and lane shifts for construction of RSS abutments and retaining walls. Shoulder closures and lane shifts	○

Evaluation Criteria	Previous Preliminary Preferred Design Concept (presented at PIC#2) North Crossing, 4 Span Bridge Only Crossing Ojibway Pkwy	Score	Revised Design Option 1 - South Crossing, Single Span over ETR tracks, Four Span over Ojibway Pkwy, Soil Fill between ETR tracks and Ojibway Pkwy	Score	Revised Design Option 2 - South Crossing, Single Span over ETR tracks, Single Span over Ojibway Pkwy, Soil Fill between ETR tracks and Ojibway Pkwy	Score	Revised Design Option 3 - South Crossing, Three Span Bridge (bridge span over boulevard between ETR tracks and Ojibway Pkwy)	Score	Revised Design Option 4 - Split Crossing, Single span over Ojibway Pkwy (North), Single Span over ETR tracks (South)	Score
	to be approximately 12 months in duration. Placement of main span girders is expected to take two weeks (one week for each direction of travel) but could be accomplished with closure of lanes in one direction with temporary traffic diversion using a median crossover.		to be approximately 12 months in duration. Placement of main span girders is expected to take two weeks (one week for each direction of travel) but could be accomplished with closure of lanes in one direction with temporary traffic diversion using a median crossover.		are expected to be approximately 18 months in duration. Full roadway closure (northbound and southbound) is required for girder placement for the main single span. Full closure is expected to be one week in duration.		are expected to be approximately 18 months in duration. Full roadway closure (northbound and southbound) is required for girder placement for the main single span. Full closure is expected to be one week in duration.		are expected to be approximately 24 months in duration. Construction impacts would be spread out between the north and south crossing portions, with a larger construction footprint. Full roadway closure (northbound and southbound) is required for girder placement for the main single span. Full closure is expected to be one week in duration.	
Roadside safety	Outside piers placed adjacent to travel lanes would require protection. Minor sight line impacts for turning movements from Broadway Boulevard due to median piers. Protection of median pier would be required.	◑	Outside piers placed adjacent to travel lanes would require protection. No sight line impacts for turning movements from Broadway Boulevard are expected. Protection of median pier would be required.	◑	Abutments and retaining walls would be set well back from traffic lanes. No sight line impacts for turning movements from Broadway Boulevard are expected. No median pier required for protection.	●	Abutment and retaining walls, and pier would be set well back from traffic lanes. No sight line impacts for turning movements from Broadway Boulevard are expected. No median pier required for protection.	●	Abutment and retaining walls, and pier would be set well back from traffic lanes. Minor sight line impacts for turning movements from Broadway Boulevard are expected due to retaining wall north of the east abutment. No median pier required for protection.	◑
Complexity of geotechnical design considerations	While design and construction of the substructure (deep foundations, temporary shoring and dewatering) is considered generally to be straightforward, some moderately complex settlement mitigation may be required for the embankments, particularly in the median and on the west approach to protect the railway and limit any potential impacts to buried infrastructure along Ojibway Parkway.	◑	While design and construction of the substructure (deep foundations, temporary shoring and dewatering) is considered generally to be straightforward, some moderately complex settlement mitigation may be required for the embankments, particularly in the median and on the west approach to protect the railway and limit any potential impacts to buried infrastructure along Ojibway Parkway.	◑	While design and construction of the substructure (deep foundations, temporary shoring and dewatering) is considered generally to be straightforward, some moderately complex settlement mitigation may be required for the embankments, particularly in the median and on the west approach to protect the railway and limit any potential impacts to buried infrastructure along Ojibway Parkway.	◑	While design and construction of the substructure (deep foundations, temporary shoring and dewatering) is considered generally to be straightforward, some moderately complex settlement mitigation may be required for the embankments, particularly on the west approach to protect the railway and limit any potential impacts to buried infrastructure along Ojibway Parkway.	◑	While design and construction of the substructure (deep foundations, temporary shoring and dewatering) is considered generally to be straightforward, some moderately complex settlement mitigation may be required for the embankments, particularly on the median and west approach to protect the railway and limit any potential impacts to buried infrastructure along Ojibway Parkway.	◑
Economic Environment										
Construction cost	Initial construction cost is estimated to be $14M. Construction cost is only for a span crossing Ojibway Parkway, no crossing of the ETR tracks is included.	●	Initial construction cost is estimated to be $33M.	○	Initial construction cost is estimated to be $28M.	◑	Initial construction cost is estimated to be $28M.	◑	Initial construction cost is estimated to be $29M.	◑
Maintenance and rehabilitation costs	Minor rehabilitation would be required at 25-year and 75-year points, consisting of concrete patch repair, crack injection, railing repairs. Major rehabilitation would be required at 50-year point with bearing replacement, concrete repairs, railing replacement.	●	Minor rehabilitation would be required at 25-year and 75-year points, consisting of concrete patch repair, crack injection, railing repairs, RSS wall repairs. Major rehabilitation would be required at 50-year point with concrete repairs and railing replacement.	◑	Minor rehabilitation would be required at 25-year and 75-year points, consisting of concrete patch repair, crack injection, railing repairs, RSS wall repairs Major rehabilitation would be required at 50-year point with concrete repairs railing replacement.	◑	Minor rehabilitation would be required at 25-year and 75-year points, consisting of concrete patch repair, crack injection, railing repairs, RSS wall repairs. Major rehabilitation would be required at 50-year point with bearing replacement, concrete repairs, railing replacement.	●	Minor rehabilitation would be required at 25-year and 75-year points, consisting of concrete patch repair, crack injection, railing repairs, RSS wall repairs. Major rehabilitation would be required at 50-year point with bearing replacement, concrete repairs, railing replacement.	○

Evaluation Criteria	Previous Preliminary Preferred Design Concept (presented at PIC#2) North Crossing, 4 Span Bridge Only Crossing Ojibway Pkwy	Score	Revised Design Option 1 - South Crossing, Single Span over ETR tracks, Four Span over Ojibway Pkwy, Soil Fill between ETR tracks and Ojibway Pkwy	Score	Revised Design Option 2 - South Crossing, Single Span over ETR tracks, Single Span over Ojibway Pkwy, Soil Fill between ETR tracks and Ojibway Pkwy	Score	Revised Design Option 3 - South Crossing, Three Span Bridge (bridge span over boulevard between ETR tracks and Ojibway Pkwy)	Score	Revised Design Option 4 - Split Crossing, Single span over Ojibway Pkwy (North), Single Span over ETR tracks (South)	Score
	Estimated maintenance and rehabilitation cost comparable with most other alternatives for their spans over Ojibway Parkway. Overall maintenance cost would be lower than other alternatives since this alternative only spans Ojibway Parkway resulting in less bridge area requiring maintenance.		Estimated maintenance and rehabilitation cost would be higher than some options due to amount of RSS wall within the boulevard.		Estimated maintenance and rehabilitation cost would be higher than some options due to amount of RSS wall within the boulevard.		Maintenance and rehabilitation cost estimated to be lower with most other alternatives since the median crossing is a clear span rather than RSS wall embankment.		Maintenance and rehabilitation cost estimated to be higher than other alternatives due to extensive RSS wall to link the split crossings.	
Recommendation	Not Preferred		Not Preferred		Not Preferred		**Preferred**		Not Preferred	

8.5.4 Revised Preferred Design

Revised Design Option 3 was identified as preferred due to the following reasons:

- The slopes across the bridge would not create an impediment to the line of sight for medium sized mammals or deer.
- Direct impacts to SAR plants are anticipated however, they may be mitigated through transplanting.
- Impacts to the Black Oak Wetland Complex are minimized.
- The boulevard beneath the bridge would remain open which would optimize ongoing visibility throughout the area to guard against the prospect of suspicious behaviour/use.
- Open configuration would allow for continued public use of the space and would accommodate any future road expansion (if required).

The revised design options, along with their evaluation and the revised preferred design were shared with Indigenous Nations, Government Agencies, ETR, the public and key stakeholders through PIC #3. Details on the preferred design are presented in Section 9, whereas details of consultation program are provided in Section 12 of this report.

9 Preferred Design for Wildlife Crossing

Portions of the Ojibway Prairie Remnants ANSI (i.e., Ojibway Park and Black Oak Heritage Park) are fragmented by the Ojibway Parkway and the ETR tracks. ANSI's have been designated to recognize the need to protect the remnant ecosystems effectively (Government of Ontario, 2002). To begin to re-establish an ecological connection, an overpass crossing (an ecopassage) has been proposed. As the crossing is not directed to any specific species or target species group, the design considers requirements for all species.

As an overpass was determined to be the best solution, a melded approach of a landscape bridge and wildlife overpass was selected. The largest size feasible was selected as the crossing aims to restore the habitat connection between the natural areas associated with Ojibway Park and Black Oak Heritage Park. It is intended to meet the movement needs of a broad spectrum of wildlife from large mammals, small mammals, amphibians and reptiles, invertebrate taxa, and plants. Microhabitat features and vegetation placement would be designed to enhance crossings by bats, insects and birds.

9.1 Description of the Preferred Design

Following the PIC #3 in January 2024, the preferred design was advanced towards a preliminary design completion level. The refined preferred design for the Wildlife Crossing is a three-span bridge comprised of a 51.3 m span over the ETR tracks, a 21.62 m span over the boulevard area, and a 47.22 m span over Ojibway Parkway. The span arrangement is uneven because standard horizontal clearances must be provided from the outside ETR tracks to the substructure, and the centre piers must be positioned to avoid existing utilities currently located in the boulevard area. The existing Ojibway Parkway Trail to the west side of Ojibway Parkway would require realignment to pass under the new structure. This design allows for the entire crossing to be one continuous bridge, including over the boulevard area, rather than the other alternatives which have two separate bridges connected with RSS supported embankments. This allows better sight-lines and access through the structure. Both concrete and steel girders were considered during the preliminary design. Prestressed concrete girders are not considered feasible due to the long spans and significant sustained loading from the soil fill on the bridge. Steel plate girders or box girders are both feasible. The preliminary design has steel plate girders since they would be easier to deliver and install compared to box girders, and the clearance over Ojibway Parkway allows the use of plate girders as per the current MTO Structural Manual. The girders have a constant depth over the west and middle span, but vary on the east span over Ojibway Parkway, to meet the MTO requirement for a 6.0m clearance for plate girders over this type of roadway (Vertical clearance over Ojibway Parkway was initially proposed to be 5.5 m). The span over ETR tracks must have a minimum vertical clearance of 7.49m which is significantly higher than the required clearance over Ojibway Parkway. To accommodate this rise, the entire bridge deck is sloped at a 3% longitudinal gradient sloping down from West to East. There is also a 0.5% crossfall transversely to encourage positive water drainage.

The approach ramps, including the side slopes of the ramps are graded at 5:1 slopes. A 5:1 slope was identified as recommended maximum slope for wildlife for approaches build on level ground. The abutments and piers are expected to be supported on deep foundations. The fully integral abutments will be supported on a single row of steel H-piles, while the piers would be supported on a group of H-piles with a batter to provide the required horizontal resistance. The preferred design also includes continuous concrete barriers along the piers to provide roadside protection. A chain-link fence with wildlife-proof mesh panels mounted on a concrete parapet wall with an architectural finish would run full length along each side of the crossing structure. A concrete retaining wall complete with fencing and a parapet wall would run from the bridge end parallel to the road on the west side of the bridge.

The crossing structure is designed exclusively for wildlife, and human use would be prohibited to minimize disturbance of both wildlife using the crossing and vegetation establishment atop the crossing. Design

elements or other measures to deter human use of the Wildlife Overpass would be evaluated and determined during detailed design phase of this project. These elements may include signage, surveillance equipment and monitoring.

The Preliminary General Arrangement drawings for the Wildlife Overpass Crossing are provided in Appendix G and include a plan, elevation, and sections. These plans are subject to review and refinement during the detailed design phase of this project.

9.2 Vegetation and Soil

The Natural Environment Report (Appendix D) provides the following recommendations for vegetation and soil for the Wildlife Crossing. The vegetation would be a heterogeneous environment, combining open areas with shrubs. The more natural a crossing appears, the more effective it would be (Ontario Road Ecology Group, Toronto Zoo, 2010). Plant species, which are native and local to the area would be used in landscaping, and to maximize continuity, native soils should be used. Soils that are removed for the construction of the crossing should be used on the ingress and egress points so long as the soil does not contain a significant amount of invasive species. Soils from outside the region should be avoided. Soil depth is recommended to be 5-8 ft (1.5-2.0 m), enough to support 10 ft shrubs. Soils must be deep enough for water retention of plants, and drainage should slope slightly (2-3%) from the center longitudinal axis to the sides. Since the bridge deck of the crossing itself can only support less than 3 ft of soil (0.85 m) due to its weight, the woody plantings on the deck should consist of shallow-rooting shrub species. The landscape design should have woody vegetation on the edges of the structure to provide cover and refuge. At the same time, the crossing center should be left open with low-lying native herbaceous vegetation (i.e. local tallgrass prairie species). Woody debris, pools (depressions), and rock piles should be placed in a stepping-stone fashion to provide microhabitats. Micro-habitats would be especially important immediately after construction while vegetation is establishing. Large boulders and brush piles can be used to deter any vehicle or human passage on the crossing.

Details regarding vegetation type and soil quantity for the structure would be confirmed during detailed design in consultation with staff from the City of Windsor and agencies (i.e., ERCA).

9.3 Wildlife Fencing

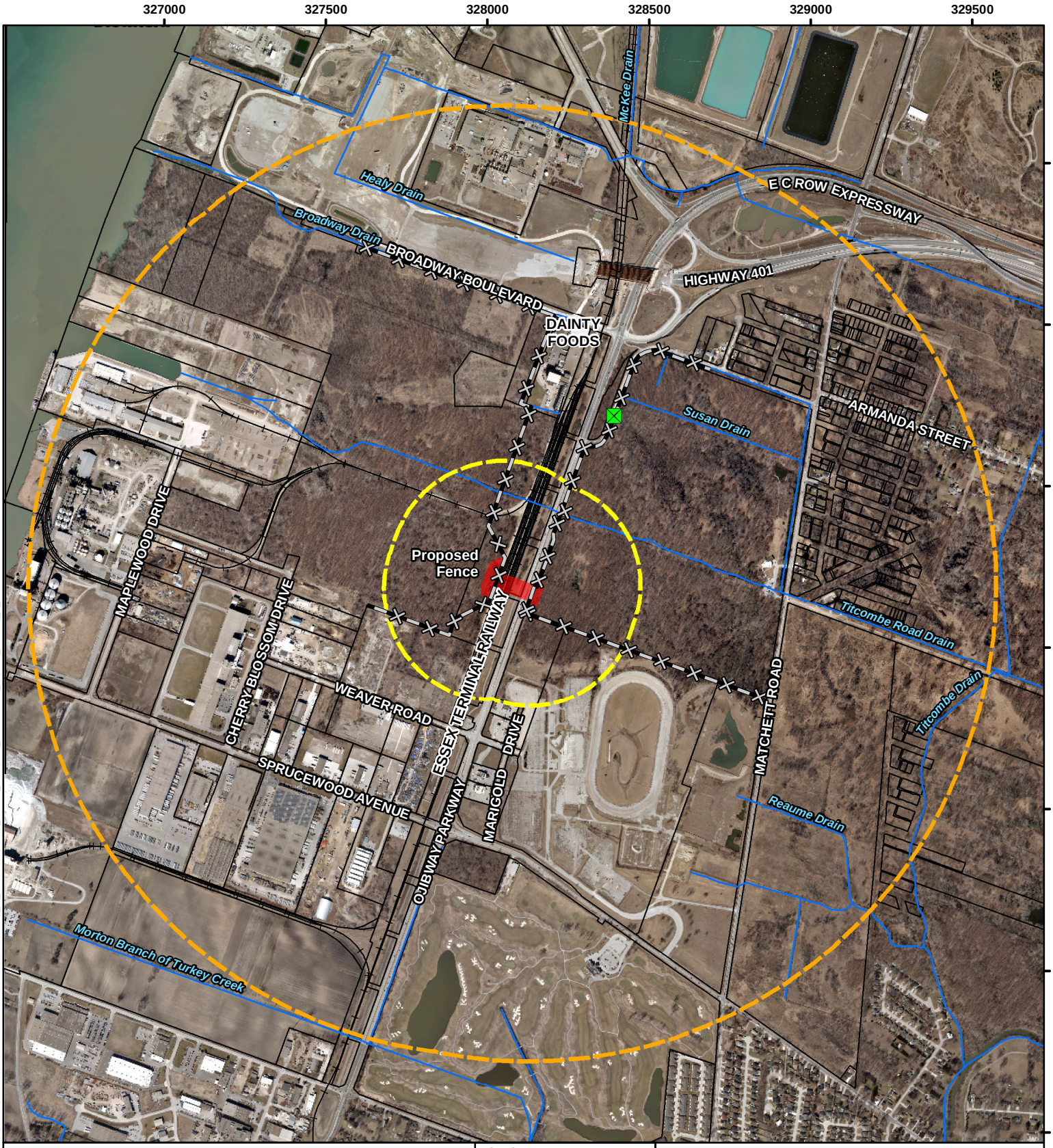
The Natural Environment Report (Appendix D) provides the following recommendations for wildlife fencing for the Wildlife Crossing. Effective wildlife fencing that is impermeable to wildlife is the most effective and preferred method to guide wildlife to the structure and prevent intrusions onto the roadway (Ontario Road Ecology Group, Toronto Zoo, 2010; U.S. Department of Transportation, 2011; Ministry of Transportation, 2016). Fencing is a key part of a mitigation plan and needs to consider what happens for wildlife that becomes trapped on the road. Escape ramps, gates, or doors must be used to allow for one-way movement of wildlife off the road (U.S. Department of Transportation, 2011; Ministry of Transportation, 2016).

On both sides of Ojibway Parkway and Black Oak Heritage Park Area, a 8.0 ft (2.4 m) high fencing must be installed that runs the length of natural areas (Figure 9-1 and Figure 9-2). Permanent galvanized (Class III) chainlink fencing installed on steel posts spaced 14-18 ft (4.2-5.4 m) is recommended to be used as the primary fencing. The fencing material should be attached to the non-roadway side of the posts. Solid material fencing designed for small animals should be affixed to the base of the primary (chainling) fencing. The solid material should extend at least 2 ft (0.6 m) above the ground with a 20 cm buried bottom as well as a top lip. The fencing (both chain-link and solid) must physically connect to the crossings to ensure no gaps or holes exist. The solid fencing material must be permanent (i.e., not geotextile fencing) and is typically a product such as galvanized mesh, concrete, sheet metal, vinyl walls. Brands such as Animex and ACO are popular, however, more products are emerging, such as E-Fence™ by ERTEC. E-Fence™ also includes one-way escapes as built-in features and is highly customizable.

While E-Fence™ is not solid, it prevents animal movement and does not have mesh which could risk animals becoming stuck. An example of a wildlife fence is shown in Figure 9-1 for illustrative purposes.

Irrelevant of fencing type, areas for escape should be included to allow small animals to escape the roadway. One-way escape gates (such as those in E-Fence™) for smaller animals would be beneficial along Broadway Boulevard (Figure 9-2). Guidance documents suggest that escape ramps for deer be placed at 500 m intervals (Ministry of Transportation, 2016). No escape ramps for deer are proposed as 500 m from the proposed crossing would occur outside the City owned lands, within PSWs, or in locations where area is inadequate. Escape ramps require large areas to implement as they should be set back in fencing and have a landing spot consisting of loose soil or other soft material. Large animal escape ramps were considered at Susan Drain and near the south property line but due to the limited length of the fencing and the impact of escape ramps they were considered unnecessary at these locations.

Figure 9-1: Fence along the Herb Gray Parkway (Example)



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LEGEND

- Project Footprint
- Property Boundaries
- Chainlink Fence
- One-way Escape Gate (Approximate Location)
- Spacing for Small Animals and Herptiles Crossings (300 m)
- Spacing for White-tailed Deer Crossings (1.4 km)
- Watercourse / Drain
- Railway

0 100 200 400 600 800 1,000 Metres

NOTES:
- Aerial imagery extracted from Essex County interactive map, 2019.

Datum: NAD83
Projection: UTM Zone 17N

THE CITY OF WINDSOR ONTARIO, CANADA

WSP

OJIBWAY PARKWAY WILDLIFE CROSSING

Minimum Wildlife Fencing Requirements and Additional Crossings

PROJECT N°: IM20104013 | **FIGURE: 9-2**

SCALE: 1:16,000 | DATE: June 2024

9.4 Constructability and Staging

The construction sequence for the proposed Wildlife Crossing would consist of but not limited to the following activities:

- Protection of existing utilities, and relocation of impacted utilities, where required
- Installation of environmental protection measures, such as, erosion and sediment control measures
- Relocation of SAR plants
- Clearing and grubbing of trees and vegetation within construction limits
- Construction of substructure including abutments, and piers
- Installation of bearings and girders
- Construction of deck slab, parapet walls, and bridge deck fencing
- Backfilling and construction of approach ramps including retaining walls
- Soil backfill of bridge deck and placement of vegetation
- Reconstruction of multi-use trail to the west side
- Installation of wildlife fence

Construction of the Wildlife Overpass would be completed in a staged approach. Temporary traffic impacts are anticipated including long term shoulder closures and lane shifts to accommodate the construction of the RSS abutments. Shoulder closure and lane shifts are estimated to be 18 months in duration. The placement of the girders over Ojibway Parkway would require a full roadway closure for a duration of at least one week.

Significant coordination with ETR would be required for the construction of the west bridge span. It is expected that ETR would require a flag person to be on site at all times, and that construction crews may need to “stand-down” when a train is passing on tracks within the work area including a buffer area. No train traffic can occur during the placement of girders. ETR may require girder placement to be done during several night shifts, to limit the impacts on their rail operations. Furthermore, regular and detailed monitoring of the rail tracks would likely be required during construction, especially during excavation and piling operations. Further consultation and coordination would be required with ETR during detailed design and construction phases.

Girder placement would require heavy-duty cranes and precise bearing placement. Girders would be continuous and require bolted field splices at locations determined during detailed design. Once the girders are installed, the concrete deck, parapet walls, and backfilling works can be completed without impact to traffic below.

There are several utilities around the two bridge piers and within the middle span. It is expected that utilities near the pier excavation areas would require daylighting, and utility owners may enforce clearance buffers to their infrastructure. The Enbridge infrastructure and Town of Lasalle forcemain near the east pier is of particular note. Exact locations should be confirmed during the detailed design process, to avoid any conflicts during construction. Further consultation and coordination will be required with the utilities owners during detailed design and construction phases.

A rigorous dewatering system would be required during construction to manage the shallow groundwater conditions and to limit artesian flow during driving of H-Piles. Settlement mitigation measures would be required for the construction of the approach embankments, especially for the taller west embankment.

9.5 Sightline Analysis

Potential road user (e.g., vehicles, cyclists and pedestrians) conflicts exist at every road intersection. However, the possibility of these conflicts can be greatly reduced through proper channelization and

appropriate traffic controls. The intersection design must provide sufficient sight distance for road users to perceive potential conflicts and to carry out the actions needed to negotiate the intersection safely. Sight distance requirements must be considered both for approaching the intersection and departing from the stopped position at the intersection.

The minimum sight distance criterion for vehicles approaching an intersection, or travelling along a turning roadway, is stopping sight distance based on design speed. Given that the proposed Ojibway Parkway Wildlife Crossing would be located south of Broadway Boulevard, a review of sight distances was completed.

The sight distances for the proposed Wildlife Overpass over Ojibway Parkway were reviewed based on the guidelines provided in the Transportation Association of Canada's (TAC) Geometric Design Guide for Canadian Roads, Chapter 9, Intersections (2017) (Transportation Association of Canada, 2017). The site distance analysis was conducted using a design speed of 90 km/h for Ojibway Parkway (the posted speed for Ojibway Parkway is 70 km/h).

