GEI Consultants
Savanta Division

Environmental Impact Study

3054 Homestead Drive, 9166 and 9175 Airport Road
Hamilton, Ontario

FEBRUARY 2023

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REPORT PREPARED FOR
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1.0 INTRODUCTION

1.1 Project Overview

GEI Consultants Ltd., Savanta Division (GEI) was retained by Fengate Homestead Holdings LP (Fengate) to complete an Environmental Impact Study (EIS) for 3054 Homestead Drive, 9166 and 9174 Airport Road, Hamilton (herein referred to as the Subject Lands; **Figure 1**, **Appendix A**). The 9166 Airport Road property was purchased in January 2023 and a site reconnaissance was conducted for this property. The Subject Lands are generally located north of Airport Road, west of Homestead Drive, east of John C. Munro Hamilton International Airport (herein referred to as the Airport Lands) and south of Dickenson Road. The Subject Lands fall within the Airport Employment Growth District (AEGD) Secondary Plan Area and are within the Twenty Mile Creek and Upper Welland River Subwatersheds (**Figure 2**, **Appendix A**).

The Subject Lands consisted of a mixture of actively managed agricultural fields (soy), recently fallow fields and/or residential lands. One drainage feature flows west-east across the northern portion of the Subject Lands. The surrounding landscape is dominated by agricultural and commercial/industrial land-uses, including the Airport Lands immediately west of the property.

1.2 Purpose of the Report

An EIS is required to assess the potential impacts of the proposed development on the Subject Lands on natural heritage features and their associated functions. This EIS considers applicable policies of the Province of Ontario's Provincial Policy Statement (PPS; Ministry of Municipal Affairs and Housing; MMAH 2020) and associated provincial implementation guidance contained in the Natural Heritage Reference Manual (NHRM; MNR 2010) as well as the City of Hamilton's Official Plan, the AEGD Secondary Plan and the Niagara Peninsula Conservation Authority's (NPCA) regulation and policies. This EIS must be prepared to the satisfaction of the City of Hamilton in consultation with the NPCA.

The EIS Terms of Reference (TOR), specific to the preparation of the EIS for the Subject Lands, was initially prepared and circulated to the City of Hamilton and the NPCA on January 19, 2021. The EIS TOR was finalized with revisions based on comments from the City on May 21, 2021, and the NPCA on March 29, 2021 (**Appendix C**). Written approval from the NPCA was received June 14, 2021, and from the City on June 30, 2021. The approved TOR outlines the purpose, Subject Lands and scope of work, in accordance with the City of Hamilton's Environmental Impact Statement Guidelines (March 2015). A copy of the approved TOR is provided in **Appendix D**.

Based on the approved TOR, this EIS considers and includes the following information:

- Description of the proposal;
- Description of the surrounding environment;

- Identification and assessment of the potential impacts of the proposal on the environment and the significant features and functions of the Core Areas (includes drainage features found on the Subject Lands and features located on adjacent lands; **Figure 2**, **Appendix A**);
- Use of the unaltered Core Area boundary, as provided by the City in its Official Plans, as the basis of the evaluation;
- Identification of positive effects of the proposal such as opportunities for enhancement and/or restoration of significant features;
- Evaluation of the feasibility of alternative mitigation measures or techniques and the ability of such measures to prevent or minimize impacts;
- Recommendation on the suitability of proceeding with the proposal, appropriate mitigation measures, whether changes to the proposal are advised; and
- Recommendation for a monitoring plan and contingency plans and funds should the proposal result in any unexpected impacts to the Core Area, if necessary.

Policy C.2.5.8 of the Urban Hamilton Official Plan (UHOP; 2018) states that the EIS shall demonstrate the following:

- No negative impacts on the Core Area's natural features or their ecological functions;
- Connectivity between Core Areas shall be maintained, or where possible, enhanced for the movement of surface and ground water, plants and wildlife across the landscape; and
- The removal of other natural features should be avoided or minimized by the planning and design of the proposed use or site alteration wherever possible.

Since no linkages were identified within the UHOP (2018) or AEGD Subwatershed Study & Stormwater Master Plan (SWS/SWMP; Version 2.2; Aquafor Beech Limited 2017), a Linkage Assessment was not warranted, and also not required, by the City of Hamilton.

This report presents the results of data collected during the background review and 2021 ecological inventories. The EIS provides further analyses of existing natural heritage conditions and an assessment of the significance and sensitivity of these resources in the context of the proposed development. Site observations and inventory findings were analyzed to assess potential constraints to development. An assessment of potential direct, indirect and cumulative impacts on various terrestrial and aquatic features and their associated natural functions was completed, based upon site observations during the appropriate seasons.

The 9174 Airport Road property was acquired by Fengate in Spring 2022. Following the acquisition of this property, several surveys were completed to update the EIS. These surveys were completed in accordance with the approved TOR (**Appendix D**).

1.3 Natural Heritage Legislation and Policy Context

An assessment of the quality and extent of natural heritage features found on, and adjacent to, the Subject Lands and the potential impacts to these features from the proposed development was undertaken to comply with requirements of the following regulatory agencies, local municipality, and/or legislation:

- UHOP (2018 Consolidation);
- AEGD Secondary Plan (2015);
- City of Hamilton AEGD SWS/SWMP Implementation Document, Final Report (Version 2.2), prepared by Aquafor Beech Limited (2017);
- City of Hamilton AEGD – Phase 2, SSWS/SWMP, Final Report, June 2011, prepared by Dillon and Aquafor Beech Limited;
- City of Hamilton, AEGD, Eco-Industrial Design Guidelines, prepared by Dillon Consulting (2010);
- City of Hamilton Environmental Impact Statement Guidelines (2015);
- NPCA Ontario Regulation 155/06 and NPCA Policy Document: Policies for the Administration of Ontario Regulation 155/06 and The *Planning Act* (May 1, 2020 Consolidation);
- PPS (MMAH 2020);
- *Migratory Birds Convention Act* (1994);
- *Endangered Species Act* (ESA; 2021 Consolidation of S.O. 2007, c. 6); and
- *Fisheries Act* (R.S.C., 1985, c. F-14).

The Subject Lands are located outside of the Greenbelt and Niagara Escarpment Planning Areas.

1.3.1 City of Hamilton Urban Official Plan and AEGD Secondary Plan

The Official Plan is designed to be a guiding document to provide direction on management of communities, land-use changes and physical development. Two Official Plans are provided within the Hamilton Official Plan: Rural Hamilton Official Plan and UHOP. The Subject Lands are located within the urban boundary of Hamilton; therefore, the UHOP (2018) was reviewed.

As identified within Schedule B (Natural Heritage Systems) of the City of Hamilton Urban Official Plan, one stream was identified within the Subject Lands. This stream flows generally west to east towards the Airport Lands. No portions of the City's Natural Heritage System (NHS) were identified within the Subject Lands, and no other Core Areas or Linkages were identified; however, it is GEI's understanding that not all Core Areas have been identified on the Schedules of the UHOP.

Core Areas are defined within the Official Plan as key natural heritage features, key hydrologic features and local natural areas.

Key Natural Heritage Features include:

a) Significant habitat of endangered and threatened species;
b) Fish habitat;
c) Wetlands;
d) Life Science ANSIs;
e) Significant valleylands;
f) Significant Wildlife Habitat (SWH);
g) Sand barrens, savannahs and tallgrass prairies; and
h) Alvars.

Key Hydrologic Features include:

a) Permanent and intermittent streams;
b) Lakes (and their littoral zones);
c) Seepage areas and springs; and
d) Wetlands.

Local natural areas are defined within the UHOP as "Environmentally significant Areas as identified by the City of Hamilton, unevaluated wetlands and Earth Science ANSIs".

Schedules B-1 to B-7 were also reviewed for:

- Key Natural Heritage Feature Life Science Areas of Natural and Scientific Interest (ANSIs);
- Significant Woodlands;
- Key Natural Heritage and Key Hydrologic Feature Wetlands;
- Key Hydrologic Feature Lakes and Littoral Zones;
- Local Natural Area Environmentally Significant Areas; and
- Local Natural Area Earth Science ANSIs.

Schedule B-8 (Detailed Natural Heritage Features Key Hydrologic Feature Streams) identified the same drainage feature discussed above as a Key Hydrologic Feature Stream. Until detailed investigations, this feature would be considered a Core Area.

The Secondary Plan for these lands was approved at the Ontario Municipal Board on February 17, 2015. The Subject Lands are designated as Airport Reserve on Map B.8-1 (Land Use Plan).

Under Volume 2, Chapter B-8 of the UHOP (2018 Consolidation), the AEGD Secondary Plan (OPA 35) establishes the phasing, land uses, requirements, design principles, and standards for the development of an eco-industrial park in the Secondary Plan Area through to the year 2031.

The UHOP has several guiding natural heritage principles/policies that will be considered as part of this EIS. Those policies are presented below within **Table 1-1**.

Table 1-1: UHOP Policy Review (Volume 1, Chapter C)

UHOP Policy Reference	UHOP Policy Description
2.2.8 – General Policies	"All natural features, required vegetation protection zones, and enhancement or restoration areas on a property shall be placed under appropriate zoning in the zoning by-law and/or protected through a conservation easement to the satisfaction of the City or the relevant Conservation Authority or deeded to a public authority. Acquisition by a public body may also be considered as an option for protecting natural features and functions."
2.3 – Natural Heritage System – Core Areas	"It is the intent of this policy to preserve and enhance Core Areas and to ensure that any development or site alteration within or adjacent to them shall not negatively impact their natural features or their ecological functions."
2.3.1 – Natural Heritage System – Core Areas	"In accordance with the policies of this Plan, Schedule B – Natural Heritage System, identifies Core Areas to include key natural heritage features and key hydrological features. Core Areas of the City's Natural Heritage System also include other locally and provincially significant areas. Schedule B – Natural Heritage System shall be amended when new Core Areas are identified."
2.3.2 – Natural Heritage System – Core Areas	"Core Areas include key natural heritage features, key hydrological features and provincially significant and locally natural areas that are more specifically identified by Schedule B-1-8 – Detailed Natural Heritage Features. Core Areas are the most important components in terms of biodiversity, productivity and ecological and hydrological functions."
2.3.3 – Natural Heritage System – Core Areas	"The natural features and ecological functions of Core Areas shall be protected and where possible and deemed feasible to the satisfaction of the City enhanced. To accomplish this protection and enhancement, vegetation removal and encroachment into Core Areas shall generally not be permitted, and appropriate vegetation protection zones shall be applied to all Core Areas."
2.5.2 – Core Areas – Outside of the Greenbelt Plan Area	"New development and site alteration shall not be permitted within provincially significant wetlands, significant coastal wetlands or significant habitat of threatened and endangered species."
2.5.3 – Core Areas – Outside of the Greenbelt Plan Area	"New development and site alteration shall not be permitted within fish habitat, except in accordance with provincial and federal requirements."
2.5.4 – Core Areas – Outside of the Greenbelt Plan Area	"New development and site alteration shall not be permitted within significant woodlands, significant valleylands, significant wildlife habitat and significant areas of natural and scientific interest unless it has been demonstrated that there shall be no negative impacts on the natural features or on their ecological functions."

UHOP Policy Reference	UHOP Policy Description
2.5.5 – Core Areas – Outside of the Greenbelt Plan Area	"New development and site alteration shall not be permitted on adjacent lands to the natural heritage features and areas identified in Section C.2.5.2 to C.2.5.4 unless the ecological function of the adjacent lands has been evaluated and it has been demonstrated that there shall be no negative impacts on the natural features or on their ecological functions."
2.5.7 – Core Areas – Outside of the Greenbelt Plan Area	"Streams are mapped in Schedule B - Natural Heritage System. Streams have been separated into two classes: Coldwater Watercourse/Critical Habitat and Warmwater Watercourse/Important/Marginal Habitat. If the stream has not been classified as part of an EIS, subwatershed study, or other study, a scoped EIS is required to determine the classification."
2.5.8 – Core Areas – Outside of the Greenbelt Plan Area	"New development or site alteration subject to Policies C.2.5.3 to C.2.5.7 requires, prior to approval, the submission and approval of an Environmental Impact Statement which demonstrates to the satisfaction of the City and the relevant Conservation Authority that: a) There shall be no negative impacts on the Core Area's natural features or their ecological functions. b) Connectivity between Core Areas shall be maintained, or where possible, enhanced for the movement of surface and ground water, plants and wildlife across the landscape. C.2 4 of 9 Urban Hamilton Official Plan August 2019 Chapter C – City Wide Systems and Designations c) The removal of other natural features shall be avoided or minimized by the planning and design of the proposed use or site alteration wherever possible."
2.5.9 – Core Areas – Outside of the Greenbelt Plan Area	"An Environmental Impact Statement shall propose a vegetation protection zone which: a) has sufficient width to protect the Core Area and its ecological functions from impacts of the proposed land use or site alteration occurring during and after construction, and where possible and deemed feasible to the satisfaction of the City, restores or enhances the Core Area and/or its ecological functions; and b) is established to achieve, and be maintained as natural self-sustaining vegetation."
2.5.10 – Core Areas – Outside of the Greenbelt Plan Area	"Where vegetation protection zone widths have not been specified by watershed and sub-watershed plans, secondary, Environmental assessments and other studies, the following vegetation protection zone widths shall be evaluated and addressed by Environmental Impact Statements. Other agencies, such as Conservation Authorities, may have different vegetation protection zone requirements. a) Coldwater Watercourse and Critical Habitat – 30-metre vegetation protection zone on each side of the watercourse, measured from the bankfull channel.

UHOP Policy Reference	UHOP Policy Description
	b) Warmwater Watercourse and Important and Marginal Habitat – 15 metre vegetation protection zone on each side of the watercourse, measured from the bankfull channel c) Provincially Significant Wetlands – 30-metre vegetation protection zone, measured from the boundary of the wetland, as approved by the Conservation Authority or Ministry of Natural Resources. d) Unevaluated wetlands – Unevaluated wetlands and locally significant wetlands require a 15 metre vegetation protection zone, measured from the boundary of the wetland, as approved by the Conservation Authority or Ministry of Natural Resources, unless an Environmental Impact Statement recommends a more appropriate vegetation protection zone. e) Woodlands – 10-metre vegetation protection zone, measured from the edge (drip line) of the woodland. f) Significant woodlands – 15-metre vegetation protection zone, measured from the edge (drip line) of the significant woodland. g) Areas of Natural and Scientific Interest (ANSIs) – Life and Earth Science ANSIs require a 15-metre vegetation protection zone. h) Significant Valleylands – As required by the relevant Conservation Authority. i) Significant Habitat of Threatened or Endangered Species and Significant Wildlife Habitat: the minimum vegetation protection zone shall be determined through Environmental Impact Statements, dependent on the sensitivity of the feature."
2.5.11 – Core Areas – Outside of the Greenbelt Plan Area	"Vegetation protection zone widths greater or less than those specified in a) to i) above may be required if ecological features and functions warrant it, as determined through an approved Environmental Impact Statement. Widths shall be determined on a site-specific basis, by considering factors such as the sensitivity of the habitat, the potential impacts of the proposed land use, the intended function of the vegetation protection zone, and the physiography of the site."
2.5.13 – Core Areas – Outside of the Greenbelt Plan Area	""All plantings within vegetation protection zones shall use only non-invasive plant species native to Hamilton. The City may require that applicants for development or site alteration develop a restoration or management plan for the vegetation protection zone as a condition of approval."

As previously stated, these policies relating to the protection of natural heritage are to be considered holistically with other applicable policies that relate to other planning considerations (e.g., growth, employment, etc.). While the above noted natural heritage policies focus on protecting and enhancing natural heritage features and functions within the landscape, it is important that these policies are interpreted wholly with other UHOP policies to understand their intent to inform proposed development applications.

A SWS/SWMP was prepared in 2011 by Dillon Consulting and Aquafor Beech Limited and then another SWS/SWMP was prepared in 2017 by Aquafor Beech Limited to bridge the policy gap between the SWS/SWMP work that was completed in 2011 and the Secondary Plan approval. While some of the Subject Lands characterization remained the same as shown in the 2011 SWS/SWMP, the 2017 Implementation Document identifies those items that have changed and/or require review due to changes in legislation and/or policy.

The SWS/SWMP (2017) document notes that all developments are required to prepare an EIS and that the scope of the EIS is to be determined in consultation with City and Conservation Authority staff.

As identified within Map B. 8-1 (AEGD Secondary Plan Land Use Plan), no Natural Open Spaces are designated within the Subject Lands, rather the property is designated as Airport Reserve. Within Map B.8-2 (AEGD Secondary Plan NHS), no linkages or Core Areas are identified within the Subject Lands. One drainage feature is identified within the Subject Lands as providing supporting or indirect fish habitat (**Figure 2**, **Appendix A**); however, City staff have confirmed that no fieldwork was undertaken as part of the SWS/SWMP (2011 and 2017) that was completed in support of the Secondary Plan. As such, all natural heritage findings within the SWS/SWMP documents and Secondary Plan are considered preliminary and need to be verified through an EIS. Map B.8-4 (Phasing Plan) was also reviewed, and no preliminary dry stormwater management ponds are identified on, or partially on, the Subject Lands.

Figures 2.3 and 2.8.1 in the SWS/SWMP (2017) show one drainage feature that flows across the Subject Lands in an easterly direction. Section 2.8.1.1 of the SWS/SWMP (2017) makes the following recommendations for watercourses:

- **Seasonal/warmwater watercourses/important/marginal fish habitat** – Undertake a native, woody, riparian vegetation planting program to establish 75% of the stream corridor length in woody vegetation with the remainder as meadow or riparian wetland as appropriate;
- **Seasonal fish habitat** – These drainage features may be modified and relocated as necessary to facilitate development provided that their natural form and function is enhanced, subject to Conservation Authority approval and potentially an assessment in accordance with the Toronto and Region Conservation Authority (TRCA)/Credit Valley Conservation (CVC) (2014) Headwater Drainage Feature Assessment (HDFA) Guidelines; and
- **Indirect/support fish habitat/marginal fish habitat** – Based on a preliminary assessment of these features, they may be replaced by stormwater infrastructure, including Low Impact Development (LID) and end-of-pipe facilities to replicate their water quantity and quality function. Alternatively, they may be enhanced and protected within a corridor width of up to 30 m (plus the bankfull channel width). Their location may also be modified and relocated provided that their water quality and quantity functions are maintained and subject to Conservation Authority approval and potentially an HDFA as per TRCA/CVC Guidelines.

Figure 2.8.2 (Terrestrial Resources) and Figure 2.8.3 (Recommended NHS) in the SWS/SWMP (2017) did not identify any Terrestrial Resources or Recommended NHS features on the Subject Lands. Figures 2.8.1 and 2.8.3 do not depict a floodplain associated with the drainage feature found within the Subject Lands.

The AEGD Secondary Plan has several guiding natural heritage principles/policies that will to be considered as part of this EIS. Those policies are presented below within **Table 1-2**.

Table 1-2: AEGD Secondary Plan (OPA 35) Policy Review (Volume 2, Chapter B)

AEGD Secondary Plan Policy Reference	AEGD Secondary Plan Policy Description
8.2.2 b) – Sense of Place Principles	"Design with nature by protecting streams, mature trees, wetlands, significant habitat and integrating topography into developments"
8.2.3 a) – Public Realm Principles	"Integrate nature into the public realm by retaining natural areas for use as buffers, open spaces and trail systems"
8.2.3 d) and e) – Public Realm Principles	"Integrate innovative storm water management infrastructure" "Distinct character for the district"
8.2.4 i) – Built Form Principles	"Maximize efficiency of lot layout to take advantage of natural features"
8.2.11 – Natural Heritage Principles	"Through sustainable design and appropriate development the employment district protects and enhances the natural environment. The intent is to: a) Develop in a manner that is sensitive to the natural environment; b) Use innovative sustainable storm and wastewater infrastructure to protect water quality and source water; c) Protect and integrate provincially and municipally significant natural features, such as streams, valleylands, wetlands, mature trees and forests into the employment district's development, implement provincial policy and meet municipal policy; d) Use sustainable design to limit the emissions, water and energy consumption of buildings within the employment district; and e) Connect the employment district's open space system to surrounding natural areas to allow employees to enjoy and explore the region's natural heritage."
8.3.5 – General Policies	"All development within the Secondary Plan Area shall be planned on a comprehensive basis, avoid where possible impacts on natural features, and effectively integrate with adjacent development and future development. The implementing zoning by-law shall incorporate provisions relating to the height, density and design of development based on the provisions of this Secondary

AEGD Secondary Plan Policy Reference	AEGD Secondary Plan Policy Description
	Plan and the Airport Employment Growth District Eco-industrial Design Guidelines and Urban Design Guidelines."
8.4.5.7 - Design	"Airport Prestige Business uses shall be developed in accordance with the supporting policies, principles and requirements of Section B.8.4.5.7 and Section B.8.4.5.8 of this Secondary Plan and the Airport Employment Growht District Eco-industrial Design Guidelines and Urban Design Guidelines. Development within the Airport Prestige Business designation shall be subject to minimum standards for urban design (such as high quality and attractive materials and landscaping) and a high level of sustainable design. Development shall integrate natural features into their landscaping and buffering to minimize impacts on adjoining areas."
8.5 – Natural Open Spaces	"The Airport Employment Growth District Secondary Plan recognizes, preserves and protects natural heritage features as key elements of the area's character and eco-industrial design."
8.5.1 – Natural Open Spaces	"Lands designated Natural Open Space on Map B.8-1 – Airport Employment Growth District Land Use Plan shall comply with Section B.3.5.3 – Parkland Policies, Section C.2 – Natural Heritage System and Section C.3.3 – Open Space Designations of Volume 1."
8.5.2 – Natural Open Spaces	"Minor refinements to boundaries of the Natural Open Space designation may be permitted without amendment to this Secondary Plan provided the change is justified by an Environmental Impact Statement to the satisfaction of the City."
8.9.6 – Water Resources and Storm Water Management	"The storm water management system for the Secondary Plan Area is required to incorporate measures such as green roofs, rain gardens, rainwater harvesting on individual lots, and combined with additional measures such as biofilters, grassed swales, and perforated storm sewers, that are implemented within road rights of ways to encourage infiltration and reduce quantity of runoff reaching local drainage features."
8.9.12 – Water Resources and Storm Water Management	"Storm water management facilities shall be designed to complement the natural characteristics of the area and provide visual amenity for surrounding development."
8.12.1 - Natural Heritage System	"Within the Airport Employment Growth District, there are wetlands, streams, woodlands, meadows, successional areas and hedgerows which are identified as Core Areas, Linkages and Hedgerows in Map B.8-2 – Airport Employment Growth District Natural Heritage System. The policies of Volume 1 Section C.2.0 – Natural Heritage System apply, with the exception of Section C.2.4."
8.12.2 - Natural Heritage System	"Streams are identified in Map B.8-2 – Airport Employment Growth District Natural Heritage System. If the stream has not been classified as part of an Environmental

AEGD Secondary Plan Policy Reference	AEGD Secondary Plan Policy Description
	Impact Study, Subwatershed study or other study, a scoped Environmental Impact Study is required to determine the classification."
8.14.25 – Site Development, Disturbance, Natural Corridors and Greenways	"Appropriate development intensity and the efficient use of land in site planning shall be encouraged."
8.14.27 – Site Development, Disturbance, Natural Corridors and Greenways	"Site disturbance should be minimized and replanting to compensate for tree removals and to provide cooling and shade for streets, building and open spaces shall be encouraged."
8.14.28 – Site Development, Disturbance, Natural Corridors and Greenways	"Green spaces that integrate with the Airport Employment Growth District's natural heritage system and greenspace beyond the district shall be encouraged."
8.14.29 – Site Development, Disturbance, Natural Corridors and Greenways	"The use of measures to reduce heat island effects shall be encouraged."
8.14.30 – Site Development, Disturbance, Natural Corridors and Greenways	"Roadway design promoting naturalized areas and green corridors shall be encouraged."
8.14.32 – Relationship to Natural Edges	"Landscape buffers that address the interface and edges and provide naturalized buffers between developed areas of the site, streets and adjacent natural features are encouraged."
8.14.33 – Relationship to Natural Edges	"Building setbacks shall be required for development adjacent to the boundary of natural features under the jurisdiction of the Niagara Peninsula Conservation Authority, Hamilton Conservation Authority and Grand River Conservation Authority. Vegetation protection zones shall comply with Sections C.2.5.9 to C.2.5.15 inclusive of Volume 1."
8.14.71 – Landscape Quality	"Landscaping that supports ecology through the design of naturalized groves of trees (deciduous and evergreen) and areas incorporating low maintenance

AEGD Secondary Plan Policy Reference	AEGD Secondary Plan Policy Description
	native plant species (woody shrubs, ground covers, grasses and perennials) and encouraged."
8.14.72 – Landscape Quality	"Landscapes that provide comfort and amenity space by using vegetation for the purpose of creating shelter and microclimates are encouraged."

Similar to the UHOP policies, these policies relating to the protection of natural heritage are to be considered holistically with other applicable policies that relate to other planning considerations (e.g., growth, employment, etc.). While the above noted natural heritage policies focus on protecting and enhancing natural heritage features and functions within the landscape, it is important that these policies are interpreted wholly with other AEGD and UHOP policies to understand their intent to inform proposed development applications.

The presence of key natural heritage features, key hydrologic features and local natural areas based on detailed field investigations are discussed in **Section 4.10**.

1.3.2 Niagara Peninsula Conservation Authority

NPCA conducts reviews of planning processes associated with development of properties within its jurisdictional boundaries. In addition, NPCA provides planning and technical advice to planning authorities to assist them in fulfilling their responsibilities regarding natural hazards, natural heritage and other relevant policy areas pursuant to the *Planning Act*.

NPCA administers the Regulation of Development, Interference with Wetlands, Alterations to Shorelines and Watercourses, under Ontario Regulation 155/06. Permission is required from NPCA for any work development within their regulated areas which include watercourses, flooding and erosion hazards and wetlands as well as regulated allowances adjacent to these features.

The NPCA Watershed Explorer interface shows the same drainage feature discussed previously on the Subject Lands. This feature receives drainage from the Airport Lands to the west and conveys flows east along the northern portion of the property. No regulated wetlands were identified within the Subject Lands on the Watershed Explorer. Furthermore, the Subject Lands fall into two different subwatersheds, with the southern portion of the property located within the Upper Welland River subwatershed and the northern portion of the property within the Twenty Mile Creek subwatershed (**Figure 2**, **Appendix A**).

Wetland boundaries were formally staked with the NPCA on August 6, 2021.

1.3.3 Provincial Policy Statement

The PPS (MMAH 2020) provides guidance on matters of provincial interest surrounding land-use planning and development. It "supports improved land use planning and management, which contributes to a more effective and efficient land use planning system" (p. 1). The PPS is to be read in its entirety and land-use planners and decision-makers need to consider all relevant policies and how they work together.

Eight types of significant natural heritage features are defined in the PPS, as follows:

- Significant wetlands;
- Significant coastal wetlands;
- Significant woodlands;
- Significant valleylands;
- Significant wildlife habitat;
- Fish habitat;
- Habitat of endangered and threatened species; and
- ANSIs.

The PPS indicates the following:

- Natural features and areas shall be protected for the long term;
- The diversity and connectivity of natural features, as well their associated functions and biodiversity of natural heritage systems should be maintained, restored and, where possible, improved;
- Natural heritage systems should be identified within Ecoregions 6E and 7E. These features and systems should be resilient to climate change; and
- Water resources should be sustainably used.

Development and site alteration shall not be permitted in significant wetlands within EcoRegions 5E, 6E and 7E, or in significant coastal wetlands. Development and site alteration shall not be permitted in significant woodlands, significant valleylands, significant wildlife habitat (SWH) or significant ANSIs, unless it is demonstrated that there will be no negative impacts on the natural features or their ecological functions.

Development and site alteration shall not be permitted in the habitat of endangered and threatened species or in fish habitat, except in accordance with provincial and federal requirements.

Development and site alteration may be permitted on lands adjacent to the above features provided it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions.

1.3.4 Endangered Species Act

The provincial ESA, 2007 (Consolidation 2021) was developed to:

- Identify species at risk (SAR), based upon best available science;
- Protect SAR and their habitats and to promote the recovery of the SAR; and
- Promote stewardship activities that would support those protection and recovery efforts.

The ESA protects all threatened, endangered and extirpated species listed on the Species at Risk in Ontario (SARO) list (Government of Ontario 2007b). These species are legally protected from harm or harassment, and their associated habitats are legally protected from damage or destruction, as defined under the ESA.

1.3.5 Fisheries and Oceans Canada

Fisheries and Oceans Canada (DFO) administers the federal *Fisheries Act*, 1985, which 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" (s. 2(1)). The *Fisheries Act* prohibits the death of fish by means other than fishing (s. 34.4(1)), and the harmful alteration, disruption or destruction of habitat (HADD; s. 35(1)). A HADD is defined as "any temporary or permanent change to fish habitat that directly or indirectly impairs the habitat's capacity to support one or more life processes" (DFO 2019).

1.3.6 Migratory Birds Convention Act

This federal legislation protects the nests and offspring of listed migratory bird species from destruction or disturbance. In its application, it requires that best management practices be implemented to detect and avoid disturbance to active nests during development activities.

Best management practices specific to this development application are discussed within **Section 6.3**.

2.0 SUMMARY OF DATA COLLECTION APPROACHES AND METHODS

2.1 Background References

GEI has reviewed the following background material and policy documents to determine the proposed scope of work:

- Aerial imagery;
- UHOP (City of Hamilton 2018) and AEGD Secondary Plan;
- PPS (MMAH 2020);
- NPCA planning documents and online mapping;
- Twenty Mile Creek Watershed Plan (NPCA 2006);
- Upper Welland River Watershed Plan (Draft; NPCA 2011);
- AEGD SWS/SWMP (Aquafor Beech Limited 2017); and
- Online citizen science databases (e.g., eBird and iNaturalist).

The SWS/SWMP (2017) identifies the Subject Lands as containing support/indirect fish habitat (per Figure 2.8.3 – Recommended NHS). This drainage feature would be classified as a key hydrologic feature and considered a Core Area under the UHOP. No other natural heritage features were identified within or immediately adjacent to the Subject Lands. No other Core Areas or Linkages were identified within or adjacent to the Subject Lands.

The following background materials have been reviewed by GEI and have informed the ecological fieldwork program (described in **Section 2.2**):

- Ministry of Natural Resources and Forestry's (MNRF) Natural Heritage Information Centre (NHIC) database (2022);
- MNRF's Land Information Ontario (LIO) database (2022);
- Bird Studies Canada's Atlas of the Breeding Birds of Ontario (Bird Studies Canada; BSC et al. 2007);
- Ontario Nature's Reptile and Amphibian Atlas (2019);
- Toronto Entomologists' Association's (TEA) Ontario Butterfly and Moth Atlases (2022, 2020); and
- DFO's Aquatic SAR Map (2022).

2.1.1 NHIC Database Results

The NHIC (MNRF 2022) database was searched for records of SAR, provincially rare species (S1 to S3), and rare vegetation communities within the Subject Lands. The database provides occurrence data by 1 km x 1 km squares, which include areas outside of the Subject Lands. The following NHIC squares overlap the Subject Lands: 17NH8778, 17NH8779, 17NH8878, and 17NH8879. The SAR identified within these squares include:

- Species listed as Threatened or Endangered on the SARO List:

  - Northern Bobwhite (*Colinus virginianus)* – Endangered (observed in all squares);
  - Barn Swallow *(Hirundo rustica)* – Threatened (observed in two squares);
  - Eastern Meadowlark (*Sturnella magna*) – Threatened (observed in one square); and
  - Red-headed Woodpecker (*Melanerpes erythrocephalus*) – Endangered (observed in one square)
- Species of Conservation Concern (i.e., listed as Special Concern on the SARO List or identified as an S1–S3 species):
  - Grass Pickerel *(Esox americanus)* – Special Concern (observed in three squares);
  - Woodland Vole *(Microtus pinetorum)* – Special Concern (observed in one square); and
  - Snapping Turtle (*Chelydra serpentina*) – Special Concern (observed in one square).

2.1.2 Land Information Ontario Natural Features Results

Based on the MNRF LIO geographic database, one drainage feature was identified on the Subject Lands; this unnamed feature is a tributary to Three Mile Creek (**Figure 2**, **Appendix A**).

No other features were identified within or immediately adjacent to the Subject Lands.

2.1.3 Ontario Breeding Bird Atlas Results

The Ontario Breeding Bird Atlas Data Summary: 2001–2005 (BSC et al 2007) contains detailed information on the population and distribution status of birds in Ontario. The database provides occurrence data by 10 km x 10 km squares. The Subject Lands is located within the atlas square 17NH87, which was used to determine a potential bird species list for the area. The Subject Lands is a small component of the overall atlas square, and therefore all the bird species listed for this atlas square may not be found within the Subject Lands. Habitat type, availability, and size are all contributing factors to bird species presence and use.

A total of 185 bird species (of which 109 were reported breeding) were recorded in atlas square 17NH87, with the following species of interest noted:

- Species listed as Threatened or Endangered on the SARO List:
  - Bank Swallow (*Riparia riparia*) – Threatened in Ontario;
  - Barn Swallow – Threatened in Ontario;
  - Bobolink (*Dolichonyx oryzivorus*) – Threatened in Ontario;
  - Chimney Swift (*Chaetura pelagica*) – Threatened in Ontario; and
  - Eastern Meadowlark – Threatened in Ontario.
- Species of Conservation Concern (i.e., listed as Special Concern on the SARO List or identified as an S1–S3 species (extremely rare, very rare, rare to uncommon); B=breeding population, N=non-breeding population, m= migrant population):

- Rough-legged Hawk (*Buteo lagopus*) – S1B,S4N;
- Great Egret (*Ardea alba*) – S2B, S3M;
- Redhead (*Aythya americana*) – S2B, S4N;
- Black-billed Magpie (*Pica hudsonia*) – S2 (very rare in Ontario);
- Caspian Tern (*Hydroprogne caspia*) – S3B, S5M;
- Long-tailed Duck (*Clangula hyemalis*) – S3B, S5N;
- Red-necked Grebe (*Podiceps grisegena*) – S3;
- Red-throated Loon (*Gavia stellata*) – S2B, S4M;
- Purple Martin (*Progne subis*) – S3B;
- Eastern Wood-Pewee (*Contopus virens*) – Special Concern in Ontario;
- Horned Grebe (*Podiceps auritus*) – Special Concern in Ontario;
- Bald Eagle (*Haliaeetus leucocephalus*) – Special Concern in Ontario;
- Rusty Blackbird (*Euphagus carolinus*) – Special Concern in Ontario; and
- Wood Thrush (*Hylocichla mustelina*) – Special Concern in Ontario.

2.1.4 Ontario Reptile and Amphibian Atlas Results

The Ontario Reptile and Amphibian Atlas (Ontario Nature 2019) contains detailed information on the population and distribution status of reptiles and amphibians in Ontario. The database provides occurrence data by 10 km x 10 km squares. The Subject Lands is located within the atlas square 17NH87, which was used to determine a potential reptile and amphibian species list for the area.

A total of 21 reptile and amphibian species have been recorded in atlas square 17NH87, including three turtle species, five snake species, eight frog and toad species, and five salamander species. The following species of interest were noted:

- Species listed as Threatened or Endangered on the SARO List:
  - Jefferson Salamander (*Ambystoma jeffersonianum*) – Endangered in Ontario.
- Species of Conservation Concern:
  - Northern Map Turtle (*Graptemys geographica*) – Special Concern in Ontario; and
  - Snapping Turtle – Special Concern in Ontario.

The Subject Lands are a small component of the overall atlas square, and therefore all the reptile and amphibian species listed for this atlas square may not be found within the Subject Lands. Habitat type, availability, and size are all contributing factors to reptile and amphibian species presence and use.

2.1.5 Ontario Butterfly and Moth Atlas Results

The Ontario Butterfly and Moth Atlases (TEA 2022, 2020) contain detailed information on the population and distribution status of butterflies and moths in Ontario. The database provides occurrence data by 10 km x 10 km squares. The Subject Lands is located within the atlas square

17NH87, which was used to determine a potential butterfly and moth species list for the area. The Subject Lands is a small component of the overall atlas square, and therefore all the butterfly and moth species listed for this atlas square may not be found within the Subject Lands. Habitat type, availability, and size are all contributing factors to reptile and amphibian species presence and use.

A total of 32 butterfly species and one moth species were recorded in atlas square 17NH87. Of these reported species, two are species of Conservation Concern: Monarch (*Danaus plexippus*) and Black Dash (*Euphyes conspicua*) – S3.

2.1.6 Aquatic SAR Distribution Mapping Results

The DFO Aquatic SAR Map (2022) was reviewed to identify any known occurrences of aquatic SAR, including fish and mussels, in the tributary of Three Mile Creek that flows eastward through the Subject Lands and 1 km downstream. No aquatic SAR were identified in this search area. The closest SAR (Grass Pickerel) was identified within Twenty Mile Creek. Three Mile Creek ultimately flows into Twenty Mile Creek approximately 4.3 km downstream of the Subject Lands.

2.1.7 Citizen Science Databases (eBird and iNaturalist)

The eBird (2022) and iNaturalist (2022) databases are citizen-science projects that collect, archive, and share flora and fauna observations from any user. As observations can be submitted by anyone, and records are not officially vetted, the data obtained from these tools should not be used as a clear indicator of species presence.

These databases were reviewed for observations on, and within 120 m, of the Subject Lands. To ensure the observations referenced in this EIS are the highest quality possible, only research-grade observations from iNaturalist are noted. As eBird does not provide a grading system for observations published in its database, all eBird observations applicable to the Subject Lands were reviewed.

No Endangered or Threatened species, or Species of Conservation Concern were recorded in the eBird or iNaturalist databases on, or within, 120 m of the Subject Lands.

2.1.8 Twenty Mile Creek and Upper Welland River Watershed Plan Review

The northern portion of the Subject Lands falls within the Twenty Mile Creek Subwatershed, specifically within the Three Mile Creek Subwatershed area. The southern portion of the site falls within the Upper Welland River Subwatershed. Based on the location of the Subject Lands, both the Twenty Mile Creek and Upper Welland River Watershed Plans were reviewed. The drainage feature located within the northern portion of the Subject Lands flows into Three Mile Creek, a tributary to Twenty Mile Creek.

According to the Twenty Mile Creek Watershed Plan, the general topography near the northern portion of the Subject Lands is rolling with steep slopes, physiography is described as Till Moraine,

and no soil texture is described as the Subject Lands are mapped as a 'Developed Urban Area' (Figures 2 to 4; NPCA 2006). Figure 6 (Significant Natural Areas) of the Twenty Mile Creek Watershed Plan does not identify any Environmentally Significant Areas, MNRF Evaluated Wetlands, or ANSIs on the Subject Lands. Consistent with other sources reviewed herein, there is one drainage feature shown on the northern portion of the Subject Lands. Figure 8 (Groundwater Susceptibility) and Figure 9 (Fish Habitat and Sampling) were also reviewed, and in both cases the Subject Lands are identified as 'Urban Areas' (NPCA 2006). Based on Figure 9, the drainage feature present on the Subject Lands is 'Unclassified' according to the MNRF Fish Habitat Classification.

The Upper Welland River Watershed Plan describes the topography in and around the southern portion of the Subject Lands as steep and gently declining in elevation towards the east (Figure 4; NPCA 2011). The physiography of the Subject Lands is characterized as Clay Plain, and the soil texture is listed as Silt Clay Loam (Figure 7). No fish habitat is identified on the southern portion of the Subject Lands (Figure 13) and the area is identified as having high groundwater vulnerability (Figure 16). No natural heritage features of interest (i.e., Environmentally Significant Areas, ANSIs, or Provincially Significant Wetlands; PSWs) were noted on or in the immediate vicinity of the Subject Lands.

2.2 Ecological Field Investigations

The following ecological field investigations were undertaken to understand potential ecological constraints to development:

- Amphibian call count surveys;
- Botanical inventory (summer and fall) and Ecological Land Classification (ELC);
- Woodland stem density survey;
- Tree inventory;
- Breeding bird surveys;
- Fish community sampling; and
- Headwater Drainage Feature Assessments.

Based on aerial imagery interpretation and site reconnaissance efforts undertaken on November 27, 2020, there is limited habitat to support reptiles or bats on the Subject Lands, therefore no targeted surveys were completed. Moreover, no forested (FO) ecosites were identified within the Subject Lands, therefore, spring botanical surveys were not warranted.

Table 1 (**Appendix B**) summarizes when ecological surveys were completed and weather conditions during each survey. The proposed work plan, outlined within the TOR, was approved by reviewing agencies (NPCA and City of Hamilton) on June 14 and 30, 2021, respectively. The final version of the TOR can be found in **Appendix D**.

As discussed above, the 9174 Airport Road was added to the Subject Lands in 2022; detailed investigations were completed on this property in accordance with the approved TOR. The 9166 Airport Road property was added in January 2023 and a site reconnaissance was conducted to characterize the nature of the property. It was determined no targeted ecological inventories were required; however, a tree inventory was completed.

Survey methodology related to each specific survey type is described below in detail.

2.2.1 Botanical Inventory and Ecological Land Classification Methodology

Vegetation communities were first identified on aerial imagery and then verified in the field. Vegetation community types were confirmed, sampled and revised, if necessary, using the sampling protocol of the ELC for Southern Ontario (Lee at al. 1998). ELC was completed to the finest level of resolution (Vegetation Type) where feasible. Species names generally follow nomenclature from the Database of Vascular Plants of Canada (Brouillet et al. 2010).

The provincial status of all plant species and vegetation communities identified and listed in this EIS is based on NHIC (2021). Identification of potentially sensitive native plant species is based on their assigned coefficient of conservatism (CC) value, as determined by Oldham et al. (1995). This CC value, ranging from 0 (low) to 10 (high), is based on a species tolerance of disturbance and fidelity to a specific natural habitat. Species with a CC value of 9 or 10 generally exhibit a high degree of fidelity to a narrow range of habitat parameters.

2.2.2 Woodland Stem Density Methodology

A woodland stem density assessment was completed to determine whether the woodlands identified using the ELC protocol would meet the definition of woodlands under the UHOP and *Forestry Act* (1990).

The Subject Lands occur within Urban Lands (Urban Hamilton Official Plan: Schedule A). As defined under the Urban Lands Official Plan:

> *Woodland means treed areas that provide environmental and economic benefits to both the private landowners and the general public, such as erosion prevention, hydrological and nutrient cycling, provision of clean air and the long-term storage of carbon, provision of wildlife habitat, outdoor recreational opportunities, and the sustainable harvest of a wide range of woodland products. Woodlands include treed areas, woodlots or forested areas (Provincial Policy Statement (PPS), 2005).*

Since this definition references the outdated 2005 PPS, the current 2020 version of the PPS was also reviewed to provide a more refined definition. The PPS (2020) states that woodlands may be

delineated according to the *Forestry Act* definition or the Province's Ecological Land Classification system definition for "forest".

The *Forestry Act* (1990) definition of woodland is based on a calculation of stem density:

> "woodland" means land that satisfies at least one of the following stem densities but does not include a cultivated fruit or nut orchard or a plantation established for the purpose of producing Christmas trees.
>
> (a) 1,000 trees, of any size, per hectare,
> (b) 750 trees, measuring over five cm in diameter, per hectare,
> (c) 500 trees, measuring over 12 cm in diameter, per hectare, or
> (d) 250 trees, measuring over 20 cm in diameter, per hectare,

The Ecological Land Classification for Southern Ontario (1998) defines forest as "a terrestrial vegetation community with at least 60% tree cover".

These two defining criteria were applied when assessing these three treed features.

Circular plots were used to determine a representative estimate of stem density within the vegetation community. Plot locations were selected through imagery interpretation and knowledge of on-site conditions; the positioning of these plots was designed to capture variability of density and maturity of woody species within the overall community. Plots were established as follows:

- Silver Maple Deciduous Swamp (SWD3-2)
  - A single 5 m radius plot was used, providing 25.7% coverage of the overall polygon
- Mineral Cultural Woodland (CUW1) – near Homestead Drive
  - Two 10 m radius plots were used, providing 24.9% coverage of the overall polygon
- CUW1 – near Airport Road
  - Six 5 m radius plots were used, providing 17.6% coverage of the overall polygon

As per the Ontario Woodlot Association (2003), a sampling intensity from 2% to 10% is common for the purpose of determining tree stem density.

Within each plot, all live trees that were 1.37 m tall or greater were counted and categorized based on diameter at breast height (DBH) (i.e., ≤5 cm, 6-12 cm, 13-20 cm, or >20 cm, following the *Forestry Act* categorization). The collective plot data was used to calculate stem density within the vegetation community. Tall shrubs, such as Common Buckthorn and Sumac were excluded from this survey.

For each location, canopy cover was visually reviewed to determine if any of the features qualified as "forest" as per ELC.

2.2.3 Tree Inventory Methodology

The tree inventory was conducted in accordance with the *Tree Protection Guidelines*. Woodland trees (Figure 1, Appendix A of the Tree Preservation and Management Plan (TPMP); **Appendix E**) within the Subject Lands are also governed under the City of Hamilton Urban Woodlands Bylaw No. 14212, which regulates woodlands that are 0.2 ha or greater.

Trees with a diameter-at-breast-height (DBH) of 10 cm and greater within the Subject Lands were tagged and assessed. Trees within two woodlands (as shown on Figure 3, Appendix A of the TPMP; **Appendix E**) were assessed but not tagged. Woodland trees were assigned a unique identifier for mapping and reference purposes. The locations for all inventoried trees on the Subject Lands were recorded in UTM coordinates using a sub-meter capable GPS unit. The following information was recorded for each tree: species, DBH, health category (biological, structural, and overall), and notes regarding the assigned health category.

Detailed health assessments (biological, structural, and overall) were completed for trees within woodlands. Tree health was categorized as good, fair, or poor. Trees categorized as "good" overall had at least 80% live canopy and showed no significant structural defects (e.g., weak limbs, girdling roots, stem lean) or evidence of biological damage (e.g., insect damage, fungal growth, leaf dieback). "Fair" trees were those with 50% to 80% live canopy and showed no significant structural or biological defects, or the tree had over 80% live canopy but did show some evidence of structural defects and/or biological damage. Trees categorized as "poor" were those with less than 50% live canopy and/or had significant structural defects and/or biological damage.

2.2.4 Amphibian Call Count Methodology

Survey protocols were based on the 'Marsh Monitoring Program' (BSC 2014).

Survey station locations were determined through an assessment of orthophotography, existing vegetation communities and ground observations. A total of nine amphibian call count stations were surveyed within the Subject Lands. Stations were located within or immediately adjacent to wetland communities (**Figure 4**, **Appendix A**).

The call count surveys were conducted at night within the appropriate timing window from approximately 30 minutes after sunset until midnight. Each station was surveyed three times (once in April, once in May and once in June) during optimal weather conditions (low wind levels, no heavy rain), if water was present. Minimum night air temperatures at time of survey of 5°C, 10°C and 17°C were applied to each of the respective survey periods. Surveys were conducted at least 15 days apart. All calls heard within a survey station were recorded, as well as any call observations outside of the survey station, including on adjacent lands. The provincial and global statuses of species identified on the Subject Lands were obtained from the NHIC (2021) and the SARO list.

2.2.5 Breeding Bird Survey Methodology

Breeding bird surveys were conducted following protocols set forth by the Ontario Breeding Bird Atlas (Cadman et al. 2007) and the Ontario Forest Bird Monitoring Program (Cadman et al. 1998).

Surveys were conducted between dawn and five hours after dawn with suitable wind conditions, no thick fog or precipitation (Cadman et al. 2007). A total of eight point count stations were surveyed within the Subject Lands (**Figure 5**, **Appendix A**). Point count stations were surveyed in various habitat types, where present, within the Subject Lands and combined with area searches to help determine the presence, variety and abundance of bird species. Each point count station was surveyed for 10 minutes for birds within 100 m and outside 100 m. All species recorded on a point-count were mapped to provide specific spatial information and were observed for signs of breeding behaviour. Surveys were conducted at least seven days apart.

No suitable grassland habitat was identified during breeding bird surveys, therefore, a third-round grassland SAR breeding bird survey was not warranted.

2.2.6 Headwater Drainage Feature Assessment Methodology

Per the requirements of the HDFA Guidelines (TRCA/CVC 2014), GEI completed three site visits to assess headwater drainage features (HDFs) on the Subject Lands on the following dates:

- Round 1 – March 18, 2021;
- Round 2 – May 19, 2021; and
- Round 3 – August 5, 2021.

During the first site visit, all areas of the Subject Lands were walked to identify potential HDFs. Each HDF observed was separated into specific reaches, per the guidance on reach delineation in the HDFA Guidelines, and data collection was completed for each reach based on Ontario Stream Assessment Protocols (OSAP) for Unconstrained Headwater Sampling, Section 4: Module 11 (Stanfield, ed. 2017). A photographic record of each HDF was collected during each survey event.

Following completion of the three survey rounds, the collected data was used to classify each HDF, based on the HDFA Guideline hierarchy.

No formal aquatic habitat assessment (AHA) was warranted within the northern drainage feature, rather, three rounds of HDFA were completed as it provided a more fulsome review of the feature, instead of one field assessment under the AHA survey methodology.

2.2.7 Fish Community Sampling Methodology

Fish community sampling was completed in conjunction with early spring HDFA throughout the unnamed tributary of Three Mile Creek (HDF H1S1; **Figure 6**, **Appendix A)**. A Halltech HT-2000 Battery Back Electrofisher and a D-frame dip net with a 500-micron mesh size were used for sampling purposes. Sampling followed the Ontario Stream Assessment Protocol standard single-pass backpack electrofishing survey methodology (Stanfield, ed. 2017; section three module 1). The purpose of the survey was to understand the fish community present within the drainage features on the Subject Lands.

Weather conditions and electrofisher shocking parameters were recorded. All data recorded was then reported to the MNRF in accordance with License to Collect Fish for Scientific Purposes permit requirements.

3.0 ENVIRONMENTAL SETTING AND CHARACTERISTICS

3.1 Physical Conditions

While the Subject Lands are dominated by agricultural land uses, the surrounding landscape contains a mixture of land uses including residential, commercial/industrial and agricultural. The 9174 Airport Road property is located within a residential area and contains one shed structure.

3.1.1 Physiography and Soil

The Subject Lands are located within the Haldimand Clay Plain and Till Moraines physiographic regions, which extend from the Niagara Escarpment toward Lake Erie (Chapman and Putnam 1984), with the underlying bedrock mapped as Guelph Formation dolostone (Armstrong and Dodge 2007). The Guelph Bedrock Formation consists of reef and inter-reef deposits and is characterized by tan, sugary, fossiliferous dolostone (NPCA 2011).

Figure 2.9.7 in the SWS/SWMP (2017) indicates that the soil types on the Subject Lands are Brantford Silt Loam, Alberton Silty Clay Loam, Toledo Silty Clay Loam, and Beverly Silt Loam.

Soil-Mat Engineers & Consultants Ltd. (Soil-Mat; 2022) found that surficial geology consisted of silty and clay substrates with minor evidence of sand and gravel (glaciolacustrine deposits). Bedrock was identified from the Middle to Lower Silurian Sandstone and Dolostone bedrock of the Guelph Formation.

3.1.2 Topography

Generally, the topography of the Subject Lands slopes south towards Airport Road or north towards the existing drainage feature (HDF H1S1). A localized topographic high was identified within the centre of the Subject Lands, which divides the drainage within the property.

3.1.3 Surface Water Drainage

Two drainage features were identified within the Subject Lands. One drainage feature (HDF H1S1) flows west to east along the northern portion of the Subject Lands. This drainage feature conveys flows from the Airport Lands towards Homestead Drive. The second drainage feature (HDF H2S1) conveys north-east flows from the agricultural field and adjacent residential properties towards Homestead Drive. No drainage features were identified within the 9174 Airport Road property.

A review of the Stormwater Management Systems Review – Hamilton International Airport (Weslake, a division of Trow Associates Inc. 2009) was completed to understand the flow contributions from the Airport Lands into the Subject Lands. Plan No. 8 (Internal Storm Drainage) illustrates the flow contributions from the Airport Lands to HDF H1S1. Two flow paths were identified within the Airport

Lands; both flow paths merge at a SWM pond before outletting onto the Subject Lands via a 600 mm corrugated steel pipe (CSP) culvert. The southern flow path consists of an approximately 175-m long swale/ditch that receives parking lot runoff. The northern flow path collects runoff from various catch basins and conveys this drainage via storm sewers before outletting into a vegetated swale for approximately 60 m. Flow from the swale is then piped under the Cargo Jet hanger for approximately 165 m (700 mm CSP) before outletting directly into the SWM pond.

HDF H1S1 conveys flows from the Airport Lands (SWM pond) towards Homestead Drive. The flows are culverted under both Homestead Drive and Upper James Street (approximately 56 m under both roadways) before outletting into the roadside ditch on the eastern side of Upper James Street. These flows then enter Three Mile Creek within the Willow Valley Golf Course (approximately 500 m downstream of the property). The secondary drainage feature (HDF H2S1) is located within a meadow marsh community and conveys flows from the wetland and adjacent residential properties towards Homestead Drive. The flows exit the Subject Lands via a culvert and are released into a roadside ditch along the western side of Homestead Drive. These flows merge with drainage from HDF H1S1 at an offsite wetland before being culverted under Homestead Drive and Upper James Street. These drainage pathways were confirmed on Weslake's Plan No. 8.

3.2 Biological Environment

The Subject Lands occur within the Carolinian or Deciduous Forest Zone (also referred to as the mixed wood plains), an area characterized by a relatively warmer climate that supports plant species typical of more southern areas. This zone is referred to by the Province as Ecoregion 7E. Broadleaved trees, including American Beech (*Fagus grandifolia*), Sugar Maple (*Acer saccharum*), Basswood (*Tilia americana*), Red Maple (*Acer rubrum*), White Oak (*Quercus alba*) and Bur Oak (*Quercus marcrocarpa*), dominate natural upland forest cover in this region (Rowe 1972). This region also contains Canada's main distribution of Black Walnut (*Juglans nigra*), Sycamore (*Platanus occidentalis*), Swamp White Oak (*Quercus bicolor*) and Shagbark Hickory (*Carya ovata*).

Figure 2 (**Appendix A**) depicts the broader landscape and potential movement and linkage corridors surrounding the Subject Lands for abiotic and biotic movement of organisms, matter and energy. As previously noted, the surrounding landscape includes a mixture of residential, commercial/industrial and agricultural land uses. As identified within Schedule B of the UHOP (2018), two Core Areas are present in the vicinity of the Subject Lands. Both Core Areas are located on the south side of Airport Road. Moreover, several Core Areas are identified immediately east of Upper James Road within Schedule B of the Rural Hamilton Official Plan (2021). Large swaths of Core Areas appear to be associated with the Welland River Corridor (approximately 3.5 km south of the Subject Lands) and the main Twenty Mile Creek Corridor (approximately 3.6 km east of the Subject Lands).

The drainage features within the Subject Lands drain east through an adjacent golf course (Willow Valley Golf Course) into Three Mile Creek, which is located approximately 1.5 km downstream of the Subject Lands. Secondary linkages within the landscape are associated with Three Mile Creek, which

is located immediately east of the property. The Three Mile Creek system eventually connects into the Twenty Mile Creek corridor. The Three Mile Creek corridor appears to provide a mosaic of habitats within the corridor as it connects woodland and wetland community types. The Three Mile Creek corridor likely supports a variety of aquatic and terrestrial species. The primary linkages within the landscape are associated with the Welland River or Twenty Mile Creek corridors.