The sightline distances are shown in Figure 9-3. The sight line distances exceed the minimum requirements of the standards.

POSTED SPEED ALONG OJIBWAY PARKWAY = 70KM/H
DESIGN SPEED USED = 90 KM/H

WEAVER ROAD

OJIBWAY PARKWAY

BASED ON TABLE 9.9.12 FROM GEOMETRIC DESIGN GUIDE FOR CANADIAN ROADS (JUNE 2017)

140.0m

90.0m

SHELL

TIM HORTONS

MARIGOLD DR.

BASED ON TABLE 9.9.1 FROM GEOMETRIC DESIGN GUIDE FOR CANADIAN ROADS (JUNE 2017)

190.0m

BASED ON TABLE 9.9.4 FROM GEOMETRIC DESIGN GUIDE FOR CANADIAN ROADS (JUNE 2017)

4.40m

BROADWAY BOULEVARD

BASED ON PAGE 66 FROM GEOMETRIC DESIGN GUIDE FOR CANADIAN ROADS (JUNE 2017)

OJIBWAY PARKWAY
WILDLIFE CROSSING
CITY OF WINDSOR
SIGHT LINE ANALYSIS FROM TAC
GEOMETERIC DESIGN GUIDE CHAPTER 9

wsp

Project No.	IM20104013
Date	JULY 2024
Scale	NTS
Drawing No.	9-3

9.6 Preliminary Cost Estimate

Based on preliminary estimates, the construction cost for the Ojibway Parkway Wildlife Overpass is estimated to be approximately $38.3 million (excluding of engineering design, permits and approvals and associated requirements (e.g., habitat compensation), and contingency costs). A breakdown of preliminary cost estimate is provided in the table below. The cost estimate provided herein is in 2024 dollars. The cost estimate assumes that no other utilities (water, sewer, gas, Bell, or Rogers) will require modifications / replacement. It is important to note that this cost estimate is high level and is based on preliminary estimates. This cost estimate is subject to further refinement during detailed design phase of the project.

The long-term rehabilitation cost is estimated to be a combined total of $16.2 million, assuming a structure life span of 100-years with minor rehabilitations at 25 and 75 years into the design life, and a major rehabilitation at 50 years.

Table 9-1: Preliminary Cost Estimate for Wildlife Overpass over Ojibway Parkway

Item No.	Item	Unit	Qty	Unit Price	Total Price
1	Steel Plate Girders including Fabrication, Delivery, and Erection	tonne	2030	$7,000.00	$14,210,000.00
2	Concrete Deck	m^3	1350.0	$2,000.00	$2,700,000.00
3	Parapet Walls	m^2	195.0	$2,000.00	$390,000.00
4	Concrete Substructure	m^3	1200.0	$2,000.00	$2,400,000.00
5	RSS Walls - Abutments & Retaining Walls	m^2	980.0	$1,500.00	$1,470,000.00
7	H-Piles	m	3860.0	$750.00	$2,895,000.00
8	Steel Reinforcement	tonne	705.0	$4,000.00	$2,820,000.00
9	Excavation for RSS Walls, Abutments and Piers	m^3	2200.0	$75.00	$165,000.00
10	Fill over structure	m^3	5750	$100.00	$575,000.00
11	Access & Protection, Construction Staging, Traffic Control, Flagging	LS	1.0	$2,500,000.00	$2,500,000.00
12	Tree Clearing	m^2	8000.0	$10.00	$80,000.00
13	Chain Link Fence with Snake Mesh and 0.3 m wide Gravel Maintenance Strip	m	4000.0	$270.00	$1,080,000.00
14	Utility Relocation (Hydro)	LS	5.0	$25,000.00	$125,000.00
15	Contaminated Soil Handling / Disposal	m^3	4800.0	$100.00	$480,000.00
16	Approach, Grading, Mobilization and Demobilization	LS	1.0	$2,500,000.00	$6,378,000.00
				Total	**$38,268,000.00**

9.7 Consideration for Additional Crossings

Additional crossings along Ojibway Parkway were considered unnecessary based on the current fragmented landscape. The recommended spacing for large mammal crossings which target White-tailed Deer is 1.4 km apart (Bissonette & Adair, Restoring habitat permeability to roaded landscapes with

isometrically-scaled wildlife crossings, 2008). Figure 9-2 shows a 1.4 km distance from the Wildlife Crossing location. The edge of the natural areas is approximately 800 m north and 250 m south from the Wildlife Crossing.

A crossing structure for small animals and herptiles was also considered. Crossing structures for smaller animals (culverts, herptile tunnels) should be spaced 300 m apart (Ministry of Transportation, 2016). However, the Preferred Wildlife Crossing is larger than the small culvert and herptile tunnel types considered under the 300 m distance suggestion. The option of a smaller under the road crossing has not been discounted but would be considered under adaptive management. Adaptive management would consider a herptile tunnel north of the Preferred Wildlife Crossing location if the preferred crossing proves unsuccessful for herptile crossing. It is recognized that crossings of various types and sizes, along with microhabitat elements, could enhance movement.

Additional crossings are not included in this Class EA along the linear corridor of Ojibway Parkway. Nevertheless, at the landscape level, the City wishes to connect Black Oak Heritage Park to Oakwood Natural Area. To do so, additional crossings are considered and being evaluated along other roads in the natural areas (e.g., Matchett and Malden Roads) under separate projects. The City hopes to re-connect an integral part of the larger regional natural heritage network.

10 Potential Environmental Effects and Mitigation Measures

10.1 Transportation

10.1.1 Roadways

Construction of the bridge structure would be completed in a staged approach. Temporary traffic impacts are anticipated including long term shoulder closures and lane shifts to accommodate the construction of the RSS abutments. Shoulder closure and lane shifts are estimated to be 18 months in duration. The placement of the girders over Ojibway Parkway would require a full roadway closure for a duration of at least one week. A detailed Construction Staging Plan and Traffic Management Plan shall be completed during detailed design to determine strategy for managing traffic during construction.

The open area within the boulevard under the crossing would accommodate future road expansion (if required). The new abutment and retaining walls on the east side of the roadway, and pier on the west side of the roadway are not expected to have significant impacts to traffic, however additional guiderails and crash attenuators may be required as part of the new structure.

To address the sightline issue, the sight lines were reviewed during the preliminary design and the Wildlife Crossing was located far enough from Broadway Boulevard to minimize sightline impacts.

Lastly, wildlife fencing has been proposed as part of the design for the Wildlife Crossing to prevent wildlife from entering onto Ojibway Parkway and the ETR tracks and to direct wildlife to the proposed Wildlife Overpass. Fencing would be a two-part system comprised of a chain-link style fence as well as a shorter reptile exclusion fence. An example of wildlife fence is shown in Figure 9-1, and proposed fence configuration is shown in Figure 9-2. Detailed specifications regarding the wildlife fencing shall be determined during the detailed design phase of the Project; however, recommendations related to fencing are provided within Section 9.3.

10.1.2 Trails

There would be no permanent changes (such as, realignment) to the existing Ojibway Parkway Trail located on the west side of Ojibway Parkway. The area within the boulevard between Ojibway Parkway and the ETR tracks would remain accessible as the overpass would bridge over it. Temporary construction related closure of the Ojibway Parkway Trail west is unavoidable. Signage shall be installed on the existing trail in advance of construction to inform the trail users of the trail closure.

The existing trail loop on the east side within the Ojibway Park is not anticipated to be impacted by the construction of the east approach of the structure. However, it should be confirmed during detailed design that construction activities (including grading limits, staging areas, etc.) continue to avoid direct impacts on the trail loop to the east side. If avoidance is not possible, then trail realignment option should be explored in the Ojibway Park.

Measures shall be identified during detailed design to deter human use of Wildlife Crossing. These measures may include temporary fencing, planting (dense shrubs), the use of camera surveillance, etc.

10.1.3 Essex Terminal Railway

The span of Wildlife Crossing over ETR tracks is proposed to have a minimum vertical clearance of 7.49m, as per input from the ETR. Significant coordination with ETR would be required for the construction of the west bridge span. It is expected that ETR would require a flag person to be on site at all times, and that construction crews may need to “stand-down” when a train is passing on tracks within the work area including a buffer area. No train traffic can occur during the placement of girders. ETR may

require girder placement to be done during several night shifts, to limit the impacts on their rail operations. Furthermore, regular and detailed monitoring of the rail tracks would likely be required during construction, especially during excavation and piling operations. Further consultation and coordination shall be completed with the ETR during detailed design and construction phases.

As noted previously, wildlife fencing has been proposed as part of the design for the Wildlife Crossing to prevent wildlife from entering onto Ojibway Parkway and the ETR tracks and to direct wildlife to the proposed Wildlife Overpass. Fencing would be a two-part system comprised of a chain-link style fence as well as a shorter reptile exclusion fence. An example of wildlife fence is shown in Figure 9-1, and proposed fence configuration is shown in Figure 9-2. Detailed specifications regarding the wildlife fencing shall be determined during the detailed design phase of the Project.

ETR property acquisition is discussed in the Land-use / Property Requirements section below.

10.2 Social Environment

10.2.1 Land-use / Property Requirements

The western approach of the Wildlife Crossing is proposed to land within the 90m-wide strip of ETR-owned land. ETR was consulted throughout this study. The area of required property acquisition shall be determined during detailed design. Consultation and negotiations with the ETR shall continue during detailed design to address their concerns and address property acquisition requirements to facilitate the construction of the proposed Wildlife Crossing. ETR's concerns are discussed under Section 12.4.

10.3 Cultural Environment

10.3.1 Built Heritage Resources and Cultural Heritage Landscapes

As noted in Section 5.3.1, the Cultural Heritage Screening Memo determined that Ojibway Park and Black Oak Heritage Park have potential for Cultural Heritage Value or Interest (CHVI). Since the CHVI of these locations have not been confirmed, any proposed development should be preceded by a Cultural Heritage Evaluation Report (CHER). The CHER should include detailed historical research, information gathering, and fieldwork to document existing conditions and any potential heritage attributes of the property. The property should also be evaluated for CHVI using the criteria prescribed in Ontario Regulation 9/06 of the *Ontario Heritage Act*. If the CHER determines that the property has CHVI, then a Statement of Cultural Heritage Value and list of heritage attributes shall be drafted.

10.3.2 Archaeological Resources

As noted in Section 5.3.2, the Study Area has been subject to two separate Stage 1 Archaeological Assessments. These Stage 1 Archaeological Assessments indicated that the Ojibway Park and Black Oak Heritage Park within the Study Area have archaeological potential. Areas of archaeological potential that would be subject to disturbance as part of project construction, shall be assessed through a Stage 2 Archaeological Assessment (and any subsequent assessments, if required). Results of Stage 1 Archaeological Assessments are shown in Figure 5-6 and Figure 5-7. The Stage 1 Archaeological Assessment Reports are provided in Appendix B and Appendix C.

10.4 Natural Environment

10.4.1 Potential Aquatic Impacts

No fish habitat exists in the Study Area; however, Titcombe Road Drain is a municipal drain near the Preferred Alternative. Based on the current understanding, there would be no in-water works associated with this Project, and the drain would not be relocated. The structure itself is not expected to change water flow, and existing conditions are expected to remain post-construction.

10.4.2 Potential Species of Conservation Concern and Species at Risk Impacts

Surveys confirmed the presence of [redacted] The Preferred Alternative location impacts these species and the minimum habitat buffers proposed by recovery plans Figure 5-16 – public version is redacted). Other plant species considered to have a moderate potential of occurring are White Colicroot, American Chestnut, Climbing Prairie Rose, and Riddell's Goldenrod. These species were not documented during field surveys, nor has the Ojibway Nature Center documented these species in the East Study Area. To confirm the presence of American Chestnut and provincially rare species, such as Black Gum and Pignut Hickory, a tree inventory should be completed.

In secondary sources, provincially rare species such as Culver's Root, Sundial Lupine, and Giant Ironweed have been documented in the general area. These species were not observed during field surveys, but additional surveys could be completed in the Study Area to ensure absence. If documented, these species could be transplanted. These species could also be considered for seed collection and replanting options.

Bird species such as Cerulean Warbler, Eastern Wood-Pewee, Red-headed Woodpecker, and Wood Thrush were all documented in secondary sources. Cerulean Warbler and Wood Thrush were documented in sources that contain areas much larger than the Study Area. In contrast, Eastern Wood-Pewee and Red-headed Woodpecker were documented within the Study Area on iNaturalist. As these species rely on specific habitat features, the retention of habitat is considered key. Eastern Wood-Pewee breeds in mature to intermediate-aged forests with an open understory, often being associated with clearings and edges. Red-headed Woodpecker breeds in areas with a high density of dead trees that can be used for nesting and perching. Both species, Eastern Wood-Pewee and Red-headed Woodpecker, can be found in a wide variety of habitats, especially when migrating. As forest area would be removed for the completion of the Crossing, a reduction in habitat would occur until restoration and replanting are successful.

Suitable habitat for various snake species has a moderate chance of occurring and preferred habitat is not limited to the area of the Preferred Alternative. Likewise, invertebrate species such as Monarch and Yellow-banded Bumble Bee have a moderate chance of breeding on-site. Both species are feeding generalists, but Monarch requires milkweeds for egg-laying. Preferred habitat is not limited to the area of the Preferred Alternative, and preferred host plants can be incorporated into restoration and planting plans.

Mitigation Measures for Species of Conservation Concern and Species at Risk Impacts

During detailed design, when a footprint is refined, a tree inventory should occur to document tree removals. A mitigation plan suitable for site requirements and removals must be completed to compensate for tree removals. Mitigation trees should be incorporated into the design of the wildlife crossing to build a 'wall' of vegetation along the outer edges of the ramps and shrubs along the edge of the Crossing. Herbaceous native species removed for the footprint of the Crossing should be included in the seed mixes and plantings. Species to consider include Culver's Root, Sundial Lupine, Giant Ironweed, milkweeds, and New Jersey Tea. The establishment of a heterogeneous ecosystem across the wildlife crossing would be essential in mitigating negative impacts from crossing development.

The overall impact of the wildlife crossing on Species of Conservation Concern and SAR is considered to be positive as there would be increased space for plant life movement and establishment as well as gene flow for animal species that Ojibway Parkway may currently segregate. Permitting under the Endangered Species Act, 2007 would be required

10.4.3 Potential Areas of Natural and Scientific Interest Impacts

Ojibway Park Area and Black Oak Heritage Park Area are part of a Life Science ANSI of provincial significance. The ANSI was established for its representation of Ontario's biodiversity and natural heritage. Appropriate design and management of restoration post-construction may also increase biodiversity in the area. The Crossing would also have a positive impact on the ANSI for scientific study and education purposes.

Mitigation Measures for Areas of Natural and Scientific Interest Impacts

The construction of the Wildlife Crossing would not negatively impact the ANSI's biodiversity and natural heritage characteristics. On the contrary, the wildlife crossing may provide a positive impact in the form of scientific study and education and further enhance and support the ANSI designation. It is recommended that the City allocate funds to support long-term studies of the Crossing and education through the Ojibway Nature Center regarding road ecology. The City may also wish to partner with Universities and local non-profits for monitoring and studies.

10.4.4 Potential Wetland Impacts

Drainage of wetland areas can cause mortality or stress to animals and possible changes in species composition; as is seen in the disturbed SWDM4-6 community. Access to the ETR lands has not been provided and therefore the true limits of wetlands and PSW's are not known. A decade has passed since the PSW was evaluated and conditions may have changed. Invasive species can dominate communities in short time frames and stochastic environmental events (e.g., floods) can drastically change an ecosystem within five years. Changes have already been noted in species compensation in the reduction of American Elm and Green Ash due to Dutch Elm Disease and Emerald Ash Borer. The increase of Eastern Cottonwood also indicates disturbance and changing conditions.
To ensure the Crossing does not further impact community changes the form and function of the wetlands in the ETR must be better understood.

Mitigation Measures for Wetland Impacts

Based on the current Project Location a small overlap of the delineated PSW exists. However, a field fit of the location is still possible in detail design which could result in avoidance of PSW limits. Likewise, a complete field investigation (ecology and hydrology to refine location of wetland pockets) of the ETR lands would benefit the understanding of existing conditions as well as restoration requirements. Groundwater will also need to be understood from a geotechnical perspective. Mitigation for the loss of wetland form and function, if it is found to occur may include:

- schedule grading to avoid times of high runoff volumes (spring and fall),
- minimize changes in land contours and natural drainage,
- develop and implement an erosion and sediment control plan, and
- revegetate as soon as possible.

Additionally, the removal of wetland areas should be compensated for, with the objective of a net gain in habitat function with the local watershed. The location of wetland compensation should be within Black Oak Heritage Park. Ideally, compensation could go towards restoration of existing wetlands within the park.

10.4.5 Potential Significant Woodland Impacts

The woodlands in the Study Area are considered significant. Direct impacts would include the loss of canopy coverage until regrowth occurs, and indirect impacts include an increased edge effect. The Project footprint removes 0.7 ha of vegetation from the Significant Woodland. Currently, interior forest habitat is measured as either 100 m (Ontario Ministry of Natural Resources, 2010) or 200 m (Ontario

Ministry of Natural Resources and Forestry, 2015) from the forest edge (Figure 10-1), which is a fixed way of accounting for edge effects. This method doesn't consider the impacts of trails and human use or some nuances of land use. The current reduction of interior forest habitat is represented in Table 10-1. Based on the footprint, the edge is pushed further into Ojibway Park, and the interior forest is reduced but not eliminated. The reduction of interior forest does not change the significance criteria of the woodland (Section 5.4.7.3). Likewise, the reduction of interior forest does not change the habitat evaluation of interior forest for avian species.

Table 10-1: Interior Forest Habitat Loss

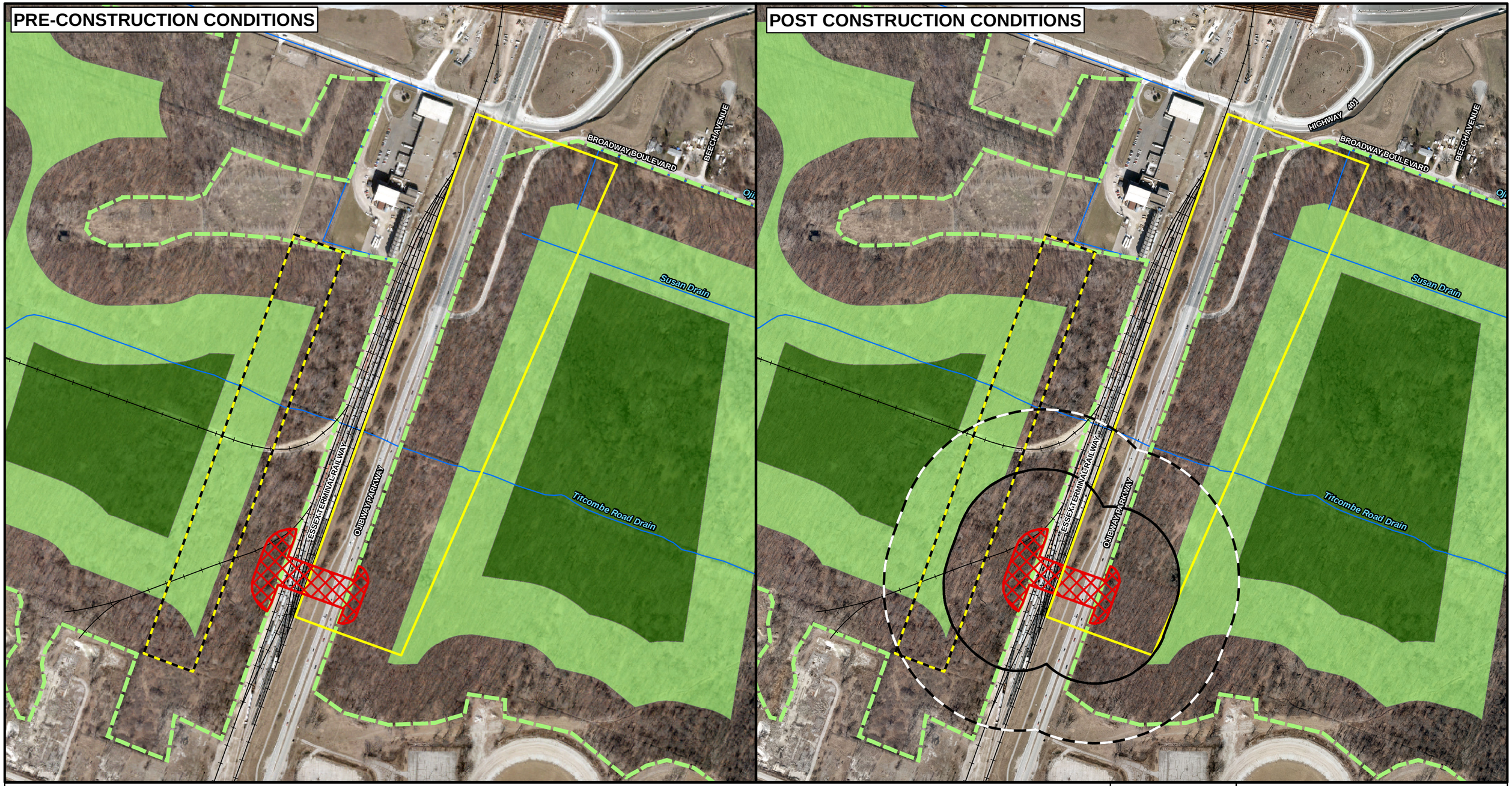
Interior Buffer	Study Area	Area (ha)
200 m	East	0.01
100 m	East	0.37
200 m	West	0.56
100 m	West	0.82

Mitigation Measures for Significant Woodland Impacts

The form and function of the Significant Woodland would remain after construction impacts and removal of 0.57 h of interior forest habitat (200 m buffer). Moreover, regeneration of the area combined with restoration and enhancement and the extension of habitat across the Crossing would reinstate the woodland area (and potentially increase area) and reduce edge effects in the long-term.

PRE-CONSTRUCTION CONDITIONS

POST CONSTRUCTION CONDITIONS



LEGEND

- Project Footprint
- Project Area
  - East Study Area
  - West Study Area
- Project Footprint Buffer
  - 100 m
  - 200 m
- Approximate Woodland Limit
- Railway
- Watercourse / Drain
- Interior Forest Habitat
  - 100 m Buffer
  - 200 m Buffer

0 200 400 600 800 1,000 Meters

NOTES:
- Aerial imagery extracted from Essex County interactive map, 2019.

Datum: NAD83
Projection: UTM Zone 17N

THE CITY OF WINDSOR ONTARIO, CANADA

wsp

OJIBWAY PARKWAY WILDLIFE CROSSING

Interior Forest Habitat

PROJECT N°: IM20104013 | **FIGURE: 10-1**

SCALE: 1:6,000 | DATE: May 2024

10.4.6 Potential Significant Valleyland Impacts

Based on the current understanding, no valleylands exist in the Study Area.

10.4.7 Potential Significant Wildlife Habitat Impacts

Candidate SWH includes Raptor Wintering, Bat Maternity Colonies, Reptile Hibernaculum, Woodland Raptor Nesting Habitat, Amphibian Breeding Habitat: Woodland, Woodland Area-Sensitive Bird Breeding Habitat, and Special Concern and Rare Wildlife Species. Confirmed SWH includes Savannah and Other Rare vegetation communities, Amphibian Breeding Habitat: Wetland, and Special Concern and Rare Wildlife Species. The commonality between all these habitat types is that they occur (or may occur) within the overall Ojibway Park and Black Oak Heritage Park.