Nearby road networks along with the Airport Lands serve as partial barriers to wildlife movement. Homestead Drive/Upper James Street and Airport Road, which generally border the eastern and southern perimeters of the Subject Lands, are likely to partially obstruct terrestrial wildlife movement. This obstruction could become more prominent in the future as these roads are widened and urbanized to accommodate the surrounding AEGD development lands. Upper James Street is already a large roadway system within the Hamilton area and is considered a high-traffic system. No enhanced wildlife structures (e.g., ecopassages) were documented within the vicinity of the Subject Lands to support the movement of wildlife. Existing culverts under the roadways appear smaller and unable to provide an openness ratio to support wildlife movement from one side to another. Finally, the airport maintains a tall, barbed fence along the western perimeter of the Subject Lands, restricting movement of medium to large sized wildlife between the properties.

3.3 Terrestrial Ecology

3.3.1 Vegetation

Ecological Land Classification

The Subject Lands occur on flat topography having a primarily silt loam substrate (LIO 2020) and consisting predominantly of agricultural land. Of the natural vegetation, the seral stage varies from open meadow to woodland. Four different communities were classified to Vegetation Type, while one was classified to Ecosite. Overall, these can be broadly quantified as:

- Agriculture = 26.7 ha (85%)
- Cultural = 2.5 ha (8%)
    - Cultural Meadow = 2.0 ha
    - Cultural Woodland = 0.5 ha
- Marsh = 1.1 ha (4%)
- Treed Swamp = 0.03 ha (0.1%)
- Other (e.g., hedgerows) = 1.0 ha (3%)

ELC mapping of the Subject Lands is shown on **Figure 3** (**Appendix A**). A description of each ELC unit is provided in **Table 2** (**Appendix B**). No provincially rare vegetation communities were present on the Subject Lands (NHIC 2021). No locally rare vegetation communities were present on the Subject Lands

(NPCA 2010). The recently purchased property located at 9166 Airport Road is entirely residential (RES).

A woodland stem density assessment is provided within **Section 3.3.2**.

Botanical

Botanical inventories completed on the Subject Lands identified a total of 165 species of vascular plants, including one that could only be identified to genus. Of that number, 71 (43%) are native and 94 (57%) are exotic. A full species list is included in **Table 3** (**Appendix B**).

The majority of the native species (92%) are ranked S5 (secure in Ontario). Two species (3%) are ranked S4 (apparently secure in Ontario; NHIC 2021), while one species is ranked S2? (presumed imperiled; this species is described further below). No regionally rare plants were observed, as per the Hamilton Region rarity rankings (Schwetz 2014). None of the species recorded from the Subject Lands had a co-efficient of conservation value of 9 or 10.

Provincially rare species (S1-S3; NHIC 2021) are summarized below:

- Honey Locust (*Gleditsia triacanthos*): A single, multi-stemmed specimen was observed along Homestead Drive. This is a tree that had been removed historically but is sending up reproductive shoots from the stump. This was a native variety, having thorns. Regardless, this species is not known to naturally occur in Hamilton Region; it is frequently planted and occasionally escapes cultivation throughout southern Ontario (Oldham et al. 2009). Based on its roadside location within a sparse hedgerow within a suburban area, this tree likely escaped cultivation and is therefore not treated as rare herein.

No SAR were observed during these surveys. Two hybrid Butternut (*Juglans cinerea)* were recorded within the newly acquired lands off Airport Road (9174 Airport Road). Tissue samples were collected from each tree and sent to the University of Guelph for genetic testing, which confirmed that they were not pure Butternuts, rather hybrid species. Hybrid Butternut trees are not protected under the *Endangered Species Act.* This report has been included within **Appendix F** of the report. Please note that samples from a site in Pickering were also submitted at the same time as the two samples from the Airport Road property were submitted. The results from this site are also included within this report, where they did find pure Butternut on that property.

Discussion on invasive species within the Subject Lands is provided below.

An NHIC search was conducted for the Subject Lands using the MNRF Biodiversity Explorer. No species have been historically documented (within the last 20 years) on or in the vicinity of the Subject Lands.

Wetlands

All wetland communities were staked with the NPCA on August 6, 2020. The staked linework informed and refined the ELC mapping shown on **Figure 3** (**Appendix A**). Wetland communities occupy a total of 1.1 ha on the Subject Lands. The LIO database was accessed to determine if any wetlands mapped by the MNRF occur on or within 750 m of the Subject Lands. Such wetlands could include PSWs, MNRF evaluated wetlands, unevaluated wetlands, or wetlands identified as "other". Results of this search show that no LIO-mapped wetlands are known to occur on or within 750 m of the Subject Lands. Wetland mapping prepared by the MNRF is not always conclusive and is continuously subject to updates and refinements. Mapping of wetland on the Subject Lands is based on ground-truthed observations by GEI and confirmed by NPCA on August 6, 2021.

Consideration was given to whether these wetlands could be evaluated as provincially significant using the Ontario Wetland Evaluation System (OWES). Initial consideration was given to existing Provincially Significant Wetlands (PSWs) within 750 m of wetland on the Subject Lands to determine if complexing rules could apply; however, no PSWs are within 750 m. Further consideration was given to potential significance based on a full evaluation. These types of evaluations require information be gathered over a landscape scale, which is an onerous task for a single proponent to undertake. Therefore, a preliminary review was completed to gauge the need for a full evaluation and, if that were completed, the likelihood of provincial significance criteria being met.

This review consisted of identifying wetland catchment areas using the Ontario Flow Assessment Tool (OFAT; MNRF 2020b) and reviewing MNRF wetlands within these catchment areas (in relation to wetlands on the Subject Lands). Based on the OFAT analysis, wetlands on the Subject Lands drain into two catchment areas. The meadow marsh and deciduous swamp communities are associated with a catchment area that drains south into the Welland River, while the shallow marsh drains east into Three Mile Creek. MNRF mapping does not show any wetland communities within the catchment areas. A review of the imagery within these catchment areas further suggests that any wetlands that may be present appear to consist of narrow drainage features and ponds associated with golf courses and active agricultural fields.

No SWH or SAR habitats were associated with the wetland features. As a result, it is GEI's opinion that these wetlands are unlikely to be considered significant should an OWES evaluation be completed.

Invasive Species

Invasive species are those that can become (or presently are) a serious problem within a defined location. These species reproduce and spread aggressively, reducing the local biodiversity and threatening ecological function. Depending on existing conditions, some invasive species can outcompete all other species.

Urban Forest Associates (2002) provides a categorical ranking system for species known to be invasive in southern Ontario. Of the 139 species observed on the Subject Lands, 10 are ranked as Category 1 by Urban Forest Associates.

Category 1 species are deemed to be the most invasive and can dominate a site to exclude all other species, remaining dominant on the site indefinitely. These are a threat to natural areas wherever they occur because they have very effective reproduction and dispersal mechanisms, allowing them to move long distances. These are regarded as a top priority for control, where eradication and follow-up monitoring are often necessary to ensure its effective removal, where sought. The 10 Category 1 species observed on the Subject Lands are:

- Canada Thistle (*Cirsium arvense*) – Occasional in Cultural Meadows, and Reed-canary Grass Mineral Meadow Marsh community types;
- Garlic Mustard (*Alliaria petiolata)* – Rare in Cultural Meadows and occasional in Cultural Woodland community types;
- Dame's Rocket (*Hesperis matronalis*) – Rare in Cultural Meadow and Cultural Woodland community types;
- Purple Loosestrife (*Lythrum salicaria*) – Occasional in Cattail Mineral Shallow Marsh and Rare in Reed-canary Grass Mineral Meadow Marsh community types;
- White Mulberry (*Morus alba*) – Rare in Cultural Meadow community type;
- European Buckthorn (*Rhamnus cathartica*) – Rare in Cultural Meadow and Reed-canary Grass Mineral Meadow Marsh community types;
- Multiflora Rose (*Rosa multiflora*) – Rare in Cultural Meadow community type;
- Manitoba Maple (*Acer negundo*) – Occasional in Cultural Meadow, and rare in Reed-canary Grass Mineral Meadow Marsh, Cultural Woodland, and Cattail Mineral Shallow Marsh community types;
- Common Reed (*Phragmites australis* ssp. *australis*) – Occasional in the overall Cattail Mineral Shallow Marsh Type community type, though where present this species is dominant; and
- Goutweed (*Aegopodium podagraria*) – Rare in Cultural Woodland community type.

Tree Inventory

A tree inventory was conducted within the Subject Lands. A total of 444 trees were mapped and assessed during the tree inventory, of which two were dead. Full details of the inventory's results are provided in the TPMP (**Appendix E**).

3.3.2 Woodland Stem Density

The results from the stem density evaluation are shown below within **Table 3-1**.

Table 3-1: Stem Density Evaluation

Woodland Criteria	SWD3-2		CUW1 – Near Homestead		CUW1 – Near Airport	
	Trees/ ha	Criteria met?	Trees/ ha	Criteria met?	Trees/ ha	Criteria met?
(a) 1,000 trees, of any size, per hectare,	3438	Yes	796	No	509	No
(b) 750 trees, measuring over five centimetres in diameter, per hectare,	1273	Yes	446	No	340	No
(c) 500 trees, measuring over 12 centimetres in diameter, per hectare, or	0	No	318	No	255	No
(d) 250 trees, measuring over 20 centimetres in diameter, per hectare.	0	No	111	No	127	No

The only treed area to meet the definition of "woodland" was the SWD3-2 vegetation community. Both CUW1 communities assessed did not contain sufficient stem density to qualify as a woodland per the *Forestry Act* definition. These two treed areas did not meet the ELC definition of "forest" due to the insufficient canopy cover; rather, these areas were classified as CUW1s.

3.3.3 Amphibian Call Count

No amphibian species were documented during amphibian call count surveys, both within the Subject Lands and on the adjacent lands in 2021 (**Table 4**, **Appendix B**). No suitable amphibian habitat was identified within the 9174 Airport Road property.

Of the nine stations identified, very minimal water presence was a general trend for all identified wetland features. Two features (AMC7 and AMC8) were located offsite; four were dry as of second round and three were dry as of third round. As amphibians generally associate with features with 10 cm of water or greater that maintain suitable hydrology until July, these features have limited potential for amphibian breeding activity. The lack of amphibian observations is expected as a result of the wetland hydrology.

3.3.4 Breeding Birds

A total of 38 bird species were observed within the Subject Lands. Of this total, eight species are confirmed, twelve are probable and eight are possible breeders on the Subject Lands. The remaining ten bird species are considered non-breeders, flyovers or migrants. Three additional species were observed only on surrounding lands within 120 m. All species observed on the Subject Lands are listed in **Table 5** (**Appendix B**).

A total of 28 (100%) of the confirmed, probable or possible breeders are provincially ranked S5, S4 or SNA (species not native to Ontario). No bird species are considered provincially rare (S1-S3; NHIC 2021).

Barn Swallow (threatened in Ontario) was the only SAR species documented within the Subject Lands. Several pairs were noted within the adjacent Airport Lands. These individuals were observed during both breeding bird surveys in 2021 foraging over the Subject Lands; however, no breeding sites were present on the Subject Lands at that time. It is presumed that they were using structures on the Airport Lands for breeding sites. In 2022, 9174 Airport Road was added to the Subject Lands, where a shed structure was identified that may provide suitable habitat for Barn Swallow. Detailed inspections were completed within the shed structure on the 9174 Airport Road property and recorded no evidence of active breeding within the structure in 2022.

The following locally (Hamilton) rare or uncommon species were observed on the Subject Lands:

- Great Blue Heron (*Ardea herodias)* – Uncommon; and
- Green Heron (*Butorides virescens)* – Uncommon.

The two heron species were observed in flight over the Subject Lands. No breeding habitat was located within or immediately adjacent (120 m) to the property.

3.3.5 Incidental Observations

Incidental wildlife species observations are summarized in **Table 6** (**Appendix B**). All incidental species observed are provincially ranked S5, S4, or SNA, and locally common and secure (Hamilton Conservation Authority, 2014).

3.4 Aquatic Ecology

NPCA's Watershed Explorer identifies one regulated watercourse within the Subject Lands (identified as HDF H1S1 in this report). Based on the characterization of this feature (discussed below within **Section 3.4.1**), GEI recommends that this should be identified as a HDF instead of a regulated watercourse. The HDFA Guideline (CVC/TRCA 2014) identifies HDFs as "non-permanently flowing drainage features that may not have defined bed or banks; they are first-order and zero-order

intermittent and ephemeral channels, swales and connected headwater wetlands, but do not include rills or furrows". All drainage features within the Subject Lands are considered to be zero to first order streams. Furthermore, all features within the Subject Lands have a drainage area less than the 50 ha threshold typically applied by Conservation Authorities to assist in determining the extent of the regulated watercourses. Moreover, these drainage features have no natural hazards (e.g., flood or erosion hazards) associated with them. As a result, they should not be considered streams or stream corridors in accordance with the UHOP.

The biological and physical characteristics of each drainage feature, as documented through GEI's data collection, are discussed in the following sections.

3.4.1 Headwater Feature Drainage Assessment

Two HDFs (H1 and H2) were identified on the Subject Lands and contained a total of three reach segments (HDFs H1S1, H1S1a and H2S1; **Figure 6**, **Appendix A**). No aquatic features were identified within the 9174 Airport Road property. It is recognized that one feature was identified on LIO immediately north of HDF H1S1 (draining to the adjacent property); however, this was not present during the early spring assessment. As a result, it is not shown on the aquatic feature **(Figure 6**, **Appendix A**).

All features were located within actively managed agricultural fields and received drainage from overland flow and/or from the Airport Lands (offsite). Bed and bank substrates consisted of clay with some scattered silt, sand and organic debris throughout the features. No bed or bank erosion was identified within the features and no suitable fish habitat morphology (e.g., riffles, runs, pools) was identified within the HDFs. No fish were caught during targeted fish community sampling (as discussed below within **Section 3.4.2)** nor were they incidentally observed during the assessments.

Surrounding lands on the Subject Lands are actively managed for agricultural land uses, which have likely resulted in altered hydrology on the Subject Lands and increased nutrient inputs into water features. Moreover, the hydrology for HDF H1S1 is likely altered from (offsite) Airport Land flow contributions. The augmented flow (described further below) was likely a result of Airport maintenance and usage.

All features are discussed in the following sections. A summary of the HDFA classifications and management recommendations assigned to each reach is provided in **Table 7** (**Appendix B**) and further discussed below.

<u>H1S1</u>

Reach H1S1 conveys flows from the adjacent Airport Lands to the west across the Subject Lands before discharging via a culvert beneath Upper James Street/Homestead Drive. This culvert was not located within the Subject Lands, however observations from the roadside indicated that this culvert

was not perched. A farm lane crossing (within the designated Airport setback) was located at the upstream extent of the Subject Lands where it received drainage via a culvert from the Airport Lands. The culvert was not observed to be perched within the Subject Lands, however observations from the Subject Land boundary suggested that some erosion at the inlet of the culvert within the Airport Lands may be occurring.

The feature was observed to be flowing throughout the monitoring period. Flow velocity ranged between 0.21 to 0.26 m/s during the summer assessment. Water depths within the feature ranged from 15 cm to 23 cm during the early spring survey, 5 cm during the late spring assessment, and 22 cm to 76 cm during the summer assessment. Based on notable increases in water depth and flow condition between the late spring and summer assessments, it is considered likely that off-site modifiers may have impacted the hydrology of this feature, however, as access to the Airport Lands was not permitted, this could not be confirmed. The Airport Lands (offsite) likely augment the flow contributions to the wetland community since flow was observed throughout spring and summer assessments. It is atypical that these types of wetlands increase in flow conditions approaching the drier summer months. Given the nature of the wetland community, it is GEI's experience that these type of wetlands with typical flow contributions (unaugmented) would have similar hydroperiods as HDF H2S1. As a result of the augmented flows, a valued hydrology is recommended for this reach. The feature width varied throughout the length of the drainage feature but was generally characterized as approximately 8 m with a wetted width ranging between 0.23 m and 4 m. Sediment deposition within the reach varied from minimal to substantial adjacent to two tractor crossings. The tractor crossings were located in the downstream half of the feature. Limited vegetation growth was observed within the crossings, rather, accumulation of algae and ponded water within the tire ruts was documented. These tractor crossings did not impede flow; however, they did slow down flow velocities within the deeper tire ruts. Bed substrates were dominated by silty clay with a fine top layer of organic substrates within the more densely vegetated portions of the reach. Riparian habitat was dominated by agricultural fields succeeding to meadow habitat within the first 1.5 m of the left and right banks. Instream vegetation was dominated by hydrophilic emergent vegetation including Cattail (*Typha ssp.*) and Common Reed; however, some other wetland species were observed (i.e., Red-Osier Dogwood - *Cornus sericea*; Spotted Jewelweed - *Impatiens capensis*). No large open pools were recorded within the wetland, rather, the vegetation was dense.

H1S1A

Reach H1S1A is an ephemeral swale surrounded by agricultural land uses. The swale originates within the agricultural field and flows into HDF H1S1. This reach does not receive drainage contributions from the Airport Lands, as no hydrologic connection was documented during early spring assessments.

Feature width was measured at 0.73 m with a wetted width of 0.28 m and a water depth of 1 cm during the early spring assessment. Flow was observed within the feature during the early spring assessment; however, the feature was observed to be dry during the late spring survey, suggesting it is ephemeral. Substantial sediment deposition was recorded within the reach, which is likely

associated with the agricultural nature of the reach. Bed substrates were dominated by silty sand. Instream erosion (i.e., slight entrenchment) was identified within the reach. Minimal feature roughness (i.e., <10%) was recorded within the feature as no discernable difference from riparian vegetation (agricultural row crops) was noted.

H2S1

Reach H2S1 is a wetland located along the eastern boundary of the Subject Lands. The feature receives inputs via overland flows from the surrounding agricultural lands and residential properties as it is a localized flow area along the edge of the fields. HDF H2S1 exits the Subject Lands via a degraded culvert on the neighbouring property. The culvert was observed to be partially blocked (with sediment and debris) during the early spring assessment, however flows were able to continue to flow into the culvert.

This reach was flowing during the early spring assessment but was observed to be dry during the late spring survey. Feature width was visually estimated at 7 m; however, wetted width could not be reliably measured due to the extreme (i.e., >60%) density of emergent vegetation. Wetted depth was measured at 1.5 cm during the early-spring assessment. No fish habitat structures were identified within the feature, likely due to the limited abundance of water and dense vegetation. Bed and bank substrates were dominated by silt grain sizes. Disturbance along the northern extent of the feature, as a result of offsite tree removal and outdoor storage associated with the adjacent residential property, was also noted.

HDF Management Recommendations and Classifications

Part 2 of the HDFA Guidelines provides an approach to classify HDFs by providing a step-by-step characterization of specific functions that may be associated with the features assessed, including hydrology, riparian function and provision of fish or terrestrial habitat. **Table 7** (**Appendix B**) highlights the key components of this analysis based on the three rounds of HDFA completed in 2021.

Part 3 of the HDFA Guidelines provides guidance on linking the characteristics and functions of features to specific management recommendations that may be applied to those features. To assist, the HDFA Guidelines include Figure 2: "Flow Chart Providing Direction on Management Options." The flow chart depicts various decision points associated with hydrology, fish habitat, riparian vegetation and terrestrial habitat, and ultimately leads the user to an appropriate management recommendation for each HDF segment. Management recommendations can include the following:

- Protection;
- Conservation;
- Mitigation;
- Maintain Recharge;
- Maintain/Replicate Terrestrial Linkage; or

- No Management Required.

The flow chart was used to determine the management recommendation for the HDFs on the Subject Lands (as identified in the final column of **Table 7**, **Appendix B**).

As identified within **Table 7** (**Appendix B**), the management recommendation for HDF H1S1 was adjusted from the management recommendation based on the HDFA Guideline flow chart, to better reflect its ecological and hydrological functions and potential associated management approaches, based on site specific observations. This is a common and accepted approach as the HDFA Guideline is meant to help guide the aquatic practitioner towards a management recommendation, with the understanding that professional judgement is incorporated through every step of the evaluation process. It is widely accepted that these management recommendations can be revised based on site specific conditions. Specifics are provided below.

- **HDF H1S1** – This feature was initially assigned a Conservation management recommendation as it is a wetland feature and, therefore, is designated Important under the riparian function category. Due to the relatively small size of the wetland (0.66 ha) and the presence of invasive species, the ecological functions it provides can be replicated elsewhere. This is a commonly accepted approach for common riparian wetland communities within the Greater Toronto Area. The wetland conveys flows from the Airport Lands through the Subject Lands before outletting into a culvert under Homestead Drive/Upper James Street and entering into a roadside ditch. A final management recommendation of Mitigation was assigned to ensure wetland mitigation occurs and any flows conveyed by the feature are maintained to downstream roadside features (and ultimately Three Mile Creek). This management recommendation ensures that the wetland function will be addressed through the NPCA permitting requirements, which will allow for wetland reconfiguration provided all relevant criteria are met; however, it allows for the practitioner to focus on the functions that the drainage feature is providing (i.e., flow conveyance) separate from the functions that the wetland community is providing (i.e., water storage, water filtration, bed and bank stabilization). This management approach is expected to maintain the existing function of the HDF while offering opportunities for enhancement in accordance with the NPCA's wetland reconfiguration policies (as further discussed below). Moreover, HDF H1's hydrology is also augmented as a result of the upstream (offsite) Airport practices. This was illustrated with an increase in flow during summer HDFA; where, a decrease in flow would be expected within this feature, similar to the functions of HDF H2.

Reviewing agencies requested additional context be provided as to why one HDF's management recommendation was adjusted (HDF H1), whereas HDF H2's management recommendation remained consistent with the HDFA Guideline. While these two HDFs are similar vegetation communities, HDF H1S1 was functioning as a different community on the landscape in comparison to HDF H2S1. For example, during summer HDFA, HDF H1S1 had substantial surface flow recorded (FC=5) as a result of the upstream inputs from the Airport run-off (as illustrated in **Table 7**, **Appendix B**). This run-off

appeared to be altering the hydrology (increasing the amount of flow) that is typically associated with these types of HDFs during these sampling periods. It is typical that these types of wetland communities contain standing water and/or are dry upon summer assessment; however, the flow condition increased in comparison to spring sampling events (there was no precipitation event that occurred prior to the survey that would have resulted in increased runoff). Moreover, the HDFA Guideline also does not consider the overall health of the vegetation community. Since Category 1 invasives (Common Reed) were documented within, downstream (offsite) and upstream (offsite) of the community it is likely that the wetland functions will continue to change as this community expands into the feature. In comparison to HDF H2S1, limited invasives were recorded within this community. H2S1 was receiving inputs from agricultural and residential run-off and resembled typical hydroperiods that are associated with these types of wetland communities (i.e., flowing/holding water during early spring assessment and dry upon summer assessment). Given these factors, the adjustment of the HDF H1 management recommendation is warranted as it will (1) ensure the protection of the important functions (i.e., flow conveyance and contributions of allochthonous materials through an open drainage feature), while (2) permitting restoration measures to enhance/restore wetland functions to the system in an alternate location away from immediate influence from the Airport.

The resulting final management recommendations for each reach, as depicted in **Figure 6** (**Appendix A**), along with the recommended management approaches for each management classification (from the HDFA Guidelines) is as follows:

Conservation (H2S1)

- Maintain, relocate and/or enhance drainage feature and its riparian zone corridor;
- If catchment drainage had been previously removed or will be removed due to diversion of stormwater flows, restore lost functions through enhanced lot level controls (i.e., restore original catchment using clean roof drainage), as feasible;
- Maintain or replace on-site flows using mitigation measures and/or wetland creation, if necessary;
- Maintain or replace external flows;
- Use natural channel design techniques to maintain or enhance overall productivity of the reach; and/or
- Drainage feature must connect to downstream.

Mitigation (H1S1, H1S1A)

- Replicate or enhance functions through enhanced lot level conveyance measures, such as well vegetated swales (herbaceous, shrub and tree material) to mimic online wet vegetation pockets or replicate through constructed wetland features connected to downstream;

- Replicate on-site flow and outlet flows at the top end of system to maintain feature functions with vegetated swales, bioswales etc. If catchment drainage has been previously removed due to diversion of stormwater flows, restore lost functions through enhanced lot level controls (i.e., restore original catchment using clean roof drainage); and/or

- Replicate functions by lot level conveyance measures (e.g., vegetated swales) connected to the NHS, as feasible and/or LID stormwater options.

3.4.2 Fish Community Sampling

Fish community sampling was completed along the entire extent of HDF H1S1 (**Figure 6**, **Appendix A)**. Sampling was not conducted with HDF H1S1A or H2S1 due to limited availability of water and lack of fish habitat.

No fish species were captured within the approximately 245 m sampling reach despite sampling effort. The densely vegetated feature was fished for a total of 1,008 seconds. The wetted width of the channel varied from 0.3 m to 4 m throughout the sampling reach.

All HDFs within the Subject Lands are identified as indirect fish habitat that contribute allochthonous material and flows to downstream habitats within Three Mile Creek, depending on their hydrology.

All data recorded was reported to the MNRF Guelph District in accordance with License to Collect Fish for Scientific Purposes permit requirements.

4.0 ANALYSIS OF ECOLOGICAL AND NATURAL HERITAGE SIGNIFICANCE (PPS AND CITY'S NATURAL HERITAGE POLICIES)

Eight types of natural features are identified in the PPS (MMAH 2020):

- Significant wetlands;
- Significant coastal wetlands;
- Significant woodlands;
- Significant valleylands;
- SWH;
- Fish habitat;
- Habitat of endangered and threatened species; and
- Significant ANSIs.

The presence/absence of these natural features on the Subject Lands are discussed in the subsequent sections of this EIS. The NHRM (MNR 2010were referenced to assess the potential significance of other natural features, and their associated forms and functions on the landscape.

In addition to the evaluation of natural heritage features identified within the PPS (2020) and criteria outlined within the NHRM (2010), **Section 4.10** evaluates the presence of key natural heritage features, key hydrologic features and local natural areas in accordance with Chapter C of the UHOP (2018) and **Section 4.11** evaluates the presence of regulated features in accordance with NPCA Ontario Regulation 155/06 and NPCA's Policy Document (2018).

Where natural features are present on the Subject Lands, their sensitivities are discussed.

4.1 Significant Wetlands

Within Ontario, significant wetlands are identified by the MNRF or by their designates. Other evaluated or unevaluated wetlands may be identified for conservation by the municipality or the conservation authority. There are no PSWs identified on or adjacent to the Subject Lands.

As part of the AEGD SWS/SWMP (2011 and 2017), constraints of provincial significance, such as PSWs, were identified and designated as Core Areas in the Secondary Plan. As noted above, the SWS and Secondary Plan process did not identify any PSWs on the Subject Lands. Furthermore, as discussed above within **Section 3.3.1**, a wetland evaluation under OWES was not warranted.

4.2 Non-Significant Wetland Units

The UHOP (2018) identifies wetlands as "*lands such as swamp, marsh, bog or fen (not including land that is being used for agricultural purposes and no longer exhibits wetland characteristics) that:*

a) is seasonally or permanently covered with shallow water or has the water table close to or at the surface;
b) has hydric soils and vegetation dominated by water-tolerant plants; and
c) has been further identified according to evaluation procedures established by the MNRF, as amended from time to time".

The following wetland communities were identified within the Subject Lands (**Figure 3**, **Appendix A**):

- Reed-Canary Grass Mineral Meadow Marsh (MAM2-2);
- Cattail/Common Reed Mineral Shallow Marsh (MAS2-1/MAS1-12); and
- Silver Maple Mineral Deciduous Swamp (SWD3-2).

The SWD3-2 vegetation community is an isolated wetland community that has no surface hydrologic connection to other aquatic features (e.g., HDFs). The SWD3-2 is a smaller isolated wetland community located adjacent to active residential dwellings. The MAS2-1/MAS1-12 vegetation community is associated with HDF H1S1, while the MAM2-2 vegetation community is associated with HDF H2S1.

No calling amphibians were identified within the wetland communities despite targeted survey effort. The wetlands do not support SAR or SWH habitat (as discussed below within **Section 4.6**). The wetland associated with HDF H1S1 is invaded with a Category 1 invasive species (Common Reed). Common Reed appears to have established populations offsite (both upstream and downstream), therefore, unmitigated it is likely to continue to invade into the MAS2-1 vegetation community.

4.3 Significant Coastal Wetlands

Similar to significant wetlands, the MNRF or their designates identify significant coastal wetlands present on the landscape. Coastal wetlands are defined in the NHRM (MNR 2010) as:

a) "any wetland that is located on one of the Great Lakes or their connecting channels (Lake St. Clair, St. Mary's, St. Clair, Detroit, Niagara and St. Lawrence Rivers); or
b) Any other wetlands that is on a tributary to any of the above-specified water bodies and lies, either wholly or in part, downstream of a line located two km upstream of the 1:100-year floodplain (plus wave run-up) of the large water body to which the tributary is connected."

No significant coastal wetlands are identified on the Subject Lands and would not be expected given the distance of the Subject Lands from the waterbodies noted above.

4.4 Significant Woodlands

Significant woodlands are identified by the planning authority in consideration of criteria established by the MNRF. Under the NHRM (2010), woodlands are defined as:

"...treed areas that provide environmental and economic benefits to both the private landowner and the general public, such as erosion prevention, hydrological and nutrient cycling, provision of clean air and the long-term storage of carbon, provision of wildlife habitat, outdoor recreational opportunities, and the sustainable harvest of a wide range of woodland products. Woodlands include treed areas, woodlots or forested areas and vary in their level of significance at the local, regional and provincial levels."

Within the UHOP (2018) – Chapter G (Glossary), significant woodlands are defined as the following:

"*an area which is ecologically important in terms of:*

a) Features such as species composition, age of trees, stand history;
b) Functionally important due to its contribution to the broader landscape because of its location, size, or due to the amount of forest cover in the planning area; and
c) Economically important due to site quality, species composition or past management history (PPS, 2005).

The presence of European Buckthorn, Common Lilac and Staghorn Sumac shall be irrelevant to the determination of whether a woodland is a significant woodland."

The City of Hamilton assesses the significance of woodlands based on the ability for the feature to meet two or more of the following criteria (Chapter G – Glossary):

- **Size** – woodlands shall meet a minimum average width of 40 m. Minimum patch size for significance is based off forest cover by planning unit (e.g., <5% forest cover = 1 ha minimum patch size);
- **Interior forest** – woodlands that contain interior forest habitat;
- **Proximity/connectivity** – woodlands that are connected within 50 m of a significant natural area (defined as wetlands 0.5 ha or greater in size, Environmentally Significant Areas, PSWs, and Life Science ANSIs);
- **Proximity to water** – woodlands where any portion is within 30 m of any hydrological feature, including all streams, headwater areas, wetlands and lakes;
- **Age** – woodlands with 10 or more native trees per hectare greater than 100 years old; and
- **Rare species** – any woodland containing threatened, endangered, special concern, provincially or locally rare species.

In accordance with the above-noted definitions, natural treed communities (FOC, FOM, FOD, SWC, Mixed Swamp, SWD) and cultural forest/plantation communities (CUW, CUP) could be considered woodlands. As discussed above within **Section 3.3.2**, both CUW1 communities within the Subject Lands did not meet the stem density requirements under the *Forestry Act* to be considered a woodland community, despite them having the woodland composition to be considered a woodland community as part of the ELC protocol. One ELC community within the Subject Lands did meet the criteria to be

classified as a woodland under the *Forestry Act*: SWD3-2. The SWD3-2 community is 0.03 ha in size and is encroached by both residential and agricultural land-uses. It is unclear from the UHOP Chapter G criteria whether size should be an overall guiding factor or whether all criteria should be evaluated equally, given that the table within the size criterion states a "minimum patch size for significance". If size is the guiding criterion, the SWD3-2 community would not meet the minimum area threshold and would not require further significance evaluation. Given the lack of clarity within the UHOP, a significance evaluation has been completed to understand whether other criterion are met within the SWD3-2 community. The evaluation of the potential significance of the SWD3-2 community is provided below within **Table 4-1**.

Table 4-1: Significance Evaluation of SWD3-2 Community

Criteria	Criteria Met?
Size – woodlands shall meet a minimum average width of 40 m. Minimum patch size for significance is based off forest cover by planning unit (e.g., <5% forest cover = 1 ha minimum patch size)	No – In discussions with M. Kiddie (City of Hamilton), the minimum patch size to meet this criterion within the AEGD is 2 ha. The SWD3-2 community is 0.03 ha in size.
Interior forest – woodlands that contain interior forest habitat	No – SWD3-2 community is not large enough to support interior forest habitat.
Proximity/connectivity – woodlands that are connected within 50 m of a significant natural area (defined as wetlands 0.5 ha or greater in size, Environmentally Significant Areas, PSWs, and Life Science ANSIs)	No - No significant natural areas are present within 50 m of the SWD3-2 community
Proximity to water – woodlands where any portion is within 30 m of any hydrological feature, including all streams, headwater areas, wetlands and lakes	Yes – SWD3-2 is a wetland community
Age – woodlands with 10 or more native trees per hectare greater than 100 years old	No – No old growth trees were recorded within the SWD3-2 community
Rare species – any woodland containing threatened, endangered, special concern, provincially or locally rare species	No – No threatened, endangered, special concern, provincially or locally rare species were recorded within the SWD3-2 community

Even if the minimum size criteria is not the guiding criterion, the SWD3-2 does not meet two or more criteria and is therefore not considered to be significant per the UHOP. It is recognized that the City of Hamilton has an Urban Woodland Conservation By-Law (14-212) in place, which regulates

woodlands greater than 0.2 ha in size. Both the CUW communities do not meet the stem density requirements (as outlined within **Section 3.3.2**). The SWD3-2 community does not meet the minimum size criteria.

4.5 Significant Valleylands

Significant valleylands are defined and designated by the planning authority. General guidelines for determining significance of these features are presented in the NHRM (MNR 2010) for Policy 2.1 of the PPS. Recommended criteria for designating significant valleylands includes prominence as distinctive landform, degree of naturalness, and importance of its ecological functions, restoration potential and historical and cultural values.

Within the UHOP (2018) – Chapter G (Glossary), significant valleylands are defined as "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 which is ecologically important in terms of features, functions, representation or amount and contributing to the quality and diversity of an identifiable geographic area or natural heritage system".

No valleylands are present on the Subject Lands and, as such, no significant valleylands are present.

4.6 Significant Wildlife Habitat

SWH is one of the more complex natural heritage features to identify and evaluate. There are several provincial documents that discuss identifying and evaluating SWH including the NHRM (MNR 2010), the Significant Wildlife Habitat Technical Guide (MNR 2000), and the SWH Eco-Region Criterion Schedule (MNRF 2015). The Subject Lands are located in Eco-Region 7E and were therefore assessed using the 7E Criterion Schedule (MNRF 2015).

There are four general types of SWH:

- Seasonal concentration areas;
- Rare or specialized habitats;
- Habitat for species of conservation concern; and
- Animal movement corridors.

General descriptions of these types of SWH are provided in the following sections.

Seasonal Concentration Areas

Seasonal concentration areas are those sites where large numbers of a species gather together at one time of the year, or where several species congregate. Seasonal concentration areas include: deer yards; wintering sites for snakes, bats, raptors and turtles; waterfowl staging and molting areas,

bird nesting colonies, shorebird staging areas, and migratory stopover areas for passerines or butterflies. Only the best examples of these concentration areas are usually designated as SWH.

No other seasonal concentration areas were identified within the Subject Lands.

Rare or Specialized Habitats

Rare and specialized habitat are two separate components. Rare habitats are those with vegetation communities that are considered rare in the province. SRANKS are rarity rankings applied to species at the 'state', or in Canada at the provincial level, and are part of a system developed under the auspices of the Nature Conservancy (Arlington, VA). Generally, community types with SRANKS of S1 to S3 (extremely rare to rare-uncommon in Ontario), as defined by the NHIC (2021), could qualify. It is to be assumed that these habitats are at risk and that they are also likely to support additional wildlife species that are considered significant. Specialized habitats are microhabitats that are critical to some wildlife species. The NHRM (MNR 2010) defines specialized habitats as those that provide for species with highly specific habitat requirements, areas with exceptionally high species diversity or community diversity, and areas that provide habitat that greatly enhances species' survival.

No other rare or specialized habitats were identified within the Subject Lands.

Habitat for Species of Conservation Concern

Species of conservation concern include those that are provincially rare (S1 to S3), provincially historic records (SH) and Special Concern species. Several specialized wildlife habitats are also included in this SWH category, including Terrestrial Crayfish habitat, and significant breeding bird habitats for marsh, open country and early successional bird species.

Habitats of species of conservation concern do not include habitats of endangered or threatened species as identified by the ESA (2019 Consolidation). Endangered and threatened species are discussed in **Section 4.8.**

No habitat for species of conservation concern was identified within the Subject Lands.

Animal Movement Corridors

Animal movement corridors are areas that are traditionally used by wildlife to move from one habitat to another. This is usually in response to different seasonal habitat requirements, including areas used by amphibians between breeding and summer/over-wintering habitats, called amphibian movement corridors.

As woodland amphibian breeding habitat was not identified on the Subject Lands, no amphibian movement corridors were assessed.

SWH Summary

Table 8 (**Appendix B**) evaluates whether any SWH was present within the Subject Lands and determined that no SWH was present based on either the absence of ecosite/habitat availability and/or absence of SWH indicator species and/or abundance criteria was not met.

4.7 Fish Habitat

Fish habitat, as defined in the federal *Fisheries Act*, c. F-14, means "spawning grounds and nursery, rearing, food supply, and migration areas on which fish depend directly or indirectly in order to carry out their life processes." Fish, as defined in S.2 of the *Fisheries Act*, c. F-14, includes "parts of fish, shellfish, crustaceans, marine animals and any parts of shellfish, crustaceans or marine animals, and the eggs, sperm, spawn, larvae, spat and juvenile stages of fish, shellfish, crustaceans and marine animals."

No fish were collected within HDF H1S1 despite survey effort (as discussed within **Section 3.4.2**). All HDFs identified within the Subject Lands provide indirect fish habitat to downstream habitats through the contributions of allochthonous materials and flows. This is consistent with the AEGD Secondary Plan's evaluation (as depicted on **Figure 2**, **Appendix A**).

4.8 Habitat of Endangered and Threatened Species

One threatened species was recorded within the Subject Lands during targeted ecological field studies: Barn Swallow. Several pairs were observed within the Airport Lands, which may support breeding habitat. These individuals were documented during breeding bird surveys foraging over the Subject Lands; however, no suitable breeding sites are present within the property.

No breeding habitat was identified for Barn Swallow within the Subject Lands. Barn Swallow are known to have a high tolerance for alteration within foraging habitat. Abundant foraging habitat will remain present within the local area within a mixture of land-uses, including agricultural, anthropogenic (e.g., Willow Valley Golf Course and Greenhorizons Sod Farm) and naturalized lands (e.g., Three Mile Creek Corridor). Foraging habitat for Barn Swallows is not protected under the ESA (2007). Engagement with the Ministry of Environment, Conservation and Parks (MECP) is not warranted given that there will be no impact to Barn Swallow habitat.

4.9 Significant Areas of Natural and Scientific Interest

No ANSIs were identified on or within 120 m of the Subject Lands (**Figure 2**, **Appendix B**).

4.10 Key Natural Heritage and Hydrologic Features – Urban Hamilton Official Plan (2018)

A review of the UHOP (2018) was undertaken to understand whether any key natural heritage features or key hydrologic features, as defined in the UHOP, are present within the Subject Lands.

Key Natural Heritage Features include:

- Significant habitat of endangered and threatened species;
- Fish habitat;
- Wetlands;
- Life Science ANSIs;
- Significant valleylands;
- SWH;
- Sand barrens, savannahs and tallgrass prairies; and
- Alvars

Two key natural heritage features were identified within the Subject Lands: wetlands and indirect fish habitat. As discussed above within **Section 3.3.1**, three wetland community types were identified within the property.

Key Hydrologic Features include:

- Permanent and intermittent streams;
- Lakes (and their littoral zones);
- Seepage areas and springs; and
- Wetlands.

Evaluation as to whether the HDFs within the Subject Lands met the permanent and intermittent streams criteria was considered. The UHOP (2018) defines intermittent streams as "stream-related watercourses that contain water or are dry at times of the year and are more or less predictable, generally flowing during wet seasons of the year but not the entire year, and where the water table is above the stream bottom during parts of the year". Permanent streams were defined as "a stream that continually flows in an average year". As previously discussed within **Section 3.4.1** of this report, HDF H1S1 and HDF H2S1 are both wetland communities and HDF H1S1A is a swale. No features exhibiting watercourse characteristics were identified within the Subject Lands. Moreover, no natural hazards are associated with either feature (e.g., flood or erosion hazards); therefore, these features should not be considered watercourses or streams in accordance with the UHOP.

One key hydrologic feature type (wetland) was identified within the Subject Lands.

Local natural areas are defined in the UHOP as "Environmentally Significant Areas as identified by the City of Hamilton, unevaluated wetlands and Earth Science ANSIs". No local natural areas were identified within or adjacent to the Subject Lands.

While no linkages were identified on the Subject Lands within the AEGD Secondary Plan/SWS, a desktop review was completed to determine whether any linkages may be present within the Subject Lands. Given the location of the Subject Lands between the Airport (west) and Upper James (east), it is unlikely that HDF H1 and its associated wetland community are acting as a wildlife movement corridor. Furthermore, the wooded features (CUW and SWD) on the property are too small, scattered and isolated to be considered "stepping stone" habitat. It is unlikely that these small communities would provide a linkage function given that they abut existing residential dwellings along Homestead Drive and Airport Road. No SAR or SWH were identified in association with these wooded communities. No other larger Core Areas are present within the vicinity for these features to provide "stepping stone" habitat to/from. GEI is in agreement with the Secondary Plan/SWS findings in that no linkages are present within the Subject Lands.

All key natural heritage and key hydrologic features found within the Subject Lands are illustrated on **Figure 7** (**Appendix A**). These key natural heritage features and key hydrologic features are considered Core Areas under the UHOP.

4.11 NPCA Regulated Features

Pursuant to Ontario Regulation 155/06, the NPCA has the authority to regulate development within its regulated areas. The NPCA regulates the following features:

- Lands adjacent to or close to the shoreline of the Great Lakes-St. Lawrence River System that may be a river or stream valleys that have depressional features associated with a river or stream, whether or not they contain a watercourse;
- Hazardous lands;
- Wetlands; and
- Other areas where development could interfere with the hydrologic function of a wetland, including areas up to 120 m of all PSWs and wetlands greater than 2 ha in size, and areas within 30 m of wetlands less than 2 ha in size.

The following wetland vegetation communities were identified within the Subject Lands:

- MAM2-2;
- MAS2-1/MAS1-12; and
- SWD3-2.

No individual or contiguous wetland communities were equal to or greater than 2 ha in size within the Subject Lands.

As previously discussed within **Section 3.4**, HDF H1S1 was identified within NPCA's Watershed Explorer as a regulated watercourse. Based on the nature of the feature and since it does not have any flood or erosion hazards associated with it, it is GEI's assessment that this feature is not a regulated watercourse; however, it is a regulated wetland.

4.12 Summary of Ecological and Natural Heritage Significance

The PPS (MMAH 2020) defines the important natural heritage features to consider in terms of impact assessment. No significant natural heritage features were identified within the Subject Lands.

Evaluation of key natural heritage and hydrologic features under the UHOP (2018) was completed. Two key natural heritage and one hydrologic feature were identified within the Subject Lands: wetlands and indirect fish habitat. The wetlands are associated with the MAM, MAS2-1/MAS1-13 and SWD3-2 communities. Indirect fish habitat was associated with HDF H1 and H2.

Wetland communities are also regulated by the NPCA pursuant of Ontario Regulation 155/06.

5.0 DESCRIPTION OF THE DEVELOPMENT PROPOSAL

An industrial development consisting of a complex of warehouses is proposed within the Subject Lands. A total of four buildings and one 30 m wide roadway (Street A; also referred to as the internal East Cargo Road) are proposed. Two retaining walls will be located along the northern Subject Land boundary. The conceptual design of the complex is illustrated on **Figure 8** (**Appendix A**). Street A alignment has been designed to allow a new road connection to Airport Road and the northern landowner's proposed right of way location. The proposed road allowance will extend from Airport Road to a proposed cul-de-sac at the northern edge of the property. Should the adjacent (northern) neighbour construct the connecting road allowance, the proposed cul-de-sac design will be omitted.

Several options for the development layout were explored by the consultant team to ensure that the identified natural heritage/hydrologic features were protected, however this wasn't feasible given the site engineering requirements. Based on the site's constraints related to the alignment of Street A, there were some grading conflicts associated with some of the natural heritage features within their existing location in proximity to the neighbouring properties (as discussed within **Section 6** of Odan Detech's Functional Servicing Report; 2023). Specifically, the location of the MAM2-2 wetland community was initially going to be retained and buffered in place, however as a result of the proposed alignment of Street A to connect with the adjacent (northern) landowner, additional grading was required within the wetland community to facilitate the new road construction. Opportunities to minimize this grading extent were considered, per the request of the NPCA's technical staff. Given the elevation range required to match site grades and construct Street A, retaining the feature was not feasible.

5.1 SWM Approach

The below summary of the SWM approach is based on Odan Detech Group's Functional Servicing Report (FSR; 2023), which has been updated based on technical discussions with their team.

Odan Detech Group's proposed SWM strategy will follow the AEGD's SWS/SWMP Implementation Document (2011, 2017). As previously noted, the Subject Lands contains two catchment areas where the southern portion of the property drains towards the Upper Welland River and the northern portion of the property flows towards Three Mile Creek. As a result of this drainage divide, Odan Detech Group's SWM approach will incorporate three separate storm outlets, with one outletting east towards the drainage feature flowing towards Homestead Drive (towards Three Mile Creek), the second outletting towards a new storm sewer on Airport Road at the Street A connection(towards the Upper Welland River) and the third outletting to the existing storm sewer on Homestead draining southwards towards Airport Road (Upper Welland River). As discussed in the AEGD's SWS/SWMP Implementation Document (2011, 2017), the outlets have different allowable flow criteria, based on the sensitivity of downstream receiving watercourses. The outlet towards the drainage feature which drains towards Homestead will match pre-development flow rates. The outlet directed towards Airport Road through

Street A will be controlled to the 100-year pre-development flow rate allocated to Lancaster Heights SWM pond, while the other outlet to the Homestead Drive storm sewer will be controlled to pre-development flow rates.

Stormwater quality controls for the proposed development will require an on-site treatment train approach utilizing a combination of LID methods such as bioswales, infiltration galleries, bioretention filters and oil/grit separators (OGS) to ensure all stormwater discharging to the proposed municipal meet MECP Level 1 quality control (80% TSS removal). In addition, 10mm of storm volume retention will be required for all ground level paved areas within the proposed LID features. This volume will not contribute to the storm runoff volume of the site as it will dissipate by way of infiltration, evaporation and evapotranspiration. Roof areas are considered to be clean runoff therefore storm treatment for these areas is not required. Conceptual quality control measures have been presented by Odan/Detech for ZBA purposes however detailed designs will completed at the Site Plan Application stage for individual blocks.

Quantity control will be achieved on-site through roof top detention, surface storage and underground storage chambers. All controls will be within the individual site boundaries prior to discharge to right-of-way sewers or proposed watercourse features. Rooftop control drains will be provided on each building to control stormwater runoff. A majority of the rooftop drainage will be collected and conveyed into infiltration galleries to meet the site water balance targets. A storm sewer system within the Subject Lands that will be directed towards the three outlets, except if it is determined within the detailed design stage that additional water is required in order to support the created wetland hydroperiod. This water is considered clean and is acceptable at 80% or Level 1. No wet ponds are proposed on site.

Within the proposed road allowance quality control will be provided by vegetated swales/ditches located in the boulevards of Street A. The roadside ditches will ultimately be intercepted by ditch inlets downstream and release into the created wetland area at the storm sewer outlet headwall.

As discussed within Section 4.6 of the FSR (Odan Detech Group 2021), one vegetated bioswale (also referred to as conveyance channel; 5 m wide corridor) is proposed to convey off-site drainage from the Airport Lands east towards Homestead Road. This bioswale will maintain the inlet and outlet locations of HDF H1S1, however the bioswale will be aligned along the northern property boundary. The bioswale will be culverted underneath the proposed cul-de-sac at Street A within an 825 mm concrete culvert.

5.2 Hydrogeological Investigations

Soil-Mat was retained to complete additional hydrogeological works on the site to inform whether shallow groundwater levels would be impacted as a result of the proposed development. Given that the development proposed is slab on grade buildings, Soil-Mat (2022) determined that the proposed development would have "little to no potential for minor interference with shallow groundwater level

and no potential impact to the deeper bedrock groundwater conditions". The installation of site services may require the use of dewatering techniques such as pumping from sumps and ditches.

Soil-Mat (2022) also advised that given the low vertical permeability of the native clayey silt deposits within the Subject Lands, on-site stormwater infiltration systems are not feasible.

5.3 Erosion Threshold Assessment

An erosion threshold assessment was undertaken by GEO Morphix (2022) to understand whether the SWM outflows could impact downstream surface water drainage features. Reach H1S3, which is located downstream of the site within Willow Valley Golf Course, was identified as the most erosion-sensitive reach within the immediate zone of impact from the proposed SWM outlets. The erosion threshold was determined to be 0.078 m^3/s; which will be used to monitor pre to post conditions within the channel.

6.0 IMPACT ASSESSMENT

This EIS presents and discusses the natural heritage features and associated functions that occur on and/or adjacent to the Subject Lands. The impact assessment was informed by the FSR (Odan Detech Group 2023) and updated input from Odan Detech Group, Hydrogeological Report (Soil-Mat 2022) and the Erosion Threshold Assessment (GEO Morphix 2022).

The EIS assesses the potential effects on these natural heritage features and functions that could occur over various periods of time (short or long term) following the implementation and construction of the conceptual site plan. This EIS also considers cumulative impacts which are defined within the City of Hamilton's EIS Guidelines (2012) as "apparent impacts of previous development applications or land-use activities on the identified environmental features and functions, including trails, dumping, excavation and fill, and introduced plants". The assessment of cumulative impacts will consider impacts associated with construction of adjacent residential and Airport Lands, as well as agricultural management within the Subject Lands.

The EIS also identifies planning, design and construction practices that are recommended to maintain, and where possible, improve or restore the health, diversity and size of natural heritage features on and adjacent to the Subject Lands.

Table 9 (**Appendix B**) summarizes impacts associated with site alteration and construction proposed by the conceptual site plan, as displayed on **Figure 8** (**Appendix A**). **Table 9** (**Appendix B)** also provides a summary of the natural heritage features and their associated function, as well as their significance and sensitivity within the landscape. Impactors are identified, along with potential effects without any form of mitigation. Impact avoidance, mitigation and/or restoration measures are identified along with predicted effects. Recommended monitoring strategies are provided to assess the effectiveness of mitigation measures.

The potential direct and indirect effects of the proposed development, and a summary of general recommended mitigation and restoration strategies are provided below.

6.1 Fish Habitat

Two HDFs were identified within the Subject Lands that consisted of three reaches: HDF H1S1, HDF H1S1A and HDF H2S1. All drainage features are heavily altered downstream (offsite). HDF H1S1 conveys flows from a SWM pond within the Airport Lands east towards Homestead Drive/Upper James Street. The drainage is then conveyed via culvert under both Homestead Drive and Upper James Street for approximately 56 m before outletting into a roadside ditch along the eastern side of Upper James Street. These flows ultimately enter Three Mile Creek approximately 500 m downstream of the Subject Lands, within the Willow Valley Golf Course. HDF H2S1 conveys flows from the wetland and adjacent residential properties towards Homestead Drive. The flows exit the Subject Lands via a degraded culvert underneath residential properties before outletting into the roadside ditch along

the western side of Homestead Drive. These flows merge with drainage from HDF H1S1 within an offsite wetland before being culverted under Homestead Drive.

Drainage from the dry SWM pond within the Airport Lands has augmented the flow contributions that HDF H1S1 receives. During the summer HDFA, increased flow was recorded within the wetland community (relative to the late spring HDFA), which is atypical of these types of wetlands during the drier summer months. Moreover, during the wetland staking exercise with the NPCA in August 2021, increased flow from the Airport Lands and an unknown substance was recorded within the wetland on the Subject Lands.

As discussed above within **Section 3.4.1**, all HDFs were identified as providing indirect fish habitat through the contributions of allochthonous materials and flows to downstream habitats. HDFs H1S1 and H1S1A were assigned a management recommendation of Mitigation, while HDF H2S1 was assigned a management recommendation of Conservation. HDFs assigned a Mitigation management recommendation can have their functions replicated through targeted mitigation actions (e.g., wetland creation, LID solutions). HDFs assigned a Conservation management recommendation can maintain or replace on-site flows using mitigation measures and/or wetland creation.

All HDFs will be removed from the landscape to accommodate the proposed site development and/or site alteration. Mitigation HDFs (HDFs H1S1 and H1S1A) will have their functions replicated through wetland creation, conveyance swale construction, SWM and LID infrastructure. This is consistent with the management recommendation guidance provided within the HDFA Guideline. As previously discussed above within **Section 5.0**, removal of the existing wetland associated with HDF H2S1 is required to accommodate grading requirements for Street A, although the created wetland will be re-constructed within the same location. Discussion on grading requirements is provided within Section 6 of the FSR (Odan Detech 2023). All impacts associated with wetland removal (HDF H1S1 and HDF H2S1) are discussed below within **Section 6.3.** It is recognized that indirect fish habitat is still considered a Key Hydrologic Feature under the UHOP and would therefore qualify as a Core Area. It is also recognized that the UHOP generally does not permit vegetation removal and encroachment into Core Areas (Chapter C, Section 2.3.3); which suggests that there may be instances where encroachments and removals are permitted in support of other planning objectives. Chapter C, Section 2.5.8 of the UHOP states that the EIS must demonstrate that there will be "no negative impacts on Core Area's natural features or their ecological functions". The remainder of this section illustrates how this test will be met.

Unmitigated, the following indirect effects to fish and fish habitat downstream could occur as a result of the proposed development:

- Impaired fish habitat and/or negative impacts on aquatic biota (e.g., fish and benthic invertebrates), including deteriorated health or mortality, due to erosion and sedimentation from site alteration and development;

- Mortality or health impacts due to accidental spills of toxic materials during or post-construction;
- Alterations in water balance (e.g., timing and volume of flows) and associated negative impacts on fish habitat functions;
- Alterations in the delivery of organic materials to downstream reaches; and
- Long-term impairment of water quality (including chemical contaminants, suspended solids and temperature) due to surface runoff from the proposed development.

Increased contributions of road salts during the winter months is expected as a result of the site development. Glycol de-icing products (Hamilton International Airport 2021) and other chemicals are currently being used within the Airport Lands and could drain through the Subject Lands. It is expected that these chemical contributions will continue as a result of the Airport land-use requirements.

Based on existing conditions, the primary functions of the drainage features are to convey drainage and contribute allochthonous materials to downstream (offsite) direct fish habitats. Drainage from the Airport Lands will continue to be conveyed through the property via an open vegetated conveyance swale. The convenyance swale will collect external flows from the upstream catchment (Airport Lands) and convey them through the Subject Lands before exiting the site into the receiving wetland before being piped under Homestead Drive. The conveyance swale has not been designed as part of the SWM strategy; rather, the primary function of the conveyance swale is to continue to convey external flows through the site. The conveyance swale will not be providing quality or quantity control. No mixing of internal site flows will occur until external and internal flows converge within the recreated wetland. The conveyance swale, which will be vegetated with native seed mix, will maintain the inlet and outlet locations associated with HDF H1S1. The conveyance swale will be located along the northern Subject Lands boundary in between the two retaining walls. The conveyance swale will continue to convey flows and allochthonous materials to downstream habitats and replicate existing drainage conveyance functions of HDF H1S1. As previously noted, HDF H1's primary function is to convey flows from upstream drainage (Airport Lands) to the receiving Three Mile Creek (offsite). The conveyance swale will ensure that these functions are replicated and maintained on the site to avoid negative impact to receiving (offsite) direct fish habitat. Other ecological functions will be replicated within the created wetland area (further described within **Section 7.0**).

The following mitigative measures are proposed to avoid potential negative impacts to fish and fish habitat:

- All in-water work must occur outside of the warmwater fisheries window (March 15 to July 15) to avoid the potential for negative impacts on downstream fish communities during important reproductive periods;
- Diversion of external flows from the Airport Lands into the vegetated conveyance swale (or other temporary diversion) should be completed prior to removing the wetland associated with HDF H1S1 to ensure no interruption in the conveyance of flows to downstream habitats;

- ESC measures will be used throughout construction;
- Spill prevention and response measures will be implemented to minimize the potential for negative effects due to accidental spills during construction;
- The conveyance swale and created wetland area will be seeded with and/or have native plants installed. The incorporation of native plant material will provide numerous ecological benefits (e.g., bank stabilization to reduce excess soil inputs, shading to reduce thermal loading, contribution of allochthonous materials to downstream habitats);
- No direct runoff from impervious surfaces associated with the proposed development will be conveyed to the conveyance swale. All stormwater from these areas will be captured and conveyed for treatment in the SWM system prior to discharge; and
- Wetland creation will help restore wetland functions (e.g., soil stabilization, increase flood storage capacity, increase water quality and clarity, reduce erosion potential) to ensure no loss in wetland functions within the Subject Lands.

Fish salvage is not warranted within the features given that no fish were documented within the feature during baseline inventories and, where feasible, the features will be removed in the dry.

The contribution of flows and allochthonous materials to downstream habitats will be maintained throughout the site through the construction of the conveyance swale and the created wetland area. Aside from the recreated wetland and the conveyance swale (conveying external upstream flows through the site), onsite flows will be captured on site and conveyed either to Homestead Drive or Airport Road (as discussed above within **Section 5.1**). Flow contributions will ensure that post development flows are matching pre-development flows to ensure that the natural features downstream (offsite) are not impacted. No erosion is expected given that the flow contributions will be maintained.

All relevant water quality criteria will be addressed through the proposed SWM treatment train approach. An increase in salt contributions from road salt applications during the winter months is expected; however, alternatives will be considered, where feasible.

To ensure the proposed mitigative measures are functioning as designed and maintained, construction monitoring of ESC measures is recommended. Monitoring of and adherence to effectiveness of spill prevention and response measures is recommended throughout the construction period. Construction monitoring of the created wetland should also occur to ensure that it is being created as designed. Post-construction monitoring of the created wetland area is detailed below within **Section 8.0**.

Localized dewatering may be required to facilitate installation of services; however, Soil-Mat (2022) determined that little to no potential for minor interference to shallow or deep groundwater levels are expected. Given that minimal interference is expected to groundwater levels, no impact to downstream fish habitats are expected as a result of the proposed development.

No vegetation protection zones (VPZs) are warranted along the conveyance swale given that (1) there are no flood or erosion hazards currently associated with the HDF that require a setback, (2) the function of the HDFs will be maintained and/or enhanced through the establishment of the conveyance swale and/or created wetland and (3) this feature does not currently and is unlikely to in the future (unless upgrades are made to Upper James Road) support direct (permanent or seasonal) fish habitat. The primary functions of the existing features providing indirect fish habitat will be replicated on site to ensure no loss in ecological function. No runoff from the site will be directed into the conveyance swale; rather it has been designed to continue to convey external drainage from the Airport Lands to downstream habitats. The function of a buffer is to protect the feature and ensure that the functions are maintained; the functions (i.e., flow conveyance, contributions of allochthonous material) will be replicated and maintained within the conveyance swale. This is further discussed within **Section 6.5** (below). A 10 m VPZ will be provided surrounding the created wetland (as discussed below in subsequent sections).

Chapter C, Section 2.5.3 of the UHOP states that "new development and site alteration shall not be permitted within fish habitat, except in accordance with provincial and federal requirements". GEI will complete a Request for Review with DFO to ensure that no Federal Fisheries Act Authorization is required. Based on our professional experience, it is our expectation that DFO will not require that these features be retained on the landscape as long as their functions are replicated (i.e., flows continue to be conveyed to downstream fish habitats, allochthonous material continues to be conveyed downstream), as will occur with the proposed conveyance swale and created wetland.

Cumulative impacts to fish and fish habitat were likely driven by the construction on the Airport Lands (west; upstream of the Subject Lands) and Upper James Road (east; downstream of the Subject Lands). It is likely that the construction of these developments/infrastructure likely impacted the hydrology, water quality and habitat availability within drainage features. As noted previously, Upper James Road appears to be a permanent barrier to fish movement. Flow augmentation was recorded within HDF H1S1 during HDFAs as increased flows were recorded within the feature during summer months, when it is expected that these features would be drier. As a result of the construction of the adjacent development, Common Reed and other invasive species are present and continue to colonize into the Subject Lands, impacting fish habitat availability and altering the hydrology of features. It is possible that the construction of residential dwellings along Airport Road and Homestead also impacted drainage pathways. Flows from the Subject Lands and upstream catchments appear to be effectively conveyed to downstream habitats as culverts were noted along Homestead Drive and Upper James Road. Impacts associated with long-term agricultural management could include excess sediment and nutrient loading into downstream habitats.

Through the use of the above-noted mitigative strategies and proposed restorative measures (wetland creation), it is GEI's assessment that no negative impacts are predicted to fish and fish habitat as a result of the proposed development. Since the work will be completed in the dry and/or within appropriate fisheries windows, no short or long term impacts are expected to fish and fish habitat. The establishment of adjacent development and active agricultural land use could have contributed

to the degradation and/or reduction of fish and fish habitat within the drainage features on the Subject Lands. The proposed development application will maintain existing functions, and where feasible, enhance the functions through restoring wetland habitat. Moreover, no impacts to downstream fish habitats are expected, as flow contributions will be maintained.

6.2 Non-Significant Wetlands

Several non-significant wetlands were identified within the Subject Lands comprised of the following three vegetation communities:

- MAM2-2 (0.42 ha);
- MAS2-1/MAS1-12 (0.66 ha); and
- SWD3-2 (0.03 ha).

All wetlands were staked with NPCA and the staked linework is shown on all figures.

The MAM/MAS vegetation communities are generally associated with HDFs H1S1 and H2S1, while the SWD3-2 vegetation community is located along the southern property boundary adjacent to active residential dwellings. One MAM2-2 vegetation community is immediately upstream of HDF H2; however, no hydrologic connection between the two features was observed during the site visits. Differing levels of physical and biological disturbance were recorded within all wetland communities. Within the MAM2-2 vegetation community (HDF H2S1), ATV tracks were recorded throughout the length of the wetland feature. Neighbouring lawns were mowed up to the wetland edge. The MAS2-1/MAS1-12 vegetation community was highly invaded by Common Reed, a Category 1 invasive species. It is expected that this community would continue to be invaded as established populations were identified upstream and downstream (offsite) of the wetland. Finally, the SWD3-2 vegetation community had been obviously disturbed from adjacent residential land-uses (e.g., presence of spoil and earthen piles, tree removal within the vicinity of the property, horticultural beds within the vicinity of the unit). No calling amphibians were recorded within any wetland community. The wetlands do not support SAR or SWH.

Direct removal of all 1.11 ha of wetland is proposed to accommodate site alteration and development. Most wetland removal is associated with the proposed building envelope; however, some removals are required within the MAM2-2 vegetation community to accommodate site grading requirements associated with the construction of Street A (as discussed above within **Section 5.0**). A review of the mitigation hierarchy was completed to determine whether other reasonable alternatives existed, specifically including opportunities for:

1. Avoidance – prevent harmful impacts from occurring
2. Mitigation – reduce harmful impacts via mitigation
3. Offsetting – counterbalance harmful impacts via offsetting

Chapter C, Section 2.5.8 of the UHOP states that "removal of other natural features should be avoided or minimized by planning and design of the proposed use or site alteration wherever possible". To demonstrate that avoidance and mitigation opportunities were not feasible within the site, the below mitigation hierarchy was reviewed.

A constraint for the mitigation hierarchy is the building envelopes required to support the proposed employment growth. This proposed development has been supported from a planning perspective given that the totality of the Subject Lands is designated for employment usage (Airport Reserve per Map B. 8.1 of the AEGD Secondary Plan). No natural open space was designated within Map B.8.1 of the AEGD Secondary Plan. As noted within the mitigation hierarchy review below, GEI has been advised by the consultant team that several of the opportunities do not support the growth targets and land-use designated represented within the UHOP and AEGD Secondary Plan.

Development scenarios were considered where the wetland was retained in place, with a VPZ. This scenario was not a viable option to the proponent given that three wetland communities are scattered around the Subject Lands, including along the northern extent of the Subject Lands. Retaining these wetlands (with a VPZ) would limit the amount of developable area. Considering the nature of these wetlands (limited ecological wildlife value, generally monocultural stands and/or smaller wetland sizes), maintaining these features in-place is not warranted as they can be easily replicated. This scenario is not consistent with the UHOP and AEGD Secondary Plan policies and intended usage for the property as these wetland units were not previously identified within the AEGD Secondary Plan or UHOP Schedules; rather, only one key hydrologic feature (associated with HDF H1) was identified with the Subject Lands.

Opportunities to retain the MAM2-2 in its current form with reduced buffers were considered, however, it was not feasible given the Street A alignment requirements in order to connect with adjacent developments. Opportunities to reduce the amount of grading into wetlands were also considered; however, given engineering constraints this was not feasible. Again, it is our understanding that this scenario is not consistent with the UHOP and AEGD Secondary Plan policies and intended usage for the property (Airport Reserve; as shown on Map B. 8-1 of the AEGD Secondary Plan (2018)).

Given that no wetlands within the Subject Lands will be retained in-place, no feature-based wetland water balance risk assessment is warranted. Flows will continue to be conveyed to downstream wetland communities; thus, no negative impacts to receiving wetlands and their associated hydrology are expected. The upstream catchment area will not be impacted by the proposed development on site, and the proposed development will ensure that flows will mimic existing conditions.

The ultimate development scenario considers ecological reconfiguration and compensation of the non-provincially significant wetland. Under this scenario, the size of the wetland will be replicated at a 1:1 ratio on the Subject Lands in a different orientation and location; while increasing the overall biodiversity of the created wetland community. While a gain in physical wetland area will not be provided, it is GEI's assessment that a gain in ecological function (increased wildlife function and

habitat availability in comparison to the existing wetlands) will be provided. It is recognized that the UHOP generally does not permit vegetation removal and encroachment into Core Areas (in accordance with Chapter C, Section 2.3.3 of the UHOP), unless the EIS can demonstrate that no negative impacts on the Core Area's natural features or their ecological functions (in accordance with Chapter C, Section 2.5.8 of the UHOP). Below demonstrates how no negative impact will be achieved.

A 1:1 ratio is warranted given that portions of the wetlands proposed for removal are degraded and/or disturbed from physical and biological disturbance. If the MAS2-1/MAS1-12 vegetation community was retained within the landscape, it is likely that this wetland would continue to be invaded by Common Reed from the offsite established populations. Moreover, the SWD3-2 vegetation is highly disturbed as a result of its location in proximity to active residential dwellings, and the MAM vegetation community has been disturbed as a result of informal ATV trails. The creation of the wetland habitat within the designated restoration area will help mitigate existing disturbance-related impacts. The created wetland will increase the native plant diversity to provide a net gain in ecological functions and resiliency of the system. Moreover, the removal of the MAS2-1/MAS1-12 vegetation community will temporarily eliminate Common Reed from the Subject Lands. Hydroperiod modelling will be completed during the detailed design phase to ensure that the wetland hydroperiod can be supported following initial discussions with reviewing agencies. Preliminary review completed by OdanDetech suggested that Building B roof top drainage would be sufficient to hydrologically support the created wetland. Further information on the proposed restoration concept is provided below within **Section 7.0** of the EIS.

Table 6-1 (below) illustrates how all requirements have been met to consider wetland reconfiguration of all wetland communities in accordance with Section 8.2.2.8 of the NPCA's Land Use Planning Document (2018).

Table 6-1: Evaluation of Criteria defined under Section 8.2.2.8 of the NPCA's Land Use Planning Document (2018)

NPCA Criteria Per Section 8.2.2.8	Criteria Met?
a) The wetland has been evaluated in accordance with OWES Protocol and approved by MNRF	a) N/A – as discussed above within **Section 3.1.1** of the EIS, an OWES evaluation is not warranted on these wetlands.
b) The wetland (as evaluated in (a) above) is not a Provincially Significant Wetland under the OWES Protocol to the satisfaction of the MNRF	b) N/A – as discussed above within **Section 3.1.1** of the EIS, an OWES evaluation is not warranted on these wetlands.
c) The reconfigured wetland and proposed development will not have a negative impact on any species of concern, significant habitat types or species at risk	c) Yes – The wetlands were not evaluated as providing habitat to any SAR or species of special concern, nor was it identified as SWH.

NPCA Criteria Per Section 8.2.2.8	Criteria Met?
d) The reconfigured wetland and proposed development will not have a negative impact on the hydrological or ecological function of the wetland	d) Yes – The reconfigured wetland will maintain existing functions while enhancing floristic diversity. No hydrological or ecological impacts are expected as a result of the proposed reconfiguration plan.
e) A restoration plan for the reconfigured wetland is provided for review and approval	e) Yes - A conceptual restoration plan is provided below within **Section 7**. Following approval of the conceptual restoration plan, a detailed Natural Heritage Design Brief will be prepared during the detailed design stage in consultation with reviewing agencies.
f) A multi-year monitoring program is required (minimum five years) to ensure the long-term establishment of the reconfigured wetland	f) Yes - A post-construction monitoring plan is provided below within **Section 8**. Through correspondence with NPCA, it was agreed that a five year monitoring period is warranted for this application (email correspondence provided within **Appendix C**).
g) A security deposit in an amount approved by the NPCA to establish the reconfigured wetland and ensure its establishment	g) To be completed – the client commits to providing a security deposit, as required by the NPCA.
h) An EIS to provide a review and approval to demonstrate conformity with Section 8.2.2.8	h) Yes - This EIS demonstrates conformance.
i) The applicant is required to enter into a restoration agreement with the NPCA that will be registered on the title of the property containing the reconfigured wetland that will provide the necessary details to implement Section 8.2.2.8	i) To be completed – the proponent commits to entering into a restoration agreement.
j) Additional information, such as an EIS, hydrologic study, restoration plan and/or other studies as required depending on site-specific characteristics	j) Yes – A conceptual restoration plan is provided within this EIS. A Natural Heritage Design Brief providing more detailed restoration details will be prepared as part of detailed design, which will include hydroperiod modelling for the reconfigured wetland.

Chapter C, Section 2.5.2 states that "new development and site alteration shall not be permitted within provincially significant wetlands, significant coastal wetlands or significant habitat of threatened and endangered species"; however, the UHOP does not specifically state that no development or alteration is permitted within non-PSWs.

As illustrated on Map B.8-2 of the AEGD Secondary Plan, HDF H1 was identified as "supporting/indirect fish habitat"; however, the wetlands associated with these features were not identified as Core Areas,

though presumably were present at the time of completion of the SWS. It is recognized that Core Areas can be later identified as part of the EIS stage. The intent of the UHOP and AEGD Secondary Plan/SWS will still be met through the proposed mitigative and restorative measures proposed. This will ensure no loss in wetland habitat will occur on site, while improvements in ecological function of the wetland community will be provided.

It is recognized that the City's policies for Core Areas (Chapter C, Section 2.3) does not permit negative impacts to natural heritage features and their ecological functions. Chapter C, Section 2.3.3 states that vegetation removal and encroachment into Core Areas shall generally not be permitted, suggesting that there are some cases where removal and encroachment are permitted provided justification is provided. Section 2.5.8 states that there shall be "no negative impacts on the Core Area's natural features or their ecological functions". The remainder of this section outlines how this test will be met.

The following mitigation measures are proposed to minimize adverse impacts associated with wetland removal:

- Wildlife rescues within wetland units proposed for removal to occur ahead of removal of the features;
- Any dewatering activities associated with the removal of these features to not outlet to downstream aquatic habitats, if possible. Since HDF H1S1 and HDF H2S1 are also identified as providing indirect fish habitat that supports downstream fisheries, removal of these features should be completed outside of the spring fisheries window (March 15 to July 15) to avoid adverse effects to downstream habitats. Dewatering activities should occur slowly to avoid excess sediment input to downstream habitats with water treatment used as necessary; and
- Opportunities for phasing will be considered to recreate wetlands ahead of the removal of existing wetlands within the Subject Lands. This may not be feasible given that the created wetlands will be guided by the grades associated with Street A and the hydroperiod will be reliant in part from the roof-top contributions from Building B.

In addition to the above-noted construction mitigation measures, a 10 m native species buffer surrounding the created wetland area is provided to protect and enhance the created wetland. Based on the proposed ecological form and function of the created wetland, a 10 m vegetated buffer will be sufficient to support the biophysical requirements of the feature. For example, the wetland will be designed to support pollinator habitat and increase native plant diversity, however it is unclear at this point in the design process whether the wetland hydroperiod will be able to support breeding amphibian habitat. Since no amphibians were recorded within the Subject Lands and the location of the wetland surrounded by existing residential and proposed industrial buildings, it is unlikely that this will support significant concentrations of wildlife. While it is recognized that the NPCA recommends a 30 m buffer on all wetlands, Section 8.2.3.3 of NPCA's Policy Document (2018) suggests that a reduction of the 30 m buffer is permitted depending on several criteria. A 10 m vegetated buffer from non-significant wetlands is recommended within both TRCA and CVC jurisdiction, as discussed within Section 7.3.1.4 of the Living City Policies (TRCA 2014) and Section 6.2.1 of CVC's Watershed Planning

and Regulation Policies (2010). As discussed within Chapter C, Section 2.5.10 of the UHOP, vegetation protection zones (VPZs) should be evaluated and addressed within the EIS. Unevaluated wetlands have a recommended VPZ of 15 m. Section 2.5.1 further states that VPZs may be refined by the completion of the EIS. The created wetland will be designed to support urbanized wildlife species that are accustomed to various levels of noise and light. Moreover, several mitigation measures have been suggested (e.g., thorny barrier plantings, educational signage, fencing and/or noise barrier) to deter human interactions with the created wetland feature. No direct runoff from the site will feed into the created wetland, rather, the wetland will be fed either by the conveyance swale, LID features and/or rooftop drainage. Given this, a 10 m vegetation buffer is warranted for the created wetland.

Additionally, the proposed conveyance swale culvert outlet and cable concrete will have a footprint of 7 m and 2.5 m within the created wetland and buffer, respectively. This specific erosion mitigation method was selected within the wetland as it still permits the growth of vegetation, whereas alternatives like riprap do not. This footprint is required in order to support the conveyance of flows from the conveyance swale under Street A and prevent erosion into the created wetland. Street A is located at a higher elevation than the created wetland area in order to match existing elevations of the East Cargo Road and the northern landowner's proposed right of way location.

No surface water runoff from parking areas or roads will be conveyed directly to the wetland or associated buffer without any form of treatment; therefore, a larger buffer is not required to provide water quality functions for the created wetland.

Finally, installation of fencing between the existing residential properties and created wetland is proposed to discourage disturbance/interaction with the feature. In addition to the fencing, incorporation of education signage will be considered during detailed design.

Salt contributions from Street A into the created wetland are likely to occur given its proximity. As discussed below within **Section 6.4**, winter maintenance standards should be created in accordance with the City of Hamilton's Salt Management Plan (2021). In addition to this, the created habitat is currently not designed to support sensitive species (i.e., breeding amphibians); the targeted fauna usage within the feature is generally restricted to terrestrial species (e.g., insects, birds, small mammals). The installation of salt-tolerant plants will be included within the planting list. These plants could include species such as Gray Dogwood (*Cornus racemosa)*, Red-osier Dogwood (*Cornus sericea)*, Choke Cherry (*Prunus virginiana)*, Wild Red Raspberry (*Rubus idaeus sp. Strigosus)*, Nannyberry (*Viburnum lentago)*.

Cumulative impacts to the existing wetlands on the Subject Lands are likely largely associated with the active agricultural management within the landscape. Agricultural management requires the disturbance of sediment within the system, which could cause increased erosion within the fields resulting in excess sedimentation in the wetland. Construction of adjacent infrastructure (Airport, roadways) could also have impacted wetland habitat, depending on the mitigative measures enacted. Cumulative impacts associated with the adjacent residential communities were identified

above, as the existing residents appear to be interacting with the MAM2-2 and SWD communities, as noted by the presence of ATV tracks and debris. Under the new proposed development application, fencing will be installed along the edge of the property boundary which will discourage residents from entering the site, and subsequently interacting with the recreated wetland.

The existing wetlands found within the Subject Lands offer limited ecological functions. The wetlands on site do not provide linkage functions, support SWH or SAR habitat. The wetlands on site are not considered provincially significant. Given the low function of these wetlands, it is GEI's recommendation that a no negative impact can be achieved based on the above-noted mitigative and restorative measures. These functions can be easily replicated given the low ecological function and form of the wetlands on site. Moreover, no negative impacts are predicted to wetlands downstream of the property. Provided that the created wetland is constructed immediately following the construction of Street A and Building B, no short or long term impacts are predicted. As noted previously, it is unlikely that creation of the wetland habitats can occur prior to the construction of Street A and Building B, since the grading of the wetland is closely linked to these structures and is reliant on the roof top contributions from the building. The establishment of adjacent development and active agricultural land use could have negatively impacted the wetlands historically; however, measures proposed during construction and post-construction have been provided to mitigate against further impacts and enhance wetland functions (through the creation of a higher-quality wetland – i.e., more ecologically and functionally diverse feature) within the Subject Lands. Post-construction monitoring of the created wetland is proposed within **Section 8.0** to ensure that the wetland is functioning as designed.

6.3 Trees

A total of 444 trees were inventoried within the Subject Lands, of which two trees were dead. These include individual trees as well as trees located within hedgerows and woodland communities; two woodland community types were identified within the Subject Lands:

- SWD3-2 (0.03 ha); and
- CUW1 (0.22 ha).

As discussed above within **Section 4.4**, the woodland (SWD) did not meet the test for significance under the UHOP (2018). All wooded communities are relatively small and isolated features within the landscape (SWD), and did not qualify as woodlands (CUWs) under the *Forestry Act*. They do not host SWH or SAR, rather they support common and secure bird species.

Removal of all woodland/wooded communities within the Subject Lands are proposed (0.25 ha). A total of 422 trees (including two dead trees) are proposed for removal to accommodate the proposed site alteration/development.

The following mitigative measures are proposed:

- All tree removals should occur outside of the active bat maternity window (April 1 to October 1) and the Migratory Bird window (April 15 to August 15);
- Tree removals should follow best arboricultural practices;
- ESC measures should be installed around nearby/receiving hydrologic features to reduce sedimentation inputs; and
- To slow the spread of invasive species (such as Emerald Ash Borer), all trees (not just Ash) should be disposed of locally to reduce transportation to other local municipalities.

Where trees were identified as preservation, tree protection measures are discussed within Section 4 of the TPMP (**Appendix E**). The City of Hamilton requires compensation of live private trees at a 1:1 ratio, therefore, a total of 420 trees are proposed to be planted to compensate for those being removed as a result of the proposed development. Detailed compensation requirements are discussed within Section 5 of the TPMP (**Appendix E**). All tree removals and compensations will be completed in accordance with City requirements. It is recognized that trees provide a variety of functions (i.e., canopy cover, energy conservation, mental health benefits and wildlife habitat); thus, compensation of these trees will ensure that there is not a loss in these functions within the landscape.

With respect to cumulative effects, it is likely that agricultural management and adjacent development have impacted trees within the Subject Lands. The CUW communities are cultural and by definition have been anthropogenically influenced (either resulting from or have been maintained by human activity). In a post-development scenario, the trees will continue to be anthropogenically influenced as some will be located in different spaces within the Subject Lands and the landscape.

6.4 Other Natural Heritage Considerations

Additional mitigation measures should be considered to avoid short term, cumulative and long-term impacts to retained and created natural heritage features:

- To slow the spread of invasive species (such as Emerald Ash Borer), all trees removed from the Subject Lands (not just Ash) should be disposed of locally to reduce transportation to other local municipalities;
- Invasive species monitoring will occur within the created wetland in an effort to detect invasive species early-on;
- Offsite invasives (Common Reed) were considered as part of the Conceptual Restoration Plan (**Section 7.2**);
- Winter maintenance standards and other strategies will be explored in accordance with the City of Hamilton's Salt Management Plan (2021);
- Educational signage, such as no dumping signs, could be installed near natural heritage features to avoid human interactions with the features;
- To avoid human-wildlife interactions from adjacent residences along Homestead within the created wetland, the installation of thorny barriers and/or fencing could be explored; and

- While unlikely that occupants from the Airport lands will interact with the retained wetland (given its proximity opposite Street A), installation of thorny barriers and/or fencing could also be explored.

The installation of wildlife fencing (to avoid wildlife/human and wildlife/traffic interactions) surrounding the created wetlands and associated conveyance swale are not warranted given the limited wildlife observations recorded within the Subject Lands.

From a cumulative perspective, where disturbance occurs it creates an environment where invasive species can encroach into and dominate an existing habitat (whether created or natural). Given the adjacent development that has occurred surrounding the Subject Lands (Airport, residential, roadways) there are various pathways in which invasives can move into the Subject Lands. Once invasive species have been introduced on the landscape they are able to continue to colonize adjacent habitats. Invasives are known within the adjacent habitats (Airport SWM pond, downstream wetland) and are likely to move onto the site. The presence of humans within the landscape can perpetuate disturbance (e.g., ATVing can collect and distribute invasive seeds) and can degrade natural features and functions. In a post-development scenario, invasive monitoring has been proposed in an effort to detect invasives as they move onto the site. Given that invasives are known within adjacent habitats, this has also been considered as part of the restoration strategy (as discussed within **Section 7**). Efforts to discourage human interactions with natural features have been considered (i.e., educational signage, fencing). Water quality within the Subject Lands is likely already impacted from the upstream Airport Land discharge and adjacent roadways. Moreover, there is potential for degraded water quality as a result of agricultural practices (e.g., pesticide usage, oil spills from machinery). With the addition of the development within the Subject Lands, it is likely that salt concentrations within the receiving waterbodies will increase; although salt management strategies will be explored to reduce the amount of salt loading. During construction, mitigation measures (e.g., accidental spill measures, ESC plans) have been proposed to minimize potential risks to downstream habitats.

6.5 Urban Hamilton Official Plan – 2018 Consolidation

Two natural heritage/hydrologic features were identified within the Subject Lands: wetlands and indirect fish habitat. The wetlands consist of MAM2-2, MAS2-1/MAS1-12 and SWD3-2 vegetation communities, while indirect fish habitat was associated with HDFs H1 and H2. Please refer to **Sections 6.1** and **6.2** above for impacts, mitigation and restoration measures as well as direct, indirect and cumulative impact review.

Indirect Fish Habitat

HDF H1 was assigned a Mitigation management recommendation and HDF H2 was assigned a Conservation management recommendation. HDF H1 will be redesigned to convey flows and allochthonous materials along the northern perimeter of the Subject Lands within a conveyance swale.

This swale will be planted with native plant materials and will be designed to replicate the existing functions of HDF H1. HDF H2 will be redesigned to support a created wetland, which will replicate existing wetland functions within the Subject Lands within one location. Flows and allochthonous materials from this feature will continue to be conveyed to downstream habitats. Post-development flows will mimic pre-development flows to ensure no impacts to downstream receiving habitats.

In accordance with Chapter C, Section 2.5.3 of the UHOP, "new development and site alteration shall not be permitted within fish habitat, except in accordance with provincial and federal requirements". A commitment has been made within **Section 6.1** of the EIS to engage with DFO through the Request for Review process to ensure that all requirements under the Fisheries Act are met. Based on our professional experience, it is unlikely that a *Fisheries Act* Authorization will be required given that these features are indirect fish habitat and their functions will be replicated to ensure no negative impact to downstream habitats.

Discussion surrounding the VPZ for the wetland and conveyance swale are discussed below.

Wetlands

As previously discussed within **Section 6.2** (above), removal of 1.11 ha of wetland habitat is proposed to facilitate the proposed site plan in accordance with the AEGD Secondary Plan. Recreation of wetland habitat is proposed within the Subject Lands at a 1:1 ratio to ensure that no loss of wetland habitat will occur as a result of the proposed development. Furthermore, the created wetland will be designed to be more floristically diverse than the existing wetlands.

Chapter C, Section 2.5 of the UHOP identifies the permitted uses within Core Areas as identified within Schedule B (Natural Heritage Systems). These wetland units were not identified as part of the AEGD Secondary Plan/SWS within the Subject Lands. Furthermore, Section 2.5 provides language stating that new development and site alteration should not be permitted within provincially significant wetlands and significant coastal wetlands; however, no policy is present within the UHOP that states new development and site alteration is not permitted within non-PSWs. Rather, Chapter C, Section 2.3.3 suggests that "vegetation removal and encroachment into Core Areas shall generally not be permitted", which suggests there may be instances were encroachments and removals are permitted in support of other planning objectives. As discussed above within **Section 4**, no PSWs were identified on (or within the vicinity of) the Subject Lands. Additional justification is provided within **Section 6.2** of the EIS, illustrating how a mitigation hierarchy was completed to determine whether there were other feasible alternatives and illustrating how a no negative impact test could be achieved. The proposed wetland removal and compensation will occur in compliance with the NPCA's wetland reconfiguration policies, as discussed above within **Section 6.2**.

Moreover, Chapter C, Section 8.1 of the UHOP states that the AEGD "...respects and enhances the prominent natural areas through the secondary plan". Given that these features within the Subject Lands were not identified as part of the SWS/Secondary Plan and based on the low ecological

functions of these features as determined through the detailed investigations completed by GEI, it is suggested that these areas should not be considered "prominent" natural areas. It is GEI's interpretation that respecting and enhancing the natural areas does not necessarily imply that these features must be retained in-situ. The proposed development respects and enhances these features of low ecological significance by maintaining their functions and enhancing their functions (replication of wetland and enhanced biodiversity). This proposal also ensures that no loss in wetland habitat will occur on the site. No long-term maintenance is expected to be required within the wetland buffers.

Discussion surrounding wetland VPZs is provided below.

Vegetation Protection Zone Analysis

As discussed within Chapter C, Section 2.5.10 of the UHOP, VPZ should be evaluated and addressed within the EIS. Section 2.5.1 further states that VPZs may be refined by the completion of the EIS. The VPZs identified within Section 2.5.10 of the UHOP are illustrated below within **Table 6-2**.

Table 6-2: Evaluation of VPZ Widths as Identified Within Chapter C, Section 2.5.10 of the UHOP Specific to the Subject Lands

Core Area Feature Type	Recommended VPZ	Applicability within the Subject Lands
Coldwater Watercourse and Critical Habitat	30 m from bankfull channel	N/A – Feature type is not present within the Subject Lands.
Warmwater Watercourse and Important/Marginal Habitat	15 m from bankfull channel	Yes – Indirect fish habitat is present.
Provincially Significant Wetlands	30 m from boundary of wetland	N/A – Feature type is not present within the Subject Lands.
Unevaluated Wetlands	15 m from boundary of wetland	Yes – One created wetland is proposed within the Subject Lands.
Woodland	10 m from dripline	N/A – While one SWD community is present within the Subject Lands, this feature is proposed for removal. As a result, no VPZ is warranted.
Significant Woodland	15 m from dripline	N/A – Feature type is not present within the Subject Lands.

Core Area Feature Type	Recommended VPZ	Applicability within the Subject Lands
Areas of Natural and Scientific Interest	15 m	N/A – Feature type is not present within the Subject Lands.
Significant Valleyland	As required by NPCA	N/A – Feature type is not present within the Subject Lands.
Significant Habitat of Threatened and Endangered Species and Significant Wildlife Habitat	Determined through EIS	N/A – Feature type is not present within the Subject Lands.

While the conveyance swale will continue to provide indirect fish habitat to downstream occupied habitats, no VPZs are warranted along the conveyance swale as (1) the existing feature is not a watercourse, (2) no natural hazards are associated with this feature that require a setback (e.g., flooding, erosion), (3) the HDFs do not provide direct fish habitat, (4) the functions (e.g., flow conveyance and contribution of allochthonous material) of the HDF will be maintained and (5) the conveyance swale will convey external drainage through the site; no direct runoff from the Subject Lands will be input into the conveyance swale. The main function of the conveyance swale is to convey flows through the Subject Lands, in accordance with the mitigation management recommendations outlined within the HDFA Guidelines (2014; as discussed above within **Section 4.10**). These functions will be achieved, which will ensure that no negative impacts occur in a post-development scenario to downstream habitats. The intent of the native vegetation within the conveyance swale is to provide indirect riparian functions (e.g., organic material deposit).

While maintaining the wetland units in their current locations was not feasible given the UHOP and AEGD Secondary Plan/SWS land-use planning for the Subject Lands (as discussed above within **Section 6.2**), a 10 m VPZ will be provided. It is recognized that this VPZ is not the recommended width within the UHOP; however, as discussed within **Section 6.2**, a 10 m buffer is justified for the created feature. This created feature will be adjacent to industrial buildings. Human-related impacts associated with industrial developments are different than those associated with residential developments, in that it is unlikely that humans will interact as often with the created wetland. No trails or pathways will be provided adjacent to the roadway near the created wetland. No runoff from the developed areas will be directly input into the created wetlands. Moreover, a noise barrier will be installed between existing residential areas and the Subject Lands to deter adjacent residents from entering the site. Given its positioning on the Subject Lands (away from most buildings, east of Street A), it is unlikely that site visitors will visit the wetland. Other deterrence and mitigative measures will be considered such as installation of thorny barrier plantings (e.g., raspberries) within the outer portion of the wetland buffer, as necessary. Since there are various mitigative measures that will be employed on site to reduce interactions with the wetland and this feature is not designed to support sensitive wildlife habitat rather will be a more robust feature (e.g., increased shrub plantings), a reduced buffer is warranted. Any wildlife expected to use the created wetland feature will likely be tolerant of urban conditions and, thus, a larger buffer is not warranted to provide greater setbacks for lighting or noise.

Summary

It is the consultant team's opinion that the proposed plan can be achieved (which meets the Province's and UHOP/AEGD Secondary Plans intent for these lands to support the Airport) while ensuring a net positive ecological gain for the site. The conceptual restoration plan (as outlined within **Section 7**) illustrates how the wetland will be compensated at a 1:1 ratio elsewhere on the site and will replicate existing functions (contribution of allochthonous material, water storage, etc.), while enhancing the flora and habitat diversity within the Subject Lands (through the installation of native plant materials, creation of pollinator habitat, addition of brush and rock piles for smaller wildlife species). The functions of the two HDFs on site will continue to be replicated through the created wetland and the conveyance swale. The proposed mitigation measures (as illustrated within **Section 6**) will work to prevent adverse effects to downstream habitats. Further, as has been detailed within the report, consideration was first given to whether avoidance or mitigation was a viable option for the site. No negative impacts are predicted as a result of the proposed site development, provided the above-noted mitigative and restorative measures are enacted. The proposed development concept meets the UHOP Volume 1 Policy C.2.3. requirements. Moreover, the proposed site development is in alignment with Section C.2.5 of the UHOP.

6.6 NPCA – Ontario Regulation 155/06

One regulated feature type was identified within the Subject Lands: wetlands. No wetland communities (even those contiguous with other wetland communities) were equal to or greater than 2 ha in size. Please refer to **Section 6.2** for discussion on wetland impacts, mitigation and restoration measures.

No negative impacts are predicted to regulated wetlands provided the proposed wetland creation area is constructed as discussed in **Section 7.0**. The proposed site plan is in compliance with Section 8.2.2.8 of NPCA's Policy Document (2018).

Specifically, Section 8.2.2.8 applies, as it has been demonstrated (within **Section 5.0**) that there are no feasible alternatives to retain wetlands in place based on the proposed site development engineering requirements. Opportunities to retain the wetland were considered, however engineering requirements for the site did not permit the retention of these features in place due to grading and servicing constraints. A formal restoration plan for the created wetland area will be prepared following consultation with the City of Hamilton and NPCA. A monitoring program for the created wetland area is presented below within **Section 8.0**.

7.0 RESTORATION AND ENHANCEMENT OPPORTUNITIES

Ecological offsetting is a mitigation strategy that is often considered in an effort to achieve a net ecological benefit to projects, subject to the approval of the planning authority. This compensation strategy quantifies the loss of natural features in order to provide compensation through habitat re-creation or alternative compensation process. Ecological offsetting approaches are typically applied as a last resort (after avoidance and mitigation have been considered). In this case, ecological offsetting is proposed as a means to achieve additional ecological benefit by meeting the replication requirement.

While the NPCA does not have a formal ecological offsetting guideline, several other local conservation authorities (TRCA, CVC and Lake Simcoe and Region Conservation Authority (LSRCA)) have guidelines in place, recognizing that "ecosystem compensation becomes an important tool to help ensure that critical ecosystem functions and services lost through development and infrastructure are restored back on the landscape for the betterment of communities" (TRCA 2018). A review of the NPCA's Land Use Planning Document (2018) was completed and incorporated throughout this EIS.

7.1 Policy Considerations

7.1.1 UHOP and Secondary Plan (OPA 35)

Section C.2 of the UHOP outlines the City's goals through the designation and management of NHSs within Urban Hamilton. Specifically, the goals outlined within the UHOP include:

- *"Protect and enhance biodiversity and ecological functions;*
- *Achieve a healthy, functional ecosystem;*
- *Conserve the natural beauty and distinctive character of Hamilton's landscape;*
- *Maintain and enhance the contribution made by the Natural Heritage System to the quality of life of Hamilton's residents;*
- *Restore and enhance connections, quality and amount of natural habitat;*
- *Provide opportunities for recreational and tourism uses where they do not impact natural heritage features; and*
- *Monitor and periodically assess the condition of Hamilton's natural environment."*

These goals were considered when developing the restoration concept for the Subject Lands.

<u>AEGD Secondary Plan (OPA 35)</u>

As discussed within Section 8.2.11 (Natural Heritage Principles) of the AEGD Secondary Plan (Volume 2, Chapter B), development within the AEGD will:

- *"Develop in a manner that is sensitive to the natural environment;*
- *Use innovative, sustainable storm and wastewater infrastructure to protect water quality and source water;*
- *Protect and integrate provincially and municipally significant natural features, such as a stream, valley lands, wetlands, mature trees and forests into the employment district's development, implement provincial policy and meet municipal policy;*
- *Use sustainable design to limit emissions, water and energy consumption of buildings within the employment district; and*
- *Connect the employment district's open space system to surrounding natural areas to allow employees to enjoy and explore the region's natural heritage."*

Furthermore, Section 8.9 (Water Resources and Storm Water Management) recognizes that a "myriad of small headwater features, combined with restrictions on open water/wetland features imposed by the Airport Lands, present a unique challenge in terms of protection of stream corridors and natural heritage features, and storm water management design that require state of the art technologies consistent with Low Impact Development design".

These design considerations were considered within the restoration concept.

The wetlands located within the Subject Lands were not identified as part of the SWS/AEGD Secondary Plan, rather, the totality of the Subject Lands were designated for employment usage (Airport Reserve per Map B. 8.1 of the AEGD Secondary Plan). Recreation of this wetland habitat within the Subject Lands is being proposed to ensure that no loss of wetland habitat will occur on site, while still facilitating the AEGD land-use plans for the Subject Lands. Wetland replication will follow NPCA's wetland reconfiguration policies, as discussed further below within **Section 7.1.2.**

As discussed above throughout **Section 6.0**, it is recognized that while the intent of Chapter C, Section 2.3 of the UHOP is to preserve and enhance Core Areas, it also states that the intent is to ensure that development and site alteration shall not negatively impact natural features and their ecological functions. Section 2.3.3 of the UHOP further states that "vegetation removal and encroachment into Core Aras shall generally not be permitted", which suggests that there may be instances where encroachment and removals are permitted in support of other planning objectives. Based on this, GEI reviewed the UHOP for policies that would be applicable should the removal be permitted. Section 2.5.8 (a) of the UHOP states that the EIS must demonstrate that there will be "no negative impacts on Core Area's natural features or their ecological functions". As detailed throughout **Section 6.0**, the wetlands found offer limited ecological functions as they do not provide linkage functions, support SWH or SAR habitats, and are not considered to be provincially significant. Given the low ecological function, as discussed within **Section 6.2** of the EIS, GEI recommends that a "no negative impact" test is satisfied through wetland removal and mitigation. The existing wetland and functions (i.e., water storage, contribution of allochthonous materials) can be easily replicated while increasing the overall ecological function (increased native flora, inclusion of pollinator habitat). Several other mitigation

measures were also outlined to avoid negative impacts to the feature (i.e., install erosion and sediment control measures and remove the feature when it is dry).

7.1.2 NPCA

Wetland Removal and Recreation

Section 8.2.2.5 of the NPCA Policy Document (2018) indicates "conservation and restoration projects may be permitted where it has been demonstrated to the satisfaction of the NPCA that the proposed works will enhance the overall ecological and hydrological function of the wetland". Furthermore, Section 8.2.2.8 states that "where no reasonable alternative exists to locate a proposed development, site alteration or other activity outside of a non-PSW (or adjacent land), the NPCA may require that an area of wetland be created to offset the disturbance". The document further states that wetland creation should occur in proximity to the area where the removal occurred. The NPCA may permit reconfiguration of wetland boundaries provided that all criteria outlined within Section 8.2.2.8 are met. All criteria were/will be met.

Wetland re-creation opportunities are discussed within the restoration concept (**Section 7.2**).

7.2 Conceptual Restoration Plan

7.2.1 Summary of Restoration Requirements

Preservation of all existing natural heritage features within the Subject Lands property cannot be achieved due to engineering site constraints (as previously discussed throughout **Sections 5.0** and **6.0**).

As described in **Section 5.0**, the proposed development area will require the alteration and/or removal of the following natural heritage features:

- Removal of non-significant wetland pockets (MAM2-2, MAS2-1/MAS1-12 and SWD3-2); and
- Tree compensation requirements associated with non-significant woodlands and hedgerows are discussed within the TPMP (**Appendix E**) and are not considered within this restoration conceptual plan.

To compensate for the removal of the above-noted non-significant wetlands, one created wetland (1.11 ha in size) is proposed along the eastern Subject Lands boundary to mitigate negative impacts. The created wetland area will have a 10 m vegetated buffer (as discussed in **Section 7.0** of the EIS; **Figure 9**, **Appendix A**). Discussions with the consultant team regarding opportunities to retain a portion of the MAM2-2 vegetation community that are currently present where the proposed created wetland is located was considered; however, given grading constraints associated with Street A and site-wide grading requirements this was not feasible.

A conceptual restoration approach is outlined in this section to show how ecological features and functions will be replicated and/or enhanced within the created wetland area and associated buffer. In addition to this, some discussion related to flow conveyance measures associated with HDF H1S1 will be provided. The conceptual restoration approach complies with local planning requirements with respect to preservation and enhancement of natural heritage features.

At the detailed design stage, an NHS Design Brief will be prepared for review by NPCA and the City ahead of submitting the NHS planting plan drawings. The NHS Design Brief will provide specific details including the results of detailed hydroperiod investigations, plant species lists, proposed plant stock type and sizing, planting timing considerations, created wetland design parameters, and wildlife habitat structure details. Hydrological information will be available at the detailed design stage regarding feature depth and predicted water levels to guide the design of created wetland. This will also allow associated plant species lists to be developed that suit the hydrological conditions.

7.2.2 Restoration Goals and Objectives

The proposed restoration concept has been designed with recognition of existing landscape constraints, namely the Airport Lands located immediately west of the Subject Lands. As a result, the creation of large, open water bodies will be avoided and/or minimized to the extent possible to avoid congregations of waterfowl.

The restoration goal is to recreate ecological features and functions, replicate total wetland area, and establish diverse and resilient vegetation communities along with wildlife habitat features at a local scale.

The restoration design includes wetland and terrestrial habitat elements. These vegetation communities will create a mosaic of habitats that are expected to create and mimic wildlife habitat functions found within the surrounding landscape. Ecological restoration objectives for the Subject Lands include:

- Replicate wetlands proposed for removal within the created wetland area at a 1:1 replication ratio (1.11 ha total area);
- Deter establishment of non-native/invasive plant species in the created wetland and associated buffer;
- Create floristically diverse and resilient vegetation communities that will support a variety of native fauna;
- Stabilize soils through the application of an annual cover crop seed mix applied in conjunction with native perennial seed mixes (along with other ESC measures, as necessary);
- Include nectaring plants and Milkweed species within groundcover planting areas to attract/support local insect populations including Monarch; and

- Provide wildlife habitat structures for a variety of wildlife (e.g., mammals, insects) to increase breeding, foraging and refugia opportunities.

While it is recognized that a gain in physical area will not be provided, GEI recommends that a gain in ecological function (increased wildlife function and habitat availability in comparison to the existing wetland communities) will be provided.

7.2.3 Restoration Planting Approach

One reference ecosystem will be selected from higher-quality ecologically functional habitats to guide planting list development. Reference ecosystems are best-suited when a variety of attributes are shared with the restoration site, such as topographic location, soil type, moisture regime, etc. If suitable, higher quality vegetation units are not available for reference in the local landscape, then appropriate reference ecosystems will be identified from the broader landscape (i.e., within the region or adjacent regions). A target vegetation community will be defined at detailed design once detailed hydrology information is available. The target vegetative community will be assigned an ELC type code (Lee et al. 1998).

Species selection will consider specific moisture, soil, and sun requirements. Some species (e.g., Ash, Elm) will not be selected due to pest and disease concerns that could impact their survivability. Native plant materials should be sourced from native plant nurseries and seed suppliers within 100 km of the Subject Lands, if possible, to reduce transplant shock. All plant materials will be obtained and installed in accordance with the Canadian Nursery Stock Standard (Canadian Nursery Landscape Association 2014). Native shrub and tree species will be selected to provide a diverse assemblage of plant species. Buffer plantings will include fast-growing and pioneer species more tolerant of harsher/variable growing conditions. Salt-tolerant species will also be considered given the wetland's proposed location adjacent to Street A.

The type of planting stock is dependent on the species and their modes of reproduction, as well as practicality. The following plant stock will be considered within the created wetland:

- Herbs (forbs, graminoids): seeds, plugs;
- Shrubs: 1-gallon pots, stem cuttings, rootstock cuttings; and
- Tree saplings: seed, bareroot, ball and burlap, whips, potted seedlings.

Moreover, an appropriate seed mix will be proposed for the conveyance swale to increase native plant diversity.

Invasive Species Considerations

By removing all existing vegetative communities from the Subject Lands, all invasive species will be removed within the property boundaries; however, Common Reed is known immediately downstream of the HDF H1S1 within the existing wetland community adjacent to Homestead Drive. This property is retained by a non-participating owner and is not located on municipally held land. There is concern that this Category 1 invasive species could invade into the created wetland area following construction due to proximity of the feature. This will be considered during detailed design and addressed within the NHS Design Brief. Specifically, opportunities to create less idealized conditions (e.g., deeper pools of water, prolonged hydroperiods) will be explored. Should deeper pools of water be required, they will follow the waterfowl deterrence measures (discussed below within **Section 7.2.5**).

During grading/construction on-site, appropriate stockpile stabilization (including application of cover crop) is essential to ensure invasive species don't colonize the created wetland area. There is potential that non-native and invasive species could colonize the created vegetation communities and, therefore, a detailed monitoring plan is discussed below within **Section 8.0**.

Site Preparation

Currently, the lands where the created wetland will be constructed are under active agricultural use and/or currently hosting wetland communities (MAM). Soil testing, prior to planting, to determine the need for soil amendments for healthy plant growth is recommended. Ahead of planting, site preparation is key to ensure that soil moisture capacity and nutrient content are suitable for native plant growth. Native plants generally require low soil nitrogen content and nutrient supplementation is not expected (generally nutrient levels are high in recently farmed cash crop fields). The addition of mycorrhizal inoculants is generally helpful to facilitate native plant establishment.

Excessive application of soil amendments could negatively impact the surrounding landscape as it will result in nutrient loading and could impact the proposed conveyance swale. In accordance with CH's *Guidelines for Landscaping and Rehabilitation Plans* (2021), should soil amendments be required, soil amendments will be sourced from sustainable practices (e.g., incorporating leaf mulch or compost that meets Category AA or A of the MECP Ontario Compost Standard Quality). The incorporation of peat moss is strongly discouraged. Upland disturbed areas should have at least 20 cm of topsoil containing 5 to 15% organic matter (by dry weight) depending on the type of vegetation to be established, a total uncompacted soil depth of at least 30 cm and a soil pH of 6.0 to 8.0 per the TRCA's (2012) *Preserving and Restoring Healthy Soil: Best Practices for Urban Construction*. Topsoil requirements will also follow CH's (2021) *Guidelines for Landscaping and Rehabilitation Plans*. Where soil has been compacted, a minimum of 45 cm of clean topsoil will be evenly distributed throughout the site. Imported soil will be mixed with native soil to ensure soil micro-organisms are adapted to the site.

Within tree pits (areas where trees will be planted), trees should have a topsoil layer of a minimum depth of 60 cm. The subsoil layer should be either tilled, scarified or excavated and replaced to a minimum depth of 30 cm. Incorporation of the upper layer into the sublayer should be included to avoid stratified layers where possible. This will produce a total of 90 cm of uncompacted soil, per the TRCA (2012).

7.2.4 Wildlife Considerations

Specialized Wildlife Habitat Structures

Inclusion of specialized wildlife habitat structures will enhance ecological functionality within the created wetland. The following specialized wildlife habitat structures will be considered and will be refined during the NHS Design Brief (i.e., regarding placement locations, quantity, and which selections are most appropriate based on the targeted wildlife species within the created wetland).

Amphibian Breeding and Overwintering Habitat

No amphibians were recorded during targeted amphibian call count surveys within the Subject Lands. Depending on hydrologic availability, creation of conditions suitable for amphibian breeding habitat and amphibian overwintering habitat (i.e., semi-permanent pools) will be considered at the detailed design stage.

Pollinator Habitat

Limited insect/pollinator habitat is currently present within the Subject Lands due to the limited diversity of native plant species.

Creation of pollinator habitat will be included within the created wetland. One common pollinator species within the area is Monarch. Monarchs have one genus of host plant (Milkweeds). Monarchs typically arrive in Ontario in late May and breed until the end of September before migrating south to their roosting grounds. A range of spring, summer and fall blooming plant species will be targeted to provide nectar sources throughout the breeding season. Native groundcover seed mixes applied within the created wetland will include Milkweed species and other nectaring plants to help support Monarch and local generalist pollinator insects. Selected seed mixes should provide pollinator breeding and foraging opportunities for Monarch through the targeted inclusion of nectaring species that flower from mid-spring to mid-fall.

Brush and Rock Piles

Woody limbs will be tightly woven together to form brush piles and will be located at several locations throughout the compensation area. Brush piles will be spaced approximately 60 m apart and separated from nodal shrub plantings to provide refuge areas for smaller wildlife species. These brush piles are intended to provide additional habitat diversity within the created wetland. Brush piles

provide wildlife with habitat for resting, feeding, escaping predators, sheltering from weather and rearing young. Native vines (e.g., Riverbank Grape, *Vitis riparia* and Hispid Greenbrier, *Smilax tamnoides*) will be planted along the edge of the brush piles. The vines will continue to grow as the brush piles decompose to form a "living brush pile." Ultimately, the vines will replace the original structure (U.S. Army Corps of Engineers 1986).

Rock piles provide a stable thermal source that attracts ectothermic species. Rocks should be cleaned and sized from 5 cm in diameter to 60 cm with some jagged edges. Jagged edges are used by molting reptiles and provide secure footing for small mammals. Rock piles should be partially buried to promote a variety of interstitial spaces.

Both rock and brush piles should be installed in the upland buffer and/or side slopes and avoid areas seasonally inundated with water. The structures should be spaced irregularly a minimum of 60 m apart and separated from nodal shrub plantings to provide refuge areas for smaller wildlife species.

7.2.5 Waterfowl Deterrence

Due to proximity to the Airport Lands, the created wetland will be designed to limit attraction of waterfowl congregations to the extent possible. This need must be balanced with other wildlife habitat types that are proposed within the created wetland areas that could potentially attract waterfowl (i.e., open water within the proposed created wetland area). Canada Geese and other waterfowl are typically found grazing near shorelines, beaches, lawns, and other open grassed areas near waterbodies. Making the site less desirable to waterfowl can be achieved using the following measures:

- Reduce number of open water areas (if open water areas are included during detailed design);
- Minimize size of open water areas to the extent feasible (if open water areas are determined during detailed design) by using irregular, narrow shapes (e.g., oxbow, wishbone shape);
- Densely plant shorelines with wetland shrubs. A screen of Cattails or similar species may be considered in areas closer to the Airport Lands;
- Installation of a low fence (30 to 60 m high) along any water's edge to restrict access to and from the water. It is recognized that this may limit opportunities for other wildlife to use these features through the installation of the fencing; and
- Create no manicured lawn/sod - all the created wetland areas will be naturally vegetated with no mowing proposed.

8.0 MONITORING REQUIREMENTS

The proposed ecological monitoring program is intended to ensure that:

- Protective mitigation strategies and actions (**Section 6.0**) are effectively implemented;
- Ecological restoration measures (**Section 7.0**) are effectively implemented; and
- Created features and associated functions are developing along projected trajectories.

Baseline monitoring is required to understand the significance and function of existing systems and provide a baseline for comparisons to future function. This monitoring was completed in 2021 within the Subject Lands; no additional baseline monitoring is warranted in support of the proposed site development.

Construction monitoring is intended to monitor the effectiveness of measures and practices designed/implemented to manage impacts due to construction. This form of monitoring most often translates into ensuring that all ESC measures are in place and functioning; however, other aspects of construction monitoring can relate to the Tree Protection Zone (TPZ), the installation of plant material or other parameters of concern.

Post-construction compliance monitoring is driven by the need to comply with permits or other approvals. It is intended to demonstrate that measures are constructed as designed. This monitoring is relatively local in scale and associated with specific works. For the Subject Lands, it would apply to the created wetland area and associated buffer, habitat compensation measures, and any plant materials (e.g., landscape warranty).

Post-construction performance monitoring relates to the functionality of the created wetland area and associated buffer. The scale of performance monitoring is typically broader than compliance monitoring and provides a means of comparison against the initial baseline monitoring.

Where necessary, adjustments through adaptive management should be applied to ensure that performance standards are achieved and to address any unanticipated impacts or deficiencies.