Raptor Wintering based on potential species occurrences and vegetation communities present Raptor Wintering SWH is considered candidate in Ojibway Park. As Ojibway Park is considered continuous with the Ojibway Prairie Provincial Nature Reserve, the Reserve is also considered candidate Raptor Wintering SWH. Therefore, the forest community is considered Candidate SWH in the Project Area. Modifying vegetation structure or drainage patterns in fields or forests supporting a winter roost may make it unattractive (Ontario Ministry of Natural Resources and Forestry, 2014). The Project footprint would not reduce or negatively alter the available vegetation structure (interior woodland) of the forest or change drainage patterns. Black Oak Heritage Park is constrained on all sides and does not have >15 ha of field/meadow habitat within and, therefore, can not be considered significant.

Bat Maternity Colonies SWH could be confirmed somewhere within Ojibway Park (it is also assumed that Black Oak Heritage Park is candidate SWH for this type and the adjacent natural ETR lands). Recordings confirmed that Big Brown Bat had the highest bat activity within the Project Area, and it is thought that the Project Area represents an important foraging site for Big Brown Bats. There are several factors responsible for the decline of bat populations, and the most important threats include White Nose Syndrome, destruction of hibernating bats and nursery colonies, habitat loss, and persecution. Developments that result in significant forest clearing would impact nursery colonies. Deforestation near and between maternity colony sites and feeding areas may decrease prey availability, foraging efficiency, and increase vulnerability to predators (Ontario Ministry of Natural Resources and Forestry, 2014). The Preferred Solution would result in a relatively small (0.3178 ha) removal of forest and is not expected to alter maternity colonies or foraging efficiency. In the long-term, the Crossing may be used by bats as a flyway between the natural areas associated with Ojibway Park and Black Oak Heritage Park.

Reptile Hibernaculum snakes depend on hibernation sites located below frost lines in burrows, rock crevices and other natural locations (e.g., tree roots) to escape freezing temperatures. An abundance of such sites is needed to ensure overwinter survival. The access to subterranean crevices is much more important than the vegetation communities that are present. Development may affect hibernacula or the effectiveness of hibernacula if it involves or removes the area of accumulated rock and woody or significantly reduces forest size. Changes to local hydrology or hydrogeology can either drown out or desiccate hibernating snakes. All known rock piles are located outside the Project footprint and excavation has previously been completed for the ditch running parallel to Ojibway Parkway. Previous work in the area has not uncovered hibernacula and has likely compacted soil. No impacts to hibernacula sites are expected.

Rare Vegetation Communities, Savannah and Other Rare Vegetation Communities are confirmed in the Project Area. The Savannah is located outside the Project footprint, so no impacts are expected. Likewise, the Pin Oak Mineral Deciduous Swamp Type SWDM1-3/SWD1-3 is outside the Project footprint, so no impacts are expected. The Dry Black Oak Deciduous Forest Type FODM1-3/FOD1-3 is the community in which the footprint occurs. The community code will not change with the removal of the vegetation. The Dry Black Oak Deciduous Forest Type should be considered in the development of restoration and planting plan goals.

Woodland Raptor Nesting SWH may occur in Ojibway Park Area, Black Oak Heritage Park Area or adjacent natural areas. Most woodland raptors have highly specialized habitat requirements and may be vulnerable to minor changes in habitat. Forests provide nesting, roosting, and prey opportunities for woodland raptors. Nesting raptors tend to be widely spaced (>1 km apart). Site alterations that reduce the availability of forest cover effectively remove productive habitat (e.g., prey production) from the territory of resident breeding pairs. Development in the vicinity of a nest may cause birds to abandon the area, particularly if development increases the level of human activity in the area (Ontario Ministry of Natural Resources and Forestry, 2014). No raptor nests were found in the Project Area, and the Project Area currently has very high levels of human activity. The most likely raptor to nest in the Project Area is Cooper's Hawk. Cooper's Hawk is an edge specialist and is unlikely to be impacted by the Preferred Solution.

Amphibian Breeding Habitat: Woodland has been evaluated in the Project Area. For a woodland pond to function as a breeding pond, it requires shallow, unpolluted water (permanent or temporary) and emergent and submergent vegetation. The surrounding woodland habitat must provide a closed canopy offering a shaded, moist understory to retain breeding pond function and an abundance of downed woody debris to act as cover. Lastly, breeding ponds must be close to summer habitat (Ontario Ministry of Natural Resources and Forestry, 2014). Development that results in the draining or filling of woodland ponds will destroy the function of the pond. Development on adjacent land can significantly impact breeding pond functions if it alters ground or surface water quality or quantity. Furthermore, adjacent development can have a very high impact if it separates breeding habitat from summer or winter habitat.

The Crossing structure would not drain or fill woodland ponds in the area and would not change the local hydrology or hydrologic function. The Crossing may have a positive impact on amphibians by connecting suitable habitats within and nearby Black Oak Heritage Park Area with Ojibway Park Area.

Amphibian Breeding Habitat: Wetland has also been confirmed in the Project Area. Most amphibians require a source of water to reproduce. During spring, many of these species concentrate in breeding ponds to mate and lay eggs. Timing of breeding, the length of time required for larvae to transform into adults, and specific habitat requirements differ among species. These parameters are important in determining what breeding species of amphibians a pond or wetland can support (Ontario Ministry of Natural Resources and Forestry, 2014). Development has the greatest potential to affect the function of breeding ponds and wetlands and summer ranges simply when expansive areas are impacted and/or changes are made to the hydrological function of the area (Ontario Ministry of Natural Resources and Forestry, 2014).

American Toad and Western Chorus Frog are confirmed breeding in the Project Area. American Toad breeds in temporary and permanent woodland pools, plus has adapted a wide, versatile breeding niche and breeds successfully in urban areas wherever water may collect. Western Chorus Frog breeds in shallow, temporary pools with vegetation in woodlands but has also adapted to agricultural areas, shrublands, and wet meadows. It is expected that the form and function of the wetland breeding habitats in the Project Area would remain, wetlands would not be drained or filled and a change in hydrology is not anticipated. The Crossing aims to reconnect Black Oak Heritage Park Area to Ojibway Park Area (and beyond) and therefore, potentially increase the breeding and foraging opportunities for amphibians.

Woodland Area-Sensitive Bird Breeding Habitat is generally used to indicate species that require large intact areas of forest to fulfil life processes. The species' sensitivity to forest fragmentation varies, and the habitat requirements of breeding birds susceptible to habitat fragmentation are extremely variable and complex. Birds vulnerable to forest fragmentation require large contiguous blocks of forest for successful nesting. The requirements of individual species may also depend upon whether it is in the core of its range or at the periphery. Impacts may occur in several ways; the most obvious direct impact is habitat loss. Indirect effects include increased predation, parasitism, and disturbance (Ontario Ministry of Natural Resources and Forestry, 2014).

When complete avoidance is not possible, and the SWH is large, minimizing the amount of habitat affected may be a satisfactory mitigation option, e.g., make the development footprint where it affects the habitat as small as possible, and site it at the edge of the habitat to minimize habitat fragmentation. Generally, if the amount of retained habitat is large enough to support the most sensitive species present, all other species should be protected (Ontario Ministry of Natural Resources and Forestry, 2014). The impact of direct removal of vegetation from the footprint would not reduce interior forest sizes to levels below what species usually require. Additionally, as stated previously, the restoration and planting plans would aim to replace habitat cover, at a minimum.

The indirect impacts of predation, parasitism, and human disturbance are considered in the SWH MiST (2014). The MiST provides a table that summarizes the general susceptibility of species in this index to indirect effects of development. All indicator species have relatively low susceptibility to humans using habitats recreationally, as is already occurring. Other factors considered in the table are avian predators, mammalian predators, and parasitism. Avian predators are species like Cooper's Hawk which hunt along forest edges and Blue Jays, American Crows, and Common Grackles, which predate nests. Mammalian predators are naturally occurring predators (e.g., Virginia Opossum, Striped Skunk, Raccoon, Coyote, Red Fox) and outdoor house cats or feral cats. Parasitism is considered as nest parasitism by Brown-headed Cowbird. The basis of these indirect impacts is that in a fragmented and smaller block of habitat, nests are more easily located by predators and obligate nest parasites (i.e., Brown-headed Cowbird). The footprint would not further fragment the habitat or increase access to nests. There are no new corridors to be cut within the woodland, maintaining the form and function.

Special Concern and Rare Wildlife Species represent a broad group, and the treatment of plants and animals is somewhat different - plants are relatively restricted in their movements while animals may be more wide-ranging. When protecting habitat, the general habitat functions and composition which support life processes must be identified (Ontario Ministry of Natural Resources and Forestry, 2014). Due to the extensive list and significance of other features on-site, the entire site is also considered SWH under this category. Impacts considered above include habitat changes (edge effects) and potential loss in breeding habitat for amphibian, avian, and bat species when vegetation is removed for the Preferred Alternative. Invertebrate SAR has also been considered above. This Impact Assessment index considers habitat requirements not already examined, such as the indirect effects such as invasive species.

Various reptile habitat features such as downed trees, brush piles, and rock piles were documented in the East Study Area. These features do not occur in the footprint of the Preferred Alternative. For some species, development has the potential to have a variety of indirect effects. Even if the habitat is left intact, it may become unsuitable as a result of changes in the microclimate such as windthrow and drainage, human trampling, and invasion by exotic species (Ontario Ministry of Natural Resources and Forestry, 2014). Various mitigation measures are presented to reduce indirect effects and maintain form and function. In summary, mitigation should consist of a restoration and planting plan which includes site-specific plantings (e.g., by including plantings to eliminate creating a new edge) to mitigate effects such as windthrow. Additionally, controlling human use and invasive species should be considered.

Drainage from the structure would not be significant as the structure is to include appropriate soil depths for water retention (for plant growth), as well as microhabitat features such as stepping pools for water retention to support wildlife movement.

Mitigation Measures for Significant Wildlife Habitat Impacts

The form and function of SWH will remain after construction impacts and removal of 0.3178 ha of forest. The PPS requires a balance such that there may be occasions when the proposed development is more in the public interest and minimizing the amount of habitat affected is a satisfactory mitigation option (Ontario Ministry of Natural Resources and Forestry, 2014). In the case of the Ojibway Parkway Crossing, the footprint affects the habitat as little as possible, and is at the edge of the habitat to minimize

fragmentation and disturbance. Additionally, creation of the Crossing would provide habitat as well as improving habitat connectivity.

The restoration and planting plan would mitigate effects such as windthrow by including plantings to eliminate creation of a new edge. The Dry Black Oak Deciduous Forest Type would be considered a target community for restoration, and plant species that typically comprise the shrub and groundcover layers of this community would be included in the planting plan for the Crossing top. Microhabitat features such as stepping pools for water retention to support wildlife movement would also be included. Areas outside the Project footprint would be protected by temporary construction exclusion fencing and creation and implementation of an Erosion and Sediment Control Plan (ESCP). Temporary exclusion fencing may also be designed to keep wildlife out of active construction and may doubly serve as tree protection. It is also recommended that an invasive species management plan be created and implemented as part of construction and post-construction environmental management.

Best practices also consider known impacts and the cumulative amount of disturbed/converted habitat relative to the amount of undisturbed habitat (Ontario Ministry of Natural Resources and Forestry, 2014). Human use is currently very high and has resulted in various footpaths off the approved trail system. Footpaths must be closed, and trails near the Crossing should be patrolled to prevent human use of the Crossing. Signage and a public education campaign may help people understand the unique characteristics of crossing and the value of leaving it undisturbed.

Regarding animal life, continued monitoring of bat populations via detectors may confirm Big Brown Bat foraging is not deterred by the construction of the Crossing, and future monitoring on the Crossing may confirm use as a corridor or foraging habitat. In general, to prevent harm to nesting birds, removal of vegetation should be conducted outside of the typical bird nesting period in this area (April 1st to August 31st). The nesting period should also protect sensitive woodland raptor nesting in this eco-district if it is occurring.

It is likely that amphibians breeding within the Project Area (and the larger habitat of the Parks) are increasingly isolated and must find breeding, foraging, and wintering habitat all within Ojibway Park Area and Black Oak Heritage Park Area. Some successful movement may occur to the east (Figure 5-18). It is unlikely that successful movement currently occurs across Ojibway Parkway between Ojibway Park Area and Black Oak Heritage Park Area. The proposed Crossing may provide a new movement corridor for amphibians leading to gene flow between populations and result in a positive impact.

10.4.8 Other Potential Impacts on Natural Environment

General impacts to the terrestrial ecosystem typically associated with construction that can be mitigated are:

- Disturbed areas and vegetation loss as a result of construction activities (e.g., trampling and removal of vegetation);
- Soil compaction from equipment, access routes, or laydown areas;
- Introduction of invasive and non-localized plant material from previous construction sites and disturbance activities;
- Construction activity may cause localized, short-term increases in noise and vibrations, which could disturb wildlife and deter animals from the area. Wildlife could also be disturbed by artificial lighting if construction occurs outside of daylight hours and permanent lighting along Ojibway Parkway;
- Dust from work activities may settle on vegetation, which may also disrupt wildlife and their habitat; and
- Contamination of vegetation communities due to the unplanned release or discharge of deleterious substances to the environment, including fuels (diesel and propane), lubricants (engine oil, transmission oil, etc.), and coolants (ethylene glycol).

Mitigation Measures for Other Potential Impacts

Most short-term impacts can be mitigated with the design and implementation of erosion and sediment control (ESC) measures (e.g., silt fencing), consistent with Ontario Provincial Standards and Specifications, and a construction staging and project phasing plan. In general:

- It is recommended that all staging areas occur outside natural areas;
- ESC measures should be maintained through all phases of the Project until vegetation is re-established, and all disturbed ground is permanently stabilized;
- All ESC measures should be inspected at least weekly and during and immediately following precipitation events to ensure that they are functioning properly and are maintained and/or upgraded as required;
- If the ESC measures are not functioning properly, no further work would occur until the sediment and/or erosion problem is addressed;
- Staging, and access areas would be minimized as feasible to avoid disturbing the natural environment beyond the proposed disturbance limit;
- Operate and store materials and equipment in such a manner that prevents any deleterious substance from entering the natural environment;
- Construction should occur during daylight hours to minimize intrusive lighting. If lighting is required adjacent to wildlife habitat areas, design lighting or install shades to emit down and away from the natural area;
- In the long-term, if lighting would be required along Ojibway Parkway it should be designed to emit down and away from natural areas. Low-pressure sodium lamps or UV filters should be used, and lighting should not occur on the Crossing;
- Prohibit access to the extent possible to any natural areas outside of the Project footprint to ensure the protection of these areas; this includes temporary access. An ESC fence should be installed around the perimeter of the work area to provide a visual barrier and to isolate wildlife from the work area. Road mortality and mortality monitoring within the construction footprint should occur during herptile movement season/times;
- Ensure a Spill Management Plan (including spill kit materials, instructions regarding their use, education of staff, and emergency contact numbers) is present on-site at all times for implementation in the event of an accidental spill. All spills are to be reported to the MECP Spills Action Centre (SAC) at 1 800-268-6060;
- Ensure that machinery arrives on site in a clean condition and is maintained free of fluid leaks, invasive species, and noxious weeds; and

Identify local regulatory authorities and have contact information available on site. Local regulatory authorities are to include the MECP, MNRF, ERCA, the City and local emergency service providers.

10.4.9 Cumulative Impacts and Impacts Summary

Short-term impacts, such as those general impacts which may occur during construction, and long-term impacts have been discussed above. The direct and indirect nature of impacts has also been considered. Ultimately, there would be no negative impact on the form and function of the Project Area. Some potential negative impacts would be eliminated or minimized by implementing mitigation measures during construction and incorporating long-term mitigation measures into the design. The Project footprint is 0.2 ha within the FODM1-3 community in the East Study Area and 0.5 ha within the ETR lands in the West Study Area. Post-construction, the impacted area would be restored and enhanced with a restoration and planting plan to replace removed habitat at a 1:1 ratio.

There is expected to be a positive cumulative impact as the Crossing would increase space for plant life movement and establishment as well as gene flow for animal species currently segregated, enhancing the landscape and connectivity for various wildlife. For example, it is unlikely that a successful amphibian movement currently occurs between Ojibway Park Area and Black Oak Heritage Park Area. The proposed Crossing may provide a new movement corridor for amphibians, leading to gene flow between populations and resulting in a positive impact. The proposed crossing, in combination with the Spring Garden Natural Area – Oakwood Natural Area crossing (Tunnel Top 5) and the potential crossing(s) at Malden and Matchett Roads, would result in cumulative positive effects for wildlife movement through natural areas in the City.

Mitigation Summary

A summary of the above mitigation is provided below, and the next section details monitoring and management recommendations:

- During detailed design, when a footprint is refined, a vegetation and tree inventory should occur to document vegetation and tree removals and to confirm species in the footprint.
  - It is recommended that all staging areas occur outside natural areas.
  - A mitigation plan suitable for site requirements and removals must be completed to compensate for vegetation and tree removals (Section 11.1).
- Areas outside the Project footprint would be protected by temporary construction exclusion fencing and the creation and implementation of an ESC Plan, developed by a professional and consistent with Ontario Provincial Standards and Specifications. A construction staging and project phasing plan would be required.
  - Temporary exclusion fencing may also be designed to keep wildlife out of active construction and may doubly serve as tree protection.
- Construction should occur during daylight hours to minimize intrusive lighting. If lighting is required adjacent to wildlife habitat areas, design lighting or install shades to emit down and away from the natural area. In the long-term, if lighting would be required along Ojibway Parkway it should be designed to emit down and away from natural areas. Low-pressure sodium lamps or UV filters should be used, and lighting should not occur on the Crossing.
- It is also recommended that an invasive species management plan be created and implemented as part of construction and post-construction environmental management.
- Human use resulting in various footpaths deviating from the approved trail system must be closed, and trails near the Crossing should be patrolled/monitored to prevent human use of the Crossing.
- Signage and a public education campaign may help people understand the unique characteristics of crossing and the value of leaving it undisturbed.
- It is recommended that the City allocate funds to support long-term studies of the Crossing and education through the Ojibway Nature Center regarding road ecology. The City may also wish to partner with Universities and local non-profits for monitoring and studies.
  - Scientific study and education further enhance and support the ANSI designation.
- Monitor bat populations via detectors to assess whether the construction of the crossing deters Big Brown Bat foraging.

10.4.10 Drainage

As discussed in Section 5.4.8, there are three municipal drains in the Study Area (Ojibway Park Drain, Titcombe Road Drain, and Susan Drain). As shown in Figure 1-1, none of the watercourses or features are located within the preferred location of the Wildlife Crossing, and the crossing is noted to lie outside of the area regulated by the ERCA. As such, no features in the immediate vicinity of the crossing are

considered to provide significant hydrologic routing or storage (i.e., attenuation) of stormwater runoff, although much of the surrounding area is serviced by municipal drains. The following sub-sections describe the anticipated impacts of the proposed crossing on stormwater runoff, and mitigation alternatives. This assessment has considered the potential impacts on stormwater quality, quantity and erosion control, and documents the corresponding management alternatives.

10.4.10.1 Stormwater Quality

The Wildlife Crossing is proposed to accommodate the passage of wildlife and would not accommodate vehicular traffic. As such, stormwater quality impacts associated with the crossing are anticipated to be minor, and not require formal stormwater quality treatment.

The surface of the crossing is proposed to be naturalized with a topsoil layer of approximately 850 mm in depth, and vegetation planted on top of the topsoil layer. Recognizing the naturalized surface treatment of the crossing, it is anticipated that the crossing would function similar to a vegetated filter strip or a green roof, both of which are considered to be types of low impact development (LID). In this respect, the surface treatment of the crossing would be anticipated to provide a form of stormwater quality enhancement for runoff generated from the crossing, as opposed to the existing runoff generated by the parkway, upon which the rainfall currently lands and runs off.

Recognizing the foregoing, the surface treatment of the crossing is considered to enhance the quality of stormwater runoff from the structure, and further stormwater quality measures are not considered to be warranted due to the intended use of the structure.

10.4.10.2 Stormwater Quantity

The proposed overpass would be graded to direct stormwater runoff toward the ends of the crossing, rather than draining onto Ojibway Parkway directly. The runoff would drain toward the natural spaces at the limits of the crossing, and due to the relatively small footprint of the structure would contribute little additional runoff toward the areas. In addition, the naturalized surface of the crossing would be anticipated to reduce the volume of runoff through both the interception and storage within the soil and reduction through evapotranspiration. On this basis, the quantity impacts of the proposed crossing to stormwater runoff are anticipated to be insignificant, and stormwater quantity controls are not considered to be warranted.

10.4.10.3 Erosion control

As noted above, the proposed crossing would be graded to direct stormwater runoff from the middle of the structure toward the approaches. The naturalized surface of the crossing and natural areas at the limits of the crossing would capture stormwater runoff during more frequent and less intense storm events, hence would reduce the volume of runoff generated by the crossing. Recognizing that no defined watercourses are located in the immediate vicinity of the crossing and given the reduction of stormwater volume running off the structure, it is anticipated that the crossing would not increase erosion potential within the receiving drainage systems, hence erosion controls are not considered to be required.

Although erosion of receiving watercourses is not anticipated to occur, local scour at the base of the approaches is considered to potentially occur over time, particularly during annual snowmelt events. The local scour impacts may be mitigated through the application of a designed erosion control blanket at the base of the approaches, or through armouring with vegetated stone to dissipate the energy from the stormwater runoff. The selection of erosion and scour protection measures is to be confirmed through the detailed design process.

10.4.11 Soil and Groundwater

The stratigraphy beneath the surficial topsoil, pavement structure and fills along the subject section of Ojibway Parkway generally consists of 2.0 m to 4.4 m of very loose to compact sands and silts overlying

an extensive soft to very stiff silty clay/clayey silt layer. Bedrock is at approximately 23 mbgs. The sands and silts are partially saturated with the ground water level within 1.2 to 2.1 m of the ground surface. The ground conditions along Ojibway Parkway are relatively uniform within the project's limits.

A rigorous dewatering system would be required during construction to manage the shallow groundwater conditions and to limit artesian flow during driving of H-Piles. Settlement mitigation measures would be required for the construction of the approach embankments, especially for the taller west embankment.

A detailed geotechnical investigation shall be completed during detailed design to confirm the subsurface soil and groundwater conditions, develop mitigation measures, and any permitting requirements for groundwater discharge.

10.4.12 Contamination

As noted in Section 5.4.11, two Areas of Potential Environmental Concerns were identified within the Study Area. Based on these APECs, soil sampling and analysis would be required to address any excess soil generated by the construction of the proposed Ojibway Park Wildlife Crossing. Reporting, sampling and analysis requirements as per Ontario Regulation 406/19 should be assessed during the detailed design phase of the Project.

Further, detailed contamination studies (such as, Phase I and II ESAs) may be required during detailed design phase to assess the entire project area and make recommendations to manage the contamination as part of project construction.

10.4.13 Source Water

As noted in Section 5.4.12, the Study Area is located within Surface Water Intake Protection Zone and Significant Groundwater Recharge Area (vulnerability score of 2) (Essex Region Conservation Authority, 2022).

Currently the policies within the Essex Region Source Protection Plan are limited to outreach and education efforts for the ERCA. With the implementation of mitigation measures recommended in this report, there are no anticipated impacts to Source Water Protection policies related to Intake Protection Zones and Significant Groundwater Recharge Areas.

10.5 Technical Environment

10.5.1 Utilities

As discussed in Section 5.5.1 and Section 12.5, there are several utilities around the two bridge piers and within the middle span. It is expected that utilities near the pier excavation areas would be requiring daylighting, and utility owners may enforce clearance buffers to their infrastructure. The Enbridge Gas pipelines and Town of Lasalle force main near the east pier is of particular note. Exact locations shall be confirmed during the detailed design process to avoid any conflicts during construction. Further consultation and coordination would be required with the utilities owners during detailed design and construction phases.

11 Monitoring Plan and Future Commitments

11.1 Monitoring and Management Recommendations

Performance evaluation of the proposed Wildlife Crossing depends upon adequate monitoring and determining who would be responsible for monitoring in the long-term. As mentioned above, there are ultimately two purposes for wildlife crossings: 1) to connect habitats and populations, and 2) to reduce mortality on roads. Monitoring should determine whether the basic functions of the wildlife crossing are being met and provide demographic information on the number of individuals using the Crossing structure and their gender (U.S. Department of Transportation, 2011). Monitoring programs should not be limited to a single species or confined to certain taxonomic groups, as doing so may fail to recognize the requirements of other non-target species and ecological processes (Center for Environmental Excellence by AASHTO, 2020). It is recommended that the City pursue research options and monitoring support from Universities and local NGOs to secure funding for monitoring. Additionally, specific benchmarks and thresholds which would trigger the implementation of adaptive management practices should be agreed to by the stakeholders and agencies involved during the detailed design phase.

11.1.1 Restoration and Planting Plan

A restoration and planting plan (i.e., Ecological Restoration Plan or natural environmental design) would be prepared as part of the Project's detailed design phase. The restoration and planting plan (the plan) would utilize ecological principles to guide the design, planting, and maintenance of the overpass and associated landscapes. The plan would include clear restoration goals, objectives, and indicators to easily assess progress over time. The plan would describe a Monitoring and Adaptive Management Plan based on routine observations, reporting, and updating knowledge, and the adjustment of management actions to include alternative ways to meet Project goals/objectives and provide the greatest ecological benefits to plant and wildlife species. Lastly, the plan would include a Vegetation Management Plan that is consistent with the targeted restored ecological communities. The Vegetation Management Plan would include a description of Best Management Practices (BMPs) and mitigation measures to protect SAR during the work activities.

Below are key considerations for development of the plan, the Monitoring and Adaptive Management Plan, and the Vegetation Management Plan:

- The use of native, locally sourced (to the extent practical) plant and seed material (such as Dry-Fresh Black Oak Deciduous Forest Type detailed in Section 6.2.1.2 of the Natural Environment Report (Appendix D)). Herbaceous species removed as a result of the construction of the proposed Wildlife Crossing should be included in the seed mixes and plantings.
- Transplanting of individual plants which would be impacted by construction onto the natural areas created on the approach ramps or atop the bridge.
- Plant species selection compatible with site-specific growing conditions including soil conditions, topography, aspect, soil moisture regime, and adjacent vegetation communities;
- Use of vegetation cover and structure to help guide or direct wildlife to the overpass approaches;
  - incorporated into the design of the proposed Wildlife Crossing is to build a 'wall' of shrubs along the outer edges of the Wildlife Crossing. Dry Black Oak Deciduous Forest Type would be considered the target community on the egress points to the proposed Wildlife Crossing and species that typically comprise the shrub and groundcover layers of this community would be included in the planting plan for the Wildlife Crossing top, reducing edge effects in the long term;
  - this consideration of successional processes may provide benefits such as increasing the native biodiversity or reducing the long-term need for vegetation management (i.e., invasive species removal).

  - selection of host plants for insects and other wildlife. Species to consider include Culver's Root, Sundial Lupine, Giant Ironweed, milkweeds, and Jersey Tea;
- It is also recommended that an invasive species management plan be implemented;
- Use of vegetation cover and structure to facilitate wildlife use and movement across the Wildlife Crossing;
- Creation of habitat features and refuge areas (microhabitat) on the Wildlife Crossing to offer security and protection to wildlife, such as stepping pools for water retention;
- Consideration of less palatable or less favourable plant species closest to Ojibway Parkway to discourage wildlife use of the restored right-of-way;
- Consideration of plant species that would help manage human activity near the overpass approach, but would not interfere with wildlife movement such as thorned native species; and
- It may be necessary to designate "no-spray" areas to ensure that significant plant species are not adversely affected. Planting the roadside with native flowers mixes (ensuring that the plants within the mix are native) may reduce the incidence of invasion of the significant habitat for the species by non-native species.
- Components of the Monitoring and Adaptive Management Plan would include, but are not limited to the following:
  - Routine site inspections to:
    - observe the health, growth, and flowering of planted and seeded species;
    - the presence of weeds, pests and/or disease;
    - plant replacement and/or maintenance needs (e.g., pruning, staking, watering);
    - need for re-seeding or other remedial actions following a disturbance;
    - the presence of wildlife and/or signs of wildlife use;
    - the need for broader vegetation management (e.g., mowing); etc.
  - Routine photo-monitoring from fixed points to capture vegetation changes over time and before and after treatments; and
  - Formal vegetation sampling utilizing plots and/or transects to quantitatively assess plant species richness and cover over time, and for the evaluation of seeded species success and natural colonization.
  - The results of Monitoring and Adaptive Management would inform vegetation management on the Wildlife Crossing and in associated restored landscapes. The Vegetation Management Plan would include, but is not limited to, the following BMPs for wildlife and SAR:
- Plan work to avoid carrying out activities when SAR or sensitive wildlife (i.e., breeding birds) are potentially present in the landscaped areas;
- Minimize any damage to existing/restored vegetation by selecting designated access routes and staging areas; selecting appropriate equipment, including the use of hand tools and hand application techniques in and around sensitive areas; and by prohibiting access to existing vegetated areas outside of the management zones;
- Develop an invasive species management plan to control the spread of exotics. Common Reed is abundant and dominates the current roadside ditch along Ojibway Parkway. Invasives species will displace native species on the Crossing and rehabilitated areas. Native animal species may avoid the Crossing it is becomes dominated by invasives.
- Develop and implement a SAR training and reporting procedure for the landscape contractor/maintenance provider to increase awareness of SAR, mitigate potential encounters with SAR, and report all encounters such that further mitigation and/or adaptive management can be considered; and

- Adhere to all applicable federal, provincial, and municipal legislation and regulations that protect SAR, wildlife, and environmentally sensitive areas.

11.1.2 Wildlife Crossing Monitoring and Management

The goals and objectives of the Ojibway Crossing are to reduce WVCs and reduce barrier effects to wildlife movement. To monitor change and maintenance of ecological processes it is recommended that monitoring of vegetation occur. As recommended in the restoration and planting plan (Section 11.1) two types of vegetation monitoring should occur:

- Routine photo-monitoring from fixed points to capture vegetation changes over time and before and after management/treatments; and
- Formal vegetation sampling utilizing plots and/or transects to quantitatively assess plant species richness and cover over time, and for the evaluation of seeded species success and natural colonization.

To monitor wildlife movement, a few focal wildlife species should be selected. Focal species monitoring should be able to provide a large enough dataset to analyze the effectiveness of the Wildlife Crossing (i.e., the species is successfully moving across, in both directions). Effectiveness monitoring should also consider the effectiveness of mitigation measures (i.e., the permanent fencing) and the effectiveness of design features such as stepping pools/ponds. Monitoring for various types of effectiveness would likely require monitoring of additional species, species which may be sensitive in adapting to the Wildlife Crossing. Monitoring species which are slower to adapt would require longer term monitoring and would also be a good indicator of ecological process and maintenance needs.

Covering a variety of animal species also provides options that range in cost and complexity. Selection of species and monitoring methods should also consider that baseline studies to define the extent of road/traffic impacts to wildlife have not been thoroughly completed. The first recommendation is to start baseline monitoring on Ojibway Parkway before and during construction from the road shoulder. Note, all on-road monitoring must only be conducted if it is safe to do so. Second recommendation is the selection of a reference site which has comparable size and traffic volume and adjacent habitat to the current Ojibway Parkway. Studies could compare the Wildlife Crossing to the T5 crossing or Matchett Road east of Ojibway Park if traffic volume is comparable. Additionally, monitoring on Matchett Road would serve to gather data for potential future crossings.

If pre-crossing conditions can be documented for Ojibway Parkway, a key management question should be '*is road-related mortality increasing or decreasing as a result of the Ojibway Wildlife Crossing*?' This question would be answered by completing road mortality surveys on Ojibway Parkway over the course of several years. There is also the question "*does the Wildlife Crossing encourage more connectivity*?" This question, while valuable, requires complex and lengthy surveys of populations both in Black Oak Heritage Park and Ojibway Park. For example, mark-recapture programs of Anuran species could inform this question.

Ultimately, the question the City would wish to answer is "*are animals able to disperse and are populations able to carry out migratory movements across the Crossing*?". To answer this question, it is recommended that the following monitoring occurs on ingress/egress points and the top of the Wildlife Crossing:

- Camera traps (infrared and motion-activated);
  - Plus, use of camera traps at microhabitat features;
- Monitor herbivory and scat during vegetation plot monitoring;
- Monitor bat populations via detectors;
- Deer highway mapping, monitor decreases in use (trails that regrow) and new trails; and

- Road mortality surveys to monitor breaches and suitable endpoints in fencing.

Last of all, to aid in monitoring efforts the City should coordinate internal communication with maintenance crews to communicate carcass removal along Ojibway Parkway, Broadway Boulevard, highway on-ramps, and any future roads in the area. Internal coordination should also extend to fence maintenance. Mitigation strategies developed around land-use planning should not terminate with the construction process. It is also recommended that the City be proactive at both local and regional scales to ensure that the Wildlife Crossing would remain functional over time.

11.1.3 Fencing Monitoring and Management

At fencing ends, signage that indicates to drivers that "wildlife concentration may increase" should be implemented. Adapting driver behaviour for a short distance may be effective in reducing WVCs at fence ends. Additionally, fences and escape ramps are not permanent structures and may be subject to constantly occurring damage. Fences must be checked regularly by walking the entire fence line, identifying gaps, breaks and other defects caused by natural and non-natural events (U.S. Department of Transportation, 2011).

11.1.4 Adaptive Management

Adaptive management is a systematic process for continually improving management policies, monitoring, design, or practices by learning from the outcomes of previous programs. For example, changing the design of a wildlife crossing in subsequent phases or projects after collecting data on the effectiveness of current structures or phases is adaptive management. Likewise, adaptive management includes:

- changing microhabitat elements if monitoring shows they do not facilitate movement.
- Irrigation of vegetation, especially in the first few years.
- Monitor and document human use and take necessary action to control it. Footpaths must be closed, and trails near the Crossing should be patrolled to prevent human use of the Crossing. Signage and a public education campaign may help people understand the unique characteristics of crossing and the value of leaving it undisturbed.
- If invasive species are dominating the regrowth then removal of the invasives must occur. It is recommended that an invasive species management plan is designed for Ojibway Park, Black Oak Heritage Park, and adjacent habitats.
- Changing, improving, or adding fencing (design or materials) that may be deficient in preventing animals from accessing the road. Similar for escape ramps, if animals are continuing to get stuck on the roadway more escape ramps or different designs may be needed.
- The addition of different types of wildlife crossing structures (e.g., herptile crossings) may be required should monitoring reveal previously undocumented or unique populations or habitat linkages.

Components of the Monitoring and Adaptive Management Plan would include, but are not limited to:

- Routine site inspections to observe the health, growth, and flowering of planted and seeded species; the presence of weeds, pests and/or disease; plant replacement and/or maintenance needs (e.g., pruning, staking, watering); need for re-seeding or other remedial actions following a disturbance; the presence of wildlife and/or signs of wildlife use; the need for broader vegetation management (e.g., mowing); etc.

11.2 Commitments for Additional Work

The following table summarizes commitments for additional work for detailed design phase.

Table 11-1: Commitments for Additional Work

Topic	Commitment
Indigenous Engagement	Indigenous Nations' preliminary interests for the next steps are documented in Section 12.6. Any subsequent phase of the Ojibway Parkway Wildlife Crossing project (i.e. implementation of the preferred design, including assessments, detailed design, construction, etc.) is subject to City Council's direction in the future. The City will follow the standards set out in the Province of Ontario's Standards and Guidelines for Consultant Archaeologists and the City of Windsor's approved policies and procedures for consultation and engagement with First Nations Communities. These standards are reflected in the province's bulletin Engaging Aboriginal Communities in Archaeology (2011), as well as the current Draft City of Windsor Archaeological Management Plan 2023, which has been circulated to the First Nations Communities for comment and review.
Construction Staging and Traffic Management	Develop a detailed Construction Staging Plan and Traffic Management Plan to determine strategy for managing traffic during construction.
Trails	Confirm whether the construction activities (including grading limits, staging areas, etc.) continue to avoid direct impacts on the trail loop to the east side in the Ojibway Park. If avoidance is not possible, then trail realignment option should be explored.
Essex Terminal Railway – Property Acquisition	The western approach of the Wildlife Crossing is proposed to land within the 90m-wide strip of ETR-owned land. ETR was consulted throughout this study. Determine area of property required and continue to consult and negotiate with the ETR to address their concerns and address property acquisition requirements to facilitate the construction of the proposed Wildlife Crossing. ETR's concerns are discussed in Section 12.4.
Essex Terminal Railway – Construction Coordination	Coordinate with the ETR regarding construction planning to avoid or minimize any impacts on ETR operations.
Built Heritage Resources and Cultural Heritage Landscapes	Complete a Cultural Heritage Evaluation Report (CHER) to document any potential heritage attributes of Ojibway Park and Black Oak Heritage Park, and evaluate them for Cultural Heritage Value or Interest (CHVI) using the criteria prescribed in Ontario Regulation 9/06 of the *Ontario Heritage Act*. If the CHER determines that the properties have CHVI, then a Statement of Cultural Heritage Value and list of heritage attributes shall be drafted.
Archaeological Resources	Complete Stage 2 Archaeological Assessment (and any subsequent assessments, if required).

Topic	Commitment
Terrestrial Ecosystem	Develop and address mitigation and monitoring requirements as outlined in Section 10 and Section 11 of the Natural Environment Report (Appendix D).
	Complete vegetation and tree inventory and develop Tree Removal and Protection Plan. The tree inventory shall confirm the presence of American Chestnut and provincially rare species, such as Black Gum and Pignut Hickory. A mitigation plan suitable for site requirements and removals must be completed to compensate for vegetation and tree removals.
	Develop an Invasive Species Management Plan and implement as part of construction and post-construction environmental management.
	Monitor bat populations via detectors to assess if Big Brown Bat foraging is deterred by the construction of the Wildlife Crossing.
	Develop a Restoration and Planting Plan (including a Vegetation Management Plan).
	Develop a Monitoring and Adaptive Management Plan.
	Determine vegetation type and soil quantity for the Wildlife Crossing.
	Continue consultation with the regulatory agencies (MECP, MNRF, ERCA).
Drainage	Identify erosion and scour protection measures to mitigate local scour impacts at the base of the approaches.
Soil and Groundwater	A detailed geotechnical investigation shall be completed during detailed design to confirm the subsurface soil and groundwater conditions, develop mitigation measures, and any permitting requirements for groundwater discharge.
	Develop a rigorous dewatering system to manage the shallow groundwater conditions and to limit artesian flow during driving of H-Piles. Settlement mitigation measures would be required for the construction of the approach embankments, especially for the taller west embankment.
Contamination	Complete reporting, sampling and analysis requirements as per Ontario Regulation 406/19 to address any excess soil generated by the construction of the proposed Ojibway Park Wildlife Crossing.
	Confirm if detailed contamination studies (such as, Phase I and II ESAs) are required to assess the entire project area. Complete these assessments if required and make recommendations to manage the contamination as part of project construction.
Utilities	Confirm the exact locations of utilities to avoid any conflicts during construction.
	Undertake further consultation with utilities owners during detailed design and construction phases.
	Contact the Town of Lasalle if there is a need to expose the force main. The Town has recommended that hydro excavation and daylighting of the force main should be performed as design advances to confirm its precise location.

Topic	Commitment
	The Town of LaSalle shall be notified during subsequent phases of the project and coordination efforts made to protect the existing forcemain and easement as per the agreement.
	Continue discussions with the Town of Lasalle regarding their request for a steel casing to be installed as part of the bridge construction to enable the Town of Lasalle to install a future force main within it without the need for excavation.
	Determine the methodology and proposed location for relocation of the electrical transmission lines owned by ENWIN.
	In consultation with Enbridge, establish vibration tolerances and vibration monitoring requirements for pile driving in proximity to Enbridge's existing pipelines.
	Obtain the required crossing agreements from utilities, including the heavy equipment crossing agreement from Enbridge if such equipment is crossing over their pipelines.
	Review Enbridge's *Third-Party Requirements in the Vicinity of Natural Gas Facilities Standard* and incorporate these requirements into the detailed design and construction process.
	Share IFC drawings with the utilities.
Project Design	Determine ultimate configuration and material for the wildlife fence.
	Determine whether additional guiderails and crash attenuators may be required as part of the new structure.
	Identify measures to deter/avoid human use of Wildlife Crossing. These measures may include temporary fencing, planting (dense shrubs), etc.

11.3 Permits and Approvals

The following table outlines the permits and approvals that may be required to facilitate construction of the proposed Wildlife Crossing.

Table 11-2: Permits and Approvals

Issue	Permit / Approval Authority	Permit / Approval
Fish and Fish Habitat	Fisheries and Oceans Canada	Submit a "Request for Review From" to Fisheries and Oceans Canada if in-water or near-water works are proposed.
Archaeological Resources	Ontario Ministry of Citizenship and Multiculturalism	Complete Stage 2 Archaeological Assessment, and any subsequent archaeological assessment that may be required (e.g., Stage 3) and submit report(s) to the MCM and obtain approval prior to ground disturbance activities.
Water Taking	Ontario Ministry of the Environment, Conservation and Parks	Complete an "Environmental Activity and Sector Registry" or obtain "Permit to Take Water", if the need is identified based on the results of geotechnical investigation.
Species at Risk	Ontario Ministry of the Environment, Conservation and Parks	Submit an Information Gathering Form to the MECP to obtain advice on the next steps to obtain a permit under the Endangered Species Act.
Wildlife Relocation	Ontario Ministry of Natural Resources and Forestry	Obtain Wildlife Scientific Collectors Authorization for intentional or anticipated incidental capture, handling and/or relocation of herpetofauna (e.g., snakes, frogs) during construction. Acquisition of this permit would be the responsibility of the construction contractor.
Natural Hazards	Essex Region Conservation Authority	Confirm whether any works are proposed in ERCA Regulated Area (including any construction access roads and storage areas). A permit from ERCA would be required for works within Regulated Areas.
Road Right-of-Way	City of Windsor	If required, obtain Right-of-Way Permit from the City for any works within the right-of-way e.g., culverts, hoarding, oversize load, signs)
Encroachment	City of Windsor	If required, obtain Encroachment Permit from the City for placing, erecting or building on the public right-of-way. Common encroachments include fences, underground piping, canopies and signs.
Tree Removal	City of Windsor	City's Parks and Recreation staff should be consulted to discuss if tree removal permit would be required for the project.
Site Plan Control / Building Permit	City of Windsor	Consult the City's Planning staff to determine the necessity of Site Plan Control or a Building Permit for this project, as it may be exempt due to the environmental assessment process.

12 Consultation Program

12.1 Consultation Approach

Comprehensive consultation was a key component of the Class EA Study. Consultation process carried out during the Class EA study was designed to exceed the formal notice and consultation requirements of the Class EA process. Consultation was carried out with public, Indigenous Nations, government agencies, ETR, utilities owners, and key stakeholder groups. The following sub-sections describe the consultation process for this Class EA Study. Consultation documentation (such as, meeting presentations, meeting minutes, project notices, newspaper ads, emails, etc.) are provided in following appendices:

- Appendix H: Study Contact List
- Appendix I: Public Information Centre #1
- Appendix J: Public Information Centre #2
- Appendix K: Public Information Centre #3
- Appendix L: Agency Consultation
- Appendix M: Impacted Property Owner Consultation
- Appendix N: Utility Consultation
- Appendix O: Indigenous Consultation

12.1.1 Project Webpage

A project webpage was setup at the commencement of this project on the City of Windsor's website. Information related to the Class EA study was posted on this webpage throughout the study, including study notices, materials related to PICs, and study reports. The project webpage can be accessed from the following link: https://www.citywindsor.ca/residents/Construction/Environmental-Assessments-Master-Plans/Pages/Ojibway-Parkway-Wildlife-Crossing-Class-Environmental-Assessment.aspx

12.1.2 Study Contact List

A Study Contact List was developed at the commencement of this Class EA study to identify contacts that may have an interest in this study. This list included contacts from the local Indigenous Nations, provincial government agencies, ERCA, emergency services provider, Town of LaSalle, ETR, utilities owners, special interest groups, members of the public who expressed interest in the study and the area residents and businesses (32 addresses). The Contact List was updated throughout the study. The final Study Contact List is provided in Appendix H. Table 12-1 identifies the contact groups that are listed on the final Study Contact List.

Table 12-1: Contact Groups on the Study Contact List

Contact Group	Name
Indigenous Nations	Walpole Island First Nation / Bkejwanong Territory
	Caldwell First Nation
	Aamjiwnaang First Nation
	Oneida Nation of the Thames
	Chippewas of the Thames First Nation
	Windsor-Essex-Kent Métis Council
	Kettle and Stony Point First Nation
Provincial Ministries	Ministry of the Environment Conservation and Parks
	Ministry of Northern Development, Mines, Natural Resources and Forestry
	Ministry of Municipal Affairs and Housing
	Ministry of Heritage, Sport, Tourism and Culture Industries
	Ministry of Indigenous Affairs
	Ministry of Transportation
Conservation Authority	Essex Region Conservation Authority
Emergency Services	Essex-Windsor EMS; Windsor Police Service; Windsor Fire and Rescue; Central Ambulance Communications Centre; Ontario Provincial Police
Interest Groups	Citizens Environmental Alliance of Southwestern Ontario; Essex County Field Naturalist's Club; The Friends of Ojibway Prairie Inc.; Tallgrass Ontario; and Bike Windsor Essex
Railway	Essex Terminal Railway and Canadian National Railway
Utilities Owners	Town of Lasalle
	ENWIN Utilities
	Bell Canada
	Cogeco Cable Services
	Enbridge (Union Gas)
	Canada Post

12.1.3 Study Notices

12.1.3.1 Notice of Study Commencement and PIC #1

A Notice of Study Commencement and PIC #1 was issued to introduce the Study and invite the interested individuals to the PIC #1. The notice was issued via following means:

- **Email:** The notice was emailed to the contacts on the Study Mailing List on November 12, 2020;
- **Mail:** The notice was mailed to the residents and businesses within the Study Area on November 12, 2020;
- **Newspaper Advertisement:** The notice was published in the Windsor Star on November 7, 2020 and on November 13, 2020 inviting the public to participate;
- **Social Media:** The notice was tweeted out from the City's Twitter account and posted on the City's Facebook account on November 19, 2020;
- **Ojibway Nature Centre's website:** The link to the project website was provided on Ojibway Nature Centre's webpage: (http://www.ojibway.ca/index.htm); and,
- **Project webpage:** The City of Windsor posted the notice and PIC information on the project webpage.

The Notice of Commencement and PIC #1 is provided in Appendix I.

12.1.3.2 Notice of PIC #2

A Notice of PIC #2 was issued to invite the interested individuals to participate in the PIC #2. The notice was issued via following means:

- **Mail:** The notice issued to Canada Post for mailout to the residents and businesses within the Study Area on April 7, 2021;
- **Newspaper Advertisement:** The notice was published in the Windsor Star on April 8, 2021 and on April 15, 2021;
- **Email:** The notice was emailed to the contacts on the Study Contact List on April 13, 2021;
- **Project webpage:** The City of Windsor posted the notice on the project webpage.
- **Social Media:** A social media post was published about the PIC #2 on the City's Facebook account on April 27, 2021.

The Notice of PIC #2 is provided in Appendix J.