The following sections provide the methodology to be used for each component of the monitoring program.

8.1 Monitoring Plan

Components of the Monitoring Plan are outlined below. Monitoring locations associated with the created wetland will be determined during detailed design.

8.1.1 Baseline Monitoring

Baseline monitoring was completed in 2021 to understand the significance and function of existing systems and provide a baseline for comparisons to future function. The results of baseline monitoring are summarized in **Section 3.0**.

8.1.2 Construction Monitoring

Construction monitoring components are defined and described in the following sections and are intended to ensure that potential impacts as a result of construction are effectively managed and mitigated.

Additional monitoring efforts typically associated with construction not addressed herein are required, including the reporting of deficiencies and landscaping survival assessments. These activities should be conducted in a standard manner to provide a level of certainty to approval agencies that works have been constructed as designed and approved.

Vegetation Monitoring

Ecological restoration and invasive species management oversight should be conducted on all construction and works associated with ecological design aspects (vegetative components of the created wetland area), which will include the following tasks:

- Identify suitable native species substitutions and/or stock size adjustments and secure approval for these substitutions with the City and NPCA, if required;
- Review layout of plant material prior to/during installation, including species type, location and densities;
- Observation of installations of planting, mulch, beds, seeding, and topsoil amendments;
- Verify native vegetation at the site prior to installation, as per the Issued for Construction Drawings; and
- Provision of monitoring and identification of management options for local outbreaks of aggressive (i.e., Category 1) invasive species that threaten the establishment, health and/or success of the native vegetation or pose a danger to human health within the restoration area.

Post-development, vegetation monitoring will be conducted once per year for two years to ensure that all works are established during the warranty period.

These efforts will aim to prevent non-native and/or invasive species from being installed on site. Additional discussions with reviewing agencies regarding the invasion of offsite Common Reed is required, as unmanaged it is likely that this species will invade into the Subject Lands.

As noted above, ecological guidance will also be provided regarding suitable native plant substitutions should certain plant materials not be available for installation. All plant material substitutions will be reviewed by a Botanist to ensure that all plant materials installed follow the planting requirements outlined within the Landscape Plan.

Tree Protection Zone

Monitoring of the TPZ should be conducted or supervised by a Certified Arborist prior to and during construction to ensure compliance with tree protection guidelines. Proposed monitoring will assess the health and structure of the trees, identify changes to environmental conditions, and respond appropriately where necessary. The Certified Arborist must be on site at all times prior to and during any construction activity occurring within any TPZ to monitor root exposure, identify root disturbance, and propose site-specific mitigation where appropriate.

All other construction monitoring should be conducted on a bi-weekly basis (at a minimum) during the active construction period. Accidental damage to any part of a tree, including accidental incursion into the TPZ, must be reported to the Certified Arborist within six hours.

Erosion and Sediment Control

As discussed within Section 7 of the FSR, an ESC Plan will be prepared at detailed design to ensure that all natural heritage features and functions will be protected. ESC measures will be applied to prevent the release of sediment from the construction site.

Post-Construction Compliance Monitoring

Post-construction compliance monitoring is intended to demonstrate compliance with permits or other approvals through local monitoring to verify that measures have been constructed as designed. This type of monitoring applies to the created wetland area and associated buffer.

All landscaped works within the created wetland area and associated buffer will be reviewed weekly during the construction period to ensure all planting and surface treatments are installed per specifications. It is also anticipated that the works will be inspected with both the City and/or NPCA once substantially complete. An additional inspection will be arranged once a year for the two-year compliance period following implementation to ensure that all works are established. At acceptance, the Owners' Compliance Monitoring obligations will be satisfied.

8.1.3 Post-Construction Performance Monitoring

It is recommended that a five-year monitoring period form the basis of the post-construction performance monitoring plan based on the period required to attain quantifiable performance standards. A performance standard is a specific state of ecosystem recovery that indicates that an

objective has been attained (e.g., growth rate, survivorship, node coverage, etc.). Therefore, monitoring protocols and timelines have been geared towards specific performance standards, where applicable. "Satisfaction of some performance standards may be attained by a single observation, while other performance standards require a series of monitoring events to document trends towards the attainment of a specified numeric threshold for a physical parameter or for a particular level of plant abundance or growth" (Clewell, Rieger and Munro 2005).

Performance standards should be based on indicators that are:

- Related to ecological restoration objectives;
- Accurately measurable;
- Appropriate to the temporal and spatial scale of the ecosystem; and
- Cost-effective (e.g., photographic monitoring).

The proposed five-year monitoring plan will outline monitoring objectives and strategies to validate performance standards and demonstrate that the ecosystem is developing as intended. Performance monitoring will focus on the functionality of the restoration area and system performance or effectiveness to confirm that mitigation/restoration activities have had the intended ecological effect (e.g., maintaining or enhancing habitat, supporting particular wildlife life history functions, achieving intended buffer functions). Where necessary, adjustments through adaptive management will be applied to ensure that performance standards are achieved and to address any unanticipated impacts or deficiencies.

It is expected that monitoring will be conducted in years 1, 2, 3 and 5 within the created wetland area and ecological buffer zone, and will commence one growing season after vegetation or other restoration measures are implemented. The length and frequency of each monitoring component is summarized in **Table 10** based on the most efficient monitoring schedule to address monitoring requirements. Through discussions with the NPCA (**Appendix C**), it was agreed that given the proposed restoration goals and objectives, a 10-year monitoring period was not warranted, rather a 5-year monitoring period would be completed.

Table 10. Post-Construction Performance Monitoring Schedule

Component	Timing	Frequency
a. Vegetation – ELC, Canopy Health	May 1 to October 1 (three seasons)	Years 1, 3 and 5
b. Invasive Plant Species	Twice during growing season in retained and created features.	Years 1, 3 and 5
c. Planted Vegetation - Growth Rate	Summer (one round)	Years 1, 3 and 5

Component	Timing	Frequency
d. Planted Vegetation – Survivorship	Summer (one round)	Years 1, 2, 3 and 5
e. Planted Vegetation – Performance	Summer (one round)	Years 1, 3 and 5
f. Planted Vegetation - Cover	Summer (one round)	Years 1, 3 and 5
g. Planted Vegetation - Node Coverage	Summer (one round)	Years 1, 3 and 5

Vegetation

Three-season botanical inventories will be completed within the created wetland area and associated buffer during years 1, 3 and 5. The plot method will be applied within features to compare and contrast ecological data and values. Within the created wetland area and associated buffer, three plots (one each for shrub, tree, groundcover) will be established. Based on quantitative data collected, FQI will be calculated. These surveys will also detect local species of significance and non-native/invasive species. During vegetation surveys, any situations of major dieback, evidence of damage due to pest or disease, and major hazards will be noted. Major infestations will be sampled and submitted for approved control methods in collaboration with reviewing agencies.

Invasive Species Management

In addition to the vegetation surveys described above, a qualified botanist will also perform transects through the created wetland area and associated buffer twice during the growth season to monitor specifically for Category 1 invasive species (as defined by Urban Forest Associates Inc., 2002). Management planning should commence promptly once specimens/colonies are discovered in restoration sites (i.e., management may occur before 5% cover is reached), however management of Common Reed may be treated differently depending on discussions with reviewing agencies. Within the created wetland area and associated buffer, the priority is to limit the exposure and spread of existing populations of highly invasive species.

As required, species-specific invasive species management plans will be prepared as part of the adaptive management plan for each Category 1 species that: (1) appears as new colonies in new features, and (2) can be reasonably eradicated or the spread contained within the restoration area. The proponent, City and NPCA will meet to discuss each priority invasive species and agree on appropriate management actions, as applicable. The proponent will be advised immediately if any invasive species that are hazardous to human health are detected (e.g., Giant Hogweed – *Heracleum mantegazzianum*).

Following implementation of the restoration plan, there is an initial period (three to five years) for native vegetation cover to establish. This self-organizing period includes the expected presence of

some level of non-native plant species, which may include some Category 2 (as defined by Urban Forest Associates Inc., 2002) species that may not necessarily trigger the need for active management depending upon observations during monitoring.

A risk assessment will be performed to determine the current extent of the species and the risk of further spread; removals/eradication will be undertaken if significant spread is likely. High priority areas for management of Category 2 species, to limit spread include areas within the vicinity of high-quality natural areas. A species-specific invasive species management plan will be prepared and provided to the City for each Category 2 species that warrants management (ideally on a feature-by-feature basis). The proponent, NPCA and the City will meet to discuss each Category 2 species that warrants management to agree on appropriate management actions.

Some other non-native species are expected to occur in limited amounts and do not pose a threat to natural areas. Many of these non-native species may occur initially at higher cover values within the restored areas (5 to 10%) and then decrease naturally to trace amounts, without active management as the natural system establishes.

Planted Vegetation Performance Monitoring

In terms of monitoring the performance of planted vegetation, five performance measures are recommended for monitoring in years 1, 3 and 5.

1. Growth Rate;
2. Survivorship;
3. 'Free-to-grow' Performance (FTG);
4. Cover; and
5. Node Coverage.

The first three parameters will be addressed through the establishment of permanent plots placed in a random, stratified fashion within the various topographic sections of the created wetland area and associated buffer. The precise location and number of plots will be determined on-site at the time of the first sampling event. The monitoring sample will be statistically representative, in the range of 5-10% of the nodes per category and topographic location. The size and shape of the plots will depend on local planting nodes; however, the plots will be generally capped at 25 m^2 (the maximum area may change depending on the eventual average size of the planting nodes).

Within the plots, the following parameters will be recorded:

- Woody species cover-abundance within each stratum (shrubs, trees);
- Total cover of woody species;
- Total cover and species composition of herbaceous species;

- Cover of native and non-native herbaceous species;
- Number of woody stems (live and dead); and
- Height of woody stems.

Amongst other statistics, this approach will enable collection of necessary data to assess:

- Growth rate based on the height and cover-abundance of the species, broken down by size category;
- Survivorship based on live:dead counts and ratios across monitoring years, per species and per plant size; herbaceous and woody species quantitative data will be compared to the prescribed plant species list/stock size/densities/quantities to assess re-vegetation success (this information will be used to provide recommendations to benefit future compensation design; mitigation measures will be proposed for any significant deficiencies (i.e., failed cover crop)); and
- Free-to-grow based on height measurements of shrubs and trees.

Coverage statistics will be generated based on the permanent plot data.

8.2 Adaptive Management Plan

Adaptive management actions may be undertaken during the third year of assessment, if not sooner, to provide corrective measures as needed. Potential adaptive management measures may include, but are not limited to:

- **Vegetation Plantings** – In-plantings of native species (i.e., seeding, tree and/or shrub) to reduce invasion by non-native species or to replace desiccated planted stock.
- **Invasive Species Management** – If Category 1 (Urban Forest Associates 2002) invasive species are detected within the created wetland area and associated buffer or within adjacent retained communities, species should be evaluated on a case-by-case basis to determine the extent of the invasion, assess the risk of further spread, evaluate preferred control methods and complete a risk assessment in terms of whether control or eradication is warranted. The outcome (i.e., intervention or no intervention) should be monitored and documented along with any follow up actions.

Given that all potential deficiencies in the form and function of the proposed features cannot be predicted, recommendations for adaptive management and any subsequent follow-up actions will be addressed through annual monitoring and reporting, as discussed below.

8.2.1 Vegetation Monitoring and Adaptive Management Parameters

Growth Rate

Sampled using statistically valid methods to assess the relative growth rates of each size category of woody material that is used.

- The monitoring approach will enable collection of necessary data to assess growth rate based on height of woody species, size category and cover-abundance.
- Target includes the establishment and achievement of varied plant height and cover target during monitoring period. Documented plant material sizes and species.
- Investigate causes of poor performance and document findings, provide interim measures such as pruning or enhanced herbivory control, and report observations and causes of weak or unbalanced growth and treatment outcomes.

Survivorship

Sampled using statistically valid methods to assess the establishment and survivorship for each size category of plant material that is used.

- The monitoring approach will enable collection of necessary data to assess survivorship based on live:dead counts and ratios over assigned monitoring years, per species and per plant size.
- Herbaceous and woody species quantitative data will be compared to the prescribed plant species list/stock size/densities/quantities to assess re-vegetation success.
- Mitigation measures will be proposed for any significant deficiencies (i.e., failed cover crop).

Free to Grow Performance

Sampled using statistically valid methods to assess the relative percentage of woody plants that achieve "free-to-grow" status three and five years after planting under the relevant monitoring program.

- The monitoring approach will enable collection of necessary data to assess "free to grow" performance.
- Causes of poor performance will be investigated and documented.
- Address causes, such as competition control, mulch top-ups, irrigation, or enhanced herbivory control.
- Report observations of excellent to poor performance and treatment outcomes, to allow the proponent or the City to adjust requirements in future planting projects.

Node Coverage

- The monitoring approach will enable collection of necessary data to assess node coverage based on statistics generated from the permanent plot data.
- Determine causes of poor performance of any nodal types and document findings.
- Report observations of excellent or deficient performance, to allow the proponent or the City to adjust requirements in future planting projects.

Invasive Species

Section 8.1.3 describes the approach for monitoring and management of invasive species, including risk assessments and species-specific management plans for Category 1 and Category 2 species, where warranted.

8.2.2 Disturbance and Encroachment

Other monitoring and adaptive management parameters may include the documentation of disturbance and/or encroachment into the created wetland area and associated buffer as a result of anthropogenic land uses (e.g., dumping, mowing, ad-hoc trails). Monitoring components may include:

- Photograph and document incident locations and describe details;
- Advise the proponent of observations of disturbance or encroachment;
- Review in next monitoring round; and
- Report observations and follow-up actions.

8.2.3 Reporting

Annual Reporting

Following the implementation of restoration measures, annual monitoring reports are to be prepared in any year in which monitoring occurs (i.e., years 1, 2, 3 and 5), summarizing the findings from the previous year. These reports are not expected to contain detailed assessment or interpretation of data. Discussion will be limited to general observations and summary of restoration activities and extent during the monitoring year. In addition, these reports will include any required recommendations for modifications to the monitoring program, repair/rehabilitation work required, and system design modifications. The reports will be provided to the City and NPCA on or before March 1 of each year, covering the monitoring from the previous calendar year.

Milestone Reporting

Ecological monitoring is recommended to occur in years 1, 2, 3 and 5. Milestone reports are proposed at years 3 and 5. These reports will include more detailed commentary on the integrity of the created wetland area and associated buffer, any perceived trends in the data collected, general performance and will provide a summary of adaptive management approaches. In addition, these reports will include any required recommendations for modifications to the monitoring program, repair/rehabilitation work required, and system design modifications.

9.0 CONCLUSIONS AND RECOMMENDATIONS

This EIS addresses the natural heritage features and associated functions found on and adjacent to the Subject Lands. Presently, the Subject Lands are dominated by agricultural lands (cropped and recently fallow fields).

Detailed ecological investigations were conducted within the Subject Lands in 2021 to determine whether natural heritage features were present within the property, and if so, identify the form and function of the features.

No significant natural heritage features under the PPS (MMAH 2020) were identified; however, two key natural heritage/hydrologic features (as per the UHOP; 2018) were identified within the Subject Lands: wetlands and indirect fish habitat. The wetlands consist of MAM, MAS2-1/MAS1-13 and SWD3-2 communities, while the indirect fish habitat is associated with HDFs H1 and H2. These wetlands are also regulated by the NPCA pursuant to Ontario Regulation 155/06. These wetlands also provide indirect fish habitat given the hydrological connection with downstream (off-site) direct fish habitat in Three Mile Creek.

The proposed conceptual site plan consists of a complex of four warehouses and one 30 m wide roadway (Street A; **Figure 8**, **Appendix A**). Since alignment of a right of way was not prescribed within the SWS/SWMP, Street A alignment has been designed to align with the existing East Cargo Road and the northern adjacent landowner's proposed right of way location. As a result of the proposed road alignment, there are some grading conflicts associated with some of the natural heritage features within their existing location. Specifically, the MAM2-2 wetland community was initially going to be retained and buffered in place; however, as a result of the proposed alignment of Street A to connect with the adjacent (northern) landowner, additional grading was required within the wetland community. These grading constraints are discussed further within Section 6 of the FSR (Odan Detech 2023).

A total of 1.11 ha of wetland habitat is proposed for removal to accommodate the site alteration/development. Wetland creation (at a 1:1 ratio) is proposed along the eastern Subject Lands boundary to address the proposed removals/alterations. A 1:1 ratio is warranted given that portions of the wetlands that are proposed for removal are already degraded and/or disturbed from physical and/or biological disturbances. The created wetland will increase native plant diversity to provide a net gain in ecological functions and resiliency of the system. Hydroperiod modelling will be completed following initial discussions with reviewing agencies during the detailed design phase. Following hydroperiod modelling, the target ecosystem will be defined as appropriate given the presence of established Common Reed populations surrounding the site. The created wetland area will be buffered by a 10 m native species buffer to protect and enhance the created wetland. In addition to the buffer, a fence is proposed between the existing residential properties and the outer edge of the buffer to discourage human engagement/disturbance of the feature. Due to the proposed industrial site usage, interactions from the industrial area are expected to be relatively limited in comparison

to the adjacent residential areas. Finally, external drainage from the adjacent Airport Lands will be conveyed through the site through a vegetated conveyance swale along the northern property boundary. Internal drainage will be captured and treated via a treatment train process before being directed into one of three storm sewers (towards Homestead Drive or Airport Road) and/or into the recreated wetland, as required. Pre to post development flows will be matched to avoid impacts to downstream (offsite) occupied fish habitats. Indirect fish habitat functions will be replicated through the continued contribution of flows and allochthonous materials via the conveyance swale and recreated wetland.

While direct removal of the wetland features is proposed, no negative impacts are predicted as a result of the proposed development provided that the recommended mitigative and restorative measures are enacted and monitored for effectiveness. The implementation of mitigation measures and appropriate construction monitoring will contribute to the maintenance of local features and functions over time. This is in compliance with Sections C.2.3 and C.2.5 of the UHOP (2018) as well as Sections 8.2.2.8 of the NPCA's Policy Document (2018).

A conceptual restoration plan (**Section 7.0**) has been provided to illustrate how the created wetland area will support various biophysical functions (e.g., improve water quality, increase native vegetation species diversity, provide pollinator habitat). A NHS Design Brief will be prepared during the detailed design phase, which will provide specific details for the created wetland area (e.g., plant lists, planting timing considerations, wildlife habitat structure locations), as well as confirming hydrologic availability. A detailed monitoring plan (**Section 8.0)** is proposed to monitor the effectiveness of the created wetland area.

GEI will engage with DFO through the Request for Review process during the detailed design phase to ensure that the management of the two drainage features does not require a Federal Fisheries Act Authorization.

Considering the above, and as discussed within the impact assessment summary table (**Table 9**, **Appendix B**), development of the Subject Lands can be completed without negative impacts to the natural heritage features and associated functions both within the property boundaries and to adjacent (offsite) features.

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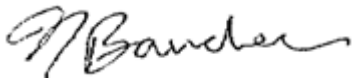

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APPENDICES

Appendix A – Figures

Appendix B – Tables

Appendix C – Agency Correspondence

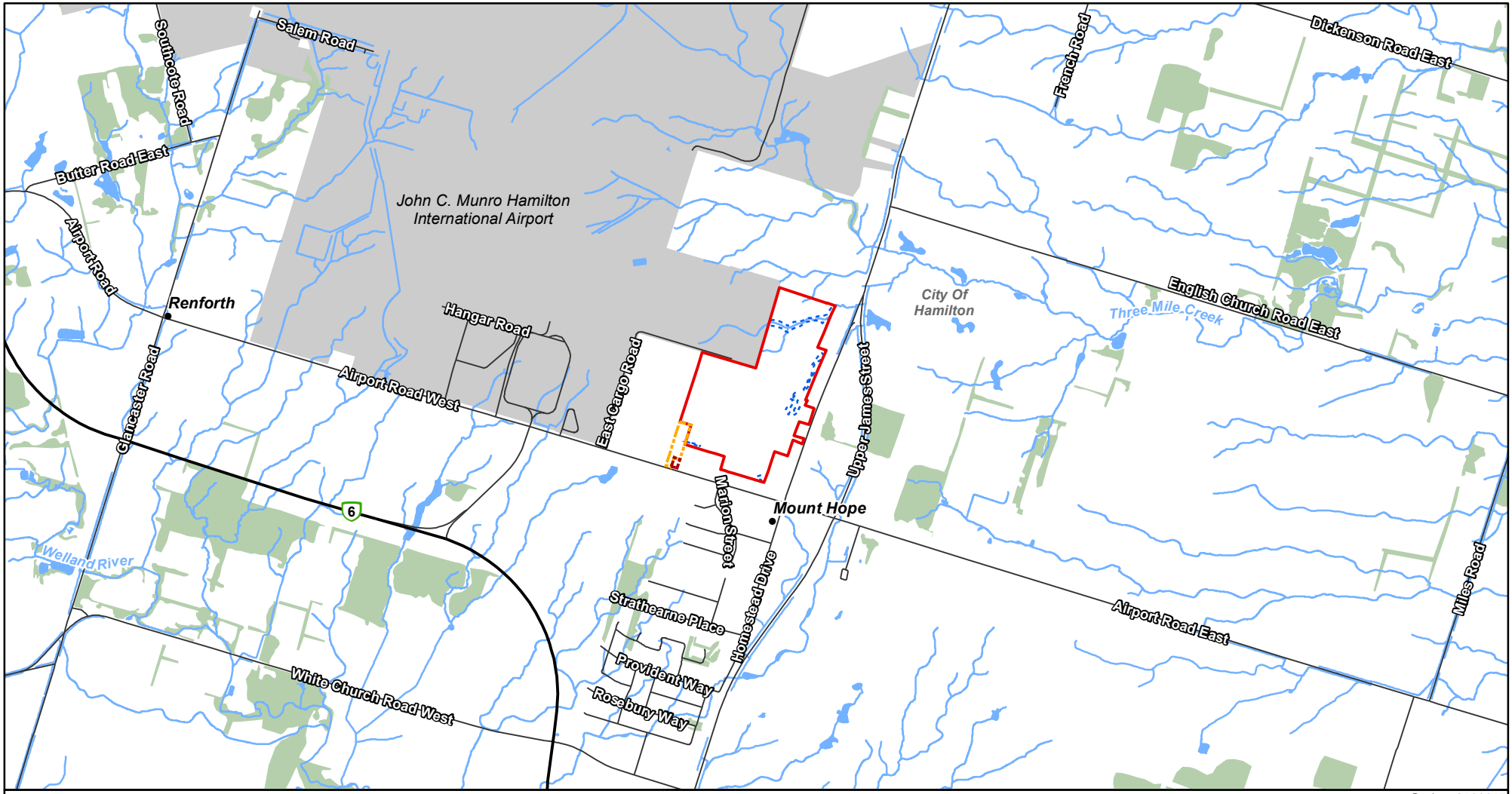
Appendix D – Approved Terms of Reference

Appendix E – TPMP

Appendix F – Butternut Test Results

Appendix A

Figures



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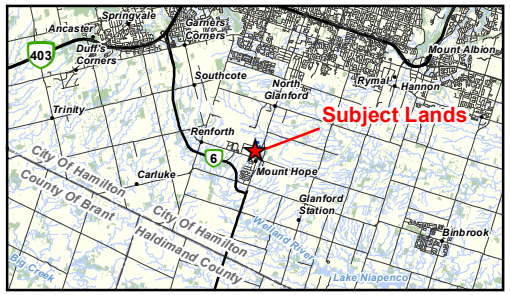
Legend

- 3054 Homestead Drive
- 9174 Airport Road
- 9166 Airport Road
- Highway
- Road
- Watercourse (NPCA)
- Waterbody (NPCA))
- Wooded Area (LIO)
- Staked Wetland (August 6, 2021)
- Airport Lands



3054 Homestead Drive,9166 and 9174 Airport Road EIS
Fengate Homestead Holdings LP

Figure 1
Location of Subject Lands

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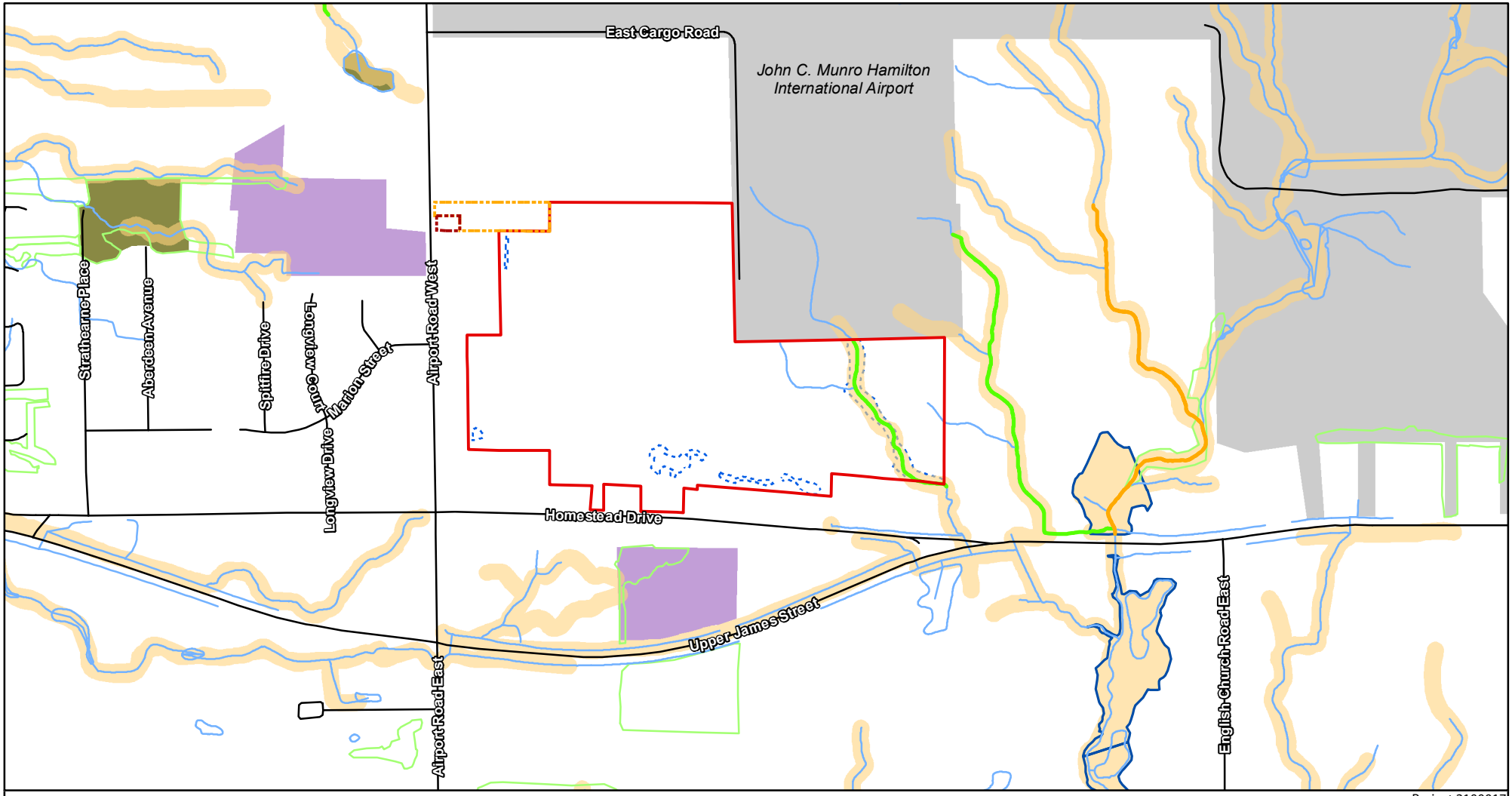

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3. Features from Map B.8-2 of the Urban Hamilton Official Plan - Airport Employment Growth District Secondary Plan - Natural Heritage System. Updated Feb 2021.
4. Features from Map B of the Urban Hamilton Official Plan. Updated Feb 2021.

Legend

- 3054 Homestead Drive
- 9174 Airport Road
- 9166 Airport Road
- Watercourse (NPCA)
- Waterbody (NPCA)
- Wooded Area (LIO)
- Staked Wetland (August 6, 2021)
- Airport Lands
- Regulation Limit (NPCA)
- Regulated Floodplain Extent (NPCA)
- Seasonal Habitat[3]
- Support/Indirect Fish Habitat[3]
- Core Areas[4]
- Parks and General Open Space[4]

3054 Homestead Drive,9166 and 9174 Airport Road EIS
Fengate Homestead Holdings LP

Figure 2
Landscape Setting

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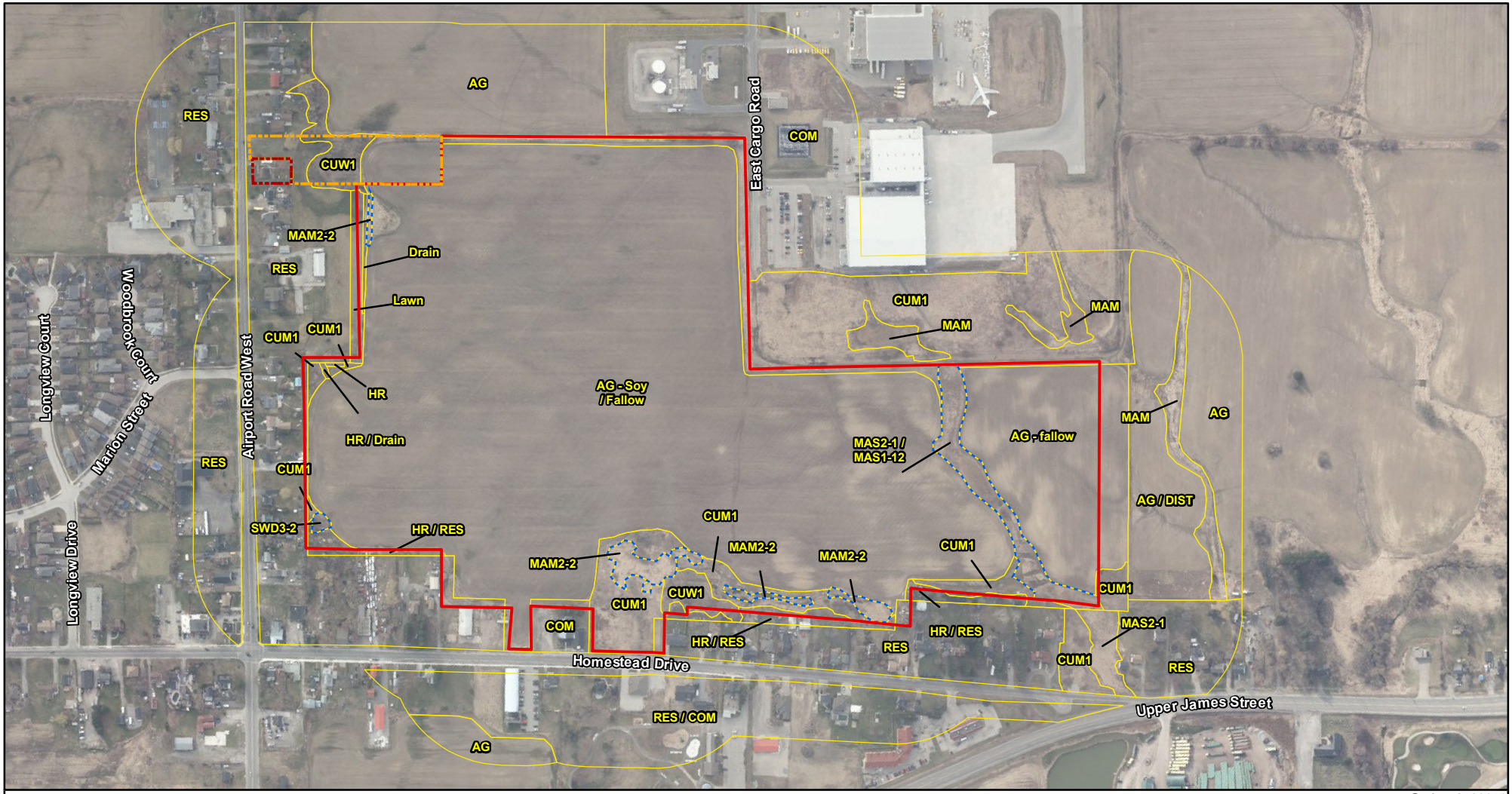

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Legend

- 3054 Homestead Drive
- 9174 Airport Road
- 9166 Airport Road
- Staked Wetland (August 6, 2021)
- Ecological Land Classification

ELC Legend

AG, Agricultural
AG / DIST, Agricultural/Disturbed
COM, Commercial
CUM1, Cultural Meadow
CUW1, Cultural Woodland
HR, Hedgerow
MAM, Meadow Marsh
MAM2-2, Reed-canary Grass Mineral Meadow Marsh
MAS2-1 / MAS1-12, Cattail / Common Reed Mineral Shallow Marsh
MAS2-1, Cattail Mineral Shallow Marsh Type
RES, Residential
SWD3-2, Silver Maple Mineral Deciduous Swamp Type

3054 Homestead Drive,9166 and 9174 Airport Road EIS
Fengate Homestead Holdings LP

Figure 3
Ecological Land Classification

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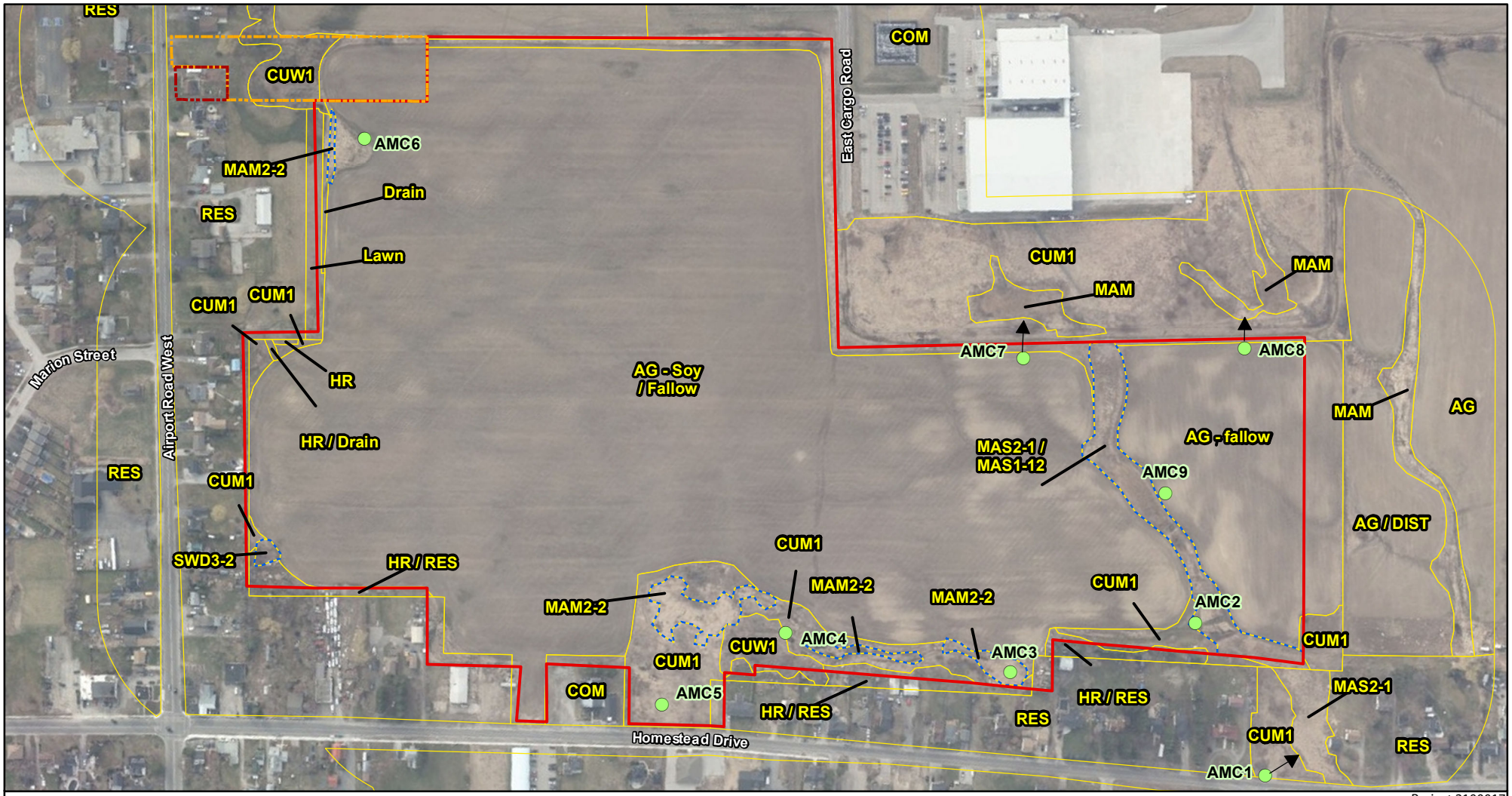

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Legend

- 3054 Homestead Drive
- 9174 Airport Road
- 9166 Airport Road
- Staked Wetland (August 6, 2021)
- Amphibian Call Count Station (= direction of listening)
- Ecological Land Classification

ELC Legend

AG, Agricultural
AG / DIST, Agricultural/Disturbed
CUM1, Cultural Meadow
CUW1, Cultural Woodland
COM, Commercial
HR, Hedgerow
MAM, Meadow Marsh
MAM2-2, Reed-canary Grass Mineral Meadow Marsh
MAS2-1 / MAS1-12, Cattail / Common Reed Mineral Shallow Marsh
MAS2-1, Cattail Mineral Shallow Marsh Type
RES, Residential
SWD3-2, Silver Maple Mineral Deciduous Swamp Type

3054 Homestead Drive,9166 and 9174 Airport Road EIS
Fengate Homestead Holdings LP

Figure 4
Breeding Amphibian Call Count Stations

0 50 m
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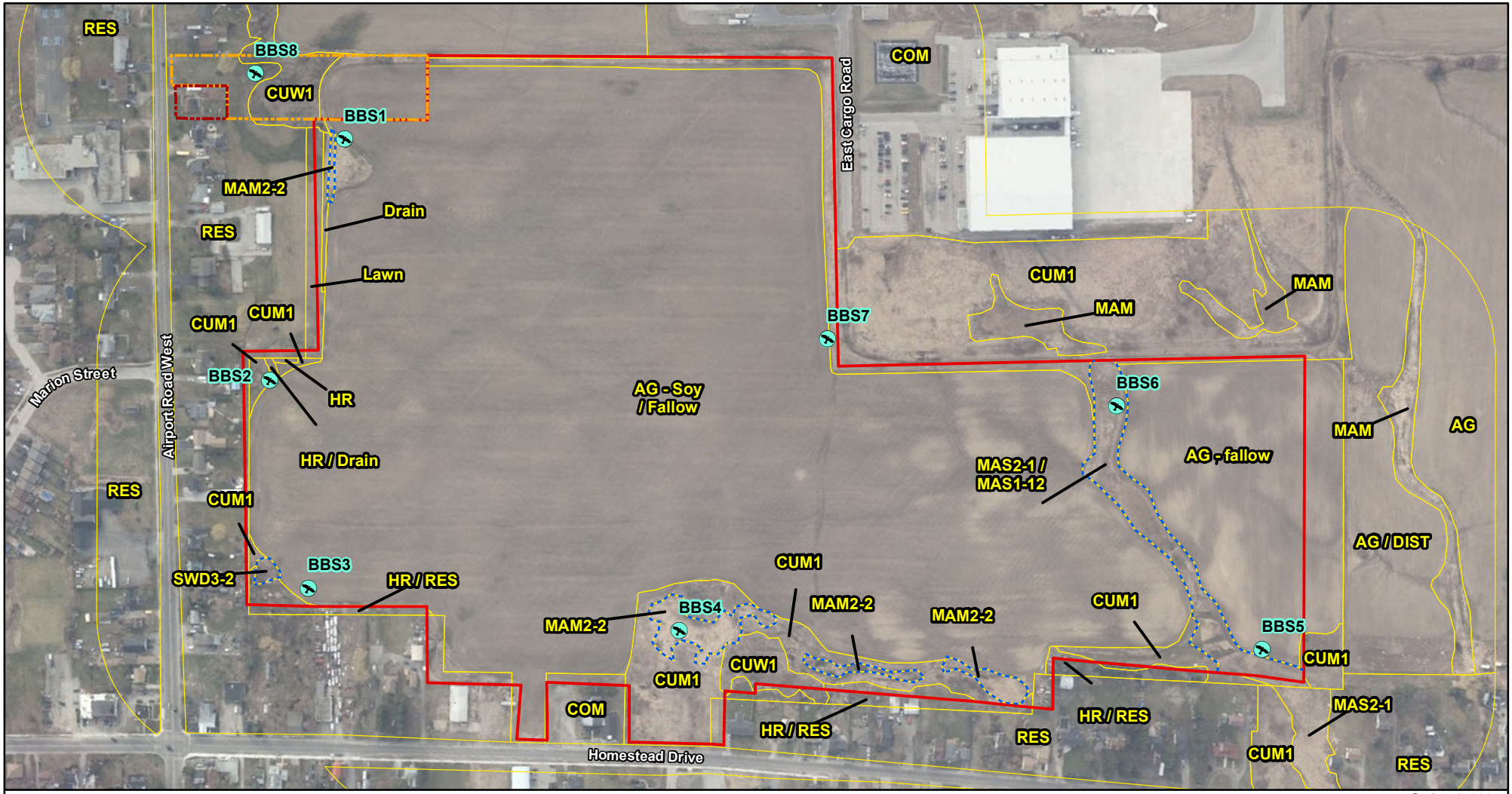

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Legend

Subject Lands

- 3054 Homestead Drive
- 9174 Airport Road
- 9166 Airport Road
- Staked Wetland (August 6, 2021)
- Breeding Bird Station
- Ecological Land Classification

ELC Legend

AG, Agricultural
AG / DIST, Agricultural/Disturbed
COM, Commercial
CUM1, Cultural Meadow
CUW1, Cultural Woodland
HR, Hedgerow
MAM, Meadow Marsh
MAM2-2, Reed-canary Grass Mineral Meadow Marsh
MAS2-1 / MAS1-12, Cattail / Common Reed Mineral Shallow Marsh
MAS2-1, Cattail Mineral Shallow Marsh Type
RES, Residential
SWD3-2, Silver Maple Mineral Deciduous Swamp Type

3054 Homestead Drive,9166 and 9174 Airport Road EIS
Fengate Homestead Holdings LP

Figure 5
Breeding Bird Survey Point Count Stations

0 50 m
1:4,500

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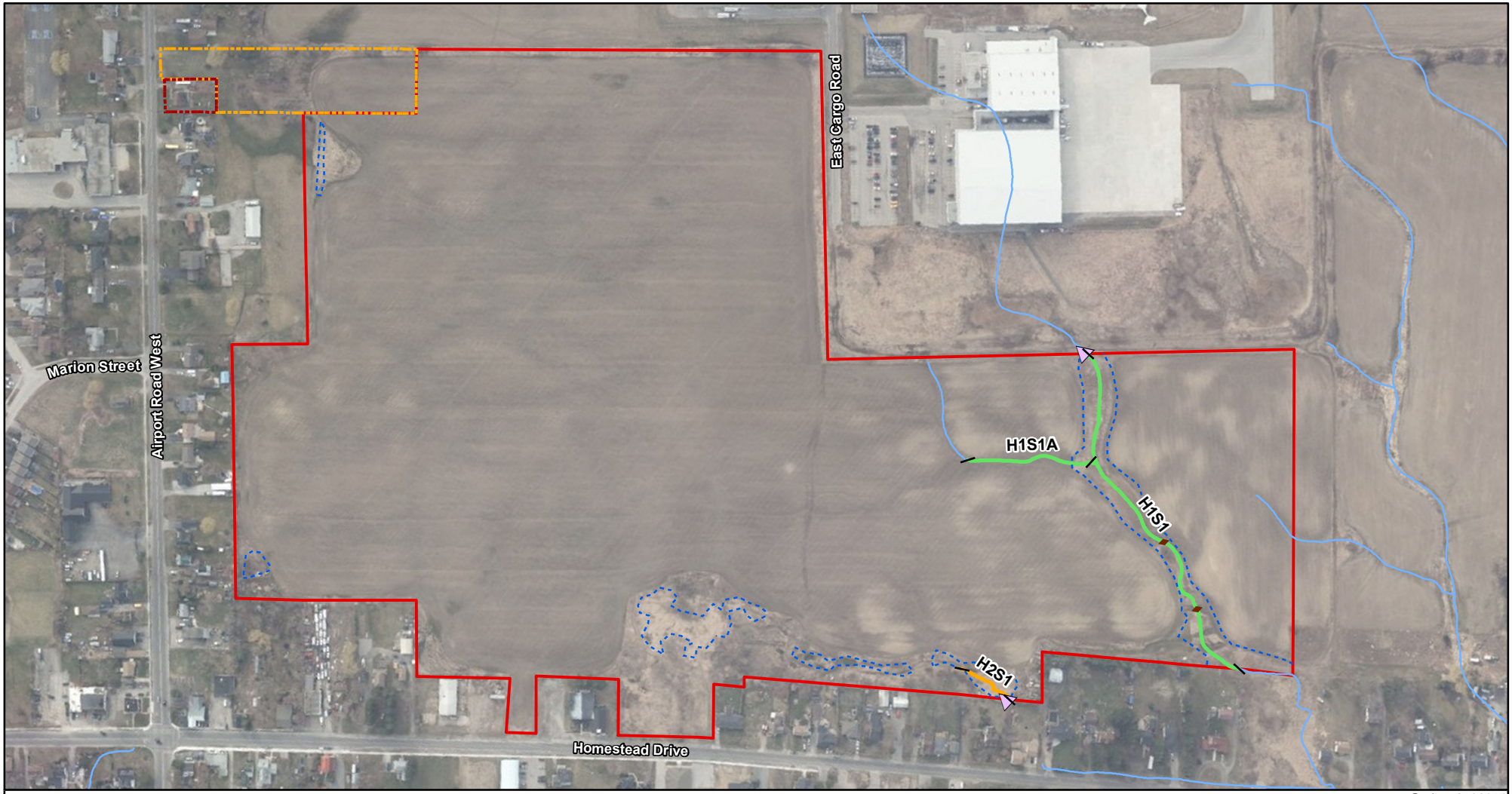

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Legend

- 3054 Homestead Drive
- 9174 Airport Road
- 9166 Airport Road
- Culvert
- Farm Crossing
- Staked Wetland (August 6, 2021)
- Watercourse (NPCA)
- Waterbody (NPCA)

HDFA Management Recommendations

- Conservation
- Mitigation

3054 Homestead Drive,9166 and 9174 Airport Road EIS
Fengate Homestead Holdings LP

Figure 6
Aquatic Survey Results

0 50 m
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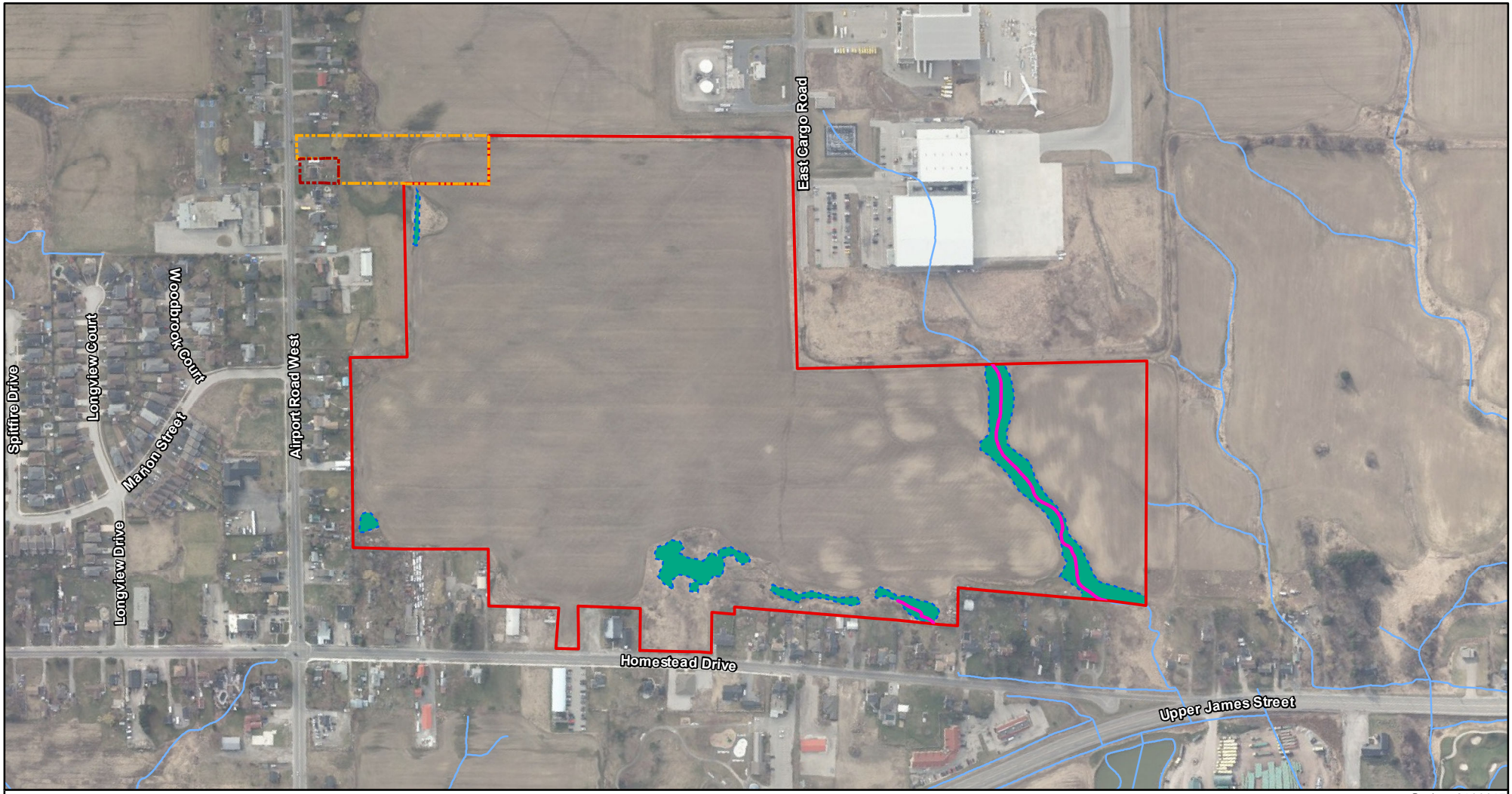

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Legend

- 3054 Homestead Drive
- 9174 Airport Road
- 9166 Airport Road
- Watercourse (NPCA)
- Waterbody (NPCA)
- Staked Wetland (August 6, 2021)
- Wetlands
- Indirect Fish Habitat

3054 Homestead Drive,9166 and 9174 Airport Road EIS
Fengate Homestead Holdings LP

Figure 7
Key Natural Heritage and Hydrologic Features (UHOP)

0 50 m
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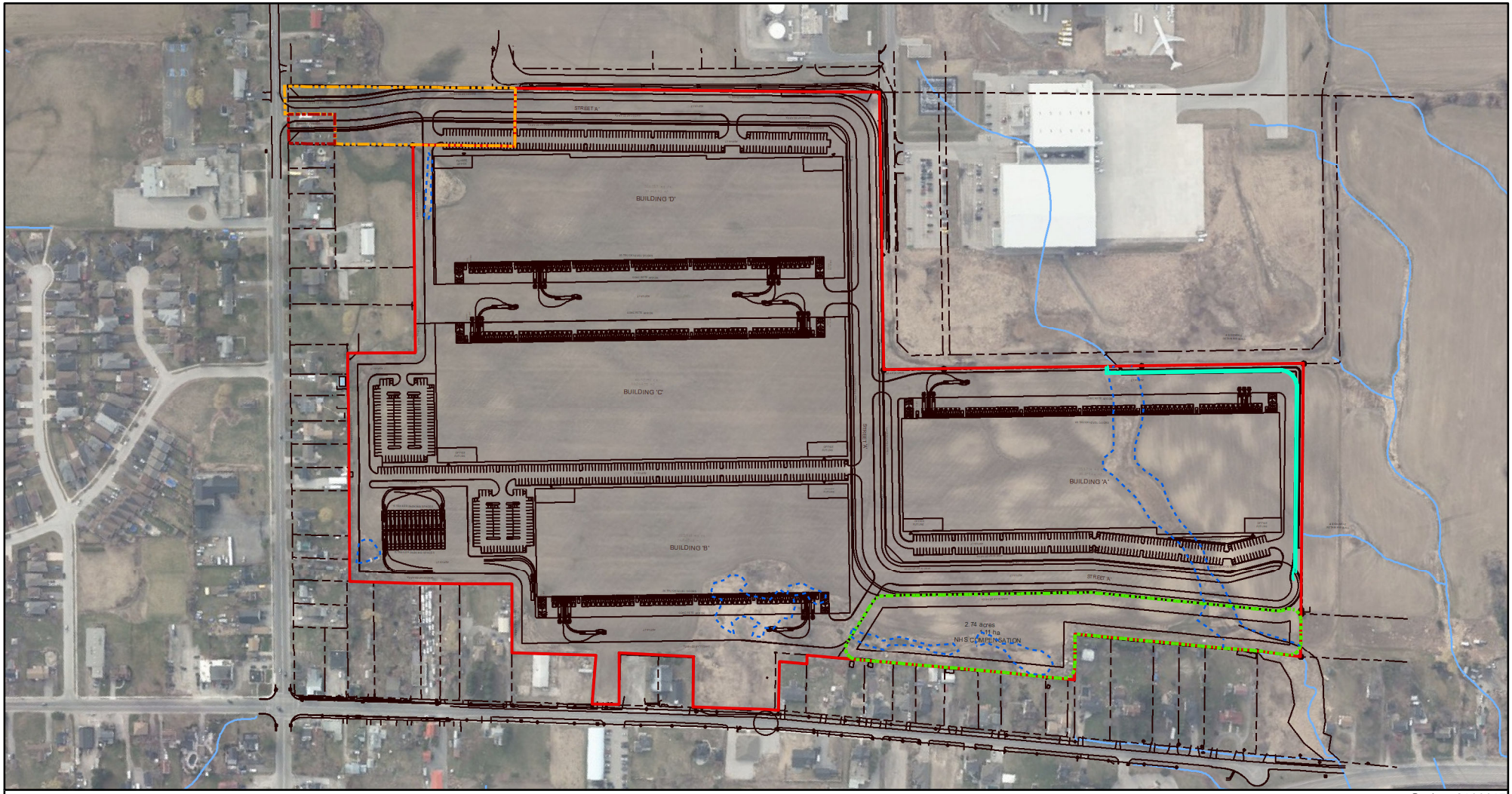

Project 2100017

NOTES:
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4. Concept Plan:'413-21-Concept Plan-2023-01-31.dwg

Legend

- 3054 Homestead Drive
- 9174 Airport Road
- 9166 Airport Road
- Watercourse (NPCA)
- Staked Wetland (August 6, 2021)
- Created Wetland Area + 10 m Buffer
- Conveyance Swale