12.1.3.3 Notice of PIC #3

A Notice of PIC #3 was issued to invite the interested individuals to participate in the PIC #3. The notice was issued via following means:

- **Mail:** The notice issued to Canada Post for mailout to the residents and businesses within the Study Area on December 12, 2023;
- **Newspaper Advertisement:** The notice was published in the Windsor Star on December 16, 2023 and on January 13, 2024;
- **Email:** The notice was emailed to the contacts on the Study Contact List on December 18, 2023, with a follow-up reminder sent on January 3, 2024;
- **Project webpage:** The City of Windsor posted the notice on the project webpage.
- **Ojibway Nature Centre's website:** The link to PIC #3 was provided on Ojibway Nature Centre's webpage on December 18, 2023 (http://www.ojibway.ca/index.htm);

– **Social Media:** Social media posts were published about the PIC #3 on the City's Facebook and Twitter accounts on December 18, 2023, December 28, 2023 and January 5, 2024.

In addition to the above, various news outlets (such as, Windsor Star, CBC) posted articles about the PIC #3 on their websites. The Notice of PIC #3 is provided in Appendix K.

12.2 Consultation with the Public

12.2.1 Public Information Centre #1

PIC #1 was held online from November 19, 2020 to December 3, 2020 using a Virtual Consultation Platform hosted on the City of Windsor project website. The information materials for PIC#1 were posted online on the Virtual Consultation Platform, which was hosted on the project website (Ojibway Parkway Wildlife Crossing Class Environmental Assessment). The PIC materials were also shared on the City's website. Comments were invited during a two-week period (November 19 – December 3, 2020). The purpose of PIC #1 was to:

– Provide a summary of study background and the Municipal Class EA process;
– Provide an overview of technical studies completed and planned;
– Present the Problem and Opportunity Statement;
– Identify the alternative solutions;
– Present the evaluation criteria;
– Present the evaluation of alternative solutions and the preliminary preferred solution;
– Allow the public to provide input;
– Enable the use of public feedback in the next stage of developing and evaluating potential alternative designs; and,
– Identifying the next stage of the process.

PIC #1 slides are provided in Appendix I.

12.2.2 Public Information Centre #2

PIC #2 was held online from April 19, 2021 to May 3, 2021 virtually using a Virtual Consultation Platform hosted on the project website (Ojibway Parkway Wildlife Crossing Class Environmental Assessment). The information materials for PIC#2 were posted on the Virtual Consultation Platform as well as project webpage. Comments were invited during a two-week period (April 19 - May 3, 2021). The purpose of PIC #2 was to:

– Provide an overview of the study
– Outline the study process (Municipal Class EA)
– Share what we heard at PIC #1
– Discuss alternative design concepts for the Wildlife Overpass
– Describe how key comments were considered
– Present the evaluation criteria and the evaluation of alternatives
– Propose the preliminary preferred design
– Review additional design considerations
– Identify Next Steps
– Request feedback.

PIC #2 slides are provided in Appendix J.

12.2.3 Public Information Centre #3

PIC #3 was hosted to present the updated preferred design for the Wildlife Crossing that would cross Ojibway Parkway and the ETR tracks and would connect Ojibway Park with the natural areas associated with Black Oak Heritage Park. PIC #3 was hosted in two formats:

- **Virtual Public Consultation:** A project information package was made available on the project webpage, starting Monday, December 18, 2023. Interested individuals were invited to review this information on their own time and submit any comments by January 26, 2024 using the online comment form.
- **In-person Open House:** In addition to the Virtual Public Consultation, an In-person Open House was hosted on Thursday, January 18, 2024, from 2 pm to 4 pm and 6 pm to 8 pm at the Ojibway Nature Centre. Interested individuals were invited to attend this event where they had the opportunity to meet with Study Team Members and ask any questions and submit comments.

The PIC #3 slides are provided in Appendix K.

12.2.4 Summary of Key Public Feedback

There were several comments and questions received from the public related to key aspects of the proposed Wildlife Crossing. A summary of key comments and Study Team's responses are provided in Table 12-2. For detailed comments received during PIC #1, PIC #2, and PIC #3, please refer to Appendix I, Appendix J, and Appendix K.

Table 12-2: Public Comments and Study Team's Responses

Summary of Comment	Study Team's Response
The Wildlife Crossing should also cross ETR tracks, in addition to Ojibway Parkway.	Following PIC #2, the Study Team the team explored more options for the Wildlife Crossing over Ojibway Parkway and ETR tracks. Additional work included: – Expanding the Study Area to include ETR lands and portions of the Black Oak Heritage Park and the adjacent natural area. – Completing ecological field investigations within the expanded Study Area. – Completing connectivity modelling to identify additional locations for a Wildlife Crossing along Ojibway Parkway. – Developing and evaluating four new "revised" design options. As a result of this rigorous process, a revised preferred design for the Wildlife Crossing was identified to span over Ojibway Parkway as well as ETR tracks. Details of design options and evaluation process are provided in Section 8.
The Wildlife Crossing should have fences to guide animals and prevent them from accessing the roadway and ETR tracks.	Wildlife fencing has been proposed as part of the design for the Wildlife Crossing to prevent wildlife from entering onto the Ojibway Parkway and ETR tracks and to direct wildlife to the proposed Wildlife Overpass. An example of wildlife fence is shown in Figure 9-1, and proposed fence configuration is shown in Figure 9-2. Detailed specifications regarding the wildlife fencing would be determined during the detailed design phase.
Provide wildlife crossing at other locations (such as Matchett Road, Titcombe Road Drain).	The intent of this Study is to provide safe passage for area wildlife and landscape connectivity between Ojibway Park Area and Black Oak Heritage Park Area. Wildlife mortality and ecological connectivity in other locations may be addressed via other studies by the City.
Why an Arch Structure not selected as Wildlife Crossing?	As a result of the 50m span of the Wildlife Overpass, the existing Ojibway Multi-use Trail would be completely closed off visually from the adjacent roadway. This would greatly restrict ongoing natural surveillance capability and thus increase susceptibility to the occurrence of unlawful behaviour without easy detection. In addition, emergency access to northbound and southbound lanes, as well as to the multi-use trail would be restricted. Due to these public safety concerns, an Arch Structure was not carried forward.
Concern about not using road mortality data, connectivity models, and species comparisons to inform the selection of Wildlife Crossing and fencing.	The intent of this Study is to identify the Preferred Wildlife Crossing that would reduce wildlife mortality. The Study was scoped based on the funding available at the time it was commenced, which limited the ability to conduct extended surveys. Additionally, completing years of pre-construction surveys would delay the project. The preferred location of the crossing considers wildlife related concerns including habitat fragmentation and connectivity for several groups of

Summary of Comment	Study Team's Response
	wildlife as well as plants. The preferred location considers the loss of habitat and secondary and cumulative impacts. Road mortality data can be used to determine hotspots and is regularly used for some animal groups, such as reptiles. However, this crossing structure is to accommodate all wildlife (and additionally plants). Wildlife-vehicle collisions cannot always be relied on (e.g., the bias in reporting, low volume roads, generalize location reporting), and other methods have evolved to determine crossing locations. Road mortality data cannot replace incorporating information about the surrounding habitat and landscape structure into an analysis of crossing locations.
Consider providing trails on the Wildlife Crossing.	The purpose of this crossing would be to primarily provide ecological connectivity and safe passage for area wildlife. The structure would not include a trail for human use.
Prohibit human-use of the Wildlife Crossing via signage, redesigning trails in the Ojibway Park, area restrictions, and cyclist speed control measures.	The Wildlife Overpass was designed without consideration for human use. Design elements or other measures to deter human use of the Wildlife Overpass would be evaluated and determined during the next phase of the project (i.e., detailed design). These elements may include signage, surveillance equipment and monitoring.
Share details on plantings, soils, and habitats.	Preliminary information on vegetation and soils is provided in Section 9.2 of this report. Further details would be established during detailed design phase.
Will the traffic along Ojibway Parkway be impacted during construction?	Construction of the Wildlife Overpass would be completed in a staged approach. Temporary traffic impacts are anticipated including long term shoulder closures and lane shifts to accommodate the construction of the RSS abutments. Shoulder closure and lane shifts are estimated to be 18 months in duration. The placement of the girders over Ojibway Parkway would require a full roadway closure for a duration of at least one week.
Other small wildlife crossings, such as, culverts and underpasses should be considered. Feasibility for installing crossing structures under the railway tracks should be investigated.	A crossing structure for small animals and herptiles was considered. Crossing structures for smaller animals (culverts, herptile tunnels) should be spaced 300 m apart (Ministry of Transportation, 2016). However, the preferred design has a much wider crossing than the small culvert and herptile tunnel types considered under the 300 m distance suggestion. The Wildlife Overpass is located approximately 40 m north of the edge of the City's property boundary and approximately 450 m south of the intersection of Broadway Boulevard and Ojibway Parkway. At present it is not considered necessary for an additional crossing structure to the north; however, the option of a smaller crossing under the road has not been discounted but would be considered under adaptive management.

12.3 Consultation with Government Agencies

Correspondence with agencies (emails and individual meetings) is summarized below. A record of consultation (correspondence and meeting minutes) is provided in Appendix L.

12.3.1 Ministry of the Environment, Conservation and Parks

On October 2, 2020, the MECP provided acknowledgement letter in response to the Notice of Study Commencement and PIC #1. Via this letter, the Ministry delegated the procedural aspects of the Duty to Consult for this project to the City of Windsor, and advised that the City is required to consult with the following Indigenous communities who have been identified as potentially affected by the proposed project:

- Kettle and Stony Point First Nation
- Aamjiwnaang First Nation
- Bkejwanong (Walpole Island First Nation)
- Chippewas of the Thames First Nation
- Caldwell First Nation
- Oneida Nation of the Thames
- Windsor-Essex-Kent Métis Council

12.3.2 Ministry of Natural Resources and Forestry

On December 3, 2020, the MNRF (formerly Ministry of Northern Development, Mines, Natural Resources and Forestry) (Aylmer District) provided a response to the Notice of Study Commencement and PIC #1. The Ministry staff stated that the Ministry has not completed a screening of natural heritage or other resource values for the project, and it is the responsibility of proponent to be aware of and comply with all relevant federal or provincial legislation, municipal by-laws or other agency approvals. Ministry staff shared the Natural Heritage Information Request Guide, which explains the natural heritage information available to the Ministry and how this information can be accessed.

12.3.3 Ministry of Citizenship and Multiculturalism

On November 26, 2023, Ministry of Citizenship and Multiculturalism (formerly Ministry of Heritage, Sport, Tourism and Culture Industries) provided a letter in response to the Notice of Study Commencement. This letter outlined Ministry's interest in this Class EA Study as it relates to its mandate of conserving Ontario's cultural heritage. Ministry's letter noted that appropriate assessments be completed to identify archaeological resources and built heritage resources and cultural landscapes and assess impacts of project on those resources. Ministry's letter indicated that the findings of the cultural heritage studies be included in the environmental assessment reporting.

On April 30, 2021, the Ministry of Citizenship and Multiculturalism (formerly Ministry of Heritage, Sport, Tourism and Culture Industries) provided a response to the Notice of PIC #2 and requested an update on the status of technical cultural heritage resource studies for this undertaking.

On May 10, 2021, WSP (formerly Wood) on behalf of the City, responded that a Stage 1 Archaeological Assessment was completed as part of this study. A Stage 2 Archaeological Assessment is being proposed for the detailed design phase of this project. When available, the City of Windsor would share the Stage 2 Archaeological Assessment Report with the Ministry for review/approval. In addition, the Ministry's checklist for built heritage resources and cultural heritage landscapes was also completed for this project. Completed checklist along with information gathering emails were provided to the Ministry.

On May 11, 2021, the Ministry provided a response, thanking the Project Team for providing the update on technical cultural heritage resource studies for this undertaking.

12.3.4 Essex Region Conservation Authority

A meeting was held with the ERCA on November 30, 2020. The purpose of this meeting was to share project information with ERCA in advance of the PIC#1 and obtain feedback for consideration into next steps of the Study.

ERCA staff noted that Underpass Wildlife Crossing is not a preferred option as there will be safety issues associated with potential human use of the underpass. For the Overpass Wildlife Crossing, consideration shall be given to how to limit human access.

ERCA staff stated that in an ideal scenario it would be beneficial to extend the Wildlife Crossing over the railway tracks into the Black Oak Heritage Park. Concern was expressed that the wildlife may use the railway corridor to travel north or south and potentially re-enter Ojibway Parkway after landing on the west side in the naturalized area beside the Ojibway Parkway Trail. The trains may also prevent the wildlife from the crossing railway tracks. It was noted that consideration should be given to as how the impact to wildlife mortality will be addressed if they are directed down to the Parkway and the railway tracks. For the Wildlife Overpass structure, ERCA staff suggested using shrubs (such as Dogwood) along both edges of the structure. This will provide screening, which will limit wildlife's view of the Parkway when crossing. The ERCA staff also provided detailed comments in the comment form for PIC #1 on November 30, 2020.

A second meeting was held with the ERCA on April 1, 2021. The purpose of this meeting was to share the preliminary preferred design with ERCA staff and discuss how public's comments received as a result of PIC #1 were incorporated into the preliminary preferred design. Information at this meeting was presented using the slides developed for the PIC #2 that was being planned to start on April 19, 2021.

ERCA staff was receptive of the idea that the crossing would end east of railway tracks with consideration that there would be monitoring in the future and the crossing may be extended over the railway tracks, if the need is identified. ERCA staff suggested the use of an adaptive management approach, which would allow for the implementation of interim measures to avoid negative impacts if the monitoring identifies wildlife mortality on railway tracks. ERCA staff also suggested that the Study Team should consider that fencing height is sufficiently high to avoid deer jumping over the fences.

The Study Team also shared the draft ESR with ERCA for review and comments. A summary of key comments from ERCA on draft ESR and Study Team's responses are provided in Section 12.7 and detailed comments are included in Appendix L.

No comments were received from ERCA as part of PIC #3.

12.3.5 Windsor Police Service

Windsor Police Service provided comments in response to the Notices of PICs #1 and #2. These comments are summarized below.

On December 5, 2020, the Windsor Police Service provided input on the Preferred Solution (Wildlife Overpass). Windsor Police Service noted that that the Wildlife Crossing (North Option) represents the most optimal option from a public safety and crime & disorder prevention perspective for a number of reasons, including:

- It is very wide and open in its configuration and orientation – this optimizes ongoing visibility, guarding against the prospect of suspicious behaviour/use to occur
- The fact it spans overtop of the roadway makes for more accountable usage in the long term – always in clear sight, even from further away
- The design's open nature makes ongoing access for monitoring and maintenance activities easier and thus, easier for responsible parties who attend there for such purposes to more easily identify if

unlawful activity has been occurring – allowing for potential problems to be identified and mitigated more efficiently

The Windsor Police Service also noted that the tunnel (underpass) option is less desirable from a public safety perspective, due to the following reasons:

- A feature such as this will be, generally speaking, far less naturally observable and thus, more susceptible to unlawful behaviour to germinate and continue without easy detection
- Because the tunnel option is considerably smaller and more confining than the overpass option, with a far greater percentage of its overall mass being less "accountably visible" to random natural surveillance, its discreet configuration lends itself more to attracting problematic behaviour of both a criminal and/or public disorder nature
- Tunnel features of this kind can be typically vulnerable to unlawful congregations of persons for unlawful purposes such as drug use/selling, loitering & trespassing, vandalism & graffiti, nuisance setting of fires, etc.
- The Windsor Police Service also identified the following possible safety and security risks associated with the Preferred Solution (Wildlife Overpass):
  - The design appears to show the overpass terminating at the nearby railyard – if wildlife can traverse this overpass, then so too (presumably) can someone who is trespassing. Trespassers ending up in the railyard space…..an area with very little ongoing activity in which to monitor and report suspicious behaviour, present a crime and disorder risk that should be avoided.
  - It is understood that as a wildlife crossing, this feature will remain largely in a "naturalized" condition……meaning minimal, if any, ongoing maintenance. The risk of having no maintenance whatsoever is that the space could eventually become attractive to unlawful behaviour that would be difficult to detect and therefore report. This should be kept in mind in terms of long-term thinking.

On March 24, 2021, the Windsor Police Service provided input on the initial Preliminary Preferred Design (Wildlife Crossing over Ojibway Parkway), noting that the design represents the most optimal option from a public safety and crime & disorder prevention perspective.

On February 6, 2024, the Windsor Police Service provided input on the Ultimate Preferred Design (Wildlife Crossing over Ojibway Parkway and ETR tracks), confirming that the recommended option is optimal for public safety. Its open and wide structure allows for natural surveillance, deterring suspicious behavior. The bridge spans over urbanized spaces without intermediate supporting columns, maximizing visual accountability. The design facilitates easy access for monitoring and maintenance, allowing for efficient identification and mitigation of potential problems. It also ensures uninterrupted visibility of the adjacent multi-use trail from the roadway, facilitating emergency access.

12.4 Consultation with Impacted Property Owner

12.4.1 Essex Terminal Railway

As noted earlier, the ETR rail yard and ETR lands are located on the west side of Ojibway Parkway. The Study Team consulted with ETR at various occasions during the Class EA process. A summary of consultation with ETR is provided below. Email correspondence and minutes of meetings are provided in Appendix M.

2020

A meeting was held with the ETR on December 7, 2020. The purpose of this meeting was to provide an overview of the project to ETR, discuss any concerns ETR may have regarding the project, the possibility of incorporating an overpass over ETR tracks, and request information from ETR which may be of use to describe potential railway impacts on wildlife.

ETR staff noted that the ETR would like to be part of the process and considers the City a partner in improving the condition of the natural environment in the City. ETR staff stated that ETR would consider accepting an overpass over the railway but it would need to meet certain design criteria and ensure the railway's continued rights of use and access.

ETR staff advised that it is unlikely that ETR would consider a land severance or easement type arrangement to enable the construction of the westernmost abutment and landing on ETR lands (further to the west of the railway yard). However, they would be willing to entertain a sale or land-swap, which would include the entire linear corridor adjacent to the railway. The reasoning behind this being that severance of a single square/rectangular area from the corridor would mean that the remaining linear portion could no longer be utilized functionally by the railway (it would segment/split the area in which they would need to run any additional expansion or features linearly adjacent to their existing railway lines).

ETR staff noted that the ETR would like to review project drawings for the location of fencing.

2021

A second meeting was held with the ETR on May 6, 2021. The purpose of this meeting was to share the initial preliminary preferred design with ETR and discuss how public comments received as a result of PIC #1 were incorporated into the preliminary preferred design. Information at this meeting was presented using the slides developed for the PIC #2 that was held from April 19, 2021, to May 3, 2021.

ETR staff did not have any comments or concerns regarding the identified initial preliminary preferred design at the time of this meeting.

The Study Team inquired whether the ETR would consider providing a gap between railway trains at the railyard, when the trains are stopped? ETR staff noted that the railway company would be willing to work with the City on this project, however, it is not feasible to leave a gap between the railway trains because the schedule for the railway trains is different throughout the day. ETR staff added that this matter would be further discussed internally.

On May 27, 2021, the ETR responded that they are unable to accommodate a designated wildlife throughway across the Ojibway switching yard. There are several operational and safety factors related to the request for consideration that pose significant risk to their operations and staff.

2022

Prior to finalizing the ESR and issuing the Notice of Completion, the Study Team shared the initial draft ESR with ETR on January 31, 2022. Follow-up reminders were sent on February 9, 2022, and March 15, 2022. On March 16, 2022, ETR contacted Study Team noting that the ETR have concerns with agreeing to this project and would like to have a meeting with the Study Team to discuss their concerns.

A third meeting was held with the ETR on April 8, 2022. The purpose of the meeting was to listen to ETR staff's concerns regarding the proposed Wildlife Crossing. ETR staff expressed concerns about increased wildlife movement through their main switching yard due to the crossing, highlighting potential safety risks, financial implications, public perception issues, and environmental regulatory concerns. They also noted that the current (initial) plan seems to shift the wildlife mortality issue from Ojibway Parkway to the ETR tracks, which they found unreasonable.

The Study Team clarified that the crossing would not increase wildlife in the area but provide safe passage for existing wildlife. They discussed potential solutions, including a wildlife crossing across railway tracks or culverts under the tracks, but ETR expressed concerns about any plan introducing wildlife to their tracks. The Study Team proposed conducting monitoring within the railway corridor, which ETR agreed to review. ETR noted that they would be open to collaboration but emphasized that their legal team would need to review any proposals involving work within the ETR corridor.

On April 13, 2022, the Study Team shared the details of the Wildlife Mortality Monitoring within ETR corridor. Follow-up emails were sent to ETR on May 2, 2022, and May 27, 2022. Specifically, the Study Team noted that the monitoring program would achieve the following objectives:

- Document mortality of wildlife associated with the switchyard operation.
- Identify wildlife currently crossing, or attempting to cross the tracks, with a specific focus on reptiles and amphibians.
- Document wildlife behavior upon approach to crossing the tracks.

The City requested ETR's permission to access their lands and conduct the monitoring and noted that the results of the monitoring will be shared with ETR and will not be disclosed to the public without ETR's consent. The City requested ETR to review the plan and provide feedback.

On May 27, 2022, ETR's Legal Team issued a letter noting that ETR has decided that it will not permit this monitoring to occur on its lands. The letter also noted that the ETR has further concluded that any proposed wildlife bridge terminating at its eastern boundary with Ojibway Parkway is very likely to encourage wildlife, including potential rare species and SAR, to enter onto its rail yard. This would be unacceptable to ETR. ETR opposed any proposal which will tend to put wildlife at increased risk by encouraging further travel across its rail yard. ETR further noted, if such a proposal is implemented, it would take proactive steps on its own lands to erect barriers at its boundaries to prevent, to the extent possible, such further wildlife migration from occurring.

On June 9, 2022, the Study Team provided a response, acknowledging ETR's expressed concern of wildlife and potential SAR migrating into the railway corridor. The Study Team noted that based on this concern, it would appear that extending the wildlife crossing structure over both Ojibway Parkway and ETR tracks would be the preferred approach to address ETR's concerns.

It was further noted that in order to update the Environmental Assessment and associated preliminary design to include a preferred span over the railway corridor, additional biological surveys may be required on ETR land holdings to the west of the tracks. These additional studies would support identification of baseline conditions only for use in the environmental impact assessment. This would not include monitoring of wildlife mortality on the tracks or any investigative work inside the active rail corridor.

The Study Team inquired if the ETR would be supportive of providing permission to enter their lands for the purpose of conducting the biological studies. The Study Team also requested a meeting with ETR (and their solicitors, if required) to confirm the details and design criteria, which ETR requires to be applied for the City's design of a wildlife overpass structure crossing the railway. The Study Team followed up with ETR on September 26 and October 3, 2022 regarding the request for a meeting.

On October 3, 2022, ETR's Legal Team issued a letter noting that ETR's preference is to avoid any crossing over its rail yard, including a grade separated crossing, and that wildlife migration should be directed elsewhere. The letter also noted that the ETR does not wish to have any wildlife crossing infrastructure located within its lands, specifically, a "wildlife overpass" of any type is not ETR's "preferred approach".

The letter also noted that ETR does not wish any part of its lands to be subject of a biological survey and would not provide permission to enter onto its lands for this purpose. ETR values its working relationship with the City of Windsor and is prepared to continue discussions to ensure that mutual interests can be protected and advanced.

On October 4, 2022, the Study Team provided a response, clarifying that there would be no costs incurred by the ETR with any overpass option or the field investigations that are required on ETR property and the surrounding area. The Study Team reiterated the request for a meeting. A meeting was scheduled for October 20, 2022.

A fourth meeting was held with the ETR on October 20, 2022. The meeting centered around the concerns of the ETR regarding a proposed wildlife crossing. ETR expressed a preference for the crossing to be developed elsewhere. ETR highlighted the following key concerns:

- Crossing of the railway switching yard is not preferred. It would require the City to agree to design the crossing in a way to not to limit ETR's use of the property for switching purposes.
- Construction, operation, and maintenance of the crossing should not affect ETR.
- ETR does not want to have any surveys/studies completed on its property.
- ETR's concerns are not only economical and operational, but also to ensure that wildlife does not migrate on to ETR lands. Barrier fencing would be required to funnel the wildlife onto the crossing. Without the fencing, the wildlife may funnel on to ETR tracks.
- Use of a small section or ETR lands parallel to their existing tracks would interrupt the "linearity" of the whole line.