3054 Homestead Drive,9166 and 9174 Airport Road EIS
Fengate Homestead Holdings LP

Figure 8
Concept Plan

0 50 m
1:5,000

N

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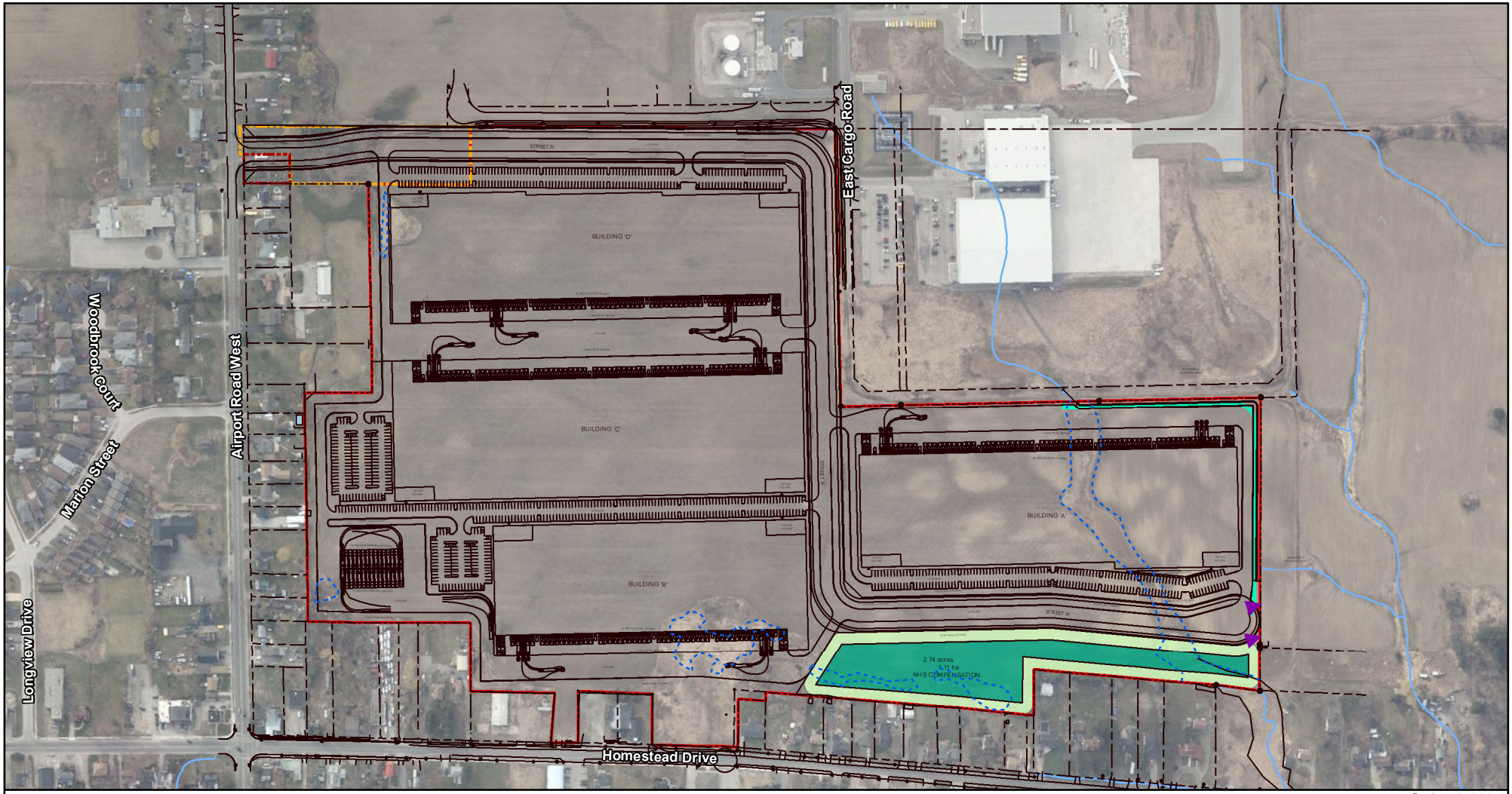

Project 2100017

NOTES:
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4. Concept Plan:'413-21-Concept Plan-2023-01-31.dwg'

Legend

- 3054 Homestead Drive
- 9174 Airport Road
- 9166 Airport Road
- Watercourse (NPCA)
- Created Wetland Area (1.11 ha)
- Vegetated Buffer from Created Wetland Area (10 m)
- Conveyance Swale
- Culvert
- Staked Wetland (August 6, 2021)

3054 Homestead Drive,9166 and 9174 Airport Road EIS
Fengate Homestead Holdings LP

Figure 9
Conceptual Restoration Plan

0 50 m
1:5,000

N

GEI Consultants

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Appendix B

Tables

Table 1: Survey Dates and Conditions

SURVEYORS (SURNAME, INTL)	SURVEY ROUND	SURVEY TYPE	DATE	TIME		AIR TEMP (c°)	WATER TEMP (c°)	HUMIDITY (%)	CLOUD COVER (%)	BEAUFORT WIND SPEED	PRECIPITATION COMMENTS
				START	END						
2021											
Rochon, M Robinson, O	1	Headwater Drainage Feature Assessment Fish Community Sampling	18-MR	09:15	12:30	2	3	66	100	2	Light rain
Williamson, L Robinson, O	1	Amphibian Call Count	8-AP	21:25	22:20	9	N/A	61	10	1	None
Rochon, M Nieroda, M	2	Headwater Drainage Feature Assessment	19-MA	10:00	12:00	23	19	34	0	3	None
Williamson, L Ng, P	2	Amphibian Call Count	19-MA	10:00	22:55	18	N/A	43	80	0	None
Burke, P	1	Breeding Bird Survey	25-MA	05:50	08:00	16	N/A	75	50	0	None
Burke, P	2	Breeding Bird Survey	15-JN	06:00	08:30	18	N/A	55	40	2	None
Williamson, L Robinson, O	3	Amphibian Call Count	17-JN	22:00	22:40	21	N/A	46	0	1	None
Leslie, J.	1	Early Summer Botanical & Ecological	23-JN	10:00	17:00	21	N/A	44	10	2	None

Table 1: Survey Dates and Conditions

SURVEYORS (SURNAME, INTL)	SURVEY ROUND	SURVEY TYPE	DATE	TIME		AIR TEMP (c°)	WATER TEMP (c°)	HUMIDITY (%)	CLOUD COVER (%)	BEAUFORT WIND SPEED	PRECIPITATION COMMENTS
				START	END						
		Land Classification									
Leslie, J.	1	Wetland Delineations / Pre-Staking	28-JL	10:00	15:00	23	N/A	60	5	3	None
Rochon, M McDonald, S	3	Headwater Drainage Feature Assessment	05-AU	10:30	11:30	24	20	46	25	1	None
Leslie, J. Robinson, O.	1	Wetland Staking Visit with NPCA	06-AU	09:30	13:00	27	N/A	50	20	2	None
Leslie, J.	2	Early Fall Botanical & Ecological Land Classification	07-SE	10:00	16:30	25	N/A	44	10	1	None
Szabo, A.	1	Tree Inventory	08-SE	10:00	14:00	23	N/A	67	20	3	None
Szabo, A.	1	Tree Inventory	14-OC	10:00	16:00	19	N/A	85	80	2	None
Szabo, A.	1	Tree Inventory	15-OC	10:00	14:00	18	N/A	76	80	2	None
2022											
Leslie, J.	1	Stem Density	17-MR	10:00	16:00	4.9	N/A	100	5	1	None
Male, S.	1	Breeding Bird Survey	10-JN	9:10	9:45	17	N/A	72	0	3	None

Table 1: Survey Dates and Conditions

SURVEYORS (SURNAME, INTL)	SURVEY ROUND	SURVEY TYPE	DATE	TIME		AIR TEMP (c°)	WATER TEMP (c°)	HUMIDITY (%)	CLOUD COVER (%)	BEAUFORT WIND SPEED	PRECIPITATION COMMENTS
				START	END						
Szabo, A.	1	Tree Inventory, Summer Botanical & Ecological Land Classification	22-JN	7:00	11:00	25	N/A	75	10	2	None
Szabo, A.	2	Fall Botanical & Ecological Land Classification	29-AU	10:00	12:00	28	N/A	74	80	4	None
Male, S.	2	Breeding Bird Survey	29-JN	8:10	8:40	17	N/A	82	100	1	None

LEGEND:

BEAUFORT WIND SPEED SCALE	
0	Calm (<1 km/hr)
1	Light Air (1-5 km/hr)
2	Light Breeze (6-11 km/hr)
3	Gentle Breeze (12-19 km/hr)
4	Moderate Breeze (20-28 km/hr)

MONTH (CODE)	
JA	January
FB	February
MR	March
AP	April
MA	May
JN	June
JL	July
AU	August
SE	September
OC	October
NO	November
DE	December

Table 2: Ecological Landscape Characterization (ELC) Community Descriptions

ELC TYPE	COMMUNITY DESCRIPTION	S-RANK / G-RANK (NHIC, 2021)
CULTURAL		
Cultural Meadow		
CUM1 Mineral Cultural Meadow	• Open meadow containing a mix of forb and graminoid species, such as Kentucky Bluegrass (*Poa pratensis*), Tall Goldenrod (*Solidago altissima*), Smooth Brome (*Bromus inermis*), Canada Bluegrass (*Poa compressa*), Teasel (*Dipsacus fullanum*), and Crack Vetch (*Vicia cracca*), among others. • Periodic woody species were also present, such as Black Walnut (*Juglans nigra*), Manitoba Maple (*Acer negundo*), European Buckthorn (*Rhamnus cathartica*), etc., though never occupying greater than 25% cover.	Not ranked
Cultural Woodland		
CUW1 Mineral Cultural Woodland	• Young woodlands with a canopies composed primarily of Manitoba Maple and Black Walnut; these species were also occasional in the understory. • Ground cover species consisted predominantly of Common Bedstraw (*Galium aparine*), White Avens (*Geum canadensis*), and Kentucky Bluegrass, with associations of primarily Canada Thistle (*Cirsium arvense*) and Garlic Mustard (*Alliaria petiolata*).	Not ranked
SWAMP		
Deciduous Swamp		
SWD3-2 Silver Maple Mineral Deciduous Swamp	• Deciduous swamp dominated by young Silver Maple (*Acer saccharinum*). • The herbaceous layer was sparse, with scattered occurrences of Purple Loostrife (*Lythrum salicaria*), Reed-canary Grass (*Phalaris arundinaceae*), Creeping Bentgrass and White Avens, among others.	S5

Table 2: Ecological Landscape Characterization (ELC) Community Descriptions

ELC TYPE	COMMUNITY DESCRIPTION	S-RANK / G-RANK (NHIC, 2021)
MARSH		
Meadow Marsh		
MAM2-2 Reed Canary Grass Mineral Meadow Marsh	• Moist meadow marsh composed primarily of Reed-canary Grass, with associations of Common Bedstraw, Canada Thistle, Creeping Bentgrasss (*Agrostis stolonifera*), and Fox Sedge (*Carex vulpinoidea*), among others. • Surface water was not observed during either survey date.	S5
Shallow Marsh		
MAS2-1 Cattail Mineral Shallow Marsh	• Meadow marsh consisting primarily of Narrow-leaved Cattail (*Typha angustifolia*) with associations of Purple Loosetrife, Reed-canary Grass, Awl Sedge (*Carex stipata*), Panicled Aster (*Symphyotrichum lanceolatum*), and Rice-cut Grass (*Leersia oryzoides*), among others. This community included a complex of smaller areas dominated by Common Reed (*Phragmites australis ssp. australis*). • Surface water was generally absent during both surveys though shallow pools were observed in ATV ruts. Soil was consistently moist.	S5
MAS1-12* Common Reed Mineral Shallow Marsh	• Part of a complex; refer to MAS2-1 description.	Not ranked

*****ELC code derived from the 2008 MNRF ELC coding structure

													LOCAL / REGIONAL STATUS	
FAMILY	**LATIN NAME**	**COMMON NAME**	**COEFFICIENT OF CONSERVATISM**	**WETNESS INDEX**	**OWES WETLAND SPECIES**	**WEEDINESS INDEX**	**INVASIVE EXOTIC RANK** (Urban Forest Associates 2002)	**PROVINCIAL STATUS (S-RANK)**	**GLOBAL STATUS (G-RANK)**	**COSSARO (MNRF)**	**COSEWIC STATUS**		**HAMILTON** (Schwetz 2014)	**AUTHORITY**
Adoxaceae	Viburnum opulus ssp. opulus	Cranberry Viburnum		-3		-1	4	S5	G5				I	L.
Alismataceae	Alisma triviale	Northern Water-Plantain	1	-5	I			S5	G5				X	L.
Amaranthaceae	Amaranthus retroflexus	Redroot Amaranth		3		-1		SNA	G5				I	L.
Amaranthaceae	Chenopodium album	Common Lamb's-Quarters		3		-1		SNA	G5T5				I	L.
Anacardiaceae	Rhus typhina	Staghorn Sumac	1	3				S5	G5				X	L.
Apiaceae	Aegopodium podagraria	Goutweed		0		-3	1	SNA	GNR				I	L.
Apiaceae	Daucus carota	Wild Carrot		5		-2		SNA	GNR				I	L.
Apiaceae	Torilis japonica	Erect Hedge-Parsley		3		-3		SNA	GNR				I	(Houtt.) de Candolle
Apocynaceae	Apocynum cannabinum	Hemp Dogbane	3	0				S5	G5					L.
Apocynaceae	Asclepias incarnata ssp. incarnata	Swamp Milkweed	6	-5	I			S5	G5T5				X	L.
Apocynaceae	Asclepias syriaca	Common Milkweed	0	5				S5	G5				X	L.
Asteraceae	Ambrosia artemisiifolia	Common Ragweed	0	3				S5	G5				X	L.
Asteraceae	Arctium lappa	Great Burdock		3				SNA	GNR				I	L.
Asteraceae	Artemisia biennis	Biennial Wormwood		-3		-1		SNA	G5				I	Willd.
Asteraceae	Artemisia vulgaris	Common Wormwood		5		-1	P	SNA	GNR				I	L.
Asteraceae	Bidens frondosa	Devil's Beggarticks	3	-3	I			S5	G5				X	L.
Asteraceae	Bidens vulgata	Tall Beggarticks	5	0	T			S5	G5				X	Greene
Asteraceae	Cichorium intybus	Wild Chicory		5		-1		SNA	GNR				I	L.
Asteraceae	Cirsium arvense	Canada Thistle		3		-1	1	SNA	GNR				I	(L.) Scop.
Asteraceae	Cirsium vulgare	Bull Thistle		3		-1		SNA	G5				I	(Savi) Tenore
Asteraceae	Erigeron annuus	Annual Fleabane	0	3				S5	G5				X	(L.) Pers.
Asteraceae	Erigeron canadensis	Canada Horseweed	0	3				S5	G5				X	(L.)
Asteraceae	Erigeron philadelphicus var. philadelphicus	Philadelphia Fleabane	1	-3	T			S5	G5				X	L.
Asteraceae	Eupatorium perfoliatum	Common Boneset	2	-3	I			S5	G5				X	L.
Asteraceae	Euthamia graminifolia	Grass-Leaved Goldenrod	2	0				S5	G5				X	(L.) Nutt.
Asteraceae	Inula helenium	Elecampane		3	T	-2	4	SNA	GNR				I	L.
Asteraceae	Lapsana communis	Common Nipplewort		3		-2	P	SNA	GNR				I	L.
Asteraceae	Leucanthemum vulgare	Oxeye Daisy		5		-1		SNA	GNR				I	Lam.
Asteraceae	Solidago altissima var. altissima	Tall Goldenrod	1	3				S5	GNR				X	L.
Asteraceae	Sonchus arvensis ssp. arvensis	Field Sow-Thistle		3				SNA	GNR				I	L.
Asteraceae	Sonchus oleraceus	Common Sow-Thistle		3		-1		SNA	GNR				I	L.
Asteraceae	Symphyotrichum lanceolatum ssp. lanceolatum	Panicled Aster (ssp. lanceolatum)	3	-3	I			S5	G5T5				X	(Willd.) G.L. Nesom
Asteraceae	Symphyotrichum lateriflorum var. lateriflorum	Calico Aster	3	0	T			S5	G5T5				X	(L.) A. & D. Löve
Asteraceae	Symphyotrichum novae-angliae	New England Aster	2	-3				S5	G5				X	(L.) G.L. Nesom
Asteraceae	Symphyotrichum pilosum var. pilosum	Old Field Aster	1	3				S5	G5T5				X	(Willd.) G.L. Nesom
Asteraceae	Taraxacum officinale	Common Dandelion		3		-2		SNA	G5				I	F.H. Wiggers
Asteraceae	Tripleurospermum inodorum	Scentless Chamomile		0		-1		SNA	GNR				I	(L.) Schultz-Bip.
Balsaminaceae	Impatiens capensis	Spotted Jewelweed	4	-3	I			S5	G5				X	Meerburgh
Betulaceae	Betula papyrifera	Paper Birch	2	3	T			S5	G5				X	Marshall
Bignoniaceae	Catalpa speciosa	Northern Catalpa		3		-1		SNA	GU				I	Warder ex Engelm.
Brassicaceae	Alliaria petiolata	Garlic Mustard		0		-3	1	SNA	G5				I	(M. Bieb.) Cavara & Grande
Brassicaceae	Barbarea vulgaris	Bitter Wintercress		0		-1	3	SNA	GNR				I	W.T. Aiton
Brassicaceae	Hesperis matronalis	Dame's Rocket		3		-3	1	SNA	G4G5				I	L.
Brassicaceae	Lepidium campestre	Field Peppergrass		5		-1		SNA	GNR				I	(L.) W.T. Aiton
Brassicaceae	Sinapis arvensis	Corn Mustard		5		-1		SNA	GNR				I	L.
Caprifoliaceae	Dipsacus fullonum	Common Teasel		3		-1	3	SNA	G?T?				I	L.
Caprifoliaceae	Lonicera x bella	Showy Fly Honeysuckle		3		-3		HYB_e	GNR				I	Zabel
Caryophyllaceae	Dianthus armeria ssp. armeria	Deptford Pink		5		-1		SNA	GNR				I	L.
Caryophyllaceae	Stellaria media	Common Chickweed		3		-1		SNA	GNR				I	(L.) Villars
Convolvulaceae	Calystegia sepium ssp. americana	American False Bindweed	2	0				S5	G5				X	(Sims) Brummitt
Convolvulaceae	Convolvulus arvensis	Field Bindweed		5		-1	3	SNA	GNR				I	L.
Cornaceae	Cornus racemosa	Grey Dogwood	2	0	T			S5	G5?				X	Lamarck
Cornaceae	Cornus sericea	Red-Osier Dogwood	2	-3	I*			S5	G5				X	L.
Crassulaceae	Hylotelephium telephioides	Alleghany Stonecrop						SNA	G4					(Michx.) H. Ohba
Cupressaceae	Thuja occidentalis	Eastern White Cedar	4	-3	T			S5	G5				X	L.
Cyperaceae	Carex cristatella	Crested Sedge	3	-3	I			S5	G5				X	Britton
Cyperaceae	Carex projecta	Necklace Sedge	5	-3	I			S5	G5				R	Mackenzie
Cyperaceae	Carex stipata var. stipata	Awl-Fruited Sedge	3	-5	I			S5	G5				X	Muhlenb. ex Willdenow
Cyperaceae	Carex vulpinoidea	Fox Sedge	3	-5	I			S5	G5				X	Michaux
Cyperaceae	Cyperus esculentus var. leptostachyus	Perennial Yellow Flatsedge	1	-3	T			S5	G5				X	Boeckeler
Cyperaceae	Scirpus atrovirens	Dark-Green Bulrush	3	-5	T			S5	G5?				X	Willdenow
Equisetaceae	Equisetum arvense	Field Horsetail	0	0	T			S5	G5				X	L.
Euphorbiaceae	Acalypha rhomboidea	Common Three-Seed Mercury	0	3				S5	G5				X	Raf.
Fabaceae	Gleditsia triacanthos	Honey Locust	8	0				S2?	G5				I	L.
Fabaceae	Lotus corniculatus	Garden Bird's-Foot Trefoil		3		-2	2	SNA	GNR				I	L.
Fabaceae	Medicago lupulina	Black Medick		3		-1	4	SNA	GNR				I	L.
Fabaceae	Robinia pseudoacacia	Black Locust		3		-3	2	SNA	G5				I	L.
Fabaceae	Trifolium hybridum	Alsike Clover		3		-1		SNA	GNR				I	L.
Fabaceae	Trifolium pratense	Red Clover		3		-2	4	SNA	GNR				I	L.
Fabaceae	Trifolium repens	White Clover		3		-1	4	SNA	GNR				I	L.
Fabaceae	Vicia cracca	Tufted Vetch		5		-1	2	SNA	GNR				I	L.
Gentianaceae	Centaurium pulchellum	Branching Centaury		0		-1		SNA	GNR				I	(Sw.) Druce
Geraniaceae	Geranium robertianum	Herb-Robert	2	3		-2		S5	G5				I	L.
Grossulariaceae	Ribes rubrum	European Red Currant		5	T	-2		SNA	G4G5				I	L.
Hypericaceae	Hypericum perforatum ssp. perforatum	Common St. John's-Wort		5		-3	4	SNA	GNR				I	L.
Juglandaceae	Juglans sp.	Butternut Hybrid												
Juglandaceae	Juglans nigra	Black Walnut	5	3				S4?	G5				X	L.
Juncaceae	Juncus dudleyi	Dudley's Rush	1	-3	T			S5	G5				X	Wiegand
Juncaceae	Juncus effusus ssp. solutus	Soft Rush (ssp. solutus)	4	-5	I			SNA	G5T5				X	(Fernald & Wiegand) Hämet-Ahti
Lamiaceae	Glechoma hederacea	Ground-Ivy		3		-2	4	SNA	GNR				I	L.
Lamiaceae	Leonurus cardiaca ssp. cardiaca	Common Motherwort		5		-2		SNA	GNR				I	L.
Lamiaceae	Lycopus uniflorus	Northern Water-Horehound	5	-5	I			S5	G5				X	Michaux
Lamiaceae	Prunella vulgaris ssp. vulgaris	Common Self-Heal		0		-1		SNA	G5T?				I	L.
Lythraceae	Lythrum salicaria	Purple Loosestrife		-5	I	-3	1	SNA	G5				I	L.
Malvaceae	Abutilon theophrasti	Velvetleaf		3		-1	3	SNA	GNR				I	Medikus
Moraceae	Morus alba	White Mulberry		0		-3	1	SNA	GNR				I	L.
Oleaceae	Fraxinus pennsylvanica	Red Ash	3	-3	T			S4	G5				X	Marshall
Onagraceae	Circaea canadensis ssp. canadensis	Canada Enchanter's Nightshade	2	3				S5	G5T5				X	(L.) Hill
Onagraceae	Epilobium ciliatum ssp. ciliatum	Northern Willowherb	3	-3	I*			S5	G5T?				I	Raf.
Onagraceae	Oenothera biennis	Common Evening Primrose	0	3				S5	G5				X	L.
Onocleaceae	Matteuccia struthiopteris var. pensylvanica	Ostrich Fern	5	0	T			S5	G5				X	(Willd.) C.V. Morton
Oxalidaceae	Oxalis dillenii	Slender Yellow Wood-Sorrel	0	3				SNA	G5				X	Jacquin
Oxalidaceae	Oxalis stricta	European Wood-Sorrel	0	3				SNA	G5				X	L.
Pinaceae	Picea abies	Norway Spruce		5		-1		SNA	GNR				I	(L.) Karsten
Pinaceae	Picea glauca	White Spruce	6	3	T			S5	G5				I/N	(Moench) Voss
Pinaceae	Pinus resinosa	Red Pine	8	3				S5	G5				I/N	Aiton
Plantaginaceae	Linaria vulgaris	Butter-And-Eggs		5		-1	4	SNA	GNR				I	Miller

													LOCAL / REGIONAL STATUS	
FAMILY	**LATIN NAME**	**COMMON NAME**	**COEFFICIENT OF CONSERVATISM**	**WETNESS INDEX**	**OWES WETLAND SPECIES**	**WEEDINESS INDEX**	**INVASIVE EXOTIC RANK** (Urban Forest Associates 2002)	**PROVINCIAL STATUS (S-RANK)**	**GLOBAL STATUS (G-RANK)**	**COSSARO (MNRF)**	**COSEWIC STATUS**		**HAMILTON** (Schwetz 2014)	**AUTHORITY**
Plantaginaceae	Plantago lanceolata	English Plantain		3		-1		SNA	G5				I	L.
Plantaginaceae	Plantago major	Common Plantain		3		-1		SNA	G5				I	L.
Poaceae	Agrostis gigantea	Redtop		-3		-2		SNA	G4G5				I	Roth
Poaceae	Agrostis stolonifera	Creeping Bentgrass		-3	T			SNA	G5				X	L.
Poaceae	Alopecurus pratensis	Meadow Foxtail		-3		-1		SNA	GNR				I	L.
Poaceae	Bromus inermis	Smooth Brome		5		-3	4	SNA	G5TNR				I	Leysser
Poaceae	Dactylis glomerata	Orchard Grass		3		-1	3	SNA	GNR				I	L.
Poaceae	Digitaria ischaemum	Smooth Crabgrass		3		-1		SNA	GNR				I	(Schreb.) Muhlenberg
Poaceae	Digitaria sanguinalis	Hairy Crabgrass		3		-1		SNA	G5				I	(L.) Scopoli
Poaceae	Echinochloa crus-galli	Large Barnyard Grass		-3	T	-1		SNA	GNR				I	(L.) Palisot de Beauvois
Poaceae	Elymus repens	Quackgrass		3		-3	3	SNA	GNR				I	(L.) Gould
Poaceae	Leersia oryzoides	Rice Cutgrass	3	-5	I			S5	G5				X	(L.) Swartz
Poaceae	Lolium arundinaceum	Tall Fescue		3		-1	3	SNA	GNR				I	(Schreber) Darbyshire
Poaceae	Lolium pratense	Meadow Fescue		3		-1		SNA	G5				I	(Hudson) Darbyshire
Poaceae	Panicum capillare ssp. capillare	Common Panicgrass	0	0				S5	G5				X	L.
Poaceae	Panicum dichotomiflorum ssp. dichotomiflorum	Fall Panicgrass		-3		-1		SNA	G5				I	Michaux
Poaceae	Phalaris arundinacea var. arundinacea	Reed Canary Grass	0	-3	T		P	S5	GNR				X	L.
Poaceae	Phleum pratense ssp. pratense	Common Timothy		3		-1		SNA	GNR				I	L.
Poaceae	Phragmites australis ssp. australis	European Reed		-3	T		1	SNA	G5T5					(Cav.) Trinius ex Steudel
Poaceae	Poa compressa	Canada Bluegrass		3				SNA	GNR				X	L.
Poaceae	Poa nemoralis	Eurasian Woodland Bluegrass		3		-1		SNA	G5				I	L.
Poaceae	Poa palustris	Fowl Bluegrass	5	-3	I			S5	G5				X	L.
Poaceae	Poa pratensis	Kentucky Bluegrass	0	3			2	S5	G5				I	L.
Poaceae	Poa trivialis	Rough Bluegrass		-3		-1		SNA	GNR				I	L.
Poaceae	Setaria faberi	Giant Foxtail		3		-1	4	SNA	GNR				I	R.A.W. Herrmann
Poaceae	Setaria pumila ssp. pumila	Yellow Foxtail		0		-1	4	SNA	GNR				I	(Poir.) Roemer & Schultes
Poaceae	Setaria viridis var. viridis	Green Foxtail		5		-1	4	SNA	GNR				I	(L.) Palisot de Beauvois
Polygonaceae	Fallopia convolvulus	Eurasian Black Bindweed		3		-1		SNA	GNR				I	(L.) A. Löve
Polygonaceae	Persicaria lapathifolia	Pale Smartweed	2	-3	T			S5	G5				X	(L.) Delarbre
Polygonaceae	Persicaria maculosa	Spotted Lady's-Thumb		-3	T	-1		SNA	G3G5				I	Gray
Polygonaceae	Polygonum aviculare ssp. aviculare	Prostrate Knotweed		3		-1		SNA	GNRTNR				X	L.
Polygonaceae	Reynoutria japonica var. japonica	Japanese Knotweed		3		-1	2	SNA	GNR				I	Houttuyn
Polygonaceae	Rumex crispus	Curled Dock		0	T	-2		SNA	GNR				I	L.
Ranunculaceae	Ranunculus acris	Common Buttercup		0	T	-2		SNA	G5				I	L.
Rhamnaceae	Rhamnus cathartica	European Buckthorn		0	T	-3	1	SNA	GNR				I	L.
Rosaceae	Crataegus sp.	Hawthorn												
Rosaceae	Fragaria vesca	Woodland Strawberry	4	3				S5	G5				X	L.
Rosaceae	Fragaria virginiana	Wild Strawberry	2	3				S5	G5				X	Miller
Rosaceae	Geum aleppicum	Yellow Avens	2	0	T			S5	G5				X	Jacquin
Rosaceae	Geum canadense	White Avens	3	0	T			S5	G5				X	Jacquin
Rosaceae	Malus pumila	Common Apple		5		-1		SNA	G5				I	Miller
Rosaceae	Potentilla recta	Sulphur Cinquefoil		5		-2		SNA	GNR				I	L.
Rosaceae	Rosa multiflora	Multiflora Rose		3		-3	1	SNA	GNR				I	Thunberg
Rosaceae	Rubus idaeus ssp. strigosus	North American Red Raspberry	2	3				S5	G5T5				X	(Michaux) Focke
Rosaceae	Rubus occidentalis	Black Raspberry	2	5				S5	G5				X	L.
Rubiaceae	Galium aparine	Common Bedstraw	4	3				S5	G5				X	L.
Salicaceae	Populus deltoides ssp. deltoides	Eastern Cottonwood	4	0	T			S5	G5T5				X	Bartram ex Marshall
Salicaceae	Populus tremuloides	Trembling Aspen	2	0	T			S5	G5				X	Michaux
Salicaceae	Salix amygdaloides	Peach-Leaved Willow	6	-3	T			S5	G5				X	Andersson
Salicaceae	Salix discolor	Pussy Willow	3	-3	I			S5	G5				X	Muhlenberg
Salicaceae	Salix petiolaris	Meadow Willow	3	-3	I			S5	G5				X	J.E. Smith
Salicaceae	Salix x fragilis	Hybrid Crack Willow			T	-3	3	HYB_e	GNA				I	L.
Salicaceae	Salix x sepulcralis	Golden Weeping Willow						HYB_e	GNA				I	Simonkai
Sapindaceae	Acer negundo	Manitoba Maple	0	0	T		1	S5	G5				X	L.
Sapindaceae	Acer platanoides	Norway Maple		5		-3	2	SNA	GNR				I	L.
Sapindaceae	Acer pseudoplatanus	Sycamore Maple		5		-1	2	SNA	GNR				I	L.
Sapindaceae	Acer saccharinum	Silver Maple	5	-3	I			S5	G5				X	L.
Sapindaceae	Acer x freemanii	Freeman's Maple	6	-5	I			HYB_n	GNA				X	E. Murray
Sapindaceae	Aesculus hippocastanum	Horse Chestnut		5		-1	3	SNA	GNR				I	L.
Scrophulariaceae	Verbascum thapsus ssp. thapsus	Common Mullein		5		-2		SNA	GNR				I	L.
Solanaceae	Solanum dulcamara	Bittersweet Nightshade		0	T	-2	3	SNA	GNR				I	L.
Solanaceae	Solanum emulans	Eastern Black Nightshade	1	3				S5	G5				X	Rafinesque
Typhaceae	Typha angustifolia	Narrow-Leaved Cattail		-5	I		P	SNA	G5				X	L.
Typhaceae	Typha x glauca	Blue Cattail		-5	I		P	HYB_n	GNA				X	Godron
Urticaceae	Urtica dioica ssp. gracilis	Slender Stinging Nettle	2	0	T			SNA	G5T5				X	(Aiton) Selander
Vitaceae	Parthenocissus vitacea	Thicket Creeper	4	3				S5	G5				X	(Knerr) Hitchcock
Vitaceae	Vitis riparia	Riverbank Grape	0	0				S5	G5				X	Michaux
Xanthorrhoeaceae	Hemerocallis fulva	Orange Daylily		5		-3	4	SNA	GNR				I	(L.) L.

													LOCAL / REGIONAL STATUS	
FAMILY	**LATIN NAME**	**COMMON NAME**	**COEFFICIENT OF CONSERVATISM**	**WETNESS INDEX**	**OWES WETLAND SPECIES**	**WEEDINESS INDEX**	**INVASIVE EXOTIC RANK** (Urban Forest Associates 2002)	**PROVINCIAL STATUS (S-RANK)**	**GLOBAL STATUS (G-RANK)**	**COSSARO (MNRF)**	**COSEWIC STATUS**		**HAMILTON** (Schwetz 2014)	**AUTHORITY**
STATISTICS														
Species Diversity														
Total Number of Species:	165													
Native Species:	71	43%												
Exotic Species:	94	57%												
S1-S3 Species:	1	1%												
S4 Species:	2	3%												
S5 Species:	65	92%												
Floristic Quality Indices														
Mean Co-efficient of Conservatism (CC)	2.6													
CC 0 - 3 = lowest sensitivity	52	73%												
CC 4 - 6 = moderate sensitivity	18	25%												
CC 7 - 8 = high sensitivity	2	3%												
CC 9 - 10 = highest sensitivity	0	0%												
Floristic Quality Index (FQI)	22													
Weedy & Invasive Species														
Mean Weediness Index (Oldham et al):	-1.6													
-1 = low potential invasiveness	51	54%												
-2 = moderate potential invasiveness	16	17%												
-3 = high potential invasivenss	16	17%												
Mean Exotic Rank (Urban Forest Associates):	3													
Category 1	10	11%												
Category 2	7	7%												
Category 3	10	11%												
Category 4	13	14%												
Potentially Invasive (P)	5	5%												
Wetland Species														
Mean Wetness Index	1.0													
Upland	25	15%												
Facultative upland	63	38%												
Facultative	29	18%												
Facultative wetland	31	19%												
Obligate wetland	12	7%												

Table 4: Amphibian Call Count Survey Station Results

SURVEY ROUND	STATION NUMBER	SPECIES CODE												WATER
		NOAM	AMTO	FOTO	GRTR	SPPE	CHFR	WOFR	NLFR	PIFR	GRFR	BULL	MIFR	Present (Y/N)
1	AMC1	X												Y
2	AMC1	X												Y
3	AMC1	DRY												N
1	AMC2	X												Y
2	AMC2	X												Y
3	AMC2	DRY												N
1	AMC3	X												Y
2	AMC3	DRY												N
3	AMC3	DRY												N
1	AMC4	X												Y
2	AMC4	DRY												N
3	AMC4	DRY												N
1	AMC5	X												Y
2	AMC5	DRY												N
3	AMC5	DRY												N
1	AMC6	X												Y
2	AMC6	DRY												N
3	AMC6	DRY												N
1	AMC7	X												NO ACCESS
2	AMC7	X												NO ACCESS
3	AMC7	X												NO ACCESS
1	AMC8	X												NO ACCESS
2	AMC8	X												NO ACCESS
3	AMC8	X												NO ACCESS
1	AMC9	X												Y

Table 4: Amphibian Call Count Survey Station Results

SURVEY ROUND	STATION NUMBER	SPECIES CODE												WATER
		NOAM	AMTO	FOTO	GRTR	SPPE	CHFR	WOFR	NLFR	PIFR	GRFR	BULL	MIFR	Present (Y/N)
2	AMC9	X												Y
3	AMC9	X												N

LEGEND:

SPECIES CODE	COMMON NAME	SCIENTIFIC NAME
NOAM	No Amphibians	No amphibians despite survey effort
AMTO	American Toad	*Anaxyrus americanus*
FOTO	Fowler's Toad	*Anaxyrus fowleri*
GRTR	Gray Treefrog	*Hyla versicolor*
CHFR	Western Chorus Frog	*Pseudacris triseriata*
WOFR	Wood Frog	*Lithobates sylvaticus*
NLRF	Northern Leopard Frog	*Lithobates pipiens*
PIFR	Pickerel Frog	*Lithobates palustris*
GRFR	Green Frog	*Lithobates clamitans*
BULL	American Bullfrog	*Lithobates catesbeianus*
MIFR	Mink Frog	*Lithobates septentrionalis*

CALL CODES	
INC	Incidental observation outside of survey period
X	No amphibians heard
1	Calls can be counted without error
2	Calls overlap but can be reliably estimated
3	Calls overlap too much to estimate number

Note: For each species, the first number is the call code and the second number, which is in brackets, is the number of individuals of that species heard calling.

No.		Common Name	Species Code	Scientific Name	Provincial Status (S Rank)	Global Status (G Rank)	COSSARO (MECP)	COSEWIC (Federal)	SWH Indicator Species	Highest Breeding Evidence		Round 1 PC 1	Round 1 PC 2	Round 1 PC 3	Round 1 PC 4	Round 1 PC 5	Round 1 PC 6	Round 1 PC 7	Round 1 PC 8	Incidental Round 1	Off Site Round 1	Incidental Round 1	Off Site Round 1	Round 2 PC 1	Round 2 PC 2	Round 2 PC 3	Round 2 PC 4	Round 2 PC 5	Round 2 PC 6	Round 2 PC 7	Round 2 PC8	Incidental Round 2	Off Site Round 2	Incidental Round 2	Off Site Round 2	SWH Indicator Species (MNR, 2012) **Special Notes: (1) All migratory songbirds and migratory raptors are eligible for SWH 7E and 6E 1.1 "Landbird Migratory Stopover Area"); (2) All Special Concern and provincially rare S1-S3 species are eligible for SWH 7E and 6E 1.3 "Special Concern and Rare Wildlife Species"**
	X										**Date:**	May 25 21	May 25 21	May 25 21	May 25 21	May 25 21	May 25 21	May 25 21	Jun 10 22	May 25 21	May 25 21	Jun 10 22	Jun 10 22	Jun 15 21	Jun 15 21	Jun 15 21	Jun 15 21	Jun 15 21	Jun 15 21	Jun 15 21	Jun 29 22	Jun 15 21	Jun 15 21	Jun 29 22	Jun 29 22	
	X										**Time:**	551	611	623	642	701	734	758	924					800	746	727	713	652	633	617	820					
	X	**Anseriformes**																																		
	X	***Anatidae***																																		
		Canada Goose	CANG	*Branta canadensis*	S5	G5			X	OB-X			75																							1.1 Waterfolw stopover / staging (aquatic) 7E,
		Mallard	MALL	*Anas platyrhychos*	S5	G5			X	OB-X		2																								
	X	**Columbiformes**																																		
	X	***Columbidae***																																		
		Mourning Dove	MODO	*Zenaida macroura*	S5	G5				PR-P		1			1	1	1				2	1		1			1	1		4	2	2	4			
	X																																			
	X	**Charadriiformes**																																		
	X	***Charadriidae***																																		
		Killdeer	KILL	*Charadrius vociferus*	S5B, S5N	G5				CO-DD		2		1	1	1		1						3	1	1		1		2						1.1 Shorebird migratory stopover area 7E, 6E
	X																																			
	X	***Scolopacidae***																																		
		Spotted Sandpiper	SPSA	*Actitis macularius*	S5	G5			X	CO-DD											2								1		2		3			1.1 Shorebird migratory stopover area 7E, 6E
	X																																			
	X	***Laridae***												2																						
		Ring-billed Gull	RBGU	*Larus delawarensis*	S5B,S4N	G5			X	OB-X			4			1			1						1				1							1.1 Colonial nesting breeding habitat (ground) 7E, 6E
		Herring Gull	HEGU	*Larus argentatus*	S5B,S5N	G5			X	OB-X							1																			1.1 Colonial nesting breeding habitat (ground) 7E
	X																																			
	X	**Pelecaniformes**																																		
	X	***Ardeidae***																																		
		Great Blue Heron	GBHE	*Ardea herodias*	S4	G5			X	OB-X			1	1																						1.1 Colonial nesting breeding habitat (trees / shrubs) 7E, 6E
		Green Heron	GRHE	*Butorides virescens*	S4B	G5			X	OB-X																										1.1 Colonial nesting breeding habitat (trees / shrubs) 7E, 6E;
	X																																			
	X	**Cathartiformes**																																		
	X	***Cathartidae***																																		
		Turkey Vulture	TUVU	*Cathartes aura*	S5B, S3N	G5				OB-X																					1					
	X																																			
	X	**Piciformes**																																		
	X	***Picidae***																																		
		Downy Woodpecker	DOWO	*Dryobates pubescens*	S5	G5				PO-H											1															
	X																																			
	X	**Passeriformes**																																		
	X	***Tyrannidae***																																		
		Willow Flycatcher	WIFL	*Empidonax traillii*	S5B	G5			X	PR-T						1					2								1	2	3			1		1.3 Shrub / Early Successional bird breeding habitat 7E, 6E
	X																																			
	X	***Vireonidae***																																		
		Warbling Vireo	WAVI	*Vireo gilvus*	S5B	G5				PR-T					1	1				1									1				1			
		Red-eyed Vireo	REVI	*Vireo olivaceus*	S5B	G5				PO-S			1	1							1															
	X																																			
	X	***Corvidae***																																		
		Blue Jay	BLJA	*Cyanocitta cristata*	S5	G5				PR-T			4				2				1				2		1			1				1		
		Common Raven	CORA	*Corvus corax*	S5	G5				OB-X																						5				
	X																																			
	X	***Alaudidae***																																		
		Horned Lark	HOLA	*Eremophila alpestris*	S5B	G5				PR-T				1	1				1											1	1					
	X																																			
	X	***Hirundinidae***																																		
		Tree Swallow	TRES	*Tachycineta bicolor*	S4B	G5				OB-X											1															
		Northern Rough-winged Swallow	NRWS	*Stelgidopteryx serripennis*	S4B	G5			X	OB-X											2				1					2						1.1 Colonial nesting breeding habitat (bank / cliff) 7E, 6E
		Barn Swallow	BARS	*Hirundo rustica*	S5B	G5	THR	THR		OB-X						1					7						1	1	4	1						
	X																																			
	X	***Paridae***																																		
		Black-capped Chickadee	BCCH	*Poecile atricapillus*	S5	G5				PO-H											1															
	X																																			
	X	***Troglodytidae***																																		
		House Wren	HOWR	*Troglodytes aedon*	S5B	G5				PO-S																					1					
	X																																			
	X	***Turdidae***																																		
		American Robin	AMRO	*Turdus migratorius*	S5B	G5				CO-FY		2		2	1	1	1		6									1	2	2		4				
	X																																			
	X	***Mimidae***																																		
		Gray Catbird	GRCA	*Dumetella carolinensis*	S4B	G5				PR-T							1															1				
	X																																			
	X	***Sturnidae***																																		
		European Starling	EUST	*Sturnus vulgaris*	SNA	G5				CO-FY					1	4	1		1		8				2									3			
	X																																			
	X	***Bombycillidae***																																		
		Cedar Waxwing	CEDW	*Bombycilla cedrorum*	S5B	G5				PO-H															1				1					1			
	X																																			
	X	***Passeridae***																																		
		House Sparrow	HOSP	*Passer domesticus*	SNA	G5				PR-T			1								2													1	1		
	X																																			
	X	***Fringillidae***																																		
		House Finch	HOFI	*Haemorhous mexicanus*	SNA	G5				PR-P					1										2					12							
		American Goldfinch	AMGO	*Spinus tristis*	S5B	G5				PR-P						1	2	2	3	4					2		1		2		1	2	2			
	X																																			
	X	***Passerellidae***																																		
		Field Sparrow	FISP	*Spizella pusilla*	S4B, S3N	G5			X	PO-S																					1					1.3 Shrub / Early Successional bird breeding habitat 7E, 6E
		Savannah Sparrow	SAVS	*Passerculus sandwichensis*	S4B	G5			X	PO-S											1															1.3 Open Country bird breeding habitat 7E, 6E
		Song Sparrow	SOSP	*Melospiza melodia*	S5B	G5				CO-CF		2	1	1	2	3	2	1	3		7			1			2	2	4	3	2		2			
		Swamp Sparrow	SWSP	*Melospiza georgiana*	S5B	G5				PO-S																			1							
	X																																			
	X	***Icteridae***																																		
		Baltimore Oriole	BAOR	*Icterus galbula*	S4B	G5				PR-T					1	1							1						1							
		Red-winged Blackbird	RWBL	*Agelaius phoeniceus*	S4	G5				CO-AE					2	2	6				2					1	2	1	3	3				1		
		Brown-headed Cowbird	BHCO	*Molothrus ater*	S4B	G5				CO-FY		1		1	1	1		1					2				7		1	1			1	2		
		Common Grackle	COGR	*Quiscalus quiscula*	S5B	G5				PO-H		1	2			1			1		1				1								2			
	X																																			
	X	***Parulidae***																																		
		Common Yellowthroat	COYE	*Geothlypis trichas*	S5B	G5				PR-T											1									1	1					
		Yellow Warbler	YWAR	*Setophaga petechia*	S5B	G5				PR-T											2									1	1					
	X																																			
	X	***Cardinalidae***																																		
		Northern Cardinal	NOCA	*Cardinalis cardinalis*	S5	G5				CO-CF			1	1						1					1					1	1		1			
		Indigo Bunting	INBU	*Passerina cyanea*	S4B	G5				PO-S				1																						
	X																																			

No.	X	Common Name	Species Code	Scientific Name	Provincial Status (S Rank)	Global Status (G Rank)	COSSARO (MECP)	COSEWIC (Federal)	SWH Indicator Species	Highest Breeding Evidence		Round 1 PC 1	Round 1 PC 2	Round 1 PC 3	Round 1 PC 4	Round 1 PC 5	Round 1 PC 6	Round 1 PC 7	Round 1 PC 8	Incidental Round 1	Off Site Round 1	Incidental Round 1	Off Site Round 1	Round 2 PC 1	Round 2 PC 2	Round 2 PC 3	Round 2 PC 4	Round 2 PC 5	Round 2 PC 6	Round 2 PC 7	Round 2 PC8	Incidental Round 2	Off Site Round 2	Incidental Round 2	Off Site Round 2	SWH Indicator Species (MNR, 2012) **Special Notes: (1) All migratory songbirds and migratory raptors are eligible for SWH 7E and 6E 1.1 "Landbird Migratory Stopover Area"); (2) All Special Concern and provincially rare S1-S3 species are eligible for SWH 7E and 6E 1.3 "Special Concern and Rare Wildlife Species"**
	X										**Date:**	May 25 21	May 25 21	May 25 21	May 25 21	May 25 21	May 25 21	May 25 21	Jun 10 22	May 25 21	May 25 21	Jun 10 22	Jun 10 22	Jun 15 21	Jun 15 21	Jun 15 21	Jun 15 21	Jun 15 21	Jun 15 21	Jun 15 21	Jun 29 22	Jun 15 21	Jun 15 21	Jun 29 22	Jun 29 22	
	X										**Time:**	551	611	623	642	701	734	758	924					800	746	727	713	652	633	617	820					

Species Common Name and Scientific Name: Chesser, R. T., K. J. Burns, C. Cicero, J. L. Dunn, A. W. Kratter, I. J. Lovette, P. C. Rasmussen, J. V. Remsen, Jr., D. F. Stotz, and K. Winker. 2019. Check-list of North American Birds (online). American Ornithological Society. Available online: http://checklist.aou.org/taxa

Species Code: Consistent with the American Ornithologists' Union. 2019. Species 4-Letter-Codes. Available online: http://www.birdsontario.org/atlas/codes.jsp?lang=en&pg=species

Highest Breeding Evidence: Codes assigned for breeding evidence are consistent with the Ontario Breeding Bird Atlas (OBBA). 2018. Breeding Evidence Codes. Available online: http://www.birdsontario.org/atlas/codes.jsp?lang=en&pg=breeding&sortorder=aou

S ranks: Provincial ranks are from the Natural Heritage Information Centre; S1 (critically imperiled), S2 (imperlied), S3 (vulnerable), S4 (apparently secure), S5 (secure); ranks were updated using NHIC species list December 2018. Available to download from: https://www.ontario.ca/page/get-natural-heritage-information

G ranks: Global ranks are from the Natural Heritage Information Centre; G1 (extremely rare), G2 (very rare), G3 (rare to uncommon), G4 (common), G5 (very common); ranks were updated using NHIC species list December 2018. Available to download from: https://www.ontario.ca/page/get-natural-heritage-information

COSSARO (MNRF): Ontario Species at Risk as listed by the Committee on the Status of Species at Risk in Ontario (from NHIC Table December 2018 and updates posted on Ontario Regulation 230/08 Species at Risk in Ontario website as of August 1, 2018: https://www.ontario.ca/laws/regulation/080230/); END - Endangered; THR - Threatened; SC - Special Concern; NAR - Not at Risk

COSEWIC: Assessed Species at Risk at the national level as listed by the Committee on the Status of Endangered Wildlife in Canada (from COSEWIC: https://wildlife-species.canada.ca/species-risk-registry/sar/index/default_e.cfm); END - Endangered, THR - Threatened, SC - Special Concern, NAR - Not at Risk

SWH Indicator Species: SWH refers to Significant Wildlife Habitat as defined by the MNRF (2015) Significant Wildlife Habitat Criteria Schedules for Ecoregions 7E and 6E (as appropriate for the Subject Lands). SWH indicator species are identified in this table and any potential SWH is discussed in the text of this report. Available online: http://www.townofnemi.on.ca/wp-content/uploads/2016/02/NEMI-OP-App-C-schedule-6e-jan-2015-access-ver-final-s.pdf

Inside Study Area	Outside Study Area	COMMON NAME	SCIENTIFIC NAME	Provincial Status (S RANK)	Global Status (G RANK)	COSSARO (MECP)	COSEWIC (Federal)	Local Status Hamilton	SWH Indicator Species 7E
		ODONATA							
X		Familiar Bluet	*Enallagma civile*	S5	G5				
		BUTTERFLIES							
X		Peck's Skipper	*Polites peckius*	S5	G5				
X		Cabbage White	*Pieris rapae*	SNA	G5				
		BUMBLE BEES							
X		Common Eastern Bumble Bee	*Bombus impatiens*	S5	G5				
		BIRDS							
X		Canada Goose	*Branta canadensis*	S5	G5				X
X		Mallard	*Anas platyrhynchos*	S5	G5				X
X		Mourning Dove	*Zenaida macroura*	S5	G5				
X		Killdeer	*Charadrius vociferus*	S5B, S5N	G5				
X		Spotted Sandpiper	*Actitus macularius*	S5	G5				
X		Ring-billed Gull	*Larus delawarensis*	S5B,S4N	G5				X
X		Herring Gull	*Larus argentatus*	S5B,S5N	G5				X
X		Great Blue Heron	*Ardea herodias*	S4	G5			m	X
X		Green Heron	*Butorides virescens*	S4B	G5			m	X
X		Turkey Vulture	*Cathartes aura*	S5B, S3N	G5				
X		Downy Woodpecker	*Dryobates pubescens*	S5	G5				
X		Willow Flycatcher	*Empidonax traillii*	S5B	G5				X
X		Warbling Vireo	*Vireo gilvus*	S5B	G5				
X		Red-eyed Vireo	*Vireo olivaceus*	S5B	G5				
X		Blue Jay	*Cyanocitta cristata*	S5	G5				
X		Common Raven	*Corvus corax*	S5	G5				
X		Horned Lark	*Eremophila alpestris*	S5B	G5				
	X	Tree Swallow	*Tachycineta bicolor*	S4B	G5				
X		Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	S4B	G5				X
X		Barn Swallow	*Hirundo rustica*	S5B	G5	THR	SC		
	X	Black-capped Chickadee	*Poecile atricapillus*	S5	G5				
	X	House Wren	*Troglodytes aedon*	S5B	G5				
X		American Robin	*Turdus migratorius*	S5B	G5				
X		Gray Catbird	*Dumetella carolinensis*	S4B	G5				
X		European Starling	*Sturnus vulgaris*	SNA	G5			E	
X		Cedar Waxwing	*Bombycilla cedrorum*	S5B	G5				
X		House Sparrow	*Passer domesticus*	SNA	G5			E	
X		House Finch	*Carpodacus mexicanus*	SNA	G5			E	
X		American Goldfinch	*Spinus tristis*	S5B	G5				
	X	Field Sparrow	*Spizella pusilla*	S4B, S3N	G5				X
	X	Savannah Sparrow	*Passerculus sandwichensis*	S4B	G5				X
X		Song Sparrow	*Melospiza melodia*	S5B	G5				
X		Swamp Sparrow	*Melospiza georgiana*	S5B	G5				
X		Baltimore Oriole	*Icterus galbula*	S4B	G5				
X		Red-winged Blackbird	*Agelaius phoeniceus*	S4	G5				
X		Brown-headed Cowbird	*Molothrus ater*	S4B	G5				
X		Common Grackle	*Quiscalus quiscula*	S5B	G5				
X		Common Yellowthroat	*Geothlypis trichas*	S5B	G5				
X		Yellow Warbler	*Setophaga petechia*	S5B	G5				
X		Northern Cardinal	*Cardinalis cardinalis*	S5	G5				
X		Indigo Bunting	*Passerina cyanea*	S4B	G5				

Table 6: Master Wildlife List

Inside Study Area	Outside Study Area	COMMON NAME	SCIENTIFIC NAME	Provincial Status (S RANK)	Global Status (G RANK)	COSSARO (MECP)	COSEWIC (Federal)	Local Status Hamilton	SWH Indicator Species 7E
		MAMMALS							
X		Eastern Cottontail	*Sylvilagus floridanus*	S5	G5				
X		Eastern Gray Squirrel	*Sciurus carolinensis*	S5	G5				
X		Coyote	*Canis latrans*	S5	G5				
X		White-tailed Deer	*Odocoileus virginianus*	S5	G5				X

SUMMARY

Total Odonata:	*1*
Total Butterflies:	*2*
Total Other Arthropods	*1*
Total Amphibians:	*0*
Total Reptiles:	*0*
Total Birds:	*38*
Total Breeding Birds:	*26*
Total Mammals:	*4*

SIGNIFICANT SPECIES

Global:	*0*
National:	*1*
Provincial:	*1*
Regional:	*0*
Local:	

Explanation of Status and Acronymns

COSSARO: Committee on the Status of Species at Risk in Ontario
COSEWIC: Committee on the Status of Endangered Wildlife in Canada
S1: Critically Imperiled—Critically imperiled in the province (often 5 or fewer occurrences)
S2: Imperiled—Imperiled in the province, very few populations (often 20 or fewer),
S3: Vulnerable—Vulnerable in the province, relatively few populations (often 80 or fewer)
S4: Apparently Secure—Uncommon but not rare
S5: Secure—Common, widespread, and abundant in the province
SX: Presumed extirpated
SH: Possibly Extirpated (Historical)
SNR: Unranked
SU: Unrankable—Currently unrankable due to lack of information
SNA: Not applicable—A conservation status rank is not applicable because the species is not a suitable target for conservation activities.
S#S#: Range Rank—A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species
S#B- Breeding status rank
S#N- Non Breeding status rank
?: Indicates uncertainty in the assigned rank
G1: Extremely rare globally; usually fewer than 5 occurrences in the overall range
G1G2: Extremely rare to very rare globally
G2: Very rare globally; usually between 5-10 occurrences in the overall range
G2G3: Very rare to uncommon globally
G3: Rare to uncommon globally; usually between 20-100 occurrences
G3G4: Rare to common globally
G4: Common globally; usually more than 100 occurrences in the overall range
G4G5: Common to very common globally
G5: Very common globally; demonstrably secure
GU: Status uncertain, often because of low search effort or cryptic nature of the species; more data needed.
T: Denotes that the rank applies to a subspecies or variety

Inside Study Area	Outside Study Area	COMMON NAME	SCIENTIFIC NAME	Provincial Status (S RANK)	Global Status (G RANK)	COSSARO (MECP)	COSEWIC (Federal)	Local Status Hamilton	SWH Indicator Species 7E

Q: Denotes that the taxonomic status of the species, subspecies, or variety is questionable.
END: Endangered
THR: Threatened
SC: Special Concern
NAR: Not At Risk
IND: Indeterminant, insufficient information to assign status
DD: Data Deficient
6: Rare in Site Region 6
7: Rare in Site Region 7
Area: Minimum patch size for area-sensitive species (ha)
H- highly significant in Hamilton Region (i.e. rare)
m- moderately significant in Hamilton Region (i.e. uncommon)
L1- extremely rare locally (Toronto Region)
L2- very rare locally (Toronto Region)
L3- rare to uncommon locally (Toronto Region)
HR- rare in Halton Region, highly significant
HU- uncommon in Halton Region, moderately significant
C-common Niagara Region
U- uncommon Niagara Region
R- rare in Niagara Region
H-historical in Niagara Region
W- widespread Niagara Region
L-localized Niagara Region
R-regionally Significant Niagara Region
I- Introduced Niagara Region
DD-Data deficient Niagara Region

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Table 7: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION (PER HDFA GUIDELINES)	FINAL MANAGEMENT RECOMMENDATION
	FUNCTION	MODIFIERS					
H1S1	FT – 6 FC – 4 (Round 1) FC – 4 (Round 2) FC – 5 (Round 3) **Valued** – While this feature was observed to be flowing during all three HDFAs, the hydrology of this feature was likely altered from (offsite) Airport Land flow contributions. Based on the vegetation communities present within the feature, intermittent hydrology	Augmented flow contributions from upstream (offsite) Airport Lands that were likely impacting the hydrology of the wetland. If flows were not augmented from the Airport Lands, hydrology of Reach H1S1 would likely be similar to HDF H2S1.	**Important** – Feature is a wetland. Meadow vegetation occurs within 1.5 m of the reach. Surrounding land uses are dominated by agricultural fields.	**Contributing** – No suitable fish habitat is present. Feature may provide contributing functions to support downstream (off-site) direct fish habitat.	**Valued** – Feature is a wetland. No calling amphibians were recorded within the feature during targeted call count assessments.	**Conservation**	**Mitigation –** The feature consists of a meadow marsh wetland that can be replicated elsewhere. The wetland likely supports downstream (offsite) hydrology. Flow contributions can be mitigated through SWM infrastructure. Therefore, a Mitigation management recommendation has been provided to ensure wetland mitigation occurs and flows are maintained to downstream culverted features (under Homestead Drive and Upper James).

Table 7: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION (PER HDFA GUIDELINES)	FINAL MANAGEMENT RECOMMENDATION
	FUNCTION	MODIFIERS					
	would be expected instead of the permanently flowing hydrology that was observed. The augmented flow documented during the summer assessment was likely augmented from the Airport Lands, therefore, a valued hydrology is recommended.						
H1S1a	FT – 7 FC – 4 (Round 1) FC – 1 (Round 2)	Agricultural land uses surrounding this feature are expected to influence its	**Limited** – Agricultural land uses surround the feature.	**Contributing** – No suitable fish habitat is present. Feature may provide	**Limited** – As per Table 7 of the HDFA Guidelines, swale features provide limited terrestrial	**Mitigation**	**Mitigation**

Table 7: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION (PER HDFA GUIDELINES)	FINAL MANAGEMENT RECOMMENDATION
	FUNCTION	MODIFIERS					
	Contributing – Feature was flowing during early spring but was dry during the late spring assessment.	hydrology (e.g., increased runoff due to lack of riparian vegetation).		contributing functions to support downstream direct fish habitat.	function, particularly where agricultural land uses surround and overlap the feature.		
H2S1	FT – 6 FC – 4 (Round 1) FC – 1 (Round 2) **Valued** – Feature was flowing during early spring, but was dry during the second round assessment.	Agricultural and residential land uses surrounding this feature are expected to influence its hydrology (e.g., increased runoff due to lack of riparian vegetation).	**Important** – Feature is a wetland.	**Contributing** – No suitable fish habitat is present. Feature may provide contributing functions to support downstream direct fish habitat.	**Valued** – Feature is a wetland. No calling amphibians were recorded within the feature during targeted call count assessments.	**Conservation**	**Conservation**

Table 7: Headwater Drainage Feature Classification and Management Recommendations

LEGEND:

FT	Feature Types (1-defined natural channel, 2-channelized, 3-multi-thread, 4-no defined feature, 5-tiled drainage, 6-wetland, 7-swale, 8-roadside ditch, 9-online pond outlet)
FC	Flow Conditions (1-no surface water, 2-standing water, 3-interstitial flow, 4-surface flow minimal, 5-surface flow substantial)

Note: Codes correspond with Ontario Stream Assessment Protocol (OSAP) guidelines.

Table 8: Significant Wildlife Habitat Assessment (7E)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	DEFINING CRITERIA MET (MINIMUM ABUNDANCES AND/OR DIVERSITY REQUIRED TO CONFIRM SWH)	SWH TYPE PRESENT
1. SEASONAL CONCENTRATION AREAS					
Waterfowl Stopover and Staging Areas (terrestrial)	Yes – CUM vegetation communities are present on the Subject Lands.	No – Features are not large enough to attract or support significant numbers. This area does not have historical waterfowl stopover use and is not an area known for sheet water use.	No	N/A	Not Present
Waterfowl Stopover and Staging Areas (aquatic)	Yes – MAS and SWD vegetation communities are present on the Subject Lands.	No – Features are not large enough to attract or support significant numbers. This area does not have historical waterfowl stopover use.	No	N/A	Not Present
Shorebird Migratory Stopover Areas	Yes – MAM vegetation communities are present on the Subject Lands.	No – Features have limited to no open water and do not have the flooding conditions to attract or support significant migratory numbers, and do not provide habitat close to or resembling shoreline habitat. This area does not have historical waterfowl stopover use and is not an area known for seasonal flooding.	No	N/A	Not Present
Raptor Wintering Areas	Yes –One forested (SWD) community and upland habitat is present on the Subject Lands.	No – Features do not meet the minimum size requirements (>20 ha) to provide suitable raptor habitat.	No	N/A	Not Present
Bat Hibernacula	No – Suitable vegetation communities are absent from the Subject Lands.	N/A	No	N/A	Not Present
Bat Maternity Colonies	Yes – One SWD vegetation community is present within the Subject Lands.	No – SWD vegetation community is too small (0.03 ha) to be considered significant habitat.	No	N/A	Not Present
Turtle Wintering Areas	Yes – SW and MA communities are present on the Subject Lands.	No – No features had the required water depths to support turtle overwintering.	No	N/A	Not Present
Reptile Hibernacula	Yes – Ecosites are present on the Subject Lands.	No – No anthropogenic or natural features provide any subsurface access below the frost line to provide suitable habitat.	No	N/A	Not Present

Table 8: Significant Wildlife Habitat Assessment (7E)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	DEFINING CRITERIA MET (MINIMUM ABUNDANCES AND/OR DIVERSITY REQUIRED TO CONFIRM SWH)	SWH TYPE PRESENT
Colonial Bird Nesting Sites (bank/cliff)	Yes – CUM vegetation communities are present on the Subject Lands.	No – Presence of exposed or eroding banks, hills, steep slopes and sand piles are not present on the Subject Lands.	No	N/A	Not Present
Colonial Bird Nesting Sites (tree/shrubs)	Yes – One SWD vegetation community is present within the Subject Lands.	No – SWD vegetation community is disturbed from adjacent land-uses (residential and agricultural). No colonies observed.	No	N/A	Not Present
Colonial Bird Nesting Sites (ground)	No – No rocky islands or peninsulas are present on the Subject Lands.	N/A	No	N/A	Not Present
Migratory Butterfly Stopover Areas	No – Upland forested communities (FOC, FOM, FOD, CUP) are absent from the Subject Lands.	N/A	No	N/A	Not Present
Migratory Landbird Stopover Areas	Yes – One SWD community is present within the Subject Lands.	No – The Subject Lands are located greater than 5 km away from Lake Ontario and Lake Erie.	No	N/A	Not Present
Deer Winter Congregation Areas	No – Mapping from the MNRF LIO database did not depict any deer wintering areas on or adjacent to the Subject Lands.	N/A	No	N/A	Not Present
2. RARE VEGETATION COMMUNITIES OR SPECIALIZED HABITAT FOR WILDLIFE					
2a. Rare Vegetation Communities					
Rare Vegetation Types (cliffs, talus slopes, sand barrens, alvars, old-growth forests, savannahs, and tallgrass prairies)	No – Rare vegetation communities are not found on the Subject Lands.	N/A	No	N/A	Not Present
Other Rare Vegetation Types (S1 to S3 communities)	No – No S1 to S3 vegetation communities are present within the Subject Lands (**Table 2**, **Appendix B**).	N/A	No	N/A	Not Present
2b. Specialized Wildlife Habitat					
Waterfowl Nesting Area	Yes – MAM, MAS and SWD vegetation communities are present on the Subject Lands.	No – Upland areas are heavily disturbed from agricultural practices. Additionally, ecosites hold limited water in spring and dry up over early summer.	No	N/A	Not Present

Table 8: Significant Wildlife Habitat Assessment (7E)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	DEFINING CRITERIA MET (MINIMUM ABUNDANCES AND/OR DIVERSITY REQUIRED TO CONFIRM SWH)	SWH TYPE PRESENT
Bald Eagle and Osprey Habitats	Yes - One SWD vegetation community is present within the Subject Lands.	No – Large aquatic features are absent from the Subject Lands.	No	N/A	Not Present
Woodland Raptor Nesting Habitat	Yes - One SWD vegetation community is present within the Subject Lands.	No – SWD community does not meet the size criteria (>30 ha with > 4 ha of interior habitat).	No	N/A	Not Present
Turtle Nesting Areas	Yes – One MAS feature is present on the Subject Lands.	No – The Subject Lands are highly disturbed (agriculture) and would not provide suitable turtle nesting opportunities. No permanent overwintering areas were identified within or immediately adjacent to the Subject Lands.	No	N/A	Not Present
Seeps and Springs	No – Forested ecosites are absent from the Subject Lands.	N/A	No	N/A	Not Present
Woodland Amphibian Breeding Habitats (within or < 120m from woodland)	Yes – One SWD vegetation community was identified within the Subject Lands.	No – SWD community does not meet minimum size criteria (>500m^2) and held no standing water in spring.	No	N/A	Not Present
Wetland Amphibian Breeding Habitats (wetland >120m from woodland)	Yes – SWD, MAM and MAS vegetation communities are present on the Subject Lands.	Yes – MAM and MAS vegetation communities do meet minimum size criteria (>500m^2). SWD vegetation communities did not meet the minimum size criteria.	Yes	No – Three rounds of amphibian call count surveys were conducted (see **Table 1**, **Appendix B** for survey dates and conditions, and **Figure 4**, **Appendix A** for call count station locations). No amphibians were recorded within the Subject Lands.	Not Present
Woodland Area-Sensitive Bird Breeding Habitat	Yes – One SWD vegetation community was present within the Subject Lands.	No – SWD does not meet minimum size criteria (>30 ha).	No	N/A	Not Present
3. SPECIES OF CONSERVATION CONCERN					
Marsh Bird Breeding Habitat	Yes – SWD, MAM and MAS vegetation communities are present on the Subject Lands.	Limited amounts of marsh habitat are present within the Subject Lands.	Yes	No - Two rounds of breeding bird surveys were completed on the Subject Lands (see **Figure 5**, **Appendix A** for point count locations). No SWH indicator species were documented during targeted surveys (**Table 6, Appendix B**)	Not Present
Open Country Bird Breeding Habitat	Yes – CUM vegetation communities are present on the Subject Lands.	No – Minimum size criteria is not met (>30 ha). Vegetation community is highly disturbed from agricultural land uses.	No	N/A	Not Present

Table 8: Significant Wildlife Habitat Assessment (7E)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	DEFINING CRITERIA MET (MINIMUM ABUNDANCES AND/OR DIVERSITY REQUIRED TO CONFIRM SWH)	SWH TYPE PRESENT
Shrub/Early Successional Bird Breeding Habitat	Yes – One CUW vegetation community is present on the Subject Lands.	No – Minimum size criteria is not met (>10 ha).	No	N/A	Not Present
Terrestrial Crayfish	Yes – MAM, MAS and SWD vegetation communities are present on the Subject Lands.	Yes – No minimum size requirement.	Yes –Observations of crayfish chimneys would have been documented, if present, during all ecological surveys.	No terrestrial crayfish chimneys were identified during the 2021 ecological inventories.	Not Present
4. ANIMAL MOVEMENT CORRIDORS					
Amphibian Movement Corridors	N/A	No – Amphibian breeding SWH types are absent from the Subject Lands.	No	N/A	Not Present

Table 9: Predicted Effects, Mitigation, Enhancement and Net Effects

NATURAL HERITAGE FEATURES AND ASSOCIATED FUNCTIONS	SIGNIFICANT CHARACTERISTICS AND SENSITIVITY	IMPACTOR	PREDICTED EFFECTS	AVOIDANCE, MITIGATION AND/OR RESTORATION	NET EFFECTS	MONITORING AND MANAGEMENT
PPS NATURAL HERITAGE FEATURES						
1. Significant Wetlands	Not Present	N/A	N/A	N/A	N/A	N/A
2. Significant Coastal Wetlands	Not Present	N/A	N/A	N/A	N/A	N/A
3. Significant Woodlands	Not Present	N/A	N/A	N/A	N/A	N/A
4. Significant Valleylands	Not Present	N/A	N/A	N/A	N/A	N/A
5. Significant Wildlife Habitat	Not Present	N/A	N/A	N/A	N/A	N/A
6. Fish Habitat	Three headwater drainage features (HDFs) were identified within the Subject Lands: • HDF H1S1 • HDF H1S1A • HDF H2S1 HDFs H1S1 and H2S1 are wetlands. Reach H1S1A is an ephemeral swale. The following management recommendations, guided in part by CVC and TRCA's 2014 HDFA Guidelines, were assigned: • HDF H1S1 – Mitigation • HDF H1S1A - Mitigation • HDF H2S1 – Conservation All drainage features are heavily altered downstream (offsite). HDF H1S1 conveys flows from the Airport Lands (SWM pond) towards Homestead Drive. The flows are culverted under both Homestead Drive and Upper James Street (approximately 56 m under both roadways) before outletting into the roadside ditch on the eastern side of Upper James Street. These flows then enter	All HDFs will be removed from the landscape. Some HDFs were wetland feature types – all impacts associated with wetland removals are discussed below within "Non-Significant Wetlands". Wetlands to be removed are proposed for replication at an on-site location to maintain existing HDF functions associated with wetlands. Drainage from the offsite SWM pond within the Airport Lands will be conveyed through the site via a vegetated conveyance swale. This conveyance swale will convey external flows entering the site from the Airport through the site before outletting into an offsite wetland and under Homestead Drive. The conveyance swale is not part of the SWM strategy (i.e., will not be providing quality or quantity control); rather is designed to replicate the existing function of HDF H1. The conveyance swale will continue to convey flows and allochthonous materials to downstream fisheries habitats.	HDFs assigned a Mitigation management recommendation will have their functions replicated through on-site wetland creation, conveyance swale construction (to convey existing offsite flows) and enhanced lot level conveyance measures (including LID solutions). The conveyance swale will maintain inlet and outlet locations associated with HDF H1S1. The conveyance swale will continue to convey external flows through the site. No internal flows are proposed to mix with the conveyance swale until they flow into the downstream (receiving) wetland. The conveyance swale will convey flows unobstructed through the Subject Lands. Contributions (flows, allochthonous material) to downstream aquatic habitats will be maintained. This will ensure that the functions of the existing HDF H1 are replicated (in addition to the proposed wetland replication).	The following mitigative measures are proposed to avoid potential negative impacts to fish and fish habitat: - All in-water work must occur outside of the warmwater fisheries window (May 15 to July 15) to avoid negative impacts on downstream fish communities during important reproductive periods. This will mitigate potential impacts occur to downstream (offsite) habitats. - Diversion of flows from the Airport Lands into the vegetated conveyance swale (or other temporary diversion) should be completed prior to removing the wetland associated with HDF H1S1. - ESC measures will be used throughout construction. - Spill prevention and response measures will be implemented to avoid negative effects	Through the use of appropriate mitigation strategies (i.e., ESC, spill prevention measures, construction phasing and timing), no negative impacts are predicted to fish and fish habitat as a result of the proposed construction. Both HDF H1 and H2 are identified as indirect fish habitat. The functions of each feature will be replicated through the proposed development strategy. Specifically, the functions of HDF H1 will be replicated through the conveyance swale (which will continue to convey external flows through the site) and the recreated wetland. HDF H2 will be replicated through the creation of the wetland. Flows and allochthonous materials will continue to be conveyed to downstream habitats. No impacts to downstream habitats are predicted as a result of the proposed development, provided the mitigative and restorative measures are enacted. This will include the proposed wetland creation (which will continue to provide indirect habitat functions) and	A construction monitoring program will be developed and implemented to ensure that the ESC measures are installed correctly, functioning as designed and maintained in good working order throughout construction. Monitoring of adherence to and effectiveness of the spill prevention and response measures is recommended throughout the construction period. Monitor effectiveness of wetland creation area to ensure it is functioning as designed (per **Section 7** of the EIS).

Table 9: Predicted Effects, Mitigation, Enhancement and Net Effects

NATURAL HERITAGE FEATURES AND ASSOCIATED FUNCTIONS	SIGNIFICANT CHARACTERISTICS AND SENSITIVITY	IMPACTOR	PREDICTED EFFECTS	AVOIDANCE, MITIGATION AND/OR RESTORATION	NET EFFECTS	MONITORING AND MANAGEMENT
	Three Mile Creek within the Willow Valley Golf Course (approximately 500 m downstream of the property). HDF H2S1 is a meadow marsh community and conveys flows from the wetland and adjacent residential properties towards Homestead Drive. The flows exit the Subject Lands via a culvert and are released into a roadside ditch along the western side of Homestead Drive. These flows merge with drainage from HDF H1S1 at an offsite wetland before being culverted under Homestead Drive and Upper James Street. HDF H1S1 conveys drainage from a SWM pond within the Airport Lands. This drainage augments the flow contributions to HDF H1S1. Increased flow was recorded during summer HDFAs which is atypical of these types of wetlands during the drier summer months. No fish were collected within HDF H1S1 despite survey effort. All HDFs identified within the Subject Lands provide indirect fish habitat to downstream habitats through the contributions of allochthonous materials and flows. This is consistent with the AEGD Secondary Plan's evaluation (as shown on **Figure 2**, **Appendix A**). No regulated watercourses were identified within the Subject	Changes in the surface water runoff and groundwater infiltration due to increased imperviousness and potential alterations to surface water quality and quantity at outlet locations. Use of heavy equipment during construction and associated potential for accidental spills of potentially toxic materials (e.g., fuel, oil, hydraulic fluid). Above ground SWM ponds were not recommended due to the potential of waterfowl congregation within proximity to the Airport Lands. The SWM infrastructure will provide lot-level controls including roof top control drains on all buildings, infiltration galleries, bioretention swales, parking/driveway surface ponding and pipe storage. Three storm sewer outlets are proposed on the site: (1) outletting towards Homestead Drive (towards the Three Mile Creek) and two towards Airport Road (towards the Upper Welland River). One of the Airport Road outlets will flow into the Lancaster Heights SWM pond, while the second outlet will be conveyed into a newly constructed storm sewer along Airport Road.	Wetland removal associated with the proposed development, unmitigated, could cause negative impacts to downstream habitats such as increased flooding potential, reduced habitat availability, reduced water quality. Detailed impacts associated with the proposed removal of wetlands are discussed below within "Non-Significant Wetlands". Erosion and sedimentation from the disturbed work area during construction could result in increased turbidity and suspended solids being conveyed to downstream aquatic habitats. Unmitigated, this could cause negative effects on fish habitat (e.g., infilling of interstitial spaces) and mortality, health effects or altered behavior of aquatic biota (fish and benthic invertebrates) and aquatic vegetation. Rooftop control drains are considered clean and acceptable at 80% or Level 1. Oil-grit separators (or other suitable method) will be located at each private storm outlet. Vegetated swales/ditches with perforated pipes along Street A will provide quality control for Street A. Increased contributions of road salts are expected as a result of the site development. This is recognized within Section 2.5.6 of the SWS/SWMP – Phase 2	due to accidental spills during construction. - The conveyance swale and created wetland area will be seeded with and/or have native plants installed. The incorporation of native plant material will provide numerous ecological benefits (e.g., bank stabilization to reduce excess soil inputs, shading to reduce thermal loading, contribution of allochthonous materials to downstream habitats). - No direct runoff from impervious surfaces associated with the proposed development will be conveyed to the conveyance swale (as the conveyance swale will only convey external flows entering the site via the Airport Lands). All stormwater from these areas will be captured and conveyed for treatment in the SWM system prior to discharge. Internal stormwater will be kept separate from external flows via the conveyance swale within the Subject Lands. - Wetland creation will help restore wetland functions (e.g., soil stabilization, increase flood storage capacity,	conveyance of offsite flows in the proposed vegetated conveyance swale. No setback is warranted along the conveyance swale as the main functions of the feature (i.e., flow conveyance) will be maintain the existing functions of HDF H1. This is further discussed within **Section 6.5** of the report. All relevant water quality criteria will be addressed through the proposed SWM treatment train approach. An increase in salt contributions from road salt applications during the winter months are expected. Site water balance will be maintained through mitigative measures such as LIDs and redirecting roof-runoff. No negative effects on fish habitat are expected due to changes in surface water and groundwater conveyance and infiltration.	

Table 9: Predicted Effects, Mitigation, Enhancement and Net Effects

NATURAL HERITAGE FEATURES AND ASSOCIATED FUNCTIONS	SIGNIFICANT CHARACTERISTICS AND SENSITIVITY	IMPACTOR	PREDICTED EFFECTS	AVOIDANCE, MITIGATION AND/OR RESTORATION	NET EFFECTS	MONITORING AND MANAGEMENT
	Lands (as discussed within **Section 3.4** and **4.11** of the EIS). No permanent or intermittent streams (per UHOP definitions) are present within the Subject Lands (as discussed within **Section 4.10** of the EIS).		Report (Dillon Consulting and Aquafor Beech Ltd. 2017). Glycol de-icing products and other chemicals are currently being used within the Airport Lands could drain through the property (as discussed within the John C. Munro Hamilton International Airport's Environmental Management webpage 2020). Accidental spills during construction or post-development could impair water quality and have negative effects on aquatic biota and aquatic and riparian vegetation. The outlet towards Homestead Drive will match pre-development flow rates ensuring that there is no negative impact to downstream (receiving) habitats. This will ensure that there is no negative impact to (offsite) direct fish habitats. This will ensure the replication of indirect fish habitat functions that HDF H1 previously provided.	increase water quality and clarity, reduce erosion potential). - Post-construction surface water will be conveyed through SWM infrastructure to provide enhanced quality control. The proposed SWM infrastructure and LID measures will help reduce thermal loading to downstream aquatic habitats. Removal of Mitigation HDFs will have their functions replicated through wetland creation, conveyance swale construction, SWM and LID infrastructure. Wetland creation will occur along the eastern Subject Land boundary, as described below within the "Non-significant Wetlands" section. Proposed wetland creation will provide indirect fish habitat benefits to address the removals of Mitigation HDF reaches and alteration to the Conservation HDF (which currently exists within the footprint of the proposed wetland creation area). Salt management opportunities to will be considered during the detailed design process. No feasible treatment methods to remove salt from urban stormwater runoff are known to be available.		

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NATURAL HERITAGE FEATURES AND ASSOCIATED FUNCTIONS	SIGNIFICANT CHARACTERISTICS AND SENSITIVITY	IMPACTOR	PREDICTED EFFECTS	AVOIDANCE, MITIGATION AND/OR RESTORATION	NET EFFECTS	MONITORING AND MANAGEMENT
7. Habitat of Endangered and Threatened Species	One SAR was identified during ecological field investigations within the Subject Lands: Barn Swallow. As discussed within **Section 4.8** of the EIS, no breeding habitat was identified for Barn Swallow within the Subject Lands. Barn Swallow are known to have a high tolerance for alteration within foraging habitat. Abundant foraging habitat will remain present within the local area. Engagement with MECP is not warranted given that there will be no impact to Barn Swallow habitat.	N/A	N/A	N/A	N/A	N/A
8. Significant Areas of Natural and Scientific Interest	Not Present	N/A	N/A	N/A	N/A	N/A
OTHER FEATURES						
1. Non-Significant Wetlands	The following wetland vegetation communities were identified within the Subject Lands: • Reed-Canary Grass Mineral Meadow Marsh (MAM2-2) – 0.42 ha; • Cattail/Common Reed Mineral Shallow Marsh (MAS2-1/MAS1-12) – 0.66 ha; and • Silver Maple Mineral Deciduous Swamp (SWD3-2) – 0.03 ha.	Direct removal of 1.11 ha of wetland to accommodate the proposed site alteration and/or development. Some wetland removal is associated with the proposed industrial buildings, while other removals are located within the created wetland area. Removals of wetland within the created wetland area are as a result of site grading requirements. The proposed conveyance swale culvert outlet and cable concrete will have a footprint of 7 m and 2.5 m within the created wetland and buffer, respectively. This specific erosion mitigation method was	Direct removal of 1.11 ha of wetland to accommodate the proposed site alteration and/or development. Creation of wetland habitat is proposed within a designated restoration area on the Subject Lands. The creation of wetland habitat will help mitigate disturbance of wetland habitat. Further details on the proposed created wetland area are provided within **Section 7** of the EIS and illustrated on **Figure 9** (**Appendix A**). The proposed conveyance swale culvert outlet and cable	The following mitigation measures are proposed to minimize adverse impacts associated with the wetland removal: • Wildlife rescues within wetland units proposed for removal to occur ahead of removal of the features; • Any dewatering activities associated with the removal of these features to not outlet to downstream aquatic habitats, if possible. Since HDF H1S1 and HDF H2S1 are also identified as providing indirect fish	No negative impacts are predicted, should the proposed restoration and mitigation approach be provided. No impacts to downstream wetlands are predicted as a result of the proposed development, so long as the mitigative and restorative measures are enacted. Removal of the MAS2-1/MAS1-12 will temporarily eradicate Common Reed from the Subject Lands. It is possible that Common Reed could continue to invade aquatic ecosystems within the property should	Monitor effectiveness of restoration areas to ensure they are functioning as designed (per **Section 7** of the EIS).

Table 9: Predicted Effects, Mitigation, Enhancement and Net Effects

NATURAL HERITAGE FEATURES AND ASSOCIATED FUNCTIONS	SIGNIFICANT CHARACTERISTICS AND SENSITIVITY	IMPACTOR	PREDICTED EFFECTS	AVOIDANCE, MITIGATION AND/OR RESTORATION	NET EFFECTS	MONITORING AND MANAGEMENT
	The SWD3-2 vegetation community is located within the southern portion of the Subject Lands and is an isolated feature that has no surface hydrologic connection to other aquatic features (e.g., HDFs). This SWD3-2 community is located immediately adjacent to active residential dwellings. The MAS2-1/MAS1-12 vegetation community is associated with HDF H1S1, while the MAM2-2 vegetation community is associated with HDF H2S1. No calling amphibians were recorded within the wetland communities despite survey effort. The wetlands do not support SAR or SWH. The MAS2-1 is invaded by Common Reed, a Category 1 invasive species. Common Reed appears to have established populations offsite (both upstream and downstream of the feature).	selected within the wetland as it still permits the growth of vegetation, whereas alternatives like riprap do not. This footprint is required in order to support the movement of flows within the conveyance swale under Street A and prevent erosion into the created wetland. Street A is located at a higher elevation than the created wetland area in order to match existing elevations of the East Cargo Road and the northern landowner's proposed right of way location. Grading constraints are further discussed within Section 6 of the FSR (Odan Detech 2023).	concrete will be located within 7 m of the created wetland and 2.5 m of the wetland buffer.	habitat to downstream fisheries, removal of these features should be completed outside of the spring fisheries window (March 15 to July 15) to avoid adverse effects to downstream habitats. Dewatering activities should occur slowly to avoid excess sediment input to downstream habitats; and • Opportunities for phasing will be considered to recreate wetlands ahead of the removal of existing wetlands within the Subject Lands. Wetland creation is proposed along the eastern portion of the Subject Lands. A total of 1.11 ha of wetland habitat will be created to replicate the wetland communities that are proposed for removal at a 1:1 compensation ratio. The created wetland area will be surrounded by a 10 m native buffer to the surrounding development and/or existing residential properties. The created wetland area will be planted with a variety of native plant species to provide increased ecological function. Installation of fencing between the existing residential properties and the created wetland will discourage pedestrian and pet access. Incorporation of educational	invasive management of the offsite populations not occur. Increased native plant diversity will provide a net gain to the ecological functions and resiliency of the system.	

Table 9: Predicted Effects, Mitigation, Enhancement and Net Effects

NATURAL HERITAGE FEATURES AND ASSOCIATED FUNCTIONS	SIGNIFICANT CHARACTERISTICS AND SENSITIVITY	IMPACTOR	PREDICTED EFFECTS	AVOIDANCE, MITIGATION AND/OR RESTORATION	NET EFFECTS	MONITORING AND MANAGEMENT
				signage along the fencing will be explored in detailed design. Hydroperiod modeling will be completed during the detailed design phase to ensure that the wetland hydroperiod can be supported within the created wetland area. A conceptual restoration plan for the Subject Lands is described within **Section 6** of the EIS. A formal NHS Design Brief will be prepared following consultation with the City of Hamilton and the NPCA and will be provided under a separate cover.		
2. Trees	A total of 444 trees were inventoried within the Subject Lands, of which two were dead. This included trees within the woodlands noted below and individual trees outside of woodlands. Two woodland communities were identified within the Subject Lands: • SWD3-2 - 0.03 ha; and • Mineral Cultural Woodland (CUW1) – 0.22 ha. These woodland communities did not meet the test for significance per the UHOP Significant Woodland Criteria. All woodlands are relatively small, isolated features and do not host SWH or SAR species,	Direct removal of all woodlands on the Subject Lands (0.25 ha) is proposed to accommodate site alteration and/or site development. Removal of a total of 424 trees (individuals and woodland trees) to accommodate site development and/or alteration.	Direct removal of 424 trees is proposed to accommodate site alteration and/or site development. Localized movement of urbanized species outside of the Subject Lands to surrounding natural and naturalized communities.	The following mitigation measures are proposed: • All tree removals should occur outside of the active bat maternity window (April 1 to October 1) and the Migratory Bird Window (April 15 to August 15); • Tree removals should follow best arboricultural practices; • ESC measures should be installed around nearby/receiving hydrologic features to reduce sedimentation inputs; and • To slow the spread of invasive species (such as Emerald Ash Borer), all trees (not just Ash) should be disposed of locally to reduce transportation to other local municipalities.	Permanent removal of 0.25 ha of woodland habitat within the Subject Lands to accommodate site alteration/development. As discussed within **Section 7** of the TPMP (**Appendix E**), a total of 235 trees will be planted as compensation for those removed (compensation for the removal of live private trees at a 1:1 ratio).	Construction monitoring should occur by the Project Arborist as discussed within **Section 6** of the TPMP (**Appendix E**). A Post-Grading Tree Maintenance Report will be prepared following construction activities.

Table 9: Predicted Effects, Mitigation, Enhancement and Net Effects

NATURAL HERITAGE FEATURES AND ASSOCIATED FUNCTIONS	SIGNIFICANT CHARACTERISTICS AND SENSITIVITY	IMPACTOR	PREDICTED EFFECTS	AVOIDANCE, MITIGATION AND/OR RESTORATION	NET EFFECTS	MONITORING AND MANAGEMENT
	rather they support common and secure bird species.			A Tree Protection and Management Plan (TPMP) outlines the tree protection measures and tree compensation requirements for the tree removals (**Appendix E**).		
OTHER CONSIDERATIONS (PROVINCIAL AND MUNICIPAL PLANS, APPROPRIATE LEGISLATION)						
1. Greenbelt Plan	Not Present	N/A	N/A	N/A	N/A	N/A
2. Urban Hamilton Official Plan	Two natural heritage/hydrologic features were identified within the Subject Lands: Wetlands and Indirect Fish Habitat. The wetlands are associated with the MAM, MAS2-1/MAS1-12 and SWD3-2 communities. Indirect fish habitat is associated with HDFs H1 and H2.	Refer to potential impacts discussed above within fish habitat and non-significant wetlands.	Refer to predicted effects discussed above within fish habitat and non-significant wetlands.	Refer to avoidance, mitigation and restoration measures discussed above within fish habitat and non-significant wetlands.	No negative impacts are expected, as a result of the proposed restoration and mitigation approach. The proposed development concept meets the UHOP Volume 1 Policy C.2.3 requirements. As previously discussed, wetlands will be recreated along the eastern Subject Lands boundary. This is in alignment with Section C.2.5 of the UHOP. Justification for buffer reductions is provided within **Section 6.5** of the EIS. A conceptual restoration plan for the Subject Lands is described within **Section 6** of the EIS. A NHS Design Brief will be prepared following consultation with the City of Hamilton and the NPCA and will be provided under a separate cover.	Refer to monitoring and management measures discussed above within non-significant wetlands.
3. NPCA – O. Reg 155/06	One regulated feature type was identified within the Subject Lands: wetlands. The wetlands are associated with the MAM, MAS2-1/MAS1-13 and SWD3-2 communities.	Refer to potential impacts discussed above within non-significant wetlands.	Refer to predicted effects discussed above within non-significant wetlands.	Refer to avoidance, mitigation and restoration measures discussed above within non-significant wetlands.	No negative impacts are predicted, should the proposed restoration and mitigation approach be provided within the created wetland area.	Monitor effectiveness of restoration areas to ensure they are functioning as designed (per **Section 7** of the EIS).

Table 9: Predicted Effects, Mitigation, Enhancement and Net Effects

NATURAL HERITAGE FEATURES AND ASSOCIATED FUNCTIONS	SIGNIFICANT CHARACTERISTICS AND SENSITIVITY	IMPACTOR	PREDICTED EFFECTS	AVOIDANCE, MITIGATION AND/OR RESTORATION	NET EFFECTS	MONITORING AND MANAGEMENT
	No wetland communities (even those contiguous with other wetland communities) were equal to or greater than 2 ha in size.				Where wetland removal is proposed, section 8.2.2.8 of the NPCA's Policy Document (2018) applies, so long as it has been demonstrated that there is no other feasible alternative to retain the wetlands in-place. Several alternatives were considered (e.g., maintaining portions of the wetlands in place), however engineering requirements for the site did not permit the retention of these features due to grading and servicing constraints. Since no other reasonable alternative exists, the NPCA may permit the reconfiguration of the wetland boundaries provided that several criteria are met (per section 8.2.2.8). As discussed within **Section 3.3.1** of the EIS, an OWES evaluation was not warranted for this site. As illustrated within this table, no SAR or SWH are present within the Subject Lands. A conceptual restoration plan for the Subject Lands is described within **Section 6** of the EIS. A NHS Design Brief will be prepared following consultation with the City of Hamilton and the NPCA and will be provided under a separate cover. A proposed monitoring program within the created wetland area is provided within **Section 7** of the EIS.	
4. **Migratory Birds Convention Act**	The federal *Migratory Birds Convention Act* (MBCA) prohibits the killing, capturing, injuring, taking or disturbing of migratory birds (including eggs) or the damaging, destroying, removing or disturbing of nests.	During construction, vegetation removal and grading have the potential to disturb, harm or destroy migratory birds and their eggs/nests.	Inadvertent harm to migratory birds or their eggs or nests.	Any tree or vegetation removal should occur outside of the migratory bird-nesting window of April 1 – August 31 (approximate). In rare circumstances where this window cannot be avoided, a nest search is recommended,	With the implementation of the mitigation measures, no negative impact is expected.	N/A

Table 9: Predicted Effects, Mitigation, Enhancement and Net Effects

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				and a buffer will be marked off surrounding any active nests that must be maintained until activity in the nest has ceased. Some species (such as Killdeer) are known to breed within active construction areas. Construction staff should be made aware of the potential for encountering breeding migratory birds. Should evidence of migratory bird nesting be observed (such as alarm calling, distraction displays, etc.), a biologist should complete an assessment to determine whether a nest is present, and if so, what mitigation measures are required.		

Appendix C

Agency Correspondence

Robinson, Olivia

From: Theresa Bukovics <tbukovics@npca.ca>
Sent: Tuesday, May 10, 2022 10:13 AM
To: Robinson, Olivia
Cc: Nikolas Wensing
Subject: [EXT] RE: 3054 Homestead Drive, Hamilton - NPCA Comment - Salt Management Plan

EXTERNAL EMAIL

Hi Olivia,

Hope you are doing well. Thank you for the email. Given that salt impacts are a recognized impact of the proposed development, NPCA staff are supportive of “winter maintenance standards and other strategies will be explored in accordance with the City of Hamilton’s Salt Management Plan."

If you have any further questions, feel free to reach out.

With Kind Regards,
Theresa

From: Robinson, Olivia <orobinson@geiconsultants.com>
Sent: May 9, 2022 9:33 AM
To: Theresa Bukovics <tbukovics@npca.ca>
Cc: Nikolas Wensing <nwensing@npca.ca>
Subject: 3054 Homestead Drive, Hamilton - NPCA Comment - Salt Management Plan

Hello Theresa,

I hope that you had a nice weekend! I was reviewing the NPCA comments further for the Homestead project and had a question about the below comment:

Re: Official Plan Amendment, Zoning By-law Amen
Plan of Subdivision Applications by Fengate Ho
Holdings LP c/o Anthony Girolami for Lands Lo
Homestead Drive, Glanbrook (Ward 11)

a. The EIS states that *An increase in salt contri*
during the winter months are expected and t
will be considered during the detailed design
of opportunities to mitigate salt contributions
during the detailed design process, a Salt Ma

We had previously received a comment from the City on another project file where she had stated that salt impacts needed to be considered to NHFs; therefore, we added some verbiage into this report to head off that comment on the first submission. In speaking with other project managers, they recommended that this comment may not be appropriate on our site given that we do not have a potable groundwater source and this is a typical impact as a result of development within a previously undeveloped landscape (i.e., this is not only an impact associated with this site, rather any development application). I also noticed that the City of Hamilton has their own Salt Management Plan (found here: https://www.hamilton.ca/sites/default/files/media/browser/2022-01-17/coh-salt-management-plan2021.pdf).

I was wondering if mentioning within the Scoped EIS that "winter maintenance standards and other strategies will be explored in accordance with the City of Hamilton's Salt Management Plan" is an appropriate response?

Let me know if you would like to discuss further!

Thanks so much,

Olivia

GEI
OLIVIA ROBINSON, CERP, M.Env.Sc. (she/her)
Intermediate Ecologist
647.988.2849
75 Tiverton Court | Unit 100
Markham, ON L3R 4M8

Please note:
We will no longer be using @savanta.ca for email and will be converting to @geiconsultants.com.

Due to the COVID-19 pandemic, the NPCA has taken measures to protect staff and public while providing continuity of services. The NPCA main office is open by appointment only with limited staff, please refer to the Staff Directory and

reach out to the staff member you wish to speak or meet with directly. Our Conservation Areas are currently open, but may have modified amenities and/or regulations.

Updates regarding NPCA operations and activities can be found at Get Involved NPCA Portal, or on social media at NPCA's Facebook Page & NPCA's Twitter page.

Robinson, Olivia

From: Theresa Bukovics <tbukovics@npca.ca>
Sent: Monday, May 16, 2022 12:05 PM
To: Robinson, Olivia
Cc: Nikolas Wensing; Amy Parks
Subject: [EXT] RE: 3054 Homestead Drive - NPCA Comment 3 Discussion

EXTERNAL EMAIL

Hello Olivia,

Yes, this is correct.

With Kind Regards,
Theresa

From: Robinson, Olivia <orobinson@geiconsultants.com>
Sent: May 16, 2022 11:37 AM
To: Theresa Bukovics <tbukovics@npca.ca>
Cc: Nikolas Wensing <nwensing@npca.ca>; Amy Parks <aparks@npca.ca>
Subject: RE: 3054 Homestead Drive - NPCA Comment 3 Discussion

Hello Theresa,

I hope that you had a nice weekend! Thank you so much for your email – I wanted to clarify, that NPCA is in agreement for this specific project that a 5-year monitoring program is appropriate (not monitoring every other year for 10 years)?

Kindest regards,

Olivia

GEI
OLIVIA ROBINSON, CERP, M.Env.Sc. (she/her)
Intermediate Ecologist
647.988.2849
75 Tiverton Court | Unit 100
Markham, ON L3R 4M8

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From: Theresa Bukovics <tbukovics@npca.ca>
Sent: Friday, May 13, 2022 8:24 AM
To: Robinson, Olivia <orobinson@geiconsultants.com>
Cc: Nikolas Wensing <nwensing@npca.ca>; Amy Parks <aparks@npca.ca>
Subject: [EXT] RE: 3054 Homestead Drive - NPCA Comment 3 Discussion

EXTERNAL EMAIL

Hi Olivia,

Generally speaking, a five year monitoring plan spanning over ten years would be required for this type of project. Given the background information that has been provided to NPCA, NPCA can allow for a five year monitoring plan. However, NPCA note that monitoring plans are dependent on the scope, nature and location of the proposed project. Therefore are assessed on a case by case basis.

If you have any other questions, please feel free to reach out.

With Kind Regards,
Theresa

From: Robinson, Olivia <orobinson@geiconsultants.com>
Sent: May 10, 2022 12:52 PM
To: Theresa Bukovics <tbukovics@npca.ca>
Cc: Nikolas Wensing <nwensing@npca.ca>
Subject: 3054 Homestead Drive - NPCA Comment 3 Discussion

Hello Theresa,

I was wondering whether we would be able to also take a look NPCA Comment 3 (below) that was provided on the Homestead Scoped EIS.

removed.

3. NPCA staff are supportive of the proposed monitoring program, howe will require that monitoring extend for a 10-year period to ensure succ

I was wondering if we could have some further discussion about this comment, given that the goals and objectives for the recreated wetland should be able to be evaluated in a shorter timeframe. As discussed within Section 7.2.2 of the Scoped EIS, the restoration goals and objectives were focused on increasing native flora diversity, stabilizing soils, creating Monarch/pollinator habitat through the establishment of nectaring plants and providing wildlife habitat structures to increase breeding/foraging/refugia opportunities. We did offer that consideration of amphibian breeding/overwintering habitat will be explored, depending on hydrologic availability (which will be confirmed in detailed design). In my experience, a five year monitoring period is standard for these types of post-construction monitoring, especially since it will help us evaluate whether the restoration goals and objectives have been met. Furthermore, I was reviewing Section 8.2.2.8 of the NPCA's Policies and noticed the attached text under wetland reconfiguration:

e) A restoration plan for the reconfigured wetland is provided for review a

f) A multi-year monitoring program is required (minimum five years) to term establishment of the reconfigured wetland;

Given the nature of the proposed reconfigured wetland and the proposed restoration goals/objectives, I continue to recommend that a five year monitoring plan is appropriate. Is this something that NPCA would be open to discussing further and/or reviewing their comment to see if they are open to a five year monitoring plan?

I am out of the office this afternoon, but am back in the office tomorrow and Thursday if you would like to set up a quick call to discuss this comment further!

Looking forward to hearing from you,

Olivia

GEI

OLIVIA ROBINSON, CERP, M.Env.Sc. (she/her)
Intermediate Ecologist
647.988.2849
75 Tiverton Court | Unit 100
Markham, ON L3R 4M8

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Van Rooi, James

From: Nikolas Wensing <nwensing@npca.ca>
Sent: June 14, 2021 10:07 AM
To: Van Rooi, James
Subject: FC-21-077, 3054 Homestead Drive, Mount Hope

Importance: High

Hello James,

I am very sorry for the delay. I recognize that you were expecting these comments on June 11th. Please let me know if these comments can still be included.

Please see the NPCA's comments on City of Hamilton file no. FC-21-077, 3054 Homestead Drive, Mount Hope below.

1. The NPCA notes the presence of Regulated Watercourses, and Unevaluated Wetlands regulated by the NPCA on the subject property.
2. The NPCA will have the following comments to provide in respect to Stormwater Management:
    a. The Stormwater Management Report shall be circulated to the NPCA for review and approval.
    b. All post development peak stormwater flows shall be attenuated to pre-development levels for up to and including the 100 year design storm event;
    c. All stormwater runoff shall be captured and treated to a Normal standard prior to discharge from the site;
    d. All stormwater runoff from the 25mm design storm event shall be captured and released over a period of 24 hours in order to mitigate the impacts of erosion on the receiving watercourse;
    e. Prior to construction, detailed grading, storm servicing, stormwater management, and construction sediment control drawings shall be circulated to the NPCA for review and approval.
3. The NPCA will have the following comments to provide in respect to the Environmental Impact Study requirement for the proposed development:
    a. The NPCA has reviewed the Environmental Impact Study (EIS) Terms of Reference (TOR) - Version 2 dated May 4th, 2021 and provided by Savanta Inc. The NPCA is satisfied with the scoping of the EIS as outlined in the TOR - Version 2.
    b. The NPCA will require that the completed EIS be submitted to the NPCA for review and approval.
4. The NPCA's fee schedule will be undergoing an update in the very near future. It is recommended that the applicant reach out to the NPCA at the time of submission of the above required materials to confirm the required fee amounts.

Please let me know if you have any questions.

Sincerely,

Nikolas Wensing, B.A., MPlan

Watershed Planner
Niagara Peninsula Conservation Authority (NPCA)
250 Thorold Road West, 3rd Floor, Welland, ON, L3C 3W2
905-788-3135, ext. 228
nwensing@npca.ca
www.npca.ca

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From:	Kiddie, Melissa
To:	Robinson, Olivia
Cc:	Izirein, Ohi; Lohnes, Shelley; Nikolas Wensing; Anthony Girolami
Subject:	[EXT] RE: Resubmission of 3054 Homestead Drive, Hamilton EIS Terms of Reference (SAV PN 2100017)
Date:	Wednesday, June 30, 2021 11:42:05 AM
Attachments:	image024.png image013.png

EXTERNAL EMAIL

Hi Olivia,

Thank you for providing the revised Terms of Reference (ToR) for 3054 Homestead Drive (FC-21-077). I have had a chance to review and I am generally satisfied that my previous comments have been addressed. As a result, the ToR has been approved.

However, it is important to note that there still seems to be some confusion with regards to Core Areas being located on the subject property. On page 3 of the ToR, it has been stated that "no Core Areas or Linkages were identified within or adjacent to the Subject Lands". In addition on page 8 states "specifically, the EIS will discuss whether any Core Areas are present within the Subject Lands". As previously noted, the watercourse on the property has been identified as a Core Area (Urban Hamilton Official Plan Volume 1-Schedule B (Natural Heritage System), Schedule B-8 (Detailed Natural Heritage Features Key Hydrologic Features Streams) as well as Volume 2-Airport Employment Growth District Secondary Plan Natural Heritage System Map B.8-2). In addition, the wetland that was identified during the reconnaissance survey may also be considered a Core Area (wetlands are included within the definitions of key natural heritage features, key hydrologic features and local natural areas).

Thanks,

Melissa

Melissa Kiddie MES (PI), ERPG
Natural Heritage Planner
Planning and Economic Development
Planning, City of Hamilton
(905) 546-2424 Ext.1290
Hamilton

NOTE: As of March 18, all City of Hamilton offices and facilities have been closed to the public with exception of the First Floor, City Hall to help prevent the possible spread of the Covid-19 virus. Planning staff will continue to serve the community over the phone and by email. However, staff are working from home as a precautionary measure to protect both the public and staff and staff will endeavour to reply to your email as soon as possible. Digital submissions and resubmissions are preferred. Alternatively, you may make your submission by courier, mail or drop

off at First Floor City Hall. Please be aware that information on the City's response to Covid-19 and the City of Hamilton's Official Plan, Zoning Bylaws and submission requirements can be found on the City's website at www.hamilton.ca. Thank you for your cooperation.

From: Robinson, Olivia <orobinson@savanta.ca>
Sent: June 16, 2021 2:20 PM
To: Kiddie, Melissa <Melissa.Kiddie@hamilton.ca>
Cc: Izirein, Ohi <Ohi.Izirein@hamilton.ca>; Lohnes, Shelley <slohnes@geiconsultants.com>; Nikolas Wensing <nwensing@npca.ca>; Anthony Girolami <anthony.girolami@fengate.com>
Subject: RE: Resubmission of 3054 Homestead Drive, Hamilton EIS Terms of Reference (SAV PN 2100017)

Hello Melissa,

Thank you very much for your comments on the Terms of Reference (TOR) for 3054 Homestead Drive in Hamilton, Ontario. Please find the attached updated TOR, which has been updated to reflect the comments received from your email below. We have also received the attached confirmation from the NPCA that they have approved our TOR, and therefore, no further edits were required.

Please let me know if you have any further concerns or would like to discuss the edits!

Kindest regards,

Olivia

OLIVIA ROBINSON, CERP
Intermediate Ecologist
647.988.2849
75 Tiverton Court | Unit 100
Markham, ON L3R 4M8

From: Kiddie, Melissa <Melissa.Kiddie@hamilton.ca>
Sent: Friday, May 21, 2021 3:25 PM
To: Nikolas Wensing <nwensing@npca.ca>; Anthony Girolami <anthony.girolami@fengate.com>; Robinson, Olivia <orobinson@savanta.ca>
Cc: Izirein, Ohi <Ohi.Izirein@hamilton.ca>; Lohnes, Shelley <slohnes@geiconsultants.com>
Subject: [EXT] RE: Resubmission of 3054 Homestead Drive, Hamilton EIS Terms of Reference (SAV PN 2100017)

EXTERNAL EMAIL

Hi Olivia,

I apologize for the delayed response. I have now had a chance to review the revised Terms of Reference (ToR) for 3054 Homestead Drive (FC-21-077) and provide the following comments. Due to further clarifications/revisions, the ToR has not been approved.

1. On page 3, it has been identified that “no Core Areas or Linkages were identified within or adjacent to the Subject Lands”. It is important that the watercourse and the wetland (identified through the reconnaissance survey) would be considered Core Areas within the City’s Natural Heritage System. In addition, not all Core Areas have been identified on the Schedules of the Urban Hamilton Official Plan (UHOP). These features include significant habitat for threatened and endangered species and significant wildlife habitat. The ToR is to be revised to reflect this information.
2. On page 3, it has been noted that a copy of the Upper James Municipal Class Environmental Assessment is requested. Further clarification is required (date of the document, consultant who completed the work).
3. On page 6, it has been identified that a 2-season vegetation survey will be completed. While Natural Heritage Planning staff is satisfied with a 2-season survey, there is concern with the timing of the surveys. Since the surveys are used to characterize the area, 1 survey is to be completed in the spring (June) and the other survey is to be completed in the fall (late August/Sept). The ToR is to be revised to reflect this timing.
4. On page 8, it has been identified that a “Natural Features Analysis” will be completed. There is concern with the approach that has been identified. The focus provided is on the Provincial Policy Statement and does not consider the City’s Natural Heritage System (“the EIS will include an evaluation of the City’s natural heritage policies where those policies may be more restrictive”). The EIS is to address the policies within the UHOP and how the proposal is consistent with them. It is important to take the information from the inventories and the development proposal and relate it back to the Official Plan policies. This section of the ToR is to be revised.
5. Trees may be located on the subject property. It is unclear if a tree inventory/tree protection plan will be included within the EIS or if it will be submitted under separate cover. Further clarification is required.
6. Table of Contents:
    a. Section 1.3.7-Additional Provincial Legislation and Associated Guideline Documents has been identified. It is unclear what will be discussed within this section. Further clarification is required.
    b. Section 3.4.9-Urban Hamilton Official Plan Key Natural Heritage and Hydrologic Features. Since there is a considerable amount of overlap with the features/functions, this subsection does not need to be provided.
    c. Section 7.0-“Compensation/Enhancement” has been identified.

There is concern with this approach. The policies of the Urban Hamilton Official Plan including the Airport Employment Growth District (AEGD) Secondary Plan do not support “compensation”/”off-setting”. A principle of the AEGD Secondary Plan is to integrate the topography of the site and “design with nature”. This is to be removed from the ToR.

Thanks,

Melissa

Melissa Kiddie MES (PI), ERPG
Natural Heritage Planner
Planning and Economic Development
Planning, City of Hamilton
(905) 546-2424 Ext.1290
Hamilton

From: Nikolas Wensing <nwensing@npca.ca>
Sent: May 19, 2021 2:23 PM
To: Anthony Girolami <anthony.girolami@fengate.com>; Robinson, Olivia <orobinson@savanta.ca>; Kiddie, Melissa <Melissa.Kiddie@hamilton.ca>
Cc: Izirein, Ohi <Ohi.Izirein@hamilton.ca>; Lohnes, Shelley <slohnes@geiconsultants.com>
Subject: Re: Resubmission of 3054 Homestead Drive, Hamilton EIS Terms of Reference (SAV PN 2100017)

Hello Olivia and Anthony,

My apologies for the delay - I can confirm that the NPCA's technical staff are currently reviewing the revised TOR.

Sincerely,

Nikolas Wensing, B.A., MPlan

Watershed Planner

Niagara Peninsula Conservation Authority (NPCA)

250 Thorold Road West, 3rd Floor, Welland, ON, L3C 3W2

905-788-3135, ext. 228

nwensing@npca.ca

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From: Anthony Girolami <anthony.girolami@fengate.com>
Sent: Monday, May 17, 2021 1:54 PM
To: Robinson, Olivia <orobinson@Savanta.ca>; Kiddie, Melissa <Melissa.Kiddie@hamilton.ca>; Nikolas Wensing <nwensing@npca.ca>
Cc: Ohi.Izirein@hamilton.ca <Ohi.Izirein@hamilton.ca>; Lohnes, Shelley <slohnes@geiconsultants.com>
Subject: RE: Resubmission of 3054 Homestead Drive, Hamilton EIS Terms of Reference (SAV PN 2100017)

Hello Melissa & Nikolas,

I would like to add that the Pre-Con File Number is FC-21-077.

Thank you,

Anthony Girolami
Development Manager, Real Estate

FENGATE Asset Management
C: 289-230-1014
anthony.girolami@fengate.com | fengate.com

From: Robinson, Olivia <orobinson@savanta.ca>
Sent: May 17, 2021 1:53 PM
To: Kiddie, Melissa <Melissa.Kiddie@hamilton.ca>; Nikolas Wensing <nwensing@npca.ca>
Cc: Ohi.Izirein@hamilton.ca; Lohnes, Shelley <slohnes@geiconsultants.com>; Anthony Girolami <anthony.girolami@fengate.com>
Subject: RE: Resubmission of 3054 Homestead Drive, Hamilton EIS Terms of Reference (SAV PN 2100017)

Hello Melissa and Nikolas,

I wanted to confirm that you have received the updated Terms of Reference for 3054 Homestead Drive, Hamilton? Please let me know if you have any questions or concerns regarding our latest submission.