Study Team clarified that the purpose of the project is to re-establish a connection between Ojibway Park and Black Oak Heritage Park. The separation between the two parks is Ojibway Parkway and the ETR tracks. Study Team added that other locations were also reviewed within the Study Area, however, we had to avoid installing the crossing at the southern extent of the parks because of the presence of SAR plants in that area. It was further noted that exclusion/directional fencing will be part of the Wildlife Crossing.

ETR noted that for a crossing across ETR tracks, the following concerns would need to be considered:

- ETR would want to preserve the operational use of its lands by providing appropriate vertical clearance for the crossing. As such, the Wildlife Crossing across the ETR switchyard would need to provide appropriate clearance to not to interfere with ETR operations.
- The Wildlife Crossing would need to provide fencing to keep the wildlife from entering the ETR lands.
- ETR would not be responsible for any costs associated with construction, operation, maintenance and deconstruction.
- ETR would not be interested having any studies/surveys completed on its lands.

2023

In December 2023 a notice letter for PIC #3 was issued to the ETR.

2024

On January 23, 2024, ETR shared a letter in response to the Notice of PIC #3. ETR expressed concerns with the location of the proposed crossing and its proximity to its active rail yard. ETR further noted that it is concerned that any proposed wildlife crossing terminating at its easterly boundary with Ojibway Parkway is very likely to encourage wildlife, including potential rare species and SAR to enter its rail yard. This would be unacceptable to ETR.

Any proposal which will tend to put wildlife at increased risk by encouraging travel near or adjacent to its rail yard without appropriate barriers or controls is not acceptable to ETR. If such a proposal were implemented, ETR would consider taking proactive steps on its own lands to erect barriers at its boundaries to prevent, to the extent possible, such further migration from occurring.

ETR concluded the letter noting that it wishes to avoid any crossing over its rail yard whether by span over its rail yard, by grade separated crossing or otherwise. In particular, ETR is concerned that any proposed wildlife crossing by span over its rail yard could pose an obstruction and reduce its level of service for the movement of goods by rail for its customers.

On July 5, 2024, the City shared a letter with ETR (dated July 3, 2024), noting that the concerns raised by ETR throughout the various stages of this study have been reviewed and considered in the finalization

of the Class EA Study. The City further noted that, as required by the Class EA process, the ESR will contain records of correspondence and meetings between the City and ETR, thus ETR's comments related to the project will be officially noted. The City noted that the Study Team anticipate posting the ESR for public review shortly. A Notice of Study Completion, outlining the public review period for the ESR, will be posted on the project webpage, and sent to all interested residents, Indigenous Nations, government agencies, and stakeholders.

12.5 Consultation with Utilities Owners

Consultation with utilities owners is summarized below. Meeting minutes and correspondence are provided in Appendix N.

12.5.1 Enbridge Gas, Bell Canada and ENWIN

A meeting was held on November 30, 2020, to share project information with utility companies in advance of the PIC#1 and obtain feedback for consideration into next steps of the Study. The meeting was attended by representatives from Enbridge Gas Inc. (formerly Union Gas) and Bell Canada. ENWIN staff did not attend the meeting.

Enbridge staff noted that there are two Enbridge gas pipelines on the west side of Ojibway Parkway within the Study Area. One pipeline is a 12" diameter pipe and the other one is a 16" diameter pipe. Given that these are high pressure pipelines, there are significant costs and timing associated with relocation of these types of pipelines. It would cost hundreds of thousands of dollars (~$1M), and one-to-two years to relocate them. Enbridge noted that they would like to review the drawings and provide comments. It was noted that there may be challenges associated with construction/relocation of the existing pipelines due to close proximity to the railway.

Bell Canada staff noted that there are two copper feeders and a fiber line located on the west side of Ojibway Parkway within the Study Area. Clarification was provided that the fiber line is located approximately 5.5 feet west of road edge of Ojibway Parkway, and 1 m behind the hydro poles. Bell Canada staff added that relocation of Fiber line could be difficult due to requirements to ensure continuity of service, but not impossible. It would cost approximately $30,000-$40,000 and take approximately three-to-four months to relocate fiber line.

WSP (formerly Wood), on behalf of the City of Windsor, contacted the utility companies on March 26, 2021 to request a meeting in advance of the PIC #2. However, a meeting could not be scheduled. WSP staff shared the link to the project webpage with the utility companies on April 13 and April 22, 2021, and invited them to review PIC #2 materials and provide input. No response was received.

On April 10, 2024, the Study Team contacted Enbridge Gas, notifying that the final PIC for the project was concluded and the Preliminary Design for the preferred alternative was advanced. The Study Team shared the design with Enbridge Gas and requested feedback. Enbridge Gas shared the following comments and questions:

- It appears that the proposed clearances (1.5 m) between the piers and pipelines are acceptable in accordance with Enbridge Gas' minimum requirement (1 m horizontally; 0.6 m vertically). It also appears that the 400 mm diameter pipe is further away, which is also acceptable.
- There is a minimum 6 m clearance from the lowest point of the steel plate girder to grade. Enbridge Gas' construction team will review to ensure that this will provide with sufficient clearance should there be a need to perform any maintenance operations (i.e., Hydrovac, etc.)
- Is the plan to drill or drive the piles into the ground? Pile driving causes vibrations that may impact the gas pipelines. Enbridge Gas would need to investigate this further prior to the commencement of construction activities.
- Will the width of the shoulder off of Ojibway Parkway be kept the same, increased, or decreased?

- Are there any grading work expected above the pipelines?
- Are the bridge piers a post or continuous-slab design? Enbridge Gas would want ensure that their crews will have the means to access the pipelines on either side of the piers (i.e., in the boulevard etc.)
- Loading stress calculations will be required if heavy equipment will cross Enbridge Gas' pipelines. Enbridge Gas would need the following forms completed to complete these calculations: 8486a, 8486b, 8486c. Is there plan to cross the gas pipelines with heavy equipment to complete this work?

Enbridge Gas shared a copy of their third-party manual (*Third-Party Requirements in the Vicinity of Natural Gas Facilities Standard)*, which outlines guidelines for construction activities with respect to the gas pipelines. This includes more details on safe excavation, pile driving, clearances from other structures, and encroachment.

Enbridge Gas requested a copy of the stamped drawings for their review.

Lastly, Enbridge Gas flagged that there are above-grade hydro lines that run parallel to Ojibway Parkway & the ETR tracks. Given its elevation, the bridge may interfere with these. If these lines need to be relocated underground, etc., then Enbridge Gas would need to coordinate requirements with the utility.

On May 1, 2024, the City provided a response to Enbridge, noting that current design is a preliminary design, and the Study Team is in the process of finalizing the ESR and completing the Municipal Class Environmental Assessment for the project. The City will need to secure funding to support the construction of the bridge before the project advances to detailed design, therefore, there's no timeline for the start of detailed design phase.

The City noted Enbridge's comments related to the proposed horizontal clearances (1.5m) to piers as well as vertical clearances (6m) to girder are noted. The City provided responses to Enbridge's questions, noting the following:

- Piles will primarily be driven into the ground; however some may also be drilled. It is anticipated that vibration monitoring will be required during construction and this requirement is already included in the ESR. Study Team's suggestion is to also add a requirement into the ESR that Enbridge be contacted upon initiation of the detailed design to confirm requirements for vibration monitoring and acceptable vibration tolerance limits.
- The width of the shoulder on Ojibway Parkway will remain the same.
- No grading work is expected above the pipelines themselves.
- The bridge piers are a post design.
- It is anticipated that construction will require heavy equipment to cross the lines. We suggest that within the ESR we add a requirement that Enbridge be contacted to obtain approval for line crossings prior to construction. This will ensure that the requirement gets conveyed to whomever ends up performing the detailed design & construction.

The City also noted that the Study Team will reference the *Third-Party Requirements in the Vicinity of Natural Gas Facilities Standard* within the ESR and make a commitment that it should be reviewed and complied with by the detailed design and construction teams. Similarly, the Study Team will note in the ESR that Enbridge be provided a copy of the issued for construction (IFC) drawings.

The comment regarding the above-grade hydro lines is noted. The requirement for the detailed design team to coordinate electrical transmission line re-locates with ENWIN during the detailed design phase will be included in the ESR.

12.5.2 Town of LaSalle

On December 19, 2023, the Town contacted the Study Team, to discuss the proposed crossing and ensure the existing sanitary sewer forcemain in the area between Ojibway Parkway and the ETR tracks has been identified and protected. The Town indicated that the existing forcemain is used by the Town to discharge wastewater to the near by Lou Romano Water Reclamation Plant located within City limits. The Town has interest in protecting this existing forcemain and the easement in which it's located as there are plans for future twining of the forcemain within this easement to accommodate future growth in the Town. The Town also mentioned there is an existing agreement with the City to protect the existing forcemain and easement and reserve space in this easement for the future twinning of the forcemain.

The Town requested a meeting to understand the proposed project, and its effect on the existing forcemain and the surrounding lands' ability to accommodate a future second forcemain.

The Town further shared that it dealt with similar concerns when the Federal Government built the overpass connecting the Herb Gray Parkway with the Gordie Howe Bridge Plaza over Ojibway Parkway and the ETR tracks just north of this site. The Town found a solution to these concerns through that process and hoped that this can be emulated in this EA process.

A meeting was held with the Town on January 15, 2024, to discuss Town's concerns regarding their existing a 32" (800mm) force main parallel to Ojibway Parkway which is located within a 15-foot wide easement. Concerns were raised regarding potential conflicts between the forcemain and bridge piers, with requests made for georeferenced structural drawings for the purpose of identifying conflicts between the piers and forcemain.

Other topics discussed included the town's preference to keep the easement clear of encumbrances, potential future twinning of the force main, and the construction of the Herb Gray Parkway near the forcemain, which required careful construction methods and a capped steel sleeve casing for future twinning. The Town expressed that they would want a similar capped casing (steel sleeve) installed for future twinning of the force main, and that they expect that the installation of that casing would be the responsibility of the party building the Ojibway Parkway wildlife overpass. It was also recommended during the meeting that hydro excavation and daylighting of the force main should be performed as design advances to confirm its precise location. This may be accomplished by including Subsurface Utility Engineering (SUE) Quality Level A (determination of exact horizontal and vertical location of the utility by exposing the utility through unobtrusive excavation methods) as an early work item in the detailed design contract. Coordination with utility operators for watermain location, adding the force main to the city's GIS database, and recommendations for confirming the force main's location through hydro excavation were also discussed. Action items included sharing relevant drawings and documentation, and the commitment to creating a georeferenced structural design file for sharing.

Following the meeting, the Town shared the as-built drawings for the sanitary forcemain (Provincial Sewage Works - drawings S-1152 (cover), S-1152-11, S-1152-12, and S-1152-13). The Town noted that it is a 32" (800mm) forcemain and is located in a permanent 15' wide easement. The Town requested a drawing that shows the location of the existing force main in relation to the existing legal easement and the preliminary design of the Wildlife Crossing, particularly in the area of future piers, foundation, piles, etc.

The Town also noted that the existing force main was not installed with a tracer wire, therefore use of a hydro-vac truck may be required to expose and confirm the exact location of the sanitary force main. The as-built drawings were completed in 1981, and the as-built measurements may be from points that no longer exist today, such as hydro poles, etc. The Town requested to be informed if there is a need to expose the forcemain with a hydro-vac so that a representative from the Town can attend to monitor that work.

The Town also clarified that it does not have any watermains in the City of Windsor's jurisdiction. The watermains within the City limits are owned by Windsor Utilities Commission (WUC), however, the existing 600mm main in the Project Area, that is owned and operated by WUC, provides one of the main feeds to the Town. Therefore, if it is affected, then it would impact the water supply to the Town as well. This watermain is located within a 10' wide easement.

On January 19, 2024, the Study Team shared the 12R survey drawing (12R-08982) showing existing easements in the Project Area, which includes Ministry of the Environment (MOE), Hydro, Gas, WUC, Essex Terminal Rail, and City of Windsor. The Study Team also shared the MOE easement registry for the forcemain (R800842). The Study Team further noted that based on the easement drawing, City's EIS mapping, and Town's as-built drawings, it appears that the distribution watermain (WUC) is located in the 10ft strip, and the forcemain (MOE) is located in the 15ft strip within the boulevard west of Ojibway Parkway. City's EIS Mapping does in fact include the forcemain and watermain location. The City requested a copy of the easement agreement from the Town for City's records. The Town provided the requested agreement to the City (Memorandum of Understanding dated April 22, 2003) and the agreement was forward to the Legal Department for their records.

On April 10, 2024, the Study Team shared the updated design drawings with the Town for review and feedback. The Town requested an update to the Preliminary Design drawings to show the limits of the existing easement; any components of the Wildlife Crossing that are proposed to be built within that easement; and the location of the proposed second foreman. The Town confirmed again that it would be amenable to a 1.2m diameter steel sleeve, capped at both ends, being installed during the construction of the Wildlife Crossing, so that in the future the Town could install the future forcemain within it.

On June 28, 2024, the Study Team shared the updated drawings showing the possible location of a future force main within the existing easement. It was noted that future force main would be significantly offset (at least 6m) from the proposed piers within the boulevard. Since the easements weren't georeferenced, they were not included in the drawings. The Study Team acknowledged the Town of LaSalle's interests and concerns and note that the City is agreeable to protecting the existing easement, as per the existing Agreement, and ensure there is no impact to the existing forcemain and space is reserved for future twinning of the forcemain. Protection methods and consideration for a casing will be reviewed further during detailed design.

12.6 Consultation with Indigenous Nations

Indigenous engagement is a key component of the Class EA process. As previously noted, the MECP delegated the procedural aspects of the duty to consult for this project to the City of Windsor. The Ministry advised that the engagement should occur with the following Indigenous Nations:

- Aamjiwnaang First Nation (AFN),
- Caldwell First Nation (CFN),
- Chippewas of the Thames First Nation (COTTFN),
- Chippewas of Kettle and Stony Point First Nation (CKSPFN),
- Métis Nation of Ontario (MNO),
- Oneida Nation of the Thames (ONT) and
- Walpole Island First Nation (Bkejwanong Territory; WIFN).

Following understood consultation protocols with these Indigenous groups, WSP (formerly Wood) contacted the Nations at major points throughout the Study. Initially, Study Team shared community-specific letters, a plain language project summary and Notice of Study Commencement and PIC #1 with the above identified Indigenous Nations on November 11, 2020. Study Team followed up by phone with each community to determine each community's interest.

Study Team contacted the above noted Indigenous Nations prior to the PIC #2 to provide a community-specific letter, Notice of PIC #2 and the Stage 1 Archaeological Assessment. Due to the COVID-19 pandemic, many of the communities preferred email contact and follow-ups only.

Following PIC #2, the Study Team shared draft ESR with the Indigenous Nations for review and comments. As noted previously, a key comment was to extend the Wildlife Crossing across ETR tracks. Accordingly, following identification of a revised preferred design (i.e., crossing over Ojibway Parkway and ETR tracks), the Study Team shared Notice of PIC #3 with the Indigenous Nations to review the updated design.

Indigenous consultation (including main points of contact and follow-ups) are outlined below. Records of Indigenous Consultation are provided in Appendix O.

12.6.1 Aamjiwnaang First Nation

The Study Team shared the Notice of Study Commencement and PIC#1 on November 11, 2020. A follow up phone call was made, and a voice-message was left along with a follow-up email on November 27, 2020.

The Study Team shared the Notice of PIC #2 and Stage 1 Archaeological Assessment for review on April 19, 2021. A follow up phone call was made with a follow-up email on May 3, 2021.

On February 1, 2022, the Study Team shared draft ESR for review and comment. A follow-up email reminder was sent on February 16, 2022.

The Study Team shared the Notice of PIC #3 on December 18, 2023. A follow-up email was sent on January 3, 2024.

No response was received from AFN.

12.6.2 Caldwell First Nation

The Study Team shared the Notice of Study Commencement and PIC#1 on November 11, 2020. A follow up phone call was made, and a voice-message was left along with a follow-up email on November 27, 2020. On December 1, 2020, WSP (formerly Wood) and CFN had a phone call to discuss the Study and WSP subsequently provided reference documents via email.

The Study Team shared the Notice of PIC #2 and Stage 1 Archaeological Assessment for review on April 19, 2021. A follow up phone call was made with a follow-up email on May 3, 2021. CFN explained that they are in the process of reviewing Study materials and will contact Project Team when ready to share feedback.

The Study Team shared the Notice of PIC #3 on December 18, 2023. A follow-up email was sent on January 3, 2024. On January 19, 2024, CFN noted that one of their coordinators will be following up soon to review the project and identify any needs for further information. On January 26, 2024, Environment and Consultation Coordinator from the CFN contacted the Study Team and requested extension for the review of PIC #3 materials. The Study Team extended the timeline for the review of PIC #3 materials for Caldwell First Nation up to February 1, 2024. CFN Environmental & Consultation Department (ECD) shared the following comments on PIC #3 materials on February 1, 2024:

- CFN ECD coordinates Field Liaison Representatives (FLRs) to participate in various forms of fieldwork on projects across Traditional Territory. To build technical capacity CFN requests opportunities for participation and funding via standard CFN procedures and rates on fieldwork associated with this project.
- CFN ECD requests the opportunity for FLR and technical staff participation with species transplanting.
- As Willowleaf Aster is a Species of Interest to Anishinaabe, CFN ECD requires a comprehensive mitigation plan to be shared and the opportunity to be involved in transplanting if necessary.

CFN ECD requests the exclusion measures during construction and post-construction restoration activities be shared prior to commencement.

- CFN ECD expects participation and funding via standard CFN procedures and rates on archaeological field participation associated with this Stage 2 archaeological assessment and onwards.
- CFN ECD requests the CHER be shared for technical revision and comments once completed. Indigenous communities in the region share a history with the buildings and landscapes associated with CHERs.

On June 12, 2024, the Study Team provided a response to CFN, noting that ESR was being finalized for presenting to the City Council for endorsement, prior to posting the document for review and issuing the Notice of Study Completion. The Study Team noted that CFN's letter and comments would be included in the ESR document. Further, any subsequent phase of the Ojibway Parkway Wildlife Crossing project (i.e. implementation of the preferred design, including assessments, detailed design, construction, etc.) will be subject to City Council's direction in the future. The City will follow the standards set out in the Province of Ontario's Standards and Guidelines for Consultant Archaeologists and the City of Windsor's approved policies and procedures for consultation and engagement with First Nations Communities. These standards are reflected in the province's bulletin Engaging Aboriginal Communities in Archaeology (2011), as well as the current Draft City of Windsor Archaeological Management Plan 2023, which has been circulated to the First Nations Communities for comment and review.

On June 17, 2024, CFN provided a response, noting that there are no additional comments.

12.6.3 Chippewas of the Thames First Nation

The Study Team shared the Notice of Study Commencement and PIC#1 on November 11, 2020. The Study Team received email response on November 23, 2020 that there are minimal concerns with the project at the time but expect to be notified of any archaeological findings, receive copies of archaeological reports, and be notified if changes to the Project occur or if environmental impacts are identified.

The Study Team shared the Notice of PIC #2 and Stage 1 Archaeological Assessment for review on April 19, 2021. A follow-up email was sent on May 3, 2021.

The Study Team received email response on May 19, 2021, noting that the proposed project is located within the McKee Treaty area to which COTTFN is a signatory. COTTFN identified that there are minimal concerns with the information presented. However, any substantial changes to the project must be communicated. Archaeology Assessments require notification and the opportunity to actively participate by sending a First Nation Field Liaison on behalf of this First Nation. COTTFN also shared the consultation protocol document that will guide positive working relationships.

On February 1, 2022, the Study Team shared draft ESR for review and comment. A follow-up email reminder was sent on February 16, 2022.

The Study Team shared the Notice of PIC #3 on December 18, 2023. A follow-up email was sent on January 3, 2024. On February 9, 2024, the COTTFN shared a response letter, which noted that the COTTFN identified this project to be of moderate concern to them. COTTFN requested a meeting to review the project and gather more information. COTTFN noted that they require notification of any archaeology work and the opportunity to actively participate in that work by sending First Nation Field Liaisons on behalf of COTTFN.

On June 12, 2024, the Study Team provided a response to COTTFN, noting that as part of the Municipal Class EA process, the City reaches out to the public, residents, Indigenous Nations, government agencies, and stakeholders and invites them to provide their comments and concerns about the subject matter. The City's current policy does not allow for the provision of funding to any party in order to obtain

their input, as participation in this aspect of the Municipal Class EA process is not considered obligatory. In relation to archaeology works, the City will follow the standards set out in the Province of Ontario's Standards and Guidelines for Consultant Archaeologists which includes consultation and engagement with First Nations Communities. These standards are reflected in the province's bulletin Engaging Aboriginal Communities in Archaeology (2011), as well as the current Draft City of Windsor Archaeological Management Plan 2023, which has been circulated to the First Nations Communities for comment and review.

The Study Team also noted that the draft ESR was being finalized for presenting to the City Council for endorsement, prior to posting the document for review and issuing the Notice of Study Completion. Any subsequent phase of the Ojibway Parkway Wildlife Crossing project (i.e. implementation of the preferred design, including assessments, detailed design, construction, etc.) is subject to City Council's direction in the future.

The Study Team inquired if COTTFN wished to meet to discuss the current Municipal Class EA phase of the project.

12.6.4 Chippewas of Kettle and Stony Point First Nation

The Study Team shared the Notice of Study Commencement and PIC#1 on November 11, 2020. A follow up phone call was made, and a voice-message was left along with a follow-up email on November 27, 2020.

The Study Team shared the Notice of PIC #2 and Stage 1 Archaeological Assessment for review on April 19, 2021. A follow up phone call was made with a follow-up email on May 3, 2021.

Study Team shared draft ESR on February 1, 2022 for CKSPFN's review and comment. A follow-up email reminder was sent on February 16, 2022. On February 23, 2022, CKSPFN expressed interest in reviewing the project report, and inquired if there is a budget available to facilitate their review. CKSPFN provided a budget for report review on March 1, 2022. Learning more about CKSPFN's engagement and involvement expectations, process and needs would better inform future outreach, engagement and involvement by the City.

Several email exchanges occurred between March 23, 2022, and March 30, 2022 to schedule a meeting with CKSPFN. Eventually, a meeting was scheduled for April 4, 2022. CKSPFN noted that the intent of the meeting was provide technical comments on the project. The meeting was attended by IBA Braiding (Consultation Advisors to CKSPFN). IBA Braiding noted that their proposed review budget was not approved by the City, instead, the City had offered a reduced amount, as such, this meeting was held to provide comments on the project. During the meeting, IBA Braiding representatives asked various questions about the project. One key question was whether the Wildlife Crossing would cross the ETR tracks. IBA Braiding requested that CKSPFN be provided a copy of the Stage 2 Archaeological Assessment Report.

The Study Team shared the Notice of PIC #3 on December 18, 2023. A follow-up email was sent on January 3, 2024.

No response received from theCKSPFN.

12.6.5 Métis Nation of Ontario

The Study Team shared the Notice of Study Commencement and PIC#1 on November 11, 2020. A follow-up email was sent on November 27, 2020.

The Study Team shared the Notice of PIC #2 and Stage 1 Archaeological Assessment for review on April 19, 2021. A follow-up email was sent on May 3, 2021.

On February 1, 2022, the Study Team shared draft ESR for review and comment. A follow-up email reminder was sent on February 16, 2022.

The Study Team shared the Notice of PIC #3 on December 18, 2023. A follow-up email was sent on January 3, 2024.

No response received from the MNO.

12.6.6 Oneida Nation of the Thames

The Study Team shared the Notice of Study Commencement and PIC#1 on November 11, 2020. A follow up phone call was made, and a voice-message was left along with a follow-up email on November 27, 2020. ONT identified preference for emails only. On November 30, 2020, ONT responded noting interest in the biological and archaeological assessments and requested a phone call to further discuss the project and the engagement process. WSP (formerly Wood) responded on the same day confirming a phone call for December 3, 2020. On December 3, WSP and ONT met for an introductory meeting to understand ONT's interest in the Study. ONT suggested WSP to attend the Oneida Environment Committee meeting to present the Study to the Chief, Council members and Clan Mothers, in order for ONT to determine the impact on Treaty Rights. On January 12, 2021, WSP and the City attended a meeting at the Environment Committee meeting. The result of the meeting was to investigate the possibility of having ONT involved in creating bat roosting boxes or bee boxes, as well the possibility of incorporating Indigenous content on its trail systems, or within the multi-use pathway. ONT also requested to be involved in any further archaeological work. WSP noted that the Stage 2 Archaeological Assessment would be provided to ONT for review and would document the commitment to provide the Stage 2 Archaeological Assessment and the need for field monitors for Stage 3 and 4 Archaeological Assessment in the ESR.

The Study Team shared the Notice of PIC #2 and Stage 1 Archaeological Assessment for review on April 19, 2021. The Study Team received email response on April 19, 2021 requesting capacity funding to review and comment on the Stage 1 Archaeological Assessment. ONT shared their draft agreement, along with fee for Stage 1 archaeological assessment report review, and also noted that an ONT monitor be present in any archaeological fieldwork.

On May 28, 2021, the Study Team contacted ONT noting that ONT's draft agreement was better suited for the fieldwork monitoring, and inquired if it would be acceptable to complete the agreement during the detailed design phase of the project when Stage 2 Archaeological Assessment would be completed. The Study Team followed-up several times to confirm payment method, however, did not receive any responses.

On February 1, 2022, the Study Team shared draft ESR for review and comment. A follow-up email reminder was sent on February 17, 2022.

The Study Team shared the Notice of PIC #3 on December 18, 2023. A follow-up email was sent on January 3, 2024. No response received from the ONT.

12.6.7 Walpole Island First Nation (Bkejwanong Territory)

The Study Team shared the Notice of Study Commencement and PIC#1 on November 11, 2020. WIFN identified interest in having a meeting. A meeting was held on November 24, 2020. WIFN identified interest in participating in the stage 2 archaeological assessments and requested to review the Natural Environment Report. WIFN also noted preference for an overpass and review of the draft ESR.

The Study Team shared the Notice of PIC #2 and Stage 1 Archaeological Assessment for review on April 19, 2021. A follow up phone call was made, and a voice-message was left along with a follow-up email on November 27, 2020.

On February 1, 2022, the Study Team shared draft ESR for review and comment. A follow-up email reminder was sent on February 17, 2022.

The Study Team shared the Notice of PIC #3 on December 18, 2023. A follow-up email was sent on January 3, 2024. No response received from WIFN.

12.7 Review of Draft Environmental Study Report

The Draft ESR was circulated to the following for their review and comment:

- Government agencies, ETR and Utility Companies (on January 31, 2022)
- Indigenous Nations (on February 1, 2022)

This opportunity for review of the draft report was provided before the formal public review period and issuance of Notice of Completion. Comments were requested by March 4, 2022. Follow-up email was sent to agencies, ETR and utility companies on February 9, 2022. Follow-up emails were sent to the Indigenous Nations on February 16-17, 2022, and March 2, 2022.

Comments received on the draft ESR and Study Team's responses are provided in Table 12-3. Correspondence with government agencies, ETR, utility companies and Indigenous Nations with regards to the review of the draft ESR are provided in Appendix L, Appendix M, Appendix N, and Appendix O.

Table 12-3: Comments on Draft Environmental Study Report and Study Team's Responses

Comment	Study Team's Response
Ministry of the Environment, Conservation and Parks - (March 8, 2022)	
Indigenous Consultation The proponent should continue to engage with all communities that have been engaged with to date as the Class EA process proceeds. Please continue reaching out to communities if there are any substantial changes to the project/process or if the proponent is applying for subsequent permits from the ministry that may be of interest or concern to communities. We recommend that the proponent include the record of consultation with any subsequent applications to the ministry to help in our review of those applications.	Comment noted. Any subsequent phase of the Ojibway Parkway Wildlife Crossing project (i.e. implementation of the preferred design, including assessments, detailed design, construction, etc.) is subject to City Council's direction in the future. The City will follow the standards set out in the Province of Ontario's Standards and Guidelines for Consultant Archaeologists and the City of Windsor's approved policies and procedures for consultation and engagement with First Nations Communities. These standards are reflected in the province's bulletin Engaging Aboriginal Communities in Archaeology (2011), as well as the current Draft City of Windsor Archaeological Management Plan 2023, which has been circulated to the First Nations Communities for comment and review.
Climate Change Climate change considerations have not been documented in the ESR. The document "Considering Climate Change in the Environmental Assessment Process" (Guide) (www.ontario.ca/page/considering-climate-change-environmental-assessment-process) is now a part of the EA program's Guides and Codes of Practice. The Guide sets out the ministry'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. The proponent should review this Guide in detail. The ministry expects proponents of Class EA projects to: Consider the project's expected production of greenhouse gas emissions and impacts on carbon sinks (climate change mitigation), as well as resilience or vulnerability of the undertaking to changing climatic conditions (climate change adaptation). Include a discrete section in the ESR 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 ESR has been updated to include a section on Climate Change Considerations. Please refer to Section 5.4.9.
Source Water Protection In October 2015 the Municipal Engineers Association Parent Class EA document was amended to include reference to the Clean Water Act in Section A.2.10.6 (accessible online at https://municipalclassea.ca/manual/page19.html), which indicates that proponents of a Class EA project must identify early in their process whether a project is or could potentially be occurring within a vulnerable area. The ministry recommends that the proponent include a section on source water protection in the main body of Report in order to clearly document how the proximity of the project to any delineated vulnerable areas was considered and assessed. For further information about the source protection plan and assistance in identifying all applicable policies and their requirements, proponents should contact source protection program manager for the applicable source protection region (resources available online: https://conservationontario.ca/conservation-authorities/source-water-protection/source-protection-plans-and-resources/).	The ESR has been updated to include a section on Drinking Water Source. Please refer to Section 5.4.12 and Section 10.4.13.
Species at Risk Red-headed Woodpecker is referenced in Section 5.4.9.7.3 of the ESR. In January 2022, Red-headed Woodpecker was up-listed to endangered and now receives species and general habitat protection. The	Comment noted. New Section 5.4.6 (Table 5-4) recognized Red-headed Woodpecker's status as endangered under Endangered Species Act. Impacts and recommended mitigation measures for SAR are discussed under Section 10.4.2.

Comment	Study Team's Response
ESR should be updated to reflect this change and Red-headed Woodpecker should be considered under the species at risk/Endangered Species Act sections, rather than Significant Wildlife Habitat. Section 10.4 identifies that 0.3178 hectares of Red- headed Woodpecker habitat would be removed for construction and a reduction in habitat will occur until restoration and replanting are successful. This should be considered under impacts to ESA-protected species.	
The ministry Species at Risk Branch (SARB) is concerned about the potential for the ecopassage to direct Species at Risk (SAR) reptiles to the Essex Terminal Railway and possible resultant impacts to individuals (e.g. injury, mortality). SARB is supportive of an extension of the overpass over the rail corridor to better connect Ojibway Park and Black Oak Heritage Park. Based on Section 10.1.3.1 of the ESR, SARB understands that monitoring will be conducted by the City of Windsor following the construction of the overpass to monitor performance and mortality on railway tracks. If a need to extend the overpass across the railway yard is identified, the City may consider construction of an additional crossing of the railway corridor, subject to the availability of funding to support additional studies, design, property acquisition and construction. If it is determined that SAR are being injured or killed in the rail yard, SARB recommends that mitigation measures be implemented (e.g. directional fencing to less busy areas of the railyard, education/outreach with the railway operators, etc.) while planning and approvals for the overpass extension are obtained.	Following the release of Draft ESR in 2022, the Study Team completed additional work to identify a preferred design option for the Wildlife Crossing that would cross both, Ojibway Parkway and ETR tracks. This work included the following: – Expanding the Study Area to include ETR tracks and portion of the Black Oak Heritage Park; – Completing additional ecological field studies; – Completing connectivity analysis, and – Developing and evaluating revised design options for Wildlife Crossing across Ojibway Parkway and ETR tracks. A revised preferred design was selected for the Wildlife Crossing that would cross Ojibway Parkway and ETR tracks. This preferred design was shared with the Indigenous Nations, the public, government agencies, ETR, utilities owners, and stakeholder groups through PIC #3, held from December 18, 2023 to January 26, 2024 (In-person Open House held on January 18, 2024). This revised preferred design has been carried forward as the recommended design for the Wildlife Crossing. Please refer to Section 8 and 9 for more information.
SARB understands that a vegetation and tree inventory will be completed to document vegetation and tree removals and to confirm species that may be impacted by construction activities. SARB also understands that the ministry will be consulted when specific project details (e.g. detailed design) are available and that a SAR screening and Information Gathering form will be submitted to SAROntario@ontario.ca for review. Based on the information in the ESR, the project may impact SAR and/or protected habitat and may require authorization under the Endangered Species Act, 2007.	Comment noted.
Surface Water Assessment of surface water bodies, through a comprehensive study of their features and functions, is essential to prevent adverse impacts to existing and future water users. It is indicated in various sections of the ESR that the study area is located in proximity to the Titcombe Road Drain and the Black Oak Wetland Complex, though the ESR does not report any water quantity and quality issues that may be experienced due to the proposed activities, both during construction and in the long-term. This is one of the major elements of assessing the natural environment. Surface water around the study area may be adversely impacted due to disruption/removal of vegetation that could lead to increased erosion, sedimentation/mud piling, and contamination from potential spills or leakages. An adequate mitigation plan and monitoring program is essential for assessing and preventing/minimizing the environmental harm during and after construction. As is noted in Section 10.4.7.1 of the ESR, erosion and sediment control measures will need to be developed and implemented to mitigate construction impacts of the undertaking and protect water quality. The Report is missing a comprehensive identification of potential impacts to nearby surface water bodies, an assessment of the magnitude of the net positive and negative effects, and consideration of any required mitigation measures as a result of the preferred alternative. Section 9.1 of Appendix C of the ESR identifies that the Titcombe Road Drain is located near the footprint of the preferred alternative. Section 5.4.9.2 of the ESR also identifies that the Black Oak Wetland Complex is located near the study area, and Section 10.4.3 notes that the wetland is distant enough that no impacts are anticipated. The ministry recommends that the assessment of impacts to these water bodies, including erosion and sedimentation due to construction	Discussion regarding surface water features is provided in Section 5.4.8 (Drainage). It is noted that various municipal drains lie in the area surrounding the preferred crossing location (i.e., Susan Drain to the north, Titcombe Road Drain to the south, and Ojibway Park Drain to the east), which are understood to be regulated by ERCA. However, no regulated watercourses or features are located within the preferred location of the crossing, and the crossing is noted to lie outside of the area regulated by the ERCA. As such, no features in the immediate vicinity of the crossing are considered to provide significant hydrologic routing or storage (i.e., attenuation) of stormwater runoff, although much of the surrounding area is serviced by municipal drains. The available elevation data indicates that the Study Area and the surrounding region is fairly flat (i.e., overland slopes less than 2%). The City's open data for the storm sewers and municipal drains indicate multiple open drains crossing Ojibway Parkway from east to west before merging near the intersection with Broadway Street. A review of available aerial imagery indicates the presence of roadside ditches on both sides of Ojibway Parkway in select locations within the Study Area limits, which route the stormwater in the road right-of-away to one of the drains, as shown below. Further to above, based on the preferred design presented in Section 9, the Titcombe Drain is located over 150 m away from the northern limit of the Wildlife Crossing. With the implementation of mitigation measures proposed in Section 10, project's effects on drainage features are not anticipated.

Comment	Study Team's Response
activities, and any mitigation measures required be further explained in the ESR to facilitate traceability of decision-making in the planning process.	
Chippewas of the Thames First Nation - (March 4, 2022)	
Thank you for notifying and inviting Chippewas of the Thames First Nation (COTTFN) to review the Ojibway Parkway Wildlife Crossing Environmental Study Report. We have reviewed the information that you have presented to COTTFN at this time, based on our review we have identified no concerns with the Report or Project. I ask that if there are any changes to the project that are of a substantive nature or additional archaeology assessments that you keep us informed by sending an electronic notification through NationsConnect. This is an online portal that COTTFN is using to receive project notices. We look forward to continuing this open line of communication. To implement meaningful consultation, COTTFN has developed its own protocol - a document and a process that will guide positive working relationships.	Comment acknowledged.
Essex Region Conservation Authority - (March 2, 2022)	
ERCA provided detailed comments on the draft Environmental Study Report. A summary of key comments from ERCA is provided below. ERCA's detailed comments are provided in Appendix L. – ERCA agreed with the identification of the problem, i.e., Ojibway Parkway and the adjacent ETR tracks functionally separate Black Oak Heritage Park and Ojibway Park, inhibiting wildlife movement. However, ERCA questioned the efficacy of the Wildlife Crossing that would end east of the ETR tracks. – ERCA concurred with the preferred location for the Wildlife Crossing, as it would have the least impact on natural heritage features. However, they expressed concerns that the design of the crossing, which does not extend over the ETR tracks, does not fulfill the ultimate goals of a Wildlife Crossing. They argued that a partial crossing does not provide a connection, as the physical habitats associated with the two parks will still be separated by the ETR tracks. – ERCA raised concerns about the proposed preferred alternative and the City's approach. They questioned the ESR's assertion that many large and meso mammals successfully cross the railway barrier due to infrequent train traffic, pointing out that the tracks are frequently occupied by parked train cars. They argued that the proposed partial crossing does not provide an effective ecological connection or safe passage for wildlife. – ERCA questioned the approach to adaptive management, which involved monitoring the performance of the Wildlife Crossing and mortality on the ETR tracks and then extending the structure over ETR tracks in the future. They argued that it is not reasonable to construct an expensive structure that may not function as intended, and then only consider fixing the problem if funding is available. – ERCA suggested that a more prudent approach would be to design a complete Wildlife Crossing and delay construction until full funding is secured. They argued that the proposed monitoring program, while robust and comprehensive, may simply confirm the severity of the mortality resulting from the installation of a partial Wildlife Crossing.	As noted above, following the release of Draft ESR in 2022, the Study Team completed additional work to identify a preferred design option for the Wildlife Crossing that would cross both, Ojibway Parkway and ETR tracks. This work included the following: – Expanding the Study Area to include ETR tracks and portion of the Black Oak Heritage Park; – Completing additional ecological field studies; – Completing connectivity analysis, and – Developing and evaluating revised design options for Wildlife Crossing across Ojibway Parkway and ETR tracks. A revised preferred design was selected for the Wildlife Crossing that would cross Ojibway Parkway and ETR tracks. This preferred design was shared with the Indigenous Nations, the public, government agencies, ETR, utilities owners, and stakeholder groups through PIC #3, held from December 18, 2023 to January 26, 2024 (In-person Open House held on January 18, 2024). This revised preferred design has been carried forward as the recommended design for the Wildlife Crossing. Please refer to Section 8 and 9 for more information.
Windsor Police Service - (February 10, 2022)	
I have reviewed all the documentation associated with this study and appreciate that our perspective was integrated into the findings and observations. I have no further comments to add at this time.	Comment acknowledged.

13 Closure and Next Steps

This report has documented the planning, decision making and consultation process for Ojibway Parkway Wildlife Crossing in accordance with the Municipal Class Environmental Assessment process for a Schedule 'C' project. This report is available for review by the Indigenous Nations, the public, government agencies, ETR, utilities owners, and interested stakeholder groups. The location and timing of the review of this report is identified in the Notice of Study Completion. Interested persons may provide written comments to the following contact in accordance with the timeline identified in the Notice of Study Completion:

Michael Todd, P.Eng.
Project Administrator
Engineering Department – Corporate Projects
mtodd@citywindsor.ca

Provided that no Section 16 Order Requests are received, this project can proceed to detailed design phase. Information on Section 16 Order Request process is provided below.

13.1 Section 16 (6) Order Request Process

The Minister of the Environment, Conservation and Parks has the authority and discretion to make an Order under Section 16 of the *Environmental Assessment Act*. A request may be made to the MECP 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.

Prior to requesting a Section 16(6) Order, the proponent should first try to resolve any concerns directly through the Class EA process. The minister must consider the factors set out in Section 16(5) of the Environmental Assessment Act. If a Section 16 Order request is made, the project proponent cannot proceed with the project until the minister makes a decision on the request. If the minister makes a Section 16 Order, the proponent may only proceed with the project if they follow the conditions in the Order.

Timing for an Order Request

At the conclusion of a project, the proponent must post a Notice of Study Completion, allowing for a minimum of 30-day public comment period for the project. During the comment period the proponent cannot proceed with the project until at least 30 days after the end of the public comment period. During the public comment period, anyone can: review the documentation, submit any comments or concerns to the proponent and request a Section 16(6) Order.

How to make a request

To submit a Section 16(6) Order request, the following information must be provided to ensure that the ministry is able to efficiently begin reviewing the request:

- Name, address and email address;
- Project name;
- Proponent name;
- What kind of Order is being requested i.e., a request for additional conditions or a request for an individual environmental assessment;

- Details about the concerns about potential adverse impacts on constitutionally protected Aboriginal or treaty rights and how the proposed Order may prevent, mitigate potential adverse impacts on Aboriginal and treaty rights, and any information in support of the statements in the request;
- Whether the concerned party belongs to, represents or has spoken with an Indigenous community whose constitutionally protected Aboriginal or treaty rights may be adversely impacted by the proposed project;
- Whether the concerned party has raised their concerns with the proponent, the proponent's response (if any) and why the concerns could not be resolved with the proponent; and
- Any other information to support the request.

Section 16 Order requests are made to the Minister of the Environment, Conservation and Parks and the Director of Environmental Assessment Branch. The request may be submitted by mail, email, fax or hand delivered to the Minister:

Minister of the Environment, Conservation and Parks
Ministry of Environment, Conservation and Parks
777 Bay Street, 5th Floor
Toronto ON M7A 2J3
Email: 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
Email: EABDirector@ontario.ca

Requests should also be copied to the proponent of the project (in this case, City of Windsor).

There is no appeal of the minister's decision with respect to a Section 16 Order. If the request for a Section 16(6) Order is denied by the minister, the proponent can proceed with the project. If the minister makes an Order, the proponent may only proceed with the project if they follow the conditions in the Order.

For more information and specific instruction and details on the process, please visit: https://www.ontario.ca/page/class-environmental-assessments-section-16-order

All personal information included in the 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.

14 References

Barg, J. J., Jones, J., & Robertson, R. J. (2005). Describing Breeding Territories of Migratory Passerines: Suggestions for Sampling, Choice of Estimator, and Delineation of Core Areas. Journal of Animal Ecology 74: 139-149.

Bissonette, J. A., & Adair, W. (2008). Restoring habitat permeability to roaded landscapes with isometrically-scaled wildlife crossings. Biological Conservation 141(2008) 482-488.

Bissonette, J. A., & Adair, W. (2008). Restoring habitat permeability to roaded landscapes with isometrically-scaled wildlife crossings. Biological Conservation 141(2008) 482-488.

Cadman, M. D., Sutherland, D. A., Beck, G. G., Lepage, D., & Couturier, A. R. (2007). Atlas of the Breeding Birds of Ontario, 2001-2005. Toronto, xxii + 706 pp: Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature.

Canada-United States-Ontario-Michigan Border Transportation Partnership. (2008). Level 3 Traffic Operations Analysis Technically and Environmentally Preferred Alternative. https://www.partnershipborderstudy.com/pdf/Level%203%20Traffic%20Operations%20(December%202008).pdf: Detroit River International Crossing Study.

Center for Environmental Excellence by AASHTO. (2020). Chapter 3 Designing for Environmental Stewardship in Construction & Maintenance, 3.4. Designing to Accommodate Wildlife, Habitat Connectivity, and Safe Crossings. In Environmental Issue Construction and Maintenance Practices Compendium. © 2020, Center for Environmental Excellence by the American Association of State Highway and TransportationOfficials (AASHTO)2020, Center for Environmental Excellence by the American Association of State Highway and TransportationOfficials (AASHTO).

Choquette, J. D., & Valliant, L. (2016). Road Mortality of Reptiles and Other Wildlife at the Ojibway Prairie Complex and Greater Park Ecosystem in Southern Ontario. The Ottawa Field-Naturalists' Club, 64-75.

Choquette, J. D., & Valliant, L. (2016). Road Mortality of Reptiles and Other Wildlife at the Ojibway Prairie Complex and Greater Park Ecosystem in Southern Ontario. The Ottawa Field-Naturalists' Club, 64-75.

City of Windsor. (2019). Active Transportation Master Plan Final Report. https://www.citywindsor.ca/residents/Construction/Environmental-Assessments-Master-Plans/Documents/Active%20Transportation%20Master%20Plan%20Final%20Report.pdf.

City of Windsor. (2020). City of Windsor Official Plan - Schedule D - Land Use. Office Consolidation : December 9, 2020. Retrieved from https://www.citywindsor.ca/residents/planning/plans-and-community-information/windsor---official-plan/Pages/Windsor-Official-Plan.aspx

City of Windsor. (2020). Degrees of Change – City of Windsor Climate Change Adaptation Plan (2020). Retrieved from https://www.citywindsor.ca/residents/environment/pages/environment.aspx#:~:text=Climate%20Change%20Emergency%20Declaration,across%20Canada%20with%20its%20declaration.

Committee on the Status of Endangered Wildlife in Canada. (2003). COSEWIC assessment and update status report on the Northern Bobwhite Colinus virginianus in Canada. Ottawa. vii + 20 pp.: COSEWIC.

Committee on the Status of Endangered Wildlife in Canada. (2006). COSEWIC assessment and status report on the Golden-winged Warbler Vernivora chrysoptera in Canada. . Ottawa. vii + 30pp: COSEWIC.

Committee on the Status of Endangered Wildlife in Canada. (2006). COSEWIC assessment and update status report on the Louisiana Waterthrush Seiurus motacilla in Canada. Ottawa. vi + 26 pp. : COSEWIC.

Committee on the Status of Endangered Wildlife in Canada. (2007). COSEWIC assessment and status report on the Olive-sided Flycatcher Contopus cooperi in Canada. Ottawa. vii + 25 pp.: COSEWIC.

Committee on the Status of Endangered Wildlife in Canada. (2007). COSEWIC assessment and update status report on the Eastern Hog-nosed Snake Heterodon platirhinos in Canada. Ottawa. viii + 36 pp.: COSEWIC.

Committee on the Status of Endangered Wildlife in Canada. (2007). COSEWIC assessment and update status report on the Peregrine Falcon Falco peregrinus (pealei subspecies – Falco peregrinus and pealei anatum/tundrius – Falco peregrinus anatum/tundrius) in Canada. Ottawa. vii + 45 pp.: COSEWIC.

Committee on the Status of Endangered Wildlife in Canada. (2007). COSEWIC assessment and update status report on the Short-eared Owl Asio flammeus in Canada. Ottawa. vii + 24 pp.: COSEWIC.

Committee on the Status of Endangered Wildlife in Canada. (2008). COSEWIC assessment and status report on the Canada Warbler Wilsonia canadensis in Canada. Ottawa. vi + 35 pp.: COSEWIC.

Committee on the Status of Endangered Wildlife in Canada. (2009). COSEWIC assessment and status report on the Whip-poor-will Caprimulgus vociferus in Canada. . Ottawa. vi + 28 pp.: COSEWIC. .