Thank you,

Olivia

OLIVIA ROBINSON, CERP
Intermediate Ecologist
647.988.2849
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Markham, ON L3R 4M8

From: Anthony Girolami <anthony.girolami@fengate.com>
Sent: Tuesday, May 4, 2021 4:43 PM
To: Robinson, Olivia <orobinson@savanta.ca>; Kiddie, Melissa <Melissa.Kiddie@hamilton.ca>; Nikolas Wensing <nwensing@npca.ca>
Cc: Ohi.Izirein@hamilton.ca; Lohnes, Shelley <slohnes@geiconsultants.com>
Subject: [EXT] RE: Resubmission of 3054 Homestead Drive, Hamilton EIS Terms of Reference (SAV PN 2100017)

EXTERNAL EMAIL

Melissa and Nikolas,

Further to Olivia's below, please find attached a copy of the email submission that was submitted on April 27th, 2021.

Please let me know if you have any questions or concerns.

Thank you,

Anthony Girolami
Development Manager, Real Estate

FENGATE Asset Management
C: 289-230-1014
anthony.girolami@fengate.com | fengate.com

From: Robinson, Olivia <orobinson@savanta.ca>

Sent: May 4, 2021 3:36 PM
To: Kiddie, Melissa <Melissa.Kiddie@hamilton.ca>; Nikolas Wensing <nwensing@npca.ca>
Cc: Ohi.Izirein@hamilton.ca; Anthony Girolami <anthony.girolami@fengate.com>; Lohnes, Shelley <slohnes@geiconsultants.com>
Subject: Resubmission of 3054 Homestead Drive, Hamilton EIS Terms of Reference (SAV PN 2100017)

Hello Melissa and Nikolas,

We have now updated our Environmental Impact Study Terms of Reference (TOR) for the Homestead Drive property located in the AEGD lands in Hamilton, Ontario. This TOR reflects comments that we received from the NPCA on March 29, 2021. Attached is a copy of the NPCA's comments to assist with your review.

It is my understanding from the client that a pre-consultation application has been formally submitted and that the City of Hamilton will now review the Terms of Reference. I have attached the pre-consultation application that was submitted to the City for your reference. Please note that some fieldwork investigations have been undertaken (in accordance with the first version of the TOR) to ensure that time-sensitive ecological windows were not missed.

Please let me know if you have any questions or concerns!

Thanks,

Olivia

OLIVIA ROBINSON, CERP
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Due to the COVID-19 pandemic, the NPCA has taken measures to protect staff and public while providing continuity of services. The NPCA main office is open by appointment only with limited

staff, please refer to the Staff Directory and reach out to the staff member you wish to speak or meet with directly.

Updates regarding NPCA operations and activities can be found at Get Involved NPCA Portal, or on social media at NPCA's Facebook Page & NPCA's Twitter page.

Appendix D

Approved Terms of Reference

GEI Consultants
Savanta Division

June 16 , 2021

Melissa Kiddie, Natural Heritage Planner
City of Hamilton
71 Main Street West, 5th Floor
Hamilton, ON
L8P 4Y5

Nikolas Wensing
Niagara Peninsula Conservation Authority
250 Thorold Road, 3rd Floor West
Welland, ON
L3C 3W2

Dear Ms. Kiddie and Mr. Wensing:

RE: Environmental Impact Study Terms of Reference – Version 3
3054 Homestead Drive, Hamilton, Ontario

1.0 INTRODUCTION

Savanta Inc., a GEI Company (Savanta) has been contracted by Fengate Asset Management to complete an Environmental Impact Study (EIS) for properties located along Homestead Drive in the City of Hamilton (herein referred to as the Subject Lands; **Figure 1**, **Appendix A**). The formal address of the Subject Lands is 3054 Homestead Drive. The Subject Lands are located within the Airport Employment Growth District Secondary Plan.

This Terms of Reference (TOR) was initially submitted on January 19, 2021 to the Niagara Peninsula Conservation Authority (NPCA) and the City of Hamilton (City) ahead of a pre-consultation meeting. The intent submission of the TOR in advance of pre-consultation is to capture sensitive timing periods for ecological surveys. Savanta received comments from the NPCA on May 29, 2021 and reissued the TOR to address their comments for a second submission on May 4, 2021. This version of the TOR has been updated to address comments from the City that were received on May 21, 2021. The NPCA has approved this TOR, per pre-consultation comments dated June 14, 2021 by Nikolas Wensing (NPCA).

Savanta conducted a site reconnaissance on November 27, 2020 to generally characterize the Subject Lands and help inform a future ecological fieldwork program. The Subject Lands were dominated by actively managed (soy) agricultural fields and were actively ploughed upon assessment. One watercourse

was identified along the northern portion of the Subject Lands and flows west-east. The watercourse appeared to receive flows from the adjacent airport lands via a culvert structure under a farm lane. The watercourse contained a riparian wetland community, which was dominated by cattails (*Typha spp*.) and European Reed (*Phragmites australis*), a highly invasive plant species. Two farm crossings were documented within the lower portion of the feature. No woodland or valleyland features were identified within the Subject Lands. No structures (e.g., barn, sheds) were identified within the Subject Lands, however structures were identified on adjacent lands.

This TOR provides an outline for the EIS report in accordance with the City of Hamilton's Environmental Impact Statement Guidelines (March 2015). The approved TOR will be included as an appendix to the final EIS.

2.0 EIS CONTENT

The technical investigations to be conducted as part of the EIS will focus on the Subject Lands as shown on **Figure 1** (**Appendix A**). Impacts to adjacent lands (i.e., within 120 m of the Subject Lands, as identified within the Natural Heritage Reference Manual; MNR 2010) will also be considered.

The EIS will consider and include the following information:

- Description of the proposal;
- Description of the surrounding environment;
- Identification and assessment of the potential impacts of the proposal on the environment and the significant features and functions of the Core Areas (includes watercourses found on the Subject Lands and features located on adjacent lands; **Figure 2**, **Appendix A**);
- Use of the unaltered Core Area boundary, as provided by the City in its Official Plans, as the basis of the evaluation;
- Identification of positive effects of the proposal such as opportunities for enhancement and/or restoration of significant features;
- Evaluation of the feasibility of alternative mitigation measures or techniques and the ability of such measures to prevent or minimize impacts;
- Recommendation on the suitability of proceeding with the proposal, appropriate mitigation measures, whether changes to the proposal are advised; and
- Recommendation for a monitoring plan and contingency plans and funds should the proposal result in any unexpected impacts to the Core Area, if necessary.

It is noted that policy C.2.5.8 of the Urban Hamilton Official Plan (2018) states that the EIS shall demonstrate the following:

- No negative impacts on the Core Area's natural features or their ecological functions;

- Connectivity between Core Areas shall be maintained, or where possible, enhanced for the movement of surface and ground water, plants and wildlife across the landscape; and
- The removal of other natural features should be avoided or minimized by the planning and design of the proposed use or site alteration wherever possible.

All figures provided within the EIS will utilize the most up-to-date aerial imagery available. A proposed Table of Contents for the EIS is provided within **Appendix B**.

2.1 Background Information Review

Savanta has reviewed the following background material and policy documents to determine the proposed scope of work:

- Aerial imagery;
- Urban Hamilton Official Plan (City of Hamilton 2018) and AEGD Secondary Plan;
- Provincial Policy Statement (MMAH 2020);
- Niagara Peninsula Conservation Authority (NPCA) planning documents and online mapping;
- Twenty Mile Creek Watershed Plan (NPCA 2006);
- Airport Employment Growth District Subwatershed Study & Stormwater Master Plan (Aquafor Beech Ltd. 2017); and
- Online citizen science databases (e.g., eBird and iNaturalist).

The Subwatershed Study and Stormwater Master Plan identifies the Subject Lands as containing support/indirect fish habitat (per Figure 2.8.3 – Recommended Natural Heritage System). No other natural heritage features were identified within or immediately adjacent to the Subject Lands. No Core Areas or Linkages were identified within or adjacent to the Subject Lands, however it is Savanta's understanding that not all Core Areas have been identified on the Schedules of the Urban Hamilton Official Plan. Determination of whether any Core Areas or Linkages are present within the Subject Lands will be identified by Savanta and associated environmental planners.

It should be noted that the Subject Lands are located outside of the Greenbelt Planning Area. The following background materials have already been reviewed by Savanta and have informed the proposed fieldwork program (described in section 2.2):

- Ministry of Natural Resources and Forestry's (MNRF) Natural Heritage Information Centre (NHIC) database (2020);
- MNRF's Land Information Ontario (LIO) database (2020);
- Bird Studies Canada's Atlas of the Breeding Birds of Ontario (BSC et al. 2008);
- Ontario Nature's Reptile and Amphibian Atlas (2020);
- Toronto Entomologists' Association's (TEA) Ontario Butterfly and Moth Atlases (2020 a, b); and

- Fisheries and Oceans Canada's (DFO) Aquatic Species at Risk (SAR) Map (2020).

Additional background reports that are made available to Savanta by reviewing agencies will be reviewed and incorporated into the EIS, as appropriate.

2.1.1 NHIC Database Results

Savanta searched the NHIC (MNRF 2020) database for records of SAR, provincially rare species (S1 to S3), and rare vegetation communities within the Study Area. The database provides occurrence data by 1 km x 1 km squares, which include areas outside of the Study Area. The following NHIC squares overlap the Study Area: 17NH8778, 17NH8779, 17NH8878, and 17NH8879.

All of these squares contained records for Northern Bobwhite (*Colinus virginianus)*, an Endangered bird species, and one of these squares also contained a record for Woodland Vole (*Microtus pinetorum*), a Special Concern mammal species.

2.1.2 Land Information Ontario Natural Features Results

Based on the MNRF LIO geographic database, one watercourse feature was identified on the Subject Lands; this unnamed feature is a tributary to Three Mile Creek (**Figure 2**, **Appendix A**). Potential impacts associated with site alteration and/or development will be discussed within the EIS, including potential impacts to its ecological function. All potential impacts will be discussed within the mitigation and restoration section of the EIS.

2.1.3 Ontario Breeding Bird Atlas Results

The Ontario Breeding Bird Atlas Data Summary: 2001–2005 (Bird Studies Canada 2020) contains detailed information on the population and distribution status of birds in Ontario. The database provides occurrence data by 10 km x 10 km squares. The Study Area is located within the atlas square 17NH87, which was used to determine a potential bird species list for the area. The Study Area is a small component of the overall atlas square, and therefore all the bird species listed for this atlas square may not be found within the Study Area. Habitat type, availability, and size are all contributing factors to bird species presence and use.

A total of 185 bird species (of which 109 were reported breeding) were recorded in atlas square 17NH87, with the following species of interest noted:

- Species listed as Threatened or Endangered on the Species at Risk Ontario (SARO) List:
    - Bank Swallow (*Riparia riparia*) – Threatened in Ontario;
    - Barn Swallow (*Hirundo rustica*) – Threatened in Ontario;

  - Bobolink (*Dolichonyx oryzivorus*) – Threatened in Ontario;
  - Chimney Swift (*Chaetura pelagica*) – Threatened in Ontario; and
  - Eastern Meadowlark (*Sturnella magna*) – Threatened in Ontario.
- Species of Conservation Concern (i.e., listed as Special Concern on the SARO List or identified as an S1–S3 species):
  - Bald Eagle (*Haliaeetus leucocephalus*) – Special Concern in Ontario;
  - Black-billed Magpie (*Pica hudsonia*) – S3 (rare to uncommon in Ontario);
  - Caspian Tern (*Hydroprogne caspia*) – S3;
  - Eastern Wood-Pewee (*Contopus virens*) – Special Concern in Ontario;
  - Great Egret (*Ardea alba*) – S2 (very rare in Ontario);
  - Horned Grebe (*Podiceps auritus*) – Special Concern in Ontario;
  - Long-tailed Duck (*Clangula hyemalis*) – S3;
  - Purple Martin (*Progne subis*) – S3S4 (rare to uncommon/apparently common and secure in Ontario);
  - Redhead (*Aythya americana*) – S2;
  - Red-necked Grebe (*Podiceps grisegena*) – S3;
  - Red-throated Loon (*Gavia stellata*) – S3;
  - Rough-legged Hawk (*Buteo lagopus*) – S1 (extremely rare in Ontario);
  - Rusty Blackbird (*Euphagus carolinus*) – Special Concern in Ontario; and
  - Wood Thrush (*Hylocichla mustelina*) – Special Concern in Ontario.

2.1.4 Ontario Reptile and Amphibian Atlas Results

The Ontario Reptile and Amphibian Atlas (Ontario Nature 2020) contains detailed information on the population and distribution status of reptiles and amphibians in Ontario. The database provides occurrence data by 10 km x 10 km squares. The Study Area is located within the atlas square 17NH87, which was used to determine a potential reptile and amphibian species list for the area.

A total of 21 reptile and amphibian species were recorded in atlas square 17NH87, including three turtle species, five snake species, eight frog and toad species, and five salamander species. The following species of interest were noted:

- Species listed as Threatened or Endangered on the SARO List:
  - Jefferson Salamander (*Ambystoma jeffersonianum*) – Endangered in Ontario.
- Species of Conservation Concern (i.e., listed as Special Concern on the SARO List or identified as an S1–S3 species):
  - Northern Map Turtle (*Graptemys geographica*) – Special Concern in Ontario; and
  - Snapping Turtle (*Chelydra serpentina*) – Special Concern in Ontario.

The Study Area is a small component of the overall atlas square, and therefore all the reptile and amphibian species listed for this atlas square may not be found within the Study Area. Habitat type, availability, and size are all contributing factors to reptile and amphibian species presence and use.

2.1.5 Ontario Butterfly and Moth Atlas Results

The Ontario Butterfly and Moth Atlases (Toronto Entomologists' Association 2020a, 2020b) contain detailed information on the population and distribution status of butterflies and moths in Ontario. The database provides occurrence data by 10 km x 10 km squares. The Study Area is located within the atlas square 17NH87, which was used to determine a potential butterfly and moth species list for the area. The Study Area is a small component of the overall atlas square, and therefore all the butterfly and moth species listed for this atlas square may not be found within the Study Area. Habitat type, availability, and size are all contributing factors to reptile and amphibian species presence and use.

A total of 14 butterfly species and one moth species were recorded in atlas square 17NH87. Of these reported species, one is a species of Conservation Concern (i.e., listed as Special Concern on the SARO List or identified as an S1–S3 species): Black Dash (*Euphyes conspicua*) – S3.

2.1.6 Aquatic SAR Distribution Mapping Results

The DFO Aquatic Species at Risk Map (2020) was reviewed to identify any known occurrences of aquatic SAR, including fish and mussels, in the tributary of Three Mile Creek that flows eastward through the Subject Lands and 1 km downstream. No aquatic SAR were identified in this search area. The closest SAR (Grass Pickerel – *Esox americanus*) was identified within Twenty Mile Creek. Three Mile Creek ultimately flows into Twenty Mile Creek downstream of the Subject Lands.

2.2 Ecological Inventories

An ecological field survey program is proposed to provide the data required to complete a significant assessment for each natural heritage feature present on and adjacent to the Subject Lands. All of the proposed ecological inventories will be completed during the 2021 field season. Based on Savanta's review of aerial imagery and from information gathered during November 27, 2020 site reconnaissance, the following ecological field studies are proposed:

- Amphibian Call Count Surveys (March/April, May, June 2021);
- Botanical Inventories and Ecological Land Classification surveys (June, late August/September 2021);
- Breeding Bird Surveys (May-July 2021); and
- Headwater Drainage Features Assessment (HDFA; March/April, April/May, July/August 2021), Aquatic Habitat Assessment (June/July 2021) and Fish Community Sampling (March/April 2021).

Based on aerial imagery interpretation and site reconnaissance efforts undertaken on November 27, 2020, there is limited habitat to support reptiles, bats, or insects on the Subject Lands, therefore no targeted surveys are proposed. Should any species be incidentally observed, they will be recorded and provided within the Master Wildlife Table. Moreover, no woodlands were identified within the Subject Lands, therefore, spring botanical surveys are not warranted.

All species identified will include federal, provincial and local status rankings. The local status ranking will be based upon the Hamilton Natural Areas Inventory Project 3rd Edition (2014) Species Checklist.

Since the first submission of the TOR, first round amphibian call count survey was conducted on April 7 and first round HDFA and fish community sampling was conducted on March 18.

Field forms will be included within EIS submission.

2.2.1 Botanical and Ecological Land Classification Surveys

Two rounds of botanical inventories (spring and fall; June, late August/September) and one ELC survey will be completed on the Subject Lands. As previously indicated, no spring botanical inventory is warranted due to the absence of woodland communities. Vegetation communities within the Subject Lands will be verified through the review of aerial imagery and ground truthing in the field. A botanical inventory list will be compiled to understand the flora present within the Subject Lands. Flora nomenclature will be based on the Ontario Plant List (Newmaster et al. 1988) with updates from the NHIC database (2018). ELC surveys will follow the ELC for Southern Ontario Protocol (Lee et al. 1998). Observations of rare, threatened or endangered species will be documented and mapped during the field investigations.

Should any Butternut (*Juglans cinerea)* be identified within the Subject Lands, a Butternut Health Assessment will be completed by a certified Butternut Health Assessor.

2.2.2 Tree Inventory

A tree inventory will be conducted by a certified arborist in the spring, summer or fall months of 2021. Any wooded features (including hedgerow features) will be assessed during the tree inventory. As per the City of Hamilton's Tree Protection Guidelines (2010), all trees measuring 10 cm diameter at breast height (DBH) or greater must be included in the inventory. Each tree will be mapped using a sub-meter GPS and will have the following information recorded: species, DBH, biological and structural health. Each tree will also be assigned a unique identification number and tagged. Trees adjacent to the Subject Lands (i.e., within 6m) will be remotely assessed from the property boundary, where possible, but will not be tagged. Any observations of rare, threatened or endangered plant species (e.g., Butternut*)* will be documented and mapped.

A Tree Protection and Management Plan will be prepared following the City's Tree Protection Guidelines (2010).

2.2.3 Amphibian Call Count Surveys

Three rounds of amphibian call count surveys will be conducted in accordance with the Marsh Monitoring Program (BSC 2003). In late March/April (minimum 5ºC), May (minimum 10ºC) and June (minimum 17ºC) 2020. Call count surveys will identify frogs and toad species that are present and breeding in wetland communities. All appropriate sampling locations will be surveyed during optimal weather conditions (low wind levels, no heavy rain) during the evening.

2.2.4 Breeding Birds Surveys

Two Breeding Bird Surveys (area searches, point counts) will be conducted according to Ontario Breeding Bird Atlas Protocol (OBBA, 2001-2005). Surveys will be completed at least two weeks apart between late May and early July, with first round surveys being undertaken between May 24th and June 15th, and second round surveys being completed between June 15th and July 10th, 2020. Point count stations will be surveyed between dawn and five hours after dawn. Surveys will consist of a combination of point count surveys and area searches to be completed under favourable weather conditions (i.e., without thick fog or precipitation and wind speeds generally below 19 km/h).

It is Savanta's understanding that the Subject Lands are actively managed agricultural fields, therefore it is unlikely that grassland habitat is present. If habitat is present for grassland birds, such as Bobolink or Eastern Meadowlark, then a third-round survey (July) will be required as per the MNR (2012) "Bobolink Survey Protocol."

2.2.5 Headwater Drainage Feature Assessment, Aquatic Habitat Assessment and Fish Community Sampling

Three rounds of HDFAs will be completed during the spring and summer months to understand the nature of hydrologic features on the Subject Lands. HDFAs will identify ephemeral, intermittent and permanent features on the landscape. Headwater drainage features will be divided into reaches as appropriate and will be subject to a HDFA utilizing the *Evaluation, Classification and Management of Headwater Drainage Feature Guidelines* (the Guideline: TRCA and CVC 2014). The guideline recommends three rounds of surveys to complete the HDFA. The first visit is to occur under spring freshet conditions, generally around mid-March to mid-April, weather dependent. The second visit is to occur in late spring, allowing at least two days after a rainfall event, generally around mid-April to end of May, weather dependent. A third visit will verify the flow regime of the features as intermittent or permanent feature on the landscape, generally early July to end of August, weather dependent.

One fish community sampling event will be completed in conjunction with the first round HDFA survey to confirm the distribution and extent of direct fish habitat in the features on the Subject Lands, identify species diversity and relative abundance. Prior to commencing the survey, Savanta will obtain a License to Collect Fish for Scientific Purposes from the MNRF Guelph District. During these sampling events, a Halltech HT-2000 Battery Backpack Electrofisher and two D-frame dip nets with a 500-micron mesh size will be used to retrieve fish and semi-aquatic organisms (e.g., frogs) from the feature. Sampling will be conducted using the Ontario Stream Assessment Protocol standard single pass survey method (Stanfield 2017). The survey will be completed within a defined stretch through riffles, pools and runs. Fish captured will be transferred into aerated buckets for processing. Each fish will be identified to species level, enumerated and weighed before being returned to the channel, downstream from the sampling location. Additional information collected during sampling events will include water temperature, conductivity and pH measurements. Weather conditions and electrofisher shocking parameters (e.g., voltage and frequency) will be recorded. All data recorded will be reported to the MNRF in accordance with the License requirements.

One aquatic habitat assessment will be completed in conjunction with the second or third round HDFA survey to assess the fish habitat characteristics within any watercourses within the Subject Lands. The aquatic habitat assessment will follow the Ontario Stream Assessment Protocol (Version 10; 2017). Sites will be selected based on section 1 of the manual. Based on the site reconnaissance results, it appears that only one watercourse feature is present within the Subject Lands, however this will be confirmed under appropriate ecological conditions. Stream characteristics such as stream morphology (e.g., riffles, runs, pools), channel bed and bank substrate, in-stream cover (e.g., woody debris, undercut banks), bank stability and in-stream and riparian vegetation communities will be assessed to determine the overall fish habitat available within the system, as well as the suitability of habitat for providing a range of life cycle functions for the fish community. Aquatic habitat assessments consist of visual surveys and habitat mapping over a defined length of channel, as well as detailed habitat transects through representative cross-sections.

2.3 Natural Heritage Features Analysis

Eight types of significant natural heritage features are defined in the PPS (MMAH 2020), as follows:

- Significant wetlands;
- Significant coastal wetlands;
- Significant woodlands;
- Significant valleylands;
- Significant wildlife habitat;
- Fish habitat;
- Habitat of endangered and threatened species; and

- Significant areas of natural and scientific interest.

All eight types of significant natural heritage feature types will be evaluated. SWH will be assessed using the Significant Wildlife Habitat Technical Guide (MNR 2000) and the SWH Eco-Region Criterion Schedule 7E (MNRF 2015). All four general types of SWH (seasonal concentration areas, rare or specialized habitats, habitat for species of conservation concern, and animal movement corridors) will be evaluated. In addition to the PPS policies, the EIS will include an evaluation of the city's natural heritage policies. Specifically, the EIS will discuss whether any Core Areas are present within the Subject Lands. Core Areas including key natural heritage features, key hydrologic features and local natural areas. The EIS will also address whether any NPCA regulated features (watercourses, wetlands, shorelines or other hazardous lands) are present within the Subject Lands.

SAR and their habitats are considered provincially sensitive information. Due to the sensitive nature of this information, all correspondence and precise location-related information will remain with the Ministry of Environment, Conservation and Parks (MECP). All SAR information will be disclosed to the MECP through their Information Gathering Form, or a similar process upon completion of the EIS prior to site alteration/development.

2.4 Description of Development Proposal

The EIS will discuss and describe the development proposal for the Subject Lands. A conceptual site plan will be provided overlaying significant natural heritage features (identified in the Natural Heritage Features Analysis section). Key details outlined within engineering reports (e.g., stormwater management, hydrology) will be discussed within this section. Any potential impacts associated with site alteration or development will be discussed within the impact assessment portion of the report. Within this section of the report, ecological buffer zones will be discussed and illustrated on the conceptual plan.

A preliminary copy of the conceptual site plan is provided within **Appendix D**. It should be noted that the field investigations undertaken by Savanta will inform whether this site plan is feasible and determine ecological constraints.

2.5 Impact Assessment, Avoidance and Mitigation Measures Discussion

The EIS will present and discuss the natural heritage features and associated functions that occur on and/or adjacent to the Subject Lands. Where available, engineering reports will be incorporated into the impact assessment to assess potential impacts to the Subject Lands.

The EIS will assess the potential effects to natural heritage features and functions that occur over various periods of time (short and long term) following the implementation and construction of a conceptual site plan. The EIS will also identify planning, design and construction practices that are recommended to

maintain, and where possible, improve or restore the health, diversity and size of natural heritage features on and adjacent to the Subject Lands. Impact avoidance, mitigation and/or restoration measures will be identified along with predicted net effects. Recommended monitoring strategies will be provided to assess the effectiveness of mitigation measures.

The impact assessment will identify direct and indirect impacts, as well as cumulative impacts associated with site alteration and/or development, while the mitigation measures section will specifically target discussions around measures proposed to eliminate or reduce impacts (e.g., restoration and enhancement, avoidance, invasive species management, adaptive management, erosion and sediment control).

3.0 PROPOSED TIMELINE

Below is the proposed timeline for the EIS.

TIME PERIOD	KEY ACTIVITIES
Spring – Fall 2021	Complete ecological field program
Fall 2021	Prepare EIS report
Late Fall 2021	Submit EIS report to reviewing agencies with planning application

4.0 FINAL REMARKS

We trust that the above information and proposed EIS TOR will be met with your approval. Should you have any questions or comments, please do not hesitate to contact the undersigned.

Kindest regards,

GEI Consultants
Savanta Division

Olivia Robinson, CERP
Project Manager
647-988-2849
orobinson@geiconsultants.com

Shelley Lohnes
Project Director
289-971-7389
slohnes@geiconsultants.com

REFERENCES

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APPENDICES

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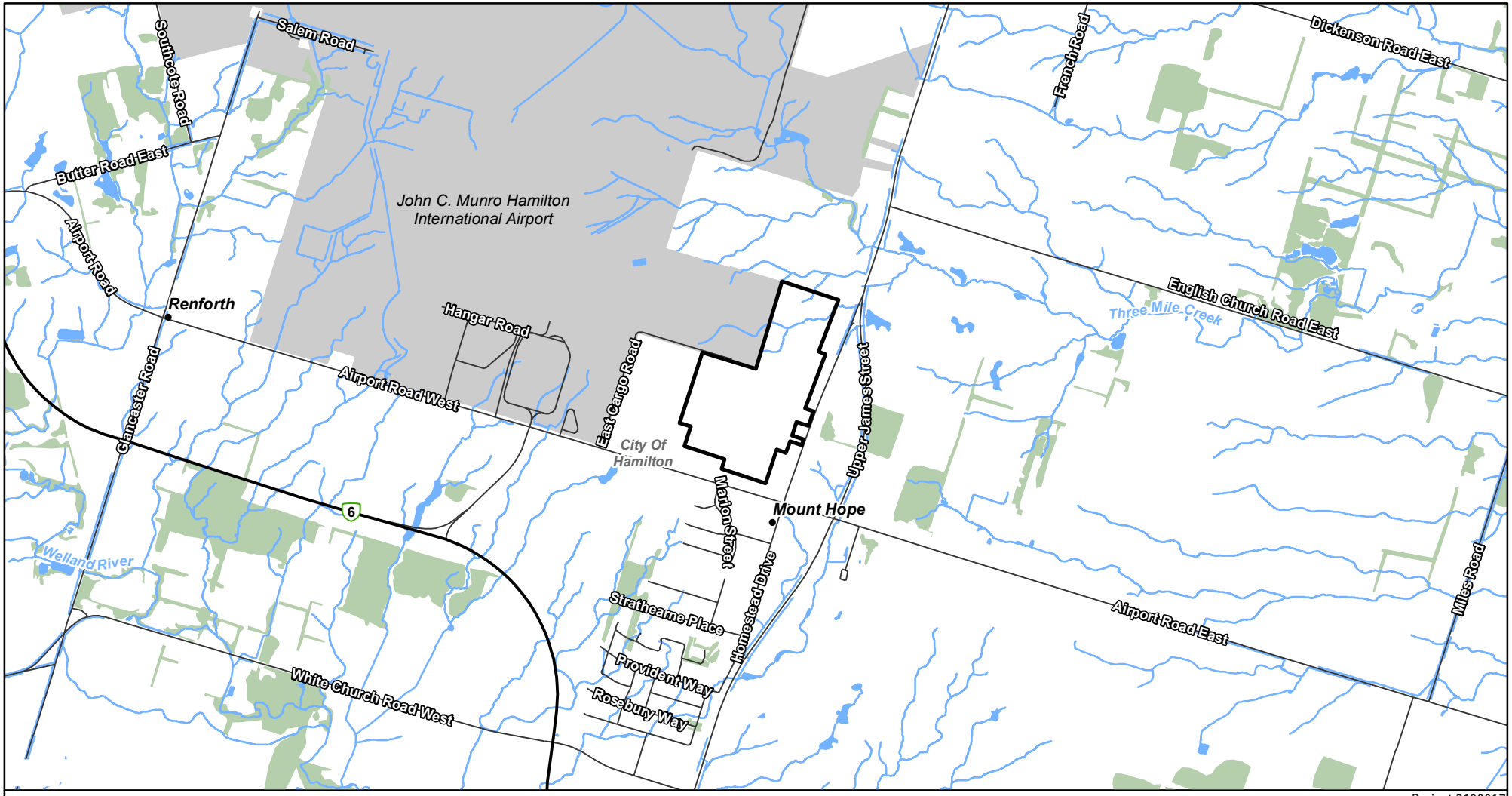
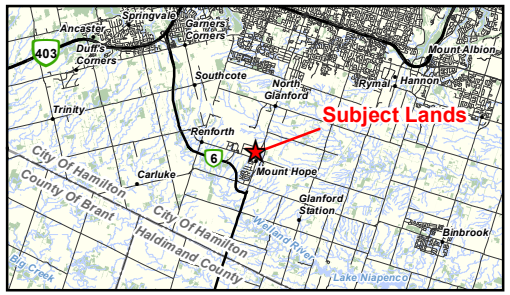


Legend

- Subject Lands
- Highway
- Road
- Watercourse
- Waterbody
- Wooded Area
- Airport

NOTES:

1. Coordinate System: NAD 1983 UTM Zone 17N.
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2021; © Niagara Peninsula Conservation Authority, 2021.



Project 2100017

Homestead Hamilton Environmental Impact Study
Fengate Asset Management

Figure 1
Location of Subject Lands

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Savanta Division

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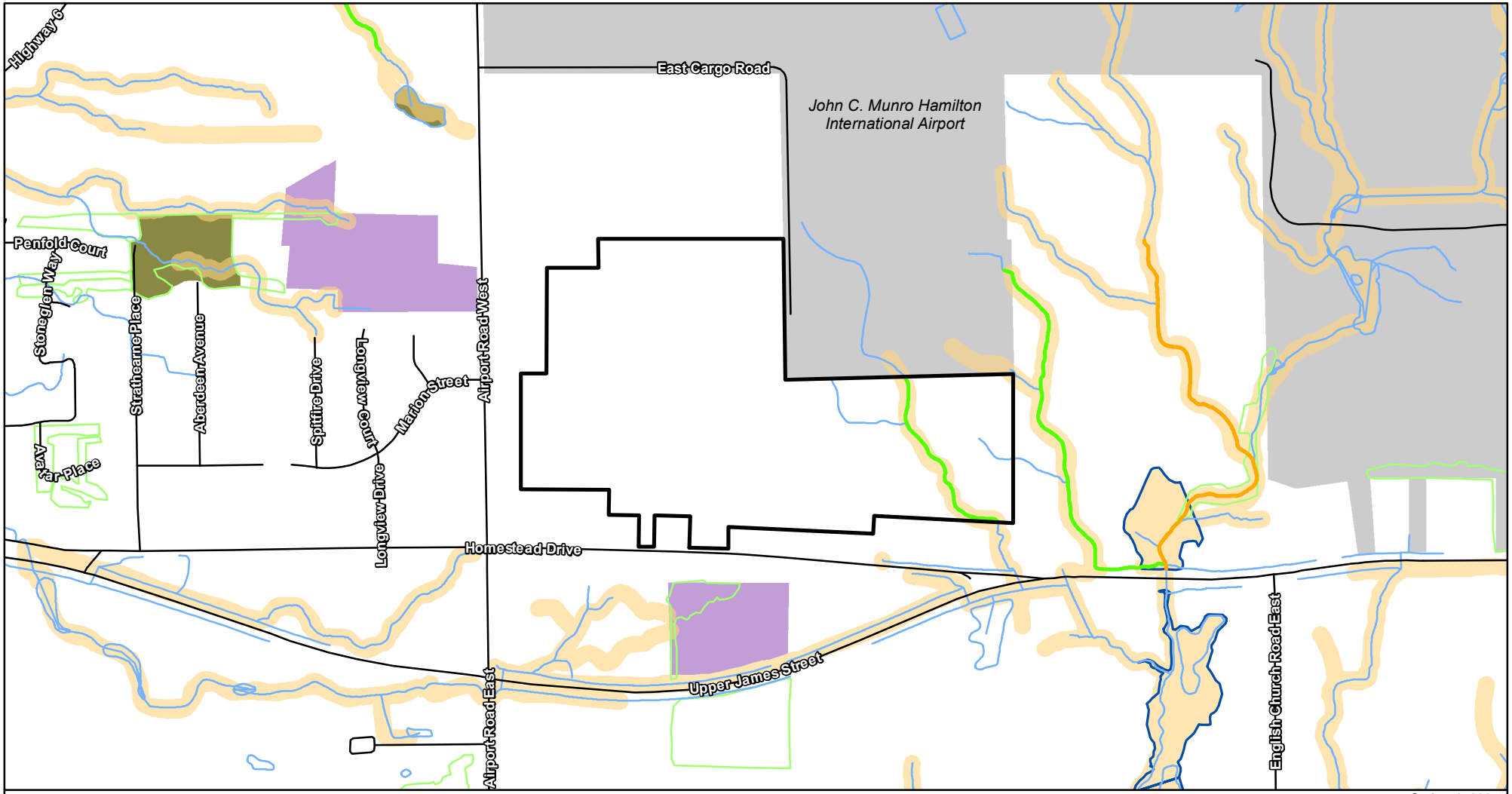

Project 2100017

NOTES:

1. Coordinate System: NAD 1983 UTM Zone 17N.
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2021; © Niagara Peninsula Conservation Authority, 2021; © City of Hamilton, 2021.
3. Features from Map B.8-2 of the Urban Hamilton Official Plan - Airport Employment Growth District Secondary Plan - Natural Heritage System. Updated on April 10, 2015.
4. Features from Map B of the Urban Hamilton Official Plan. Updated on July 8, 2020.

Legend

- Subject Lands
- Watercourse
- Waterbody
- Wooded Area
- Airport
- Regulation Limit (NPCA)
- Regulated Floodplain Extent (NPCA)
- Seasonal Habitat[3]
- Support/Indirect Fish Habitat[3]
- Core Areas[4]
- Parks and General Open Space[4]

Homestead Hamilton Environmental Impact Study
Fengate Asset Management

Figure 2
Landscape Settings

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Appendix C – Curriculum Vitae of Key Staff

Shelley Lohnes
Senior Ecologist

resume

Shelley Lohnes is a wildlife and fisheries ecologist with 15 years of experience in biological inventory and environmental impact assessment of aquatic and terrestrial environments; 10 of those years have been spent in the consulting industry.

Her broad understanding of aquatic and terrestrial ecology allows her to effectively manage multi-disciplinary projects with an ecosystems-based approach. Shelley has facilitated regulatory approvals and screenings under the Endangered Species Act, including Section 17(2)(c) and Section 17(2)(b) permits. In addition, she has completed Mitigation and Habitat Management Plans under a variety of Regulations for both aquatic and terrestrial Species at Risk.

Shelley also has extensive professional experience with assessment and development of erosion protection and sediment control measures, as they pertain to Species at Risk protection. She is a Certified Inspector of Sediment and Erosion Control (CAN-CISEC 0145) in good standing.

PREVIOUS PROJECT EXPERIENCE

Highways and Bridges

Windsor Detroit Bridge Authority, Gordie Howe International Bridge, Windsor: Species at Risk lead for Early Works and Construction at the Canadian Port of Entry. Prepared the Bridge To Strengthen Trade Act Species At Risk Plan Amendment, and was responsible for preparing Species at Risk awareness training module for site personnel. Prepared and implemented the Environmental Management and Monitoring Plan for Wildlife and Species at Risk. Project is ongoing. (2018-present)

Ministry of Transportation Ontario Detail Design Highway 427 / 409 Structures, Culverts and Retaining Walls (2017-E-0029). Conducted background review and field investigations and prepared the Terrestrial Ecosystems Existing Conditions and Impact Assessment Report in support of the Class EA and Detail Design Study for the rehabilitation of 11 bridges, two structural culverts and nine retaining walls along Highway 427 and Highway 409. Field investigations included ELC, vascular plant inventory, identification of SWH and SAR habitat. (2018-ongoing)

Ministry of Transportation Ontario Highway 410 Improvements between Eglinton Avenue and Mayfield Road, Contract 3 (G.W.P. 2381-15-00). Lead the terrestrial ecosystems component of this project including but not limited to oversight of field investigations and the senior review and coordination of the Terrestrial Ecosystems Existing Conditions and Assessment Report.

Ministry of Transportation Ontario Highway 401 Eastbound Collector Lanes from Avenue Road to Warden Avenue, City of Toronto (G.W.P. 2030-01-00). Senior review of deliverables

EDUCATION
B.Sc. with Honours, Wildlife Biology, University of Guelph, 2004
Diploma, Arctic and Boreal Entomology, University of the Arctic, 2004

EXPERIENCE IN THE INDUSTRY
16 years

EXPERIENCE WITH GEI
Less than 1 year

REGISTRATIONS/CERTIFICATIONS
Bat Acoustic Data Analysis and Management
DFO Species at Risk Mussel Identification Workshop
MTO/MNR Endangered Species Act Training
Natural Sciences, Fisheries Assessment and Fisheries Contracts Specialist (listed on RAQS)
WHMIS/Transportation of Dangerous Goods
Royal Ontario Museum Fish Identification Workshop
Ontario Stream Assessment Protocol
Pleasure Craft & Zodiac Operator's Certification
Electrofishing Crew Lead - Backpack
Red Cross Level C First Aid & C.P.R, AED
GO-Safe Railway Orientation
Enbridge Contractor Safety and Environment Orientation

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describing results of field investigations in support of the Class EA and Detail Design Study for the rehabilitation of the Highway 401 eastbound collector lanes between Avenue Road and Warden Avenue in the City of Toronto. Field investigations included ELC, vascular plant inventory, identification of Significant Wildlife Habitat (SWH), and identification of SAR habitat including inventory of suitable bat maternity roost trees relevant to the proposed works. Review of documents screening impacts under the Endangered Species Act was also undertaken (2018-ongoing)

Ministry of Transportation Ontario – Re-alignment of McGillivray Road. Senior technical review of terrestrial ecological field investigations and the Terrestrial Ecosystems Existing Conditions Report. Senior oversight for authorizations under the ESA (2007) in order to proceed with geotechnical investigations within confirmed SAR habitat. (2019)

Ministry of Transportation Ontario, Highway 400 – Highway 404 Link (Bradford Bypass). Provided senior oversight in the development of the Terrestrial Ecosystems Existing Conditions Report, which provides updated background information for the Study Area of the Bradford Bypass, as described in the 1997 approved Bradford By-Pass Recommended Plan. (2019-2020)

Ministry of Transportation Ontario, Highways 6 & 401 improvements from Hamilton North Limits to Guelph South Limits including the new alignment of a segment of Highway 6 (G.W.P 3042-14-00), in the Township of Puslinch. Senior ecological lead providing oversight for SAR and wildlife, including review of data collection methods and results. Technical Review of project deliverables including the Terrestrial Ecosystems Existing Conditions and Impact Assessment Report outlining background information, existing terrestrial conditions, potential impacts and recommended mitigation measures and next steps. In addition, deliverables and tasks include ongoing consultation and reporting to the Ministry of Natural Resources and Forestry on Endangered Species Act implications for the proposed project works. (2018 – Present) Years on the Project: 2.

Ministry of Transportation Ontario, Highway 427 Expansion, Toronto. Played an integral role in preparation of a Wildlife and Species at Risk Framework to guide detailed design, which included field investigations, reporting, identification of required Species at Risk permitting and draft restoration and compensation plans (MTO Agreement #2014-E-0056) (2015 – ongoing)

Ministry of Transportation Ontario, Highway 8 Improvements, Shakespeare, Ontario. Planned and implemented species presence/absence surveys prior to structure removal, provided senior oversight and quality control of bat acoustic data analysis and species confirmation. (2017)

City of Sudbury, Crean Hill Road and Fairbanks Road East Widening, Sudbury, Ontario. Ms. Lohnes prepared a Species at Risk habitat screening and coordinated targeted species surveys to address potential impacts to Whip-poor-will, Blanding's Turtle, and three bat species. (2014-2017).

YMCA of Greater Toronto, Cedar Glen Camp Bridge Replacement, Schomberg, Ontario. Coordinated environmental components of bridge designs and facilitated permitting with the Toronto and Region Conservation Authority and the Ministry of Natural Resources and Forestry (Endangered Species Act, Redside Dace) for 7 bridges over a coldwater stream through a residential camp. Provided construction monitoring and oversight to the client during bridge replacements to assist with compliance to permits. (2014-present).

Ministry of Transportation Ontario, Highway 11 New Interchange at South Entrance to Powassan From 5.7 km South of Highway 534, northerly 5.0 km Detail Design Study, G.W.P. 323-00-00. 2012. Completed aquatic species at risk screening, fisheries assessment fieldwork, and preparation of the risk management framework for HADD authorization and approvals from Department of Fisheries and Oceans on behalf of MTO. Also provided key input into the permitting process for the Overall Benefit Permit required for Bobolink habitat under the amended Endangered Species Act, 2007 (O.Reg. 176/13).

HCI. Highway 404 Extension from Green Lane to Queensville Sideroad, Environmental Monitor. 2010-2012. Working for the Contract Administrator, provided guidance on environmental issues and oversight of compliance with contract documents as well as federal and provincial permits and environmental assessment commitments. The site required removal of Butternut, a tree species at risk, and pre-clearing surveys for birds

were also undertaken. Dewatering and stream diversion were problematic and acted as a critical part of the team to devise a solution that was suitable to fisheries protection, contractor efficiency and cost-sensitive for the client.

Bot Construction. Highway 8 Bridge Widening, Fisheries Contracts Specialist. 2009-2012. Oversaw construction activities within the Grand River and assisted contractor with compliance to the federal Fisheries Act authorization. Works involved the twinning of a 4-lane bridge over sensitive fish and mussel habitat. Mitigative activities included mussel and fish relocation, protection of fish habitat during in-water works through isolation of work and dewatering, construction of fish spawning habitat and monitoring of restoration activities. Site conditions required amendments to the compensation design, and a new design was created and submitted for approval to the Department of Fisheries and Oceans. An amendment to the Fisheries Act approval was granted.

City of London (with Delcan). Environmental Impact Assessment for the Dingman Creek Erosion Control Wetland. 2009-2012. Completed comprehensive inventories throughout the study area, including fish, mussels, birds, butterflies, dragonflies, amphibians and mammals in order to complete an impact analysis for the creation of an online erosion control wetland. Prepared the natural environment components of the impact assessment and consulted with agencies. Ms. Lohnes also completed the design of wildlife habitat features for the wetland, which included turtle nesting and basking sites, wildlife snags, and fish nursery habitat.

City of London (with Delcan). Environmental Impact Study for the Stoney Creek Erosion Control Wetland. 2009-2010. Completed a comprehensive inventory of aquatic and terrestrial species within the study area, including fish, mussels, birds, butterflies, dragonflies, amphibians and mammals in order to complete an impact analysis related to the creation of an online erosion control wetland. Assisted in preparing the natural environment components of the impact assessment and consulted directly with agencies. Ms. Lohnes completed the design of wildlife habitat structures for the wetland design.

Ministry of Transportation Ontario. Highway 401 and Wonderland Road Interchange, London. 2011-2012. Ecologist responsible for ecological fieldwork design, implementation and reporting, including wildlife and vegetation surveys as a part of the Terrestrial Assessment, including agency consultation. Also completed Fish and Fish Habitat Screening.

Delcan for the City of London. Environmental Impact Study for the Stoney Creek Trunk Sanitary Sewer and Watermain Crossing. 2009-2010. Ms. Lohnes completed a wildlife inventory that included avian, amphibian, mammal, butterfly and dragonfly surveys. An analysis of significance of species identified was also carried out in order to assess the sensitivity of the natural areas within the study zone.

Ministry of Transportation Ontario. Species at Risk Surveys for Rehabilitation of Highway 7 from Maberly to Wemyss, WP 4512-02-00. 2010. Developed the work plan and survey methodology in consultation with the MNR to carry out species-specific surveys for 20 species at risk along 13.5km of right-of-way. Recommended an avoidance and mitigation plan to protect species at risk and to prevent contravention of the Endangered Species Act by the proponent.

Ministry of Transportation Ontario. Avian and Wildlife Assessment for the Realignment of Italia Lane, Kingston, GWP 4330-04-01. 2008-2009. As an Ecologist on this assignment negotiated acquisition of a permit under the Endangered Species Act (2007) for the removal and retention of Butternut tree specimens on the property. As a part of this application, a compensation strategy was developed for the replacement of retainable Butternut at a location off-site.

Ministry of Transportation Ontario. Terrestrial Assessment for Highway 401 and Highway 6 South, Morriston – Speed Change Lane Extension, Assignment #3008-E-0023 (15). 2011. Carried out a Species at Risk screening in accordance with the Endangered Species Act. Led species-specific surveys and habitat inventories in order to identify site constraints related to proposed highway widening design.

Ministry of Transportation Ontario. Avian and Wildlife Assessment for the Rehabilitation of Highway 37 from the North Limits of Tweed Northerly to Highway 7, GWP 213-00-00. 2008-2009. Carried out species-specific surveys and habitat inventories in accordance with the Endangered Species Act along 13.5 km of rural

highway within appropriate timing windows in order to identify site constraints related to proposed highway widening design.

Ministry of Transportation Ontario. Avian and Wildlife Assessment for the Old Gull River Bridge Removal – Highway 35, Rehabilitation of Sharpe's Creek Culverts – Highway 11, Replacement of Portage Creek Culvert – Highway 124, and Rehabilitation of Hurricane Creek Culvert – Highway 118 (2008-2010). Acted as Lead Ecologist for four structural assignments that involved complete assessments for Fish and Fish Habitat Existing Conditions & Impact Assessment; one HADD Authorization & Fisheries Compensation Design, extensive DFO and MNR agency consultation, and complete vegetation and wildlife inventories as a part of the Terrestrial Ecosystems Assessment. Also provided development of environmental components of contract documents and review of environmental commitments. Carried out species and habitat inventories in accordance with the Endangered Species Act at all study area locations within appropriate timing windows in order to identify site constraints related to structural replacement or rehabilitation.

USL Concrete. Avian Assessment for the Glen Miller Bridge, Trenton, 2010. Identified locations of and species of birds nesting within the construction zone in the bridge platform over the Trent River. Provided guidance on permitting and avoidance of the nesting birds to provide compliance with the Migratory Birds Convention Act, Fish and Wildlife Conservation Act and the Endangered Species Act.

Ministry of Transportation Ontario. Total Project Management/Detailed Design Services for Bridge and Hydrology Engineering for Local Road Board Structures; Replacement of Culverts along Nepewassi Lake Road at Highway 69 and Onaping Lake Road at Highway 144, Sudbury Area, G.W.P. 5022-10-00 & 5023-10-00 (2011-2012). As Lead Ecologist on the project, completed Species at Risk screenings for each location, developed terrestrial and aquatic field programs, and prepared fisheries impact assessments for each proposed structure replacement on behalf of the Ministry of Transportation (Ontario).

Ministry of Transportation Ontario. Fisheries assessment and impact assessment for rehabilitation of culverts crossing Highway 4 from Kippen to Clinton, W.P. 75-85-00. Assignment # 3008-E-0023 (7) (2010-2011). Completed fish and fish habitat assessments for all watercourses crossing Highway 4, including impact assessment and risk management framework in preparation of fisheries file for DFO submission. As a part of this assignment a Species at Risk screening was completed under both the Endangered Species Act (ESA) and the Species at Risk Act (SARA).

Ministry of Transportation Ontario. Detailed Design Services for the New Interchange and Extension of existing 4-laning, Highway 17 at the west junction of Sudbury Municipal Road 55, from 20.5 km west of Highway 144, easterly for 6.5km, G.W.P. 156-98-00. Ecologist responsible for species at risk screening, wildlife survey study design and existing conditions reporting. Acted on behalf of MTO to consult with regulatory agencies.

Ministry of Transportation Ontario. Highway 401 and Wonderland Road Interchange, Assignment #3008-E-0023 (14). 2011-2012. Ecologist responsible for ecological fieldwork design, implementation and reporting, including wildlife and vegetation surveys as a part of the Terrestrial Assessment, and agency consultation.

Ministry of Transportation Ontario. Highway 8 from Seaforth East Limits Easterly to Mitchell West Limits Excluding 0.94km in Dublin. 2008. Ecologist responsible for assessing aquatic and terrestrial ecosystems for the rehabilitation of Highway 8, which included structural rehabilitation of culverts crossing this alignment. Reporting included Fish and Fish Habitat Existing Conditions and Impact Assessment; Terrestrial Ecosystems Assessment, and input to and review of contract documents

Ministry of Transportation Ontario. Avian and Wildlife Assessment for the Realignment of Italia Lane, Kingston, GWP 4330-04-01. 2008-2009. As an Ecologist on this assignment negotiated acquisition of a permit under the Endangered Species Act (2007) for the removal and retention of Butternut tree specimens on the property. As a part of this application, a compensation strategy was developed for the replacement of retainable Butternut at a location off-site.

Olivia Robinson, B.Sc., CERP
Intermediate Ecologist

resume

Olivia is an Intermediate Ecologist with a deep understanding of aquatic and terrestrial ecosystems. She specializes in ecosystem restoration and ecological monitoring and holds her Certified Ecological Restoration Practitioner designation from Society for Ecological Restoration. Olivia has experience managing ecological studies, impact assessment and restoration projects related to greenfield development. Olivia performs a variety of terrestrial and aquatic ecological inventories focusing on evaluating the significance and sensitivity of natural heritage features and their associated functions across scales. She has extensive aquatic field knowledge related to headwater drainage feature assessments, aquatic habitat assessments and fish community sampling. Olivia leads both aquatic and terrestrial surveys and holds her Class 2 Electrofishing Backpack Crew Leader certification.

Olivia manages a comprehensive portfolio of ecological projects throughout Southern Ontario and is developing a track record of providing ecosystem-based solutions. She has coordinated and managed Environmental Impact Studies/Assessments, Subwatershed Impact Studies and Scoped Subwatershed Studies. Olivia has demonstrated a high degree of competency in assessing natural heritage features, including identifying Species at Risk (SAR) and associated habitats, significant wildlife habitat, significant woodlands, significant wetlands, significant valleylands and fish habitat. Olivia has worked collaboratively with various stakeholders to identify restoration and enhancement opportunities, and a has experience applying for permitting under various regulatory agencies.

PROJECT EXPERIENCE

11333 Dufferin Street Environmental Impact Study (EIS), The Milani Group, Vaughan, ON. Project Coordinator and field lead – Completed baseline studies in support of residential development. Completed impact assessment including evaluation of natural heritage features (significant wildlife assessment, habitat for endangered and threatened species, significant woodlands, fish habitat) and identification of restoration and enhancement opportunities.

230 Grand Trunk Avenue, Milani Group, Vaughan, ON. Project Coordinator – Completed Natural Heritage Evaluation report characterizing natural heritage features forms and functions within the landscape. Completed impact assessment and feature-based water balance risk assessment to evaluate indirect and direct effects associated with proposed development.

401 Corridor Expansion Areas E and F Subwatershed Impact Study (SIS), Landowner Group, Halton Hills, ON. Project Coordinator and field lead – Conducted various ecological inventories to understand presence of natural heritage features within the Study Area. Prepared SIS reporting to address potential impacts associated

EDUCATION

Masters of Environmental Science, University of Toronto (Ongoing)
Post Graduate Certificate Hons. Ecosystem Restoration, Niagara College
B.Sc. (Hons.) Geological Sciences, minor in Environmental Studies, Queen's University

EXPERIENCE IN THE INDUSTRY

5 Years

EXPERIENCE WITH GEI

5 Years

REGISTRATIONS/CERTIFICATIONS

Certified Ecological Restoration Practitioner (CERP)
Ontario Stream Assessment Protocol's (OSAP) Level 2 Fish Identification
OSAP's Headwater Drainage Feature Assessment
Ontario Benthos Biomonitoring Network (OBBN)
Class 2 Electrofishing Backpack Crew Leader
Emergency First Aid with CPR "C" + AED
Workplace Hazardous Materials Information System (WHMIS)

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with development. Delineated ecological constraints and opportunities to determine developable area. Prepared preliminary restoration approach.

8175 Winston Churchill Blvd EIS, Maple Lodge Farms, Brampton, ON. Project Manager and field lead – Conducted baseline studies in support of site redevelopment. Completed impact assessment to identify natural heritage features and identified enhancement opportunities through vegetated buffer plantings along defined valleyland supporting permanent watercourse.

9555 Airport Road, ADESA Kitchener, Hamilton, ON. Project Manager and field lead - – Conducted baseline aquatic and terrestrial assessments in support of employment land development within the Airport Employment Growth District. Completed EIS to characterize natural heritage features and functions. Identified restoration goals and objectives for wetland compensation within the subwatershed.

Bathurst Street Scoped EIS, Islamnic Shia Ithna Asheri Jamaat of Toronto, Vaughan, ON. Project Manager - Completed baseline studies within occupied Redside Dace habitat in support of redevelopment. Prepared project for successful Ontario Municipal Board (OMB) proceeding.

Block 51-1 Mount Pleasant, Block 51-1 Landowner Group, Brampton, ON. Aquatic field lead and technical contributor – Completed five years of aquatic monitoring within realigned watercourse within designated Redside Dace habitat. Prepared formal monitoring reports and adaptive management plans for Fisheries and Oceans Canada (DFO), Ministry of Natural Resources and Forestry (MNRF) and Credit Valley Conservation (CVC).

Dickenson Road EIS, Broccolini Real Estate Group, Hamilton, ON. Project Manager and field lead – Conducted baseline aquatic and terrestrial assessments in support of employment land development. Completed EIS to identify natural heritage features and assess linkage functions within the landscape. Identified restoration opportunities in support of wetland and woodland compensation, SAR habitat compensation and multi-channel realignment.

Derry Green 3A SIS, Broccolini Construction, Milton, ON. Project Coordinator – Completed baseline aquatic and terrestrial studies within a site proposed for industrial development. Prepared SIS, which identified natural heritage features and worked to identify mitigative and net gain opportunities were impacts were proposed.

Derry Green 5A SIS, Broccolini Construction, Milton, ON. Project Coordinator and field lead – Completed baseline studies and assessed impacts for proposed industrial development. Prepared SIS and identified restoration opportunities, including watercourse realignment and wetland compensation and enhancement.

Eagle Heights Environmental Impact Assessment, Penta Properties Inc., Waterdown, ON. Project coordinator and field lead – Completed baseline studies which informed impact assessment for proposed residential development. Reviewed natural heritage features present on the property based on municipal and provincial criteria. Identified restoration opportunities including woodland, wetland and SAR habitat compensation.

Eighth Line Halton Scoped Subwatershed Study (SWS), Hodero Holding Ltd., Halton Hills, ON. Project Manager – Completed aquatic and terrestrial studies to inform Scoped SWS and Characterization Report. Identified ecological constraints, mitigation and restoration opportunities in support of development. Project manager and lead ecologist in a Subwatershed Technical Advisory Committee where she provided an ecological characterization of the study area.

Grand Niagara Development, Niagara Falls, ON. Field lead and technical team member- Prepared an Environmental Impact Study identifying natural heritage features and associated functions, as well as a detailed restoration plan providing habitat to amphibians, turtles, birds and pollinator species.

Hunt Club Pond Restoration, River Mill Development Corporation, Cambridge, ON. Project Manager and field lead – Conducted post-construction monitoring of realigned channel in accordance with DFO Fisheries Authorization. Prepared annual monitoring reports to DFO summarizing field results.

Kirby Road Class Environmental Assessment (EA), Milani Group, Vaughan, ON. Project Coordinator and field lead – Completed baseline studies to inform municipal Class EA for a proposed municipal road extension project. Progressing restoration and enhancement plan to provide ecological net gain to the surrounding ecosystem.

Lathrop Pond Decommissioning and Restoration Project, Nature Conservancy of Canada, Pelham, ON. Field team member - Conducted aquatic assessments with Trout Unlimited Canada (Niagara Chapter) within watercourse and pond features in support of Brook Trout restoration project.

Milton North EIS, Orlando Corporation, Milton, ON. Project Manager and field lead – Completed baseline studies and prepared EIS in support of industrial business park. Identified and provided compensation habitat for removal of SAR through a Notice of Activity under the MNRF. Progressing detailed design phase, including natural heritage design brief outlining net benefits of watercourse realignment and wetland compensation.

Mount Albert Trail Impact Study and Management Plan, Landowner Group, Mount Albert, ON. Project Coordinator and Restoration Specialist – Prepared report characterizing natural heritage features and functions in support of trail alignment to connect two residential communities. Selected best alignment based on ecological sensitivities. Prepared restoration and invasive management plan to compensate for removals associated with trail.

Patterson Creek Riparian Restoration Plan, Lawrence Thomas (Private Landowner), Richmond Hill, ON. Project coordinator and restoration advisor – Prepared and implemented riparian restoration plan within contributing Redside Dace habitat, including use of bioengineering opportunities.

Port Credit West Village EIS, Imperial Oil, Mississauga, ON. Field lead – Completed baseline aquatic and terrestrial studies in support of EIS.

Salem EIS, Penta Properties Inc., Hamilton, ON. Project coordinator and field lead – Completed baseline terrestrial surveys in support of residential development. Completed constraints analysis to understand extents of natural heritage features (significant wildlife habitat, significant woodlands, significant wetlands, fish habitat, habitat for endangered and threatened species).

Schedule C Class Environmental Assessments and Conceptual Designs for Capacity Expansions of the South Peel Wastewater Treatment Plants (GE Booth and Clarkson), Region of Peel, Mississauga, ON. Natural Heritage Project Manager – Completed natural heritage characterization reports to inform conceptual design opportunities in support of wastewater treatment plant expansion. Characterization reports identified natural heritage features such as SAR and SAR habitat, significant wildlife habitat, significant woodlands and fish habitat.

Solmar Bolton Comprehensive Environmental Impact Study and Management Plan, Solmar Development Corp., Bolton, ON. Project Coordinator and field lead – Completed baseline studies in support of site development.

PREVIOUS PROJECT EXPERIENCE

Twelve Mile Creek Aquatic Assessment and Gap Analysis, Trout Unlimited Canada – Niagara Chapter, St. Catharines, ON. Team member and field technician – Completed baseline studies and assessed restoration opportunities through a detailed gap analysis related to Brook Trout habitat availability.

PROFESSIONAL AFFILIATIONS

American Fisheries Society, Ontario Chapter

Society for Ecological Restoration

James Leslie, B.E.S.
Senior Vegetation Ecologist

resume

James Leslie is a project manager and field ecologist with expertise in vegetation ecology, botany and remote sensing. He has worked extensively in most regions of Ontario, as well as parts of southeastern Québec, northern Alberta, and the Great Lakes shorelines of Michigan. He frequently conducts comprehensive plant inventories, species at risk surveys, Ecological Land Classification (ELC), wetland assessments, and vegetation monitoring. He has also led or assisted with numerous types of wildlife surveys and habitat assessments.

James is proficient with spatial analysis software, such as ArcGIS, ERDAS, eCognition, and Agisoft Metashape. Through this, he completes tasks such as algorithm-based spectral analysis, object-based classification, and UAV imagery management. He has gained experience analyzing imagery from satellite optical, aerial optical, LiDAR, and UAV structure from motion (SFM).

James has had significant involvement in aggregate, mining, highway infrastructure, renewable energy, and oil and gas, and has managed urban development and ecological restoration projects.

PROJECT EXPERIENCE

Renaissance Wetland Restoration, Mattamy Homes, Milton, ON. Project Manager for ecology component of a 2.5-hectare wetland/upland restoration. Collaborated with Fluvial Geomorphologists, Engineers, and agencies during design and construction of marsh wetlands and upland meadows. Designed to create suitable habitat for Western Chorus Frog and other breeding amphibians with consideration to natural heritage systems and local connectivity of adjacent woodlands through strategic planting of woody species. Preparation of multi-year post-construction monitoring plan.

Point Pelee National Park Invasive Species Management Plan, Parks Canada, Leamington, ON. Project Manager for contract to prepare an Invasive Species Management Plan and adaptive modelling tool. Ensured thorough and timely compilation of invasive species background data, species at risk and sensitive vegetation communities mapping to determine best management approach for each invasive species. A weighted ranking system was developed, and analysis was completed by creating an ArcGIS model. Collaborated with local and provincial experts, State Botanists, and regulatory agencies during development of invasive species ranking and prioritization.

Kirtland's Warbler Habitat Restoration Site Selection, Environment Canada, Southern Ontario. Vegetation Ecologist and GIS Specialist tasked with identifying and mapping current and potential breeding habitat for Kirtland's Warbler across Central, Northeastern, Eastern Ontario, and into Northern Ontario. The GIS analysis used provincial datasets for soil texture, drainage, and existing land cover; weighted values were assigned to each of these variables An

EDUCATION
Certificate Program, University of Toronto, Geographic Information Systems (GIS) for Environmental Management
Bachelor of Environmental Studies, University of Waterloo, Waterloo, ON

EXPERIENCE IN THE INDUSTRY
14 Years

EXPERIENCE WITH GEI
6 Years

REGISTRATIONS/CERTIFICATIONS
Advanced Hydric Soils, Wetland Training Institute, Portage, WI;
Applied Field Identification of Grasses and Sedges, Humboldt Field Research Institute, Steuben, ME;
Butternut Health Assessor, Ontario Ministry of Natural Resources & Forestry;
Ontario Wetland Evaluation System, Ontario Ministry of Natural Resources & Forestry;
Ecological Monitoring and Assessment Network, Environment Canada;
Ecological Land Classification, Ontario Ministry of Natural Resources & Forestry;
Registry, Appraisal & Qualification System (RAQS), Ontario Ministry of Transportation;
Standard First Aid & CPR/AED Level C

GEI Consultants

analysis was then completed using this data to locate all large, contiguous areas of potentially suitable habitat (i.e., currently suitable or potentially suitable through restoration efforts). In total, 56 suitable areas were identified and mapped for future consideration of Kirtland's Warbler habitat restoration efforts.

Line 5 Rare Wetland Survey, Enbridge, Great Lakes Shoreline, MI. Botanist assisting with targeted surveys of rare wetland communities along the western shoreline of Lake Huron and northern shoreline of Lake Michigan. Worked alongside other Botanists conducting plant inventories, rare species documentation, soil classification, and wetland classification/mapping using the Michigan Natural Features Inventory protocol.

Milton Phase 4 Lands Development Process, MP4 Landowners Group, Milton, ON. Lead Vegetation Ecologist for a proposed urban development of a 5,260-hectare block of rural land. Responsibilities have included ELC, vascular plant inventories, wetland delineations, soil assessments, and woodland significance analysis. Provided technical input regarding significance of wetlands to client and agencies.

Riverfront Community, GR(CAN) Investments Inc., Niagara Falls, ON. Vegetation Ecologist for an Environmental Impact Study for urban development of a 77-hectare greenfield site. Responsible for ELC, wetland delineations, and plot-based woodland stem density surveys.

Lathrop Pond Decommissioning and Restoration Project, Nature Conservancy of Canada, Pelham, ON. Vegetation Ecologist for a restoration project to decommission and restore two anthropogenic ponds and associated access routes through a Carolinian forest. Completed refinements to ELC mapping, vascular plant surveys, population mapping of the nine rare plant species observed, and invasive plant species mapping.

Wylie Road Carden Plain Ecological Surveys, Premier Shooting Centre, Dalrymple Lake, ON. Vegetation Ecologist for a proposed shooting range. Completed ELC and vascular plant inventories of a 555-hectare naturalized property consisting of alvar, forest, and wetlands. Assisted with bat habitat assessments and nocturnal avian surveys of Eastern Whip-poor-will and Common Nighthawk.

Kirby Road Extension Municipal Class EA, Rizmi Holdings Limited and City of Vaughan, Vaughan, ON. Vegetation Ecologist assisting multidisciplinary team to determine route options for a proposed extension of Kirby Road from Dufferin Street to Bathurst Street in the Oak Ridges Moraine physiographic region. Completed ELC, vascular plant inventories, Butternut health assessments, American Ginseng (*Panax quinquefolius*) surveys, and amphibian call-count and egg mass surveys.

Preston Road, Delpark Homes, Courtice, ON. Project Manager and Vegetation Ecologist for Environmental Impact Study of proposed urban development. Managed and assisted with technical surveys of vascular plants, bat habitat and ultrasonic call analysis, amphibians, fish, turtles, and birds. Correspondence with agencies and preparation of EIS.

Sunderland Pit, Vicdom Sand and Gravel, Sunderland, ON. Vegetation Ecologist for a proposed below water-table gravel pit application and accompanying Natural Environment Level 1 and Level 2 Technical Report. Study areas consisted of approximately 120 hectares and surveys completed included ELC, vascular plant inventories, and wetland delineations and significance analysis with the Ontario Ministry of Natural Resources & Forestry.

Ontario Place Live Nation VIP Deck, Somerville Construction, Toronto, ON. Project Manager of proposed VIP deck overhanging a channel of Lake Ontario at the Amphitheatre at Ontario Place. Objectives were to identify potential environmental constraints and prepare an Environmental Constraints Opinion Letter.

Ground Mounted Solar Project Environmental Assessment, Solar-Flow Through and Renesola Canada, Toronto, ON. Vegetation Ecologist for species at risk due diligence reviews to identify permitting triggers under Ontario's *Endangered Species Act*. Completed desktop ELC mapping and strategic ground-truthing surveys for numerous project properties across Ontario. Ground-truthing included surveys of globally rare alvar vegetation communities.

Waterdown to Finch Pipeline Replacement Project, Imperial Oil Inc., Hamilton to Toronto, ON. Lead Vegetation Ecologist for a 63 km pipeline replacement project extending across urban and rural areas, as well as

naturalized features associated with the Niagara Escarpment, Conservation Authorities, and privately owned lands. Conducted ELC, vascular plant inventories, Butternut health assessments, tree inventories, and targeted species at risk surveys.

Block 51-1 Terrestrial and Aquatic Performance Monitoring, North West Brampton Landowners' Group, Brampton, ON. Lead Vegetation Ecologist for the monitoring component of a 5 km Natural Heritage System created in Northwest Brampton. Studies included multi-year monitoring of 60 permanent plots, most of which were 1 m² with analysis of species diversity, frequency, and prominence value. A year-5 survey consisted of ELC and vascular plant inventories to determine success of vegetation community establishment and floristic quality.

PREVIOUS PROJECT EXPERIENCE

Newman Todd Project, Confederation Minerals, Red Lake, ON. Lead Terrestrial Ecologist at prospective gold mine in remote northwest Ontario. Completed desktop background review of study area and GIS mapping of all vegetation communities. Field work consisted of strategic ELC ground-truthing of targeted community types and wildlife/wildlife habitat surveys. Prepared technical report.

Kami Iron Ore, Alderon Iron Ore Corp., Port of Sept Iles, QC. Lead Botanist for proposed rail reconfiguration at mineral shipping port. On-site surveys and preparation of vegetation community mapping and vascular plant inventory. Objective of survey was to confirm presence/absence of species at risk and document observations. Prepared and submitted Rare Plant Survey Report.

Bissett Creek Mine, Northern Graphite Corp., Mattawa, ON. Lead Vegetation Ecologist for proposed graphite mine having a study area of nearly 3,000 hectares. Completed desktop ELC of all vegetation communities using ArcGIS; data layers included digital elevation models, LiDAR, multiple orthographic images, and provincial datasets. Ground verification was completed using plot-based assessments in pre-determined locations.

Acton Quarry, Dufferin Aggregates, Acton, ON. Project Ecologist for proposed quarry expansion. Assisted with seven years of amphibian surveys to identify and monitor significant wildlife habitat, species diversity, and presence/absence of Jefferson Salamander. Surveys included amphibian call-counts, egg mass surveys, pit and aquatic trapping, and tail clippings of potential Jefferson species (in conjunction with the Ontario Ministry of Natural Resources & Forestry).

Duntroon Quarry, Walker Aggregates, Duntroon, ON. Terrestrial Ecologist for proposed quarry expansion. Designed and conducted a multi-year research program to assess the habitat characteristics of American hart's-tongue fern (*Asplenium scolopendrium*) – a federal and provincial Special Concern species. Research objective was to identify suitable transplant locations by studying a naturally occurring population. Research included in-field studies of soil, ambient air, tree canopy cover, associate species, slope aspect, and snow depth. A preliminary transplant of over 500 ferns was conducted where post-transplant monitoring studies were completed over three years.

Energy East Project, TransCanada, ON and QC. Lead Vegetation Ecologist for Ontario segment of a national pipeline project proposed to transport crude oil from Alberta to New Brunswick and Québec. Ontario study area extended from the border of Manitoba to the border of Québec, surveying vegetation communities and vascular plants. Québec study area was near Cacouna and included surveys of inland vegetation as well as estuary marshes along the St. Lawrence River. Desktop assessment included GIS mapping of all vegetation communities; field surveys occurred over a two-year period, consisting of ELC, vascular plant inventories, documentation of species at risk and significant wildlife habitat. Identified amphibian breeding habitat through air-photo interpretation and verified the data by helicopter surveys. Conducted amphibian call-counts and Blanding's Turtle surveys. Assisted the soils team with field data collection in organic wetland communities. Primary author of four reports – two technical data reports, and two Environmental Assessment reports, submitted by TransCanada to the National Energy Board.

Line 37 Spill Site, Enbridge, Fort McMurray, AB. Lead Botanist at a recently ruptured petroleum pipeline in northern Alberta. Conducted full botanical inventory and vegetation community mapping of contaminated

wetlands; also conducted similar surveys of adjacent upland areas proposed for temporary use. Each survey required prompt submission of accompanying technical reports.

PCB Remediation, Georgia Pacific, Thorold, ON. Terrestrial Ecologist for vegetation component of PCB remediation project. Completed ELC, Butternut health assessments, developed and implemented multi-year vegetation monitoring plan to determine density, frequency, dominance, and importance value of restoration area plant species.

Yellow Falls Hydroelectric Project, Carlex Corporation Inc., Smooth Rock Falls, ON. Terrestrial Ecologist for proposed hydroelectric dam in remote northern Ontario. Assisted with ELC, vascular plant inventories and soil surveys.

Terrestrial Surveys for Wind and Solar Projects, various municipalities, ON. Conducted numerous pre-construction surveys under the Renewable Energy Approvals (REA) process for proposed wind and solar projects. Field work included wetland delineations and evaluations using the Ontario Wetland Evaluation System, ELC, plant and wildlife inventories, and identification of significant wildlife habitat. Completed data analysis and technical reports, which were integrated into their respective Natural Heritage Assessment Reports. Projects included but were not limited to:

- White Pines Wind Project, wpd Canada, Prince Edward County. 28 wind turbines. Lead Vegetation Ecologist.
- Amherst Island Wind Energy Project, Windlectric Inc., County of Lennox and Addington. 26 wind turbines. Lead Vegetation Ecologist.
- Bow Lake Wind Facility, BluEarth Renewables, District of Algoma. 36 wind turbines. Lead Vegetation Ecologist.
- Port Dover and Nanticoke Wind Project, Capital Power, Haldimand and Norfolk Counties. 58 wind turbines. Terrestrial Ecologist.
- Almonte Solar Project, Beckwith Solar Inc., Lanark County. 10 megawatt. Lead Vegetation Ecologist.

Highway 401 and Highway 8 Improvements, Preliminary Design, Ontario Ministry of Transportation. Terrestrial Ecologist for proposed interchange improvements in the cities of Kitchener and Cambridge along Highway 401 and Highway 8. Conducted ELC, inventories of vascular plants and wildlife, and mapping of significant wildlife habitat. The preliminary impact assessment included constraint rankings of each ELC unit affected by the Preferred Plan.

Highway 11/17 Route Planning Study, Preliminary Design, Ontario Ministry of Transportation, Kakabeka Falls to Shabaqua Corners. Terrestrial Ecologist for a proposed 40 km highway. Conducted ELC, inventories of vascular plants and wildlife, and mapping of significant wildlife habitat. Assisted with preparation and submission of a Terrestrial Ecosystems Report.

Highway 69, Patrol Yard Selection, Preliminary Design, Parry Sound to Sudbury, Ontario Ministry of Transportation. Terrestrial Ecologist for siting of suitable Patrol Yard locations based on ecological considerations along Highway 69 between Parry Sound and Sudbury. Conducted ELC, inventories of vascular plants and wildlife, and mapping of significant wildlife habitat. Assisted with preparation and submission of a Terrestrial Ecosystems Report.

Victoria Road North Class EA, City of Guelph, Guelph ON. Terrestrial Ecologist and Task Manager for a proposed road widening, parking area and boat launch. Completed background review of applicable legislation and guidelines, conducted or delegated appropriate field surveys and participated in agency consultation. Prepared Natural Environment Technical Report.

PROFESSIONAL AFFILIATIONS

Ontario Invasive Plant Council, Member

Field Botanists of Ontario, Member

PRESENTATIONS

Leslie, James 2019. The Ontario Wetland Evaluation System & Wetland Conservation Strategy. At Latornell Conservation Symposium, Orillia, Ontario. November 20, 2019.

Leslie, James, Melanie Randolph 2019. Mount Pleasant Sub-Area 51-1 Restoration: Year-5 Terrestrial Performance Monitoring. At Latornell Conservation Symposium, Orillia, Ontario. November 21, 2019.

PUBLICATIONS

Leslie, James (2018). Vascular Plants at Risk in Ontario. 103 pp. Available online: http://www.savanta.ca/idea/new-publication-vascular-plants-at-risk-in-ontario

Peter Burke
Ornithologist, Senior Ecologist

resume

Peter has broad experience working with Species at Risk (SAR); their biology, habitat, management, threats, regulations, policies and programs. He is familiar with the *Endangered Species Act (2007)* and has become immersed in working towards the recovery, conservation and management of species ranging from Special Concern to Endangered across Ontario. Peter evaluates issues pertaining to SAR in relation to his understanding of the needs of his clients. He has worked extensively with environmental impact and assessment, permitting and habitat compensation evaluation for clients involved in land development and resource extraction. He is an effective communicator, facilitator and presenter, and can share his knowledge with those who may have limited understanding of the topic.

Peter has a solid naturalist-driven knowledge of all components of Ontario's flora and fauna communities that comes with decades of field experience and communication with professionals within Canada and internationally. He possesses expert knowledge of birds, mammals, reptiles, amphibians and a wide variety of insect groups, including Odonata and Lepidoptera, and other non-insect Arthropods. He is frequently consulted on identifications and biology from across Ontario and globally. He has a long interest in botany with a well-rounded knowledge of Ontario's plants and vegetation communities. This knowledge supports his experience with guiding restoration aimed at early successional and grassland systems of southern Ontario. Peter is involved with overseeing forestry and restoration joint ventures to improve landscape health and function across Ontario's landscape.

EDUCATION
B.S., Biology, Guelph University

EXPERIENCE IN THE INDUSTRY
20 years

EXPERIENCE WITH GEI
5 years

REGISTRATIONS/CERTIFICATIONS
Wilderness First Aid Training
Wilderness Bear Safety Courses
First Aid and CPR

PROJECT EXPERIENCE

Viability Assessment for Species at Risk. Ring of Fire. Environment and Climate Change Canada. Downsview ON. Performed background review of species biology from the scientific literature, determined risk potentially associated with development and constructed a viability assessment tool to potentially measure and assess risk associated with future scenarios of human activity in the area.

PAR033 Fire Impacts Henvey Inlet First Nation Reserve #2. Henvey Inlet First Nations, ON. Co-author of Special Report. Prepared and reviewed sections of report describing historical, ecological and SAR specific impacts due to fire, citing scientific literature and solicited expert opinion. Conducted field surveys to assess fire impact on SAR and breeding bird habitat on PAR033 and documented the results.

Species at Risk Loggerhead Shrike Mitigation. Solar Flow-Through, Napanee, ON. Conducted breeding bird and SAR monitoring protocols for endangered Loggerhead Shrike (LOSH) and threatened Eastern Whip-poor-will (EWPW) in 2017 on the Napanee Plain. Assessed habitat and consulted with Wildlife Preservation Canada (WPC) and a Federal SAR biologist regarding LOSH breeding

GEI Consultants

site suitability history of client lands. Participated as part of a team in discussions with MNRF, WPC and the client to navigate policies and procedures to avoid and/or minimize adverse effects for LOSH and EWPW. Helped map protected Category 1, 2 and 3 habitats to determine viable options for development based on known nests/territories.

Kirtland's Warbler Recovery Monitoring. Environment and Climate Change Canada, Downsview, ON. Used Land Information Ontario (LIO) mapping and ground-truthing to identify sites with some habitat characteristics in proximity to a known breeding location of Kirtland's Warbler (a federally and provincially Endangered Species) in southern Ontario. Acoustic recording devices (SM4 songmeters) were deployed in the breeding season, data cards were downloaded, and files analyzed using Wildlife Acoustics Kaleidoscope Pro licensed software. Over 300,000 song samples were identified and analyzed by the recognition software, which were then filtered using a constructed algorithm to identify breeding song of Kirtland Warbler, and other species associated with the same habitat. Some 3,100 hits were analyzed visually and auditorily to confirm presence or absence.

Kirtland's Warbler Habitat Restoration. Simcoe County, ON. Conceptualized, coordinated, and helped to lead restoration of habitat for endangered Kirtland's Warbler on 50 ha of County land over a three-year project term. Provided guidance into restoration and adaptive management plans for the area, helped coordinate site restoration works, completed site inventory works, participated in the collection of 85 species of native, local seed to be used during restoration, and coordinated and co-authored the final Restoration Plan document. Helped with ongoing communications efforts and delivered presentations to numerous interested groups across southern Ontario and coordinated, co-authored Restoration Plan document.

PREVIOUS PROJECT EXPERIENCE

Species at Risk Management Plans and constructed Annotated SAR Bibliography. Ontario Ministry of Natural Resources, Peterborough. Constructed annotated bibliography on all Ontario SAR bird species through collection of copious amounts of information from a diverse array of sources to complete the over 1200-page document. Additionally, prepared Ontario Ministry of Natural Resources and Forestry Management Plans for Special Concern species the West Virginia White and Black Tern, which included an extensive literature search and analysis of large data sets to extract essential information related to current distribution.

Wildlife Inventory. Ring of Fire. Golder Associates, Sudbury Office, ON. Field surveys along two proposed transportation corridors, including river crossings, to service Ring of Fire mining camps in Hudson Bay Lowlands. Sites accessed by helicopter, transects surveyed by foot. Wilderness First Aid and Bear Safety training. Seven weeks remote work with data coordination, collection, and entry.

Surveying Odonate populations across Ontario. Ontario Ministry of Natural Resources, Peterborough. ON. Surveying for SAR and uncommon Odonate (Dragonfly and Damselfly) populations on several large rivers in the Timmins/Cochrane/Hearst/Lake Superior area, and south-western Ontario counties of Grey, Huron, Lambton, Essex, Middlesex, Oxford, Elgin, and Norfolk. Extensive work surveying for adult and aquatic stages of species diversity and abundance.

PROFESSIONAL AFFILIATIONS

Served as Chair of the Ontario Bird Records Committee: 2001, eBird reviewer 2011-present. Participant in three Ontario Breeding Bird Atlases (1981-85, 2001-05, 2021-2025).

World-renowned illustrator for bird and insect identification guides for North, Central and South American countries. Published with Houghton-Mifflin, National Geographic and Princeton University.

Laura Williamson, B.E.S., CERPIT
Intermediate Ecologist

resume

Laura is an Intermediate Ecologist with a thorough understanding of ecological systems and their functions on the landscape. She specializes in ecosystem restoration, resource management, and ecological monitoring. Laura has experience leading a wide variety of ecological studies, environmental impact studies and restoration projects related to compensation and species at risk (SAR) habitat creation efforts. Laura has earned her Certified Ecological Restoration Practitioner (in training) designation from Society for Ecological Restoration.

Laura conducts a wide range of terrestrial and aquatic ecological surveys that evaluate the significance of natural heritage features and their associated functions. She specializes in terrestrial surveys and inventories related to herptiles, bats and insects. She has developed her knowledge of Significant Wildlife Habitat (SWH) evaluation criteria, and SAR habitat identification and protocols for confirming presence or absence. She also has experience with invasive species management and amphibian habitat rehabilitation. Laura has begun to manage ecological projects focused on providing ecosystem-based solutions to urban expansion.

PROJECT EXPERIENCE

Milton Phase 4, Milton Phase 4 Landowner Groups, Milton ON, Environmental Impact Study (EIS). Project Coordinator and field lead – Completed baseline studies across all properties as part of a large-scale block plan for a proposed multi-development residential expansion. Reviewed natural heritage features present on the properties based on municipal and provincial criteria. Identified restoration opportunities including woodland, wetland and SAR habitat compensation.

Riverfront Residential, GR (CAN) Investments LTD, Niagara ON, Environmental Impact Study (EIS). Project Coordinator and field lead – Completed baseline studies and assessed impacts for proposed residential development. Identified restoration opportunities including woodland, wetland and SAR habitat compensation.

Nelson Burlington Quarry Expansion, Nelson Aggregate, Burlington, ON, Natural Environment Technical Report (NETR). Project Coordinator and field lead – Completed baseline studies and assessed impacts for a proposed aggregate quarry. Prepared the Level 1 and Level 2 NETR, including evaluation of occurrence of significant natural heritage features on and adjacent to the proposed expansion area.

Bram East 47-3, Orlando Corporation, Brampton, ON, Environmental Impact Study (EIS). Project Coordinator – Completed baseline studies to inform the EIS Progressing restoration and enhancement plan to provide ecological net gain to the surrounding ecosystem.

EDUCATION

Post Graduate Certificate Hons. Ecosystem Restoration, Niagara College
BES Hons. Environmental Studies, Con. Resource Management, York University

EXPERIENCE IN THE INDUSTRY

3.5 Years

EXPERIENCE WITH GEI

3.5 Years

REGISTRATIONS/CERTIFICATIONS

Certified Ecological Restoration Practitioner in Training (CERPIT)
Class 2 Electrofishing Backpack Crew Leader
Ontario Benthos Biomonitoring Network
Standard First Aid with CPR "C' + AED
PADI Open Water Scuba Diving
Workplace Hazardous Materials Information System (WHMIS)

GEI Consultants

Boblo Island, Boblo Developments Inc, Windsor ON, Overall Benefit Permit (OBP). Project Coordinator and field lead – Completed baseline studies for Eastern Foxsnake, assessed impacts of a proposed residential development on identified SAR and their habitat, assisted in the preparation of the Information Gathering Form and OBP application to further engagement with the Ministry of Natural Resources and Forestry, and recommended restoration opportunities for Eastern Foxsnake.

Bahá'i Temple, Bahá'i Community of Canada, Markham, Environmental Impact Study (EIS). Project Manager - Completed baseline studies within significant woodland habitat in support of a forest temple placement. Creation of restoration conceptual plan to provide invasive species management and an overall net increase in forest cover.

Re-establishment of Kirtland's Warbler Habitat in Southern Ontario, Simcoe County, Simcoe County, Restoration Initiative. Project and Volunteer Coordinator – Co-organized seed collection and planting efforts for the restoration of habitat for a provincially and federally endangered species. Assisted in the monitoring of the planting and planning efforts.

Monarch Stop Over Area Settlement Support, Central Lake Ontario Conservation Authority (CLOCA) and City of Oshawa, Oshawa ON, Local Planning Appeal Tribunal (LPAT) Hearing. Project Coordinator – Completed technical peer review on behalf of CLOCA and the City of Oshawa of an EIS prepared in support of a proposed residential development along the shore of Lake Ontario. Presented the results of the peer review during a settlement meeting under the LPAT process. Provided technical support for witness statements and hearing preparation for the LPAT along with CLOCA and the City of Oshawa.

PROFESSIONAL AFFILIATIONS

Society for Ecological Restoration

PRESENTATIONS

Re-establishing a Lost Ecosystem in Southern Ontario – Recovery of Kirtland's Warbler – Latornell Conservation Symposium, 2018

Shared perspectives and approaches to effectively restore habitat for an endangered song bird and ecosystem in Southern Ontario – Society for Ecological Restoration, 2019 Annual General Meeting

Endangered Species Site Walk (Fieldtrip) – Recovery of Kirtland's Warbler – Latornell Conservation Symposium, 2019

Noel Boucher B.Sc. (Env)
Senior Fisheries Biologist

resume

Noel Boucher is a Senior Fisheries Biologist who specializes in the design and implementation of fisheries studies, fish and fish habitat impact assessment and related permitting for a wide range of project types in the land development, energy and infrastructure industries. He has provided fisheries input to support environmental assessments, environmental impact studies, watershed and subwatershed planning studies, permitting and approvals, constraints assessments, restoration designs and post-construction studies.

Noel has experience with numerous fisheries assessment protocols and techniques, as well as agency expectations regarding fisheries studies in various development sectors. Noel is experienced with the assessment and permitting requirements for aquatic species at risk including Redside Dace, Silver Shiner, American Eel and Lake Sturgeon.

In addition to his technical expertise, Noel is a senior Project Manager, with experience managing projects ranging from small studies to large, multidisciplinary assessments for complex developments.

PROJECT EXPERIENCE

Lathrop Pond Decommissioning and Restoration Project, Nature Conservancy of Canada, Pelham, ON. Fisheries Biologist and Project Manager for the design and implementation of a restoration project to decommission and restore two anthropogenic online ponds in the headwaters of a coldwater stream. Completed fish and fish habitat investigations, managed natural heritage studies, participated in the design of conceptual restoration options and completed pre-consultation with agencies. Currently preparing detailed design and permit applications.

Block 51-1 Post Construction Aquatic Monitoring, Block 51-1 Landowners Group, Brampton, ON. Fisheries Biologist responsible for completing 5-year post construction aquatic monitoring program to assess effectiveness of realigned watercourse and other habitat improvements. Monitoring elements included fish habitat assessment and fish and benthic community studies. Annual data reports and comprehensive final report were prepared to evaluate overall effectiveness.

Mill Pond EA, Town of Richmond Hill, Richmond Hill, ON. Senior Fisheries Biologist and Project Manager for natural heritage input to the Class Environmental Assessment to assess options for upgrades to the Mill Pond property, including potential stormwater management pond upgrades, trail realignments/upgrades, channel realignment and pond mitigation. Scoped aquatic field studies including trap netting, electrofishing and habitat assessment.

Hunt Club Pond Decommissioning and Restoration, Hunt Club Partners Inc., Cambridge, ON. Managed the successful application for an Authorization under the *Fisheries Act* to permit decommissioning of an online pond and restoration of the former pond area with a natural

EDUCATION
B. Sc., Environmental Science, University of Guelph

EXPERIENCE IN THE INDUSTRY
21 years

EXPERIENCE WITH GEI
5 years

CERTIFICATIONS & TRAINING
MTO/DFO/OMNRF Fisheries Protocol Training
Ontario Class 2 Backpack Electrofishing Certification
Standard First Aid & CPR/AED

GEI Consultants

channel and restored riparian habitat. Managed and implemented the first year of post-restoration fish and fish habitat monitoring to assess the performance of the realigned channel and restored riparian habitat.

Brightwater Development, Port Credit West Village Partners, Mississauga, ON. Fisheries Biologist and Project Manager for an Environmental Impact Study for commercial/residential redevelopment of a former industrial property on the Lake Ontario shoreline. Completed fish community investigations and managed overall natural heritage studies and impact assessment process. Completed consultations with DFO to address *Fisheries Act* requirements for stormwater outfalls to Lake Ontario.

Milton Phase 4 Lands Development Process, MP4 Landowners Group, Milton, ON. Project Manager and Fisheries Biologist representing the Landowner's Group in the municipally led Subwatershed Study for urban development on a 5,260-ha block of rural land. Responsibilities have included completion of aquatic ecological investigations, input to the design of the Natural Heritage System, review and comment on behalf of the Landowner's Group on the Town's Subwatershed Study documentation and participation in the Technical Advisory Committee.

Britannia West Secondary Plan Area, MP4 (West) Landowners Group, Milton, ON. Project Manager and Fisheries Biologist representing the Landowner's Group in the municipally led Master Environmental Servicing Plan and Secondary Plan development processes for urban development with a currently rural area. Responsibilities have included completion of aquatic ecological investigations, input to the design of the Natural Heritage System, review and comment on behalf of the Landowner's Group on the Town's study documentation and participation in the Technical Advisory Committee.

Trafalgar Corridor Secondary Plan Area, Milton P4 Trafalgar Landowners Group Inc., Milton, ON. Project Manager and Fisheries Biologist representing the Landowner's Group in the municipally led Master Environmental Servicing Plan and Secondary Plan development processes for urban development with a currently rural area. Responsibilities have included completion of aquatic ecological investigations, input to the design of the Natural Heritage System, review and comment on behalf of the Landowner's Group on the Town's study documentation and participation in the Technical Advisory Committee. GEI is currently assisting with the preparation of a Master Environmental Servicing Plan and Development Area Environmental and Functional Servicing Study to support development applications.

Lagerfeld Drive Extension, Ecological Permitting, Mattamy (Credit River) Ltd., Brampton, ON. Project Manager and Fisheries Biologist for completion of initial phases of permitting and agency consultation for two proposed road crossings of Huttonville Creek. Permit requirements include Endangered Species Act Overall Benefit Permit for Redside Dace and *Fisheries Act*/*Species at Risk Act* authorization. Project remains ongoing.

Feedmill Development SWM Infrastructure Permitting, Mattamy (Credit River) Ltd., Brampton, ON. Project Manager and Fisheries Biologist responsible for agency consultation and permitting for a proposed SWM outfall to a watercourse providing fish habitat, including habitat for Endangered Redside Dace. Project remains ongoing.

Cornell Property Ecological Services, Lindwide, Markham, ON. Project Manager for completion of discussions with TRCA regarding wetland removal and compensation requirements in order to secure Draft Plan approval.

Boyne Survey Block 1 Subwatershed Impact Study, Block 1 Landowners Group, Milton, ON. Project Manager for the Subwatershed Impact Study for urban development of a 200-ha block of rural land. Completed agency consultation and managed preparation of project documentation.

Riverfront Community, GR(CAN) Investments Inc., Niagara Falls, ON. Fisheries Biologist and Project Manager for an Environmental Impact Study for urban development of a 77-ha greenfield site. Participated in environmental impact study documentation, ecological field investigations and agency consultation.

Industrial Lands Development, 678604 Ontario Inc., Mississauga, ON. Fisheries Biologist and Project Manager for an Environmental Impact Study for a proposed industrial development on an existing agricultural property. Completed aquatic ecological studies, participated in agency consultations including meetings and field

visits and managed overall natural heritage studies and impact assessment process. Currently completed MECP discussions under the *Endangered Species Act* to ensure all requirements associated with regulated Redside Dace habitat are met.

Environmental Impact Study, Shellbrant Developments Ltd., Brantford, ON. Project Manager and Fisheries Biologist for completion of a scoped Environmental Impact Study to assess potential effects of proposed residential development. Components included successful agency discussions regarding proposed woodland buffer reductions. Completed agency consultations regarding fish and fish habitat impacts associated with stormwater management pond outlets.

South Wellington Lands Development, The Stronach Group, Aurora, ON. Fisheries Biologist and Project Manager for an Environmental Impact Study for residential development of an existing property with a mix of land uses. Completed aquatic ecological studies including headwater drainage feature assessment and fish community surveys, participated in agency consultations including meetings and field staking events and managed overall natural heritage studies and impact assessment process.

Jeffery Property Residential Development, Delpark Homes, Port Perry, ON. Fisheries Biologist and Project Manager for an Environmental Impact Study for residential development of an existing agricultural property. Completed aquatic ecological studies, participated in agency consultations including meetings and field staking events and managed overall natural heritage studies and impact assessment process.

Whitlock Bridge Environmental Permitting, Milton Phase 3 Landowner's Group, Milton, ON. Fisheries Biologist and Project Manager for provision of ecological assistance to address permitting requirements under the *Endangered Species Act* (for Silver Shiner), Conservation Authority regulation and *Fisheries Act* for an approximately 180-m long bridge over the Sixteen Mile Creek valley.

Confidential Aggregate Pit Expansion Project, ON. Fisheries Biologist responsible for design and implementation of baseline fish and fish habitat assessment program and completion of fish habitat impact assessment for documentation in the Level I/II Natural Environment Technical Report.

Hallstone Road Storm Sewer Bypass Project, Kaneff Group of Companies, Brampton, ON. Fisheries Biologist and Project Manager for an infrastructure project involving the construction of a new storm sewer to bypass an existing online golf course pond. Completed aquatic field studies, prepared Environmental Impact Study documentation and addressed all requirements under the *Fisheries Act* and *Endangered Species Act*.

West Gormley Sanitary Sewer Expansion, DG Group, Richmond Hill, ON. Fisheries Biologist responsible for discussions with DFO and MNRF to obtain clearance under the *Fisheries Act* and *Endangered Species Act* for a proposed sanitary sewer construction project in Redside Dace contributing habitat.

Park Place Phase 2, Country Green Homes, Waterdown, ON. Fisheries Biologist and Project Manager for an Environmental Impact Study to assess effects and mitigation requirements for realignment of a watercourse and installation of servicing for a proposed residential development. Completed agency discussions (City of Hamilton, Hamilton Conservation Authority, MNRF) and Environmental Impact Study documentation.

4050 Yonge Street, 2432014 Ontario Inc., Toronto, ON. Fisheries Biologist for the permitting for a shoreline and slope stabilization project on the Lower West Don River to support a commercial/hotel development on the adjacent tablelands. Completed a DFO Request for Review package and obtained confirmation that no authorization under the *Fisheries Act* was required. Provided input to the fish and fish habitat mitigation tender specifications and drawings.

Mary Fix and Levi Creek Erosion Risk Mitigation Project, City of Mississauga, ON. Fisheries Biologist providing input to the Class Environmental Assessment and *Fisheries Act*/*Endangered Species Act* review processes for proposed channel upgrades to address ongoing erosion in two urban creeks. Completed DFO Request for Review packages for each creek and obtained confirmation that no authorizations under the *Fisheries Act* were required.

13330 Dufferin Street, 632025 Ontario Ltd., King Township, ON. Fisheries Biologist and Project Manager for an Environmental Impact Study for a proposed urban development on a currently agricultural property in the Oak Ridges Moraine. Requirements included assessment of development limits and potential effects on a watercourse and significant wetland associated with upgrades of an existing farm lane road crossing.

Block 18 SWM Pond Fish Removal, Landowners Group, Vaughan, ON. Fisheries Biologist and Project Manager for the completion of a fish salvage operation in two stormwater management ponds prior to pond clean-out activities. Fish salvage resulted in collection of over 10,000 fish from two ponds in an urban settlement area.

Shickluna Hydro Development, St. Catharines Hydro, St. Catharines, ON. Fisheries Biologist and Project Manager for revisions to *Fisheries Act*, *Endangered Species Act* and Conservation Authority permit applications for a proposed small hydroelectric development on Twelve Mile Creek.

Cochrane Solar Project, Northland Power Inc., Cochrane, ON. Project Manager for the completion of Renewable Energy Approval amendment for the existing Cochrane Solar Project. The amendment was required for construction and operation of a new access road and water crossing. Amendment required revised study documentation, impact assessment and public notification.

PREVIOUS PROJECT EXPERIENCE

Kabinakagami River Hydro Development, Northland Power Inc., Kabinakagami First Nation, ON. Fisheries Biologist and Project Manager for the Class Environmental Assessment for four proposed small hydroelectric facilities on the Kabinakagami River in northern Ontario. Completed fish community, spawning, tagging/tracking and fish habitat studies, agency, public and Indigenous consultation, provided aquatic input to design of a fish habitat compensation and completed all Environmental Assessment requirements.

Umbata Falls Hydroelectric Development, Innergex Power Corporation, Marathon, ON. Fisheries Biologist for the environmental screening and permitting for a greenfield hydroelectric facility on the Umbata River in northern Ontario. Completed fish community, spawning, and fish habitat studies, and provided aquatic input to the Environmental Assessment requirements. Completed three years of post-construction monitoring to confirm and verify predicted impacts.

Gull Bay Shoreline Stabilization Project, Ontario Power Generation, Gull Bay First Nation, ON. Fisheries Biologist and Project Manager for the environmental permitting and community consultation for a shoreline stabilization project, including opening of a new rock quarry for source material. Completed applications under *Fisheries Act*, *Aggregate Resources Act* and *Endangered Species Act* (Eastern Whip-poor-will).

Chaudière Hydro Project, Energy Ottawa, Ottawa, ON. Fisheries Biologist for the Environmental Effects Determination and permitting and approvals for a proposed 26 MW redevelopment of an aging hydroelectric facility on the Ottawa River. Completed agency consultation, provided aquatic input to the Environmental Effects Determination and design of downstream eel passage facilities and prepared application for *Fisheries Act* Authorization.

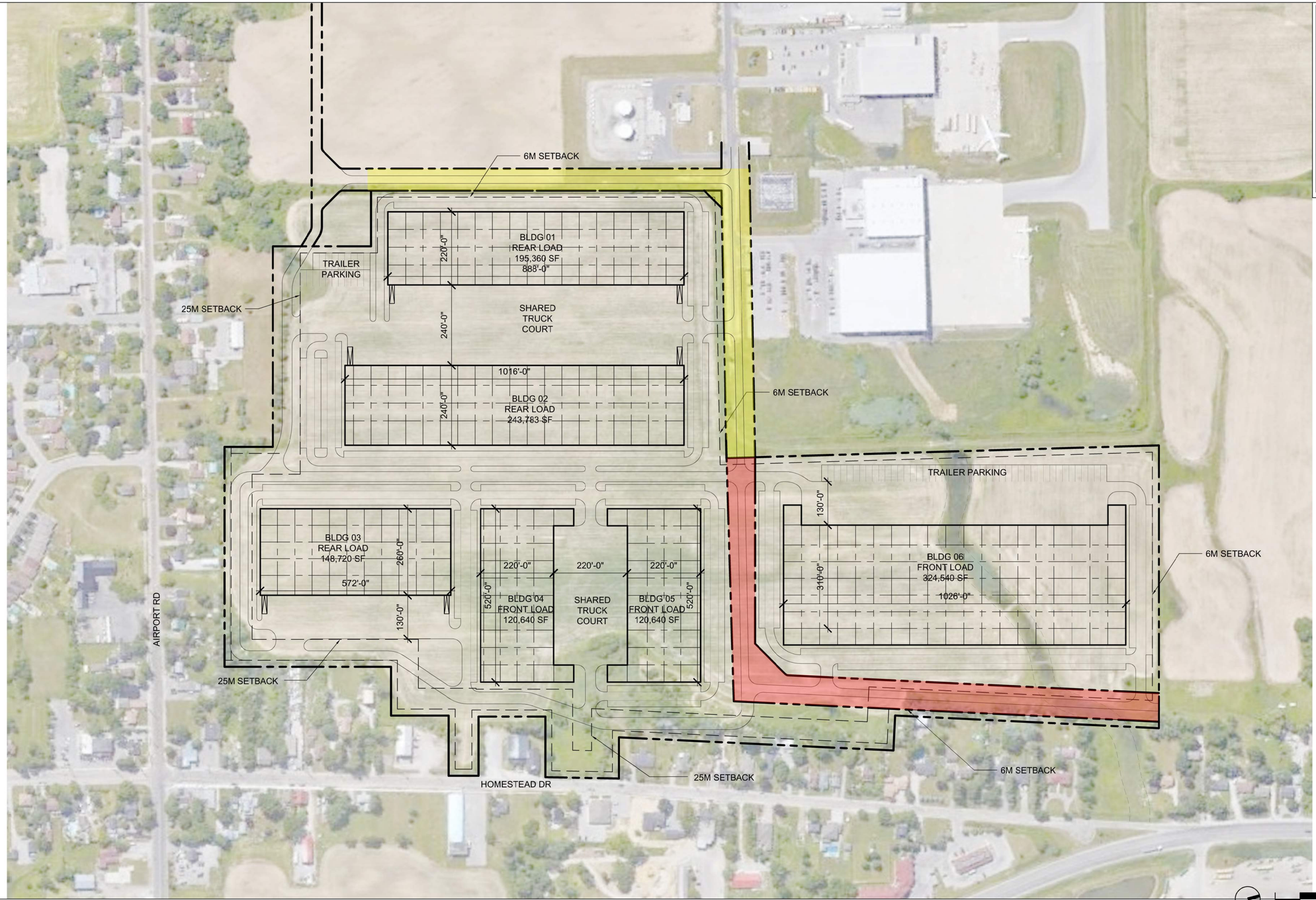
Darlington Deepwater Characterization, Ontario Power Generation, Bowmanville, ON. Fisheries Biologist and Project Manager for the baseline aquatic ecological studies to assess potential water intake locations for an expanded nuclear facility on the Lake Ontario shoreline. Fisheries studies included habitat assessment, fish community assessment (adult netting, larval trawling), water quality and zooplankton studies.

PRESENTATIONS

Boucher, N., Heaton, M. and A. Watt, 2019. Natural Channel Design for an Aquatic Species at Risk vs. Nature's Engineer: Case Study of Mount Pleasant, Brampton. At *Latornell Conservation Symposium*, Orillia, Ontario. November 21, 2019.

Appendix D – Conceptual Site Plan

SITE PLAN SCHEME 2B



BLDG NUMBER	SQUARE FOOTAGE
1	195,360
2	243,783
3	148,720
4	120,640
5	120,640
6	324,540
TOTAL BUILDING AREA	1,153,683
TOTAL SITE PLAN	3,291,556 SF (75.79 ACRES)
BUILDING COVERAGE	35%
ROAD AREA	164,426 SF (3.8 ACRES)
SETBACK	6 METERS (AIRPORT SIDE) 25 METERS (RESIDENTIAL SIDE)
PARKING REQ'D	1193 *(1.04/1000)*

0 75 150 300 600

*PRELIMINARY NOT FOR CONSTRUCTION, PERMIT, OR REGULATORY APPROVAL. * RENDERING IS REPRESENTATIVE OF DESIGN INTENT ONLY. IT IS NOT A PHOTOREALISTIC REPRESENTATION OF ACTUAL MATERIALS PROPOSED AND SHOULD BE CONSIDERED PRELIMINARY AT ALL STAGES.
* ALL BUILDING AREAS ARE APPROXIMATE UNTIL BUILDING FOOTPRINT/ ENTRY DESIGNS ARE FINALIZED.

3054 HOMESTEAD
a project for
FENGATE ASSET MANAGEMENT

powers brown architecture

TORONTO 30 NOVEMBER 2020 CANADA 081193

Appendix E

Tree Protection and Management Plan

Tree Protection and Management Plan

3054 Homestead Drive, 9166 Airport Road, and 9175 Airport Road

Hamilton, Ontario

Submitted to:
Fengate Asset Management
2275 Upper Middle Road East, Suite 700
Oakville, Ontario L6H 0C3

Submitted by:
GEI Consultants Ltd.
100 Ahrens Street West, Unit 201
Kitchener, Ontario N2H 4C3

Updated February 2023
Project 2100017

Table of Contents

Appendices

1. Introduction

GEI Consultants Ltd. (GEI) was retained by Fengate Homestead Holdings LP to complete a tree inventory and prepare a Tree Protection and Management Plan for the properties located at 3054 Homestead Drive, 9175 Airport Road, and 9166 Airport Road in the City of Hamilton, Ontario (collectively referred to herein as the Subject Lands). The Subject Lands are generally located north of Airport Road, west of Homestead Drive, east of John C. Munro Hamilton International Airport, and south of Dickenson Road within the Twenty Mile Creek watershed (**Figure 1**, **Appendix A**).

It is GEI's understanding that the Subject Lands will accommodate commercial development within the Airport Employment Growth District (AEGD) Secondary Plan (OPA 35). The AEGD has been designed to provide business park development to integrate and complement the existing John C. Munro Hamilton International Airport (herein referred to as the Airport Lands). The proposed development includes a complex of four commercial buildings and associated parking lots and one street (**Figure 2**, **Appendix A**). A created wetland will be constructed on the eastern portion of the Subject Lands near the existing adjacent residences.

GEI completed a tree inventory within the Subject Lands over multiple years, as properties were added into the Subject Land boundary: 3054 Homestead was surveyed in 2021, 9175 Airport Road was surveyed in 2022, and 9166 Airport Road was surveyed in 2023. This Tree Protection and Management Plan presents the results of the tree inventory, identifies opportunities for tree preservation and protection, recommends measures to protect preservation trees, and proposes compensation for tree removals. The objective of the Tree Protection and Management Plan is to retain existing tree cover wherever feasible and to minimize the risk of injury to trees identified for protection. The preparation of this Tree Protection and Management Plan was guided by the City of Hamilton's *Tree Protection Guidelines* (2010).

2. Methodology

GEI completed the tree inventory at 3054 Homestead Drive on September 8, October 14, and October 15, 2021. The tree inventory at 9175 Airport Road was completed on June 22, 2022. A final site visit was conducted on January 31, 2023 to inventory the trees at 9166 Airport Road. Trees with a diameter-at-breast-height (DBH) of 10 cm and greater within the Subject Lands were tagged and assessed. Trees within two of the three woodlands (as shown on **Figure 3**, **Appendix A**) and on adjacent lands were assessed but not tagged. Woodland and neighbour trees were assigned a unique identifier beginning with W and N, respectively, for mapping and reference purposes. The locations for all inventoried trees on the Subject Lands were recorded in UTM coordinates using a sub-meter capable GPS unit. The following information was recorded for each tree: species, DBH, health category (biological, structural, and overall), and notes regarding the assigned health category.

Tree health was categorized as good, fair, or poor. Trees categorized as “good” overall had at least 80% live canopy and showed no significant structural defects (e.g., weak limbs, girdling roots, stem lean) or evidence of biological damage (e.g., insect damage, fungal growth, leaf dieback). “Fair” trees were those with 50% to 80% live canopy and showed no significant structural or biological defects, or the tree had over 80% live canopy but did show some evidence of structural defects and/or biological damage. Trees categorized as “poor” were those with less than 50% live canopy and/or had significant structural defects and/or biological damage.

3. Tree Inventory

A total of 444 trees were mapped and assessed during this tree inventory, including two dead trees (**Figure 3**, **Appendix A**). All inventoried trees were located on private lands; no municipal trees were identified during this tree inventory.

Table 1 (**Appendix B**) outlines the results of the tree inventory, including the tree identification number, species, DBH, crown radius, health category (biological, structural, and overall), notes regarding the assigned health category, recommendations for preservation or removal, rationale for tree removal, tree ownership, and the size of the Tree Protection Zone (TPZ) for preservation trees. GEI and City of Hamilton Forestry Staff have agreed to defer inclusion of grading and utilities information until detailed design. This Tree Protection and Management Plan will be updated once that detailed information is available.

The inventoried trees included 19 different species, including one hybrid and one that could only be identified to genus. Of the 442 live inventoried trees, 265 (60%) are native to the Hamilton Conservation Authority and Conservation Halton watersheds (HCA 2014).

Two Hybrid Butternut (*Juglans cinerea* x *Juglans ailantifolia*), as confirmed through DNA testing (see **Appendix C**), were inventoried. Therefore, these trees are not afforded any protections under the *Endangered Species Act, 2007*.

3.1 Preservation Trees

Preservation trees are those that are unlikely to be significantly impacted by the proposed construction or can likely be preserved using tree protection measures, as described in **Section 4**. Of the 444 inventoried trees, 20 are preservation trees.

3.2 Removal Trees

Removal trees are those that are located within the proposed construction footprint and cannot be preserved. Of the 444 inventoried trees, 424 are removal trees (including two dead trees). Compensation for removal trees is discussed in **Section 5**.

The tree inventory noted several private trees on or near the property boundary, slated for removal. Permission is required from both landowners prior to the removal of trees located on the property boundary. Ownership of these trees can only be determined through a legal survey completed by an Ontario Land Surveyor.

The proponent should ensure that the works are in conformance with the *Migratory Birds Convention Act, 1994* and the *Endangered Species Act, 2007*. Specifically, tree removals should comply with timing window restrictions with regards to the protection of nesting birds (April 1 to August 31) and Species at Risk bats (April 1 to September 30). Where these timing windows cannot be avoided, it is recommended that a qualified ecologist conduct a nest search and bat habitat assessment.

4. Tree Protection and Management Plan

Tree preservation will be achieved through avoidance and/or the use of appropriate tree protection measures. GEI inventoried 444 trees within the Subject Lands. Of these, 20 are preservation trees. The proposed Tree Protection and Management Plan is described in the following subsections.

4.1 Tree Protection Zones

The area of protection around a tree is referred to as the TPZ and is measured outward from the trunk. The TPZ was determined in accordance with the City of Hamilton's *Tree Protection Guidelines* (2010). The width of the TPZ corresponds to the crown radius (dripline) plus one meter.

The TPZs must be fenced off to prevent physical damage to the tree and compaction of the soil, as described in the *Tree Protection Guidelines*. The TPZ must remain fully intact throughout all phases of construction and cannot be used for the temporary storage of fill, topsoil, building materials, equipment storage, washing of equipment, or dumping of any construction debris. Tree protection fencing will provide protection to the individual trees and clumps of trees, as shown on **Figure 3** (**Appendix A**). Page wire farm fencing shall be the standard form; snow fencing is not acceptable. Signage must be posted in visible locations on each tree protection fence and must clearly state that the barrier delineates the TPZ. Tree protection measures for preservation trees must follow the City of Hamilton's Tree Preservation Details, included in **Appendix D**.

A Verification of Tree Protection Letter is to be prepared by a recognized tree management professional (i.e., certified arborist, registered professional forester, or landscape architect) to ensure that all tree protection measures have been implemented. This correspondence is to be provided to the Director of Planning prior to the start of any on-site works.

4.2 Protection of Preservation Trees

The objective of the TPZ is to maximize protection of the tree to ensure its long-term survival. It is recognized, however, that encroachment into the prescribed