Committee on the Status of Endangered Wildlife in Canada. (2011). COSEWIC assessment and status report on the Yellow-breasted Chat auricollis subspecies Icteria virens auricollis and the Yellow-breasted Chat virens subspecies Icteria virens virens in Canada. Ottawa. xvi + 51 pp.: COSEWIC.

Committee on the Status of Endangered Wildlife in Canada. (2012). COSEWIC assessment and status report on the Eastern Musk Turtle Sternotherus odoratusin Canada. Ottawa. x + 40 pp.: COSEWIC.

Committee on the Status of Endangered Wildlife in Canada. (2012). COSEWIC assessment and status report on the Massasauga Sistrurus catenatus in Canada. Ottawa. xiii + 84 pp.: COSEWIC.

Committee on the Status of Endangered Wildlife in Canada. (2012). COSEWIC assessment and status report on the Mottled Duskywing Erynnis martialis in Canada. Ottawa. xiv + 35 pp: COSEWIC.

Conservation Ontario. (2021). Conservation Authorities. Retrieved from About Conservation Authorities: https://conservationontario.ca/conservation-authorities/about-conservation-authorities

COSEWIC. (2007). COSEWIC assessment and status report on the Chimney Swift Chaetura pelagica in Canada. Ottawa. Vii + 49 pp: Committee on the Status of Endangered Wildlife in Canada.

COSEWIC. (2008). COSEWIC assessment and update status report on the Eastern Foxsnake Elaphe gloydi, Carolinian population and Great Lakes/St. Lawrence population, in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 45 pp. Retrieved from https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/cosewic-assessments-status-reports/eastern-foxsnake.html

COSEWIC. (2010). COSEWIC assessment and status report on Butler's Gartersnake Thamnophis butleri in Canada. Ottawa. xi + 51 pp.: Committee on the Status of Endangered Wildlife in Canada .

COSEWIC. (2012). COSEWIC assessment and status report on the Eastern Wood-pewee Contopus virens in Canada. Ottawa. x + 39 pp: Committee on the Status of Endangered Wildlife in Canada.

COSEWIC. (2016). COSEWIC assessment and status report on the Blanding's Turtle Emydoidea blandingii, Nova Scotia population and Great Lakes/St. Lawrence population, in Canada. Ottawa. Xix+107pp.: Committee on the Status of Endangered Wildlife in Canada. .

COSSARO. (2013). Candidate Species at Risk Evaluation for Northern Map Turtle (Graptemys geographica). http://cossaroagency.ca/wp-content/uploads/2017/06/Final-COSSARO-Evaluation-Northern-Map-Turtle-March-15_GFM-FINAL-s.pdf: Committee on the Status of Species at Risk in Ontario.

COSSARO. (2013). Candidate Species at Risk Evaluation for Wood Thrush (Hylocichla mustelina). http://cossaroagency.ca/wp-content/uploads/2017/06/Final-COSSARO-Evaluation-Wood-Thrush-Feb-2013-final_GFM-FINAL-s.pdf.

Eastern Foxsnake Recovery Team. (2010). Recovery strategy for the Eastern Foxsnake (Pantherophis gloydi) – Carolinian and Georgian Bay populations in Ontario. Ontario Recovery Strategy Series. Peterborough, Ontario. vi + 39 pp.: Prepared for the Ontario Ministry of Natural Resources.

Eberhardt, E. (2008). Current and potential wildlife fatality hotspots along the Thousand Islands Parkway in eastern Ontario, Canada. Ottawa, ON: M. Sc. Thesis, Department of Geography and Environmental Studies, Carleton Univeristy.

Eco-Kare International. (2017). Effectiveness of wildlife mitigation measures for large- to mid ized animals on Highway 69 in Northeastern Ontario: September 2011 to September 2016.

Environment Canada. (2015). Recovery Strategy for the Spotted Wintergreen (Chimaphila marmaculata) in Canada. Ottawa. 26 pp. + Annexes: Species at Risk Act Recovery Strategy Series. Environment Canada.

Essex Region Conservation Authority. (2022). Interactive Mapping Tool. Retrieved from Essex Region Conservation Authority: https://essexregionconservation.ca/map-your-property/

Falconer, M., Richardson, K., Heagy, A., Tozer, D., Stewart, B., McMracken, J., & Reid, R. (2016). Recovery Strategy for the Bank Swallow (Riparia riparia) in Ontario. Peterborough, ON. ix + 70 pp.: Ontario Recovery Strategy Series. Prepared for the Ontario Ministry of Natural Resources and Forestry.

Freeman, E. (1979). Geological highway map, southern Ontario. Scale: 1 : 800 000. Author(s): Freeman, E.B. . Retrieved from http://www.geologyontario.mndm.gov.on.ca/mndmfiles/pub/data/records/M2441.html

GeoHub. (2019, April 10). Ontario GeoHub: Wooded Area. Land Information Ontario.

Government of Canada. (2017). Recovery Strategy for the Eastern Foxsnake (Pantherophis gloydi), Carolinian and Great Lakes/St. Lawrence Populations, in Canada - 2017 [Proposed]. Retrieved from https://www.sararegistry.gc.ca/default.asp?lang=En&n=B1795D3B-1&offset=2

Government of Canada. (2020, 03 09). 2020-21 Departmental Plan-Core responsibilities: planned results, resources, and key risks. Retrieved from infrastructure.gc.ca: https://www.infrastructure.gc.ca/pub/dp-pm/2020-21/2020-03-eng.html

Government of Ontario. (2002). Ojibway Prairie Provincial Park Management Plan. Retrieved from Provincial park management direction, Queen's Printer for Ontario: https://www.ontario.ca/page/ojibway-prairie-provincial-park-management-plan

Government of Ontario. (2002). Ojibway Prairie Provincial Park Management Plan. Retrieved from Provincial park management direction, Queen's Printer for Ontario: https://www.ontario.ca/page/ojibway-prairie-provincial-park-management-plan

Government of Ontario. (2006). Clean Water Act, 2006, S.O. 2006, c. 22. Retrieved from https://www.ontario.ca/laws/statute/06c22

Government of Ontario. (2021). Eastern Foxsnake (Carolinian Population) Habitat Protection Summary. Retrieved from https://www.ontario.ca/page/eastern-foxsnake-carolinian-population-habitat-protection-summary

Government of Ontario. (2021). Massasauga Rattlesnake General Habitat Description. https://www.ontario.ca/page/massasauga-rattlesnake-general-habitat-description.

Heagy, A., Badzinski, D., Bradley, D., Falconer, M., McCracken, J., Reid, R., & Richardson, K. (2014). Recovery Strategy for the Barn Swallow (Hirundo rustica) in Ontario. Peterborough, ON. vii +64 pp.: Ontario Recovery Strategy Series. Prepared for the Ontario Ministry of Natural Resource and Forestry.

Henry et al. (1991). Quaternary geology of Ontario, southern sheet; Ontario Geological Survey, Map 2556, scale 1:1000 000. Author(s): Henry, A.P., Barnett, P.J., Cowan, W.R. Retrieved from http://www.geologyontario.mndm.gov.on.ca/mndmfiles/pub/data/records/M2556.html

Humphrey, C., & Fotherby, H. (2019). Recovery Strategy for the Little Brown Myotis (Myotis lucifugus), Northern Myotis (Myotis septentrionalis) and Tri-colored Bat (Perimyotis subflavus) in Ontario. Ontario Recovery Strategy Series. Peterborough, Ontario. vii + 35 pp. + Appendix. : Prepared by the Ministry of the Environment, Conservation and Parks, Adoption of the Recovery Strategy for the Little Brown Myotis (Myotis lucifugus), the Northern Myotis (Myotis septentrionalis), and the Tr.

Jackson, S. (2000). Overview of Transportation Impacts on Wildlife Movement and Populations. Pp. 7-20 In Messmer, T.A. and B. West, (eds) Wildlife and Highways: Seeking Solutions to an Ecological and Socio-economic Dilemma. The Wildlife Society.

James, R. D. (1999). Update COSEWIC status report on the Least Bittern Ixobrychus exilis in Canada. Ottawa. 1-10 pp.: COSEWIC.

Jones, J. (2013). Recovery Strategy for the Slender Bush-clover (Lespedeza virginica) in Ontario. Ontario Recovery Strategy Series. . Prepared for the Ontario Ministry of Natural Resources, Peterborough, Ontario. vi + 26 pp.

Jones, J. (2013). Recovery strategy for the Willowleaf Aster (Symphyotrichum praealtum) in Ontario. . Peterborough, Ontario. vi + 29 pp.: Ontario Recovery Strategy Series. Prepared for the Ontario Ministry of Natural Resources, .

Kraus, T. (2011). Recovery Strategy for the Eastern Hog–nosed Snake (Heterodon platirhinos) in Ontario. Ontario Recovery Strategy Series. Prepared for the Ontario Ministry of Natural Resources, Peterborough, Ontario. i + 6 pp + Appendix vi + 24 pp. Adoption of the Recovery Strategy for the Eastern Hog–nosed Snake (Heterodon platirhinos) in Canada (Seburn, 2009).

McCracken, J. D., Reid, R. A., Renfrew, R. B., Frei, B., Jalava, J. V., Cowie, A., & Couturier, A. R. (2013). Recovery Strategy for the Bobolink (Dolichonyx oryzivorus) and Eastern Meadowlark (Sturnella magna) in Ontario. Peterborough, Ontario. viii + 88 pp.: Ontario Recovery Strategy Series. Prepared for the Ontario Ministry of Natural Resources.

Ministry of Environment, Conservation, and Parks. (2021, July 20). Species at Risk. Retrieved from Common Nighthawk: https://www.ontario.ca/page/common-nighthawk

Ministry of Municipal Affairs and Housing. (2020). Provincial Policy Statement, 2020. Approved by the Lieutenant Governor in Council, Order in Council No. 229/2020.

Ministry of Municipal Affairs and Housing. (2020). Provincial Policy Statement, 2020. Under the Planning Act. Retrieved from https://www.ontario.ca/page/provincial-policy-statement-2020

Ministry of Natural Resources and Forestry. (2021a, May 11). Make A Map: Natural Heritage Areas. General Natural Areas Report, Ojibway Prairie Provincial Nature Reserve. Natural Heritage Information Centre (NHIC) data request. Retrieved from Natural Heritage Information Centre (NHIC) data request.

Ministry of the Environment, Conservation and Parks (MECP). (2014, July 18). Species Profile. Retrieved from Red-headed Woodpecker (Melanerpes erythrocephalus): https://www.ontario.ca/page/red-headed-woodpecker#:~:text=Red%2Dheaded%20Wood

Ministry of the Environment, Conservation and Parks. (2014, July 14). Species Profile. Retrieved from Climbing Prairie Rose (Rosa setigera): https://www.ontario.ca/page/climbing-prairie-rose

Ministry of the Environment, Conservation and Parks. (2014, July 17). Species Profile. Retrieved from Snapping Turtle Chelydra serpentina: https://www.ontario.ca/page/snapping-turtle

Ministry of the Environment, Conservation and Parks. (2014, July 17). Species Profile. Retrieved from Little Brown Myotis (Myotis lucifugus): https://www.ontario.ca/page/little-brown-myotis

Ministry of the Environment, Conservation and Parks. (2014, July 17). Species Profile. Retrieved from Monarch (Danaus plexippus): https://www.ontario.ca/page/monarch

Ministry of the Environment, Conservation and Parks. (2016, June 15). Species Profile. Retrieved from Grasshopper Sparrow (Ammodramus savannarum): https://www.ontario.ca/page/grasshopper-sparrow

Ministry of the Environment, Conservation and Parks. (2017). Considering climate change in the environmental assessment process. Retrieved from https://www.ontario.ca/page/considering-climate-change-environmental-assessment-process

Ministry of the Environment, Conservation and Parks. (2019). Recovery Strategy for the Purple Twayblade (Liparis liliifolia) in Ontario. Ontario Recovery Strategy Series. Peterborough, Ontario. iv + 6 pp. + Appendix. Adoption of the Recovery strategy for the Purple Twayblade (Liparis liliifolia) in Canada (Environment Canada 2018).: Prepared by the Ministry of the Environment, Conservation and Parks.

Ministry of the Environment, Conservation and Parks. (2021, July 20). Species Profile. Retrieved from American chestnut (Castanea dentata): https://www.ontario.ca/page/american-chestnut-species-risk

Ministry of the Environment, Conservation and Parks. (2021, July 20). Species Profile. Retrieved from Blue ash (Species at Risk) (Fraxinus quadrangulata): https://www.ontario.ca/page/blue-ash-species-risk

Ministry of the Environment, Conservation and Parks. (2021, March 10). Species Profile. Retrieved from Kentucky Coffee-tree (Gymnocladus dioicus): https://www.ontario.ca/page/kentucky-coffee-tree-species-risk

Ministry of the Environment, Conservation and Parks. (2021, July 20). Species Profile. Retrieved from Slender bush-clover (Lespedeza virginica): https://www.ontario.ca/page/slender-bush-clover

Ministry of the Environment, Conservation and Parks. (2021, July 20). Species Profile. Retrieved from Dense blazing star (Liatris spicata): https://www.ontario.ca/page/dense-blazing-star#:~:text=In%20Ontario%2C%20Dense%20Blazing%20Star,floods%2C%20drought%2C%20or%20grazing.

Ministry of the Environment, Conservation and Parks. (2021, July 20). Species Profile. Retrieved from Red mulberry (Species at Risk) (Morus rubra): https://www.ontario.ca/page/red-mulberry-species-risk

Ministry of the Environment, Conservation and Parks. (2021, July 20). Species Profile. Retrieved from Riddell’s goldenrod (Solidago riddellii): https://www.ontario.ca/page/riddells-goldenrod#:~:text=Riddell's%20Goldenrod%20belongs%20to%20the,to%20450%20tiny%20flowering%20heads.

Ministry of the Environment, Conservation and Parks. (2021, July 20). Species Profile. Retrieved from Colicroot (Aletris farinosa): https://www.ontario.ca/page/colicroot#:~:text=Colicroot%20is%20a%20member%20of,arranged%20in%20a%20long%20spike.

Ministry of the Environment, Conservation and Parks. (2021, July 20). Species Profile. Retrieved from Purple Twayblade (Liparis liliifolia): https://www.ontario.ca/page/purple-twayblade

Ministry of the Environment, Conservation and Parks. (2021, July 20). Species Profile. Retrieved from Horned grebe (Podiceps auritus): https://www.ontario.ca/page/horned-grebe

Ministry of the Environment, Conservation and Parks. (2021, July 20). Species Profile. Retrieved from Spotted turtle (Clemmys guttata): https://www.ontario.ca/page/spotted-turtle

Ministry of the Environment, Conservation and Parks. (2021, July 20). Species Profile. Retrieved from Eastern hog-nosed snake (Heterodon platirhinos): https://www.ontario.ca/page/eastern-hog-nosed-snake

Ministry of the Environment, Conservation and Parks. (2021, July 20). Species Profile. Retrieved from Gray fox (Urocyon cinereoargenteus): https://www.ontario.ca/page/grey-fox#:~:text=In%20Ontario%2C%20the%20Grey%20Fox,burrows%20dug%20by%20other%20animals.

Ministry of the Environment, Conservation and Parks. (2021, July 20). Species Profile. Retrieved from Proud Globelet (Patera pennsylvanica): https://www.ontario.ca/page/proud-globelet#:~:text=The%20Proud%20Globelet%20is%20a,protrusion%20at%20the%20shell%20opening.

Ministry of the Environment, Conservation and Parks. (2021, July 20). Species Profile. Retrieved from Yellow-banded Bumble Bee (Bombus terricola): https://www.ontario.ca/page/yellow-banded-bumble-bee

Ministry of the Environment, Conservation, and Parks. (2021, July 20). Species Profile. Retrieved from Eastern whip-poor-will (Antrostomus vociferus): https://www.ontario.ca/page/eastern-whip-poor-will

Ministry of Transportation. (2016). Environmental Guide for Mitigating Road Impacts to Wildlife. Retrieved from https://roadecology.ucdavis.edu/files/content/projects/Ontario%20Environmental%20Guide%20for%20Mitigating%20Road%20Impacts%20to%20Wildlife_2017.pdf

Ministry of Transportation. (2016). Environmental Guide for Mitigating Road Impacts to Wildlife. Updated final report submitted by Eco-Kare International to the Ministry of Transportation. St. Catharines, Ontario, 107 pages.

Ministry of Transportation. (2016). Ministry of Transportation The Rt. Hon. Herb Gray Parkway 'A Parkway in a Prairie'. Retrieved from https://www.tac-atc.ca/sites/default/files/conf_papers/foster.pdf

Ministry of Transportation. (2018). Ontario Road Safety Annual Report 2018.

Municipal Engineers Association. (2023). Municipal Class Environmental Assessment. March 2023. Retrieved from https://municipalclassea.ca/

Oldham, M. (2017). List of the Vascular Plants of Ontario's Carolinian Zone (Ecoregion 7E). Peterborough, ON: Carolinian Canada and Ontario Ministry of Natural Resources and Forestry.

Ontario. (1990). Environmental Assessment Act (R.S.O. 1990, c. E.18). Retrieved from https://www.ontario.ca/laws/statute/90e18

Ontario Ministry of Natural Resources. (2000). Significant wildlife habitat technical guide. 151 p.

Ontario Ministry of Natural Resources. (2000). Significant Wildlife Habitat Technical Guide. Fish and Wildlife Branch, Wildlife Section, Science Development and Transfer Branch, South-central Sciences Section.

Ontario Ministry of Natural Resources. (2010). . Natural Heritage Reference Manual for Natural Heritage Policies of the Provincial Policy Statement, 2005. Second Edition. Toronto: Queen's Printer for Ontario. 248 pp.

Ontario Ministry of Natural Resources and Forestry. (2014). SIGNIFICANT WILDLIFE HABITAT MITIGATION SUPPORT TOOL.

Ontario Ministry of Natural Resources and Forestry. (2015, January). Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E. Peterborough, Ontario.

Ontario Ministry of Natural Resources and Forestry. (2015). Significant Wildlife Habitat Criteria Schedules For Ecoregion 7E.

Ontario Ministry of Natural Resources and Forestry. (2016). Best Management Practices for Mitigating the Effects of Roads on Amphibian and Reptile Species at Risk in Ontario. Queen's Printer for Ontario. 112 pp.

Ontario Ministry of Natural Resources and Forestry. (2016). Recovery Strategy for the Dense Blazing Star (Liatris spicata>) in Ontario. Ontario Recovery Strategy Series. Prepared by the Ontario Ministry of Natural Resources and Forestry, Peterborough, Ontario. iv + 8 pp. + Appendix vii + 28 pp. Adoption of Dense Blazing Star (Liatris spicata) in Canada (Environment Canada 2014).

Ontario Ministry of Natural Resources and Forestry. (2016). Recovery Strategy for the Least Bittern (Ixobrychus exilis) in Ontario. Ontario Recovery Strategy Series. Peterborough, Ontario. : Prepared by the Ontario Ministry of Natural Resources and Forestry.

Ontario Ministry of Natural Resources and Forestry. (2016). Recovery Strategy for the Massasauga (Sistrurus catenatus) – Carolinian and Great Lakes – St. Lawrence populations in Ontario. Ontario Recovery Strategy Series. . Prepared by the Ontario Ministry of Natural Resources and Forestry, Peterborough, Ontario. v + 9 pp. + Appendix ix + 37 pp. Adoption of the Recovery Strategy for the Massasauga (Sistrurus catenatus) in Canada (Parks Canada Agency 2015).

Ontario Ministry of Transportation. (2020). MTO Design Supplement for TAC Geometric Design Guide (GDG) For Canadian Roads (April 2020). St. Catharine's, ON : Ontario Ministry of Transportation, Transportation Infrastructure Management Division, Standards & Specifications Branch, Design Standards & Specifications Office. Retrieved from https://www.library.mto.gov.on.ca/SydneyPLUS/Sydney/Portal/default.aspx?lang=en-US

Ontario Peregrine Falcon Recovery Team. (2010). Recovery strategy for the Peregrine Falcon (Falco peregrinus) in Ontario. Ontario Recovery Strategy Series. Peterborough, Ontario. vi + 36 pp: Prepared for the Ontario Ministry of Natural Resources.

Ontario Road Ecology Group, Toronto Zoo. (2010). A Guide to Road Ecology in Ontario. Environment Canada Habitat Stewardship Program for Species at Risk.

Ontario Road Ecology Group, Toronto Zoo. (2010). A Guide to Road Ecology in Ontario. Environment Canada Habitat Stewardship Program for Species at Risk.

Reed, D. F., & Ward, A. L. (1985). Efficacy of methods advocated to reduce deer-vehicle accidents: research and rationale in the USA. Routes et faune sauvage. Service d'Etudes Techniques de Routes et Autoroutes, Bagneaux, France. Pages 285-293.

Rodger, L. (1998). Tallgrass Communities of Southern Ontario A Recovery Plan. World Wildlife Fund and the Ontario Ministry of Natural Resources.

Ruediger, B., & Lloyd, J. (2003). A RAPID ASSESSMENT PROCESS FOR DETERMINING POTENTIAL WILDLIFE, FISH AND PLANT LINKAGES FOR HIGHWAYS. International Conference on Ecology & Transportation, (p. 206). Lake Placid, New York.

Sage Earth. (2019). Black Oak Heritage Park Management Plan.

SOFIA. (2020, October 23). Southern Ontario Floral Inventory Analysis Version 3.40 (beta). Essex Region Conservation Authority.

Stantec Consulting Ltd. (2017). Broadway Street Railway Crossing Detailed Safety Assessment. Prepared for: Windsor Detroit Bridge Authority. February 28, 2017.

Statistics Canada. (2020). Canada's Core Public Infrastructure Survey: Roads, bridges and tunnels, 2018.

Traffic Injury Research Foundation. (2012). Wildlife-vehicle Collisions in Canada: A Review of the Literature and a Compendium of Existing Data Sources.

Transportation Association of Canada. (2017). Geometric Design Guide for Canadian Roads. Retrieved from https://www.tac-atc.ca/en/publications-and-resources/geometric-design-guide-canadian-roads

U.S. Department of Transportation. (2011). Wildlife Crossing Structure Handbook Design and Evaluation in North America. Publication No. FHWA-CFL/TD-11-003.

U.S. Department of Transportation. (2011). Wildlife Crossing Structure Handbook Design and Evaluation in North America (March 2011). U.S. Department of Transportation, Federal Highway Administration, Washington D.C., USA. Retrieved from https://roadecology.ucdavis.edu/files/content/projects/DOT-FHWA_Wildlife_Crossing_Structures_Handbook.pdf

Ursic, K., Farrell, T., Ursic, M., & Stalker, M. (2010). Recovery Strategy for the Spotted Wintergreen (Chimaphila maculata) in Ontario. Ontario Recovery Strategy Series. . Prepared for the Ontario Ministry of Natural Resources, Peterborough, Ontario. vi + 28 pp.

Wildlife Collision Prevention Program. (2021). Collision Facts. Retrieved from https://www.wildlifecollisions.ca/collision/collision-facts.htm

WSP. (2023a). Preliminary Wildlife Crossing Study, Ojibway Prairie Complex. Prepared for the City of Windsor. pp. 51.

WSP. (2023b). Tallgrass Plant Community Assessment, Ojibway National Urban Park. Prepared for the City of Windsor. pp. 94.

WSP. (2023c). Historical Ecological Land Classification and Desktop Natural Heritage Review, Ojibway Prairie Complex. Prepared for the City of Windsor. pp. 197.

WSP. (2024). Natural Heritage Review Report, Proposed National Urban Park in Windsor, Ojibway Prairie Complex. Prepared to the City of Windsor. pp. 621.

Yanes, M., Velasco, J., & Suárez, F. (1995). Permeability of roads and railways to vertebrates: the importance of culverts. Biological Conservation 71: 217-222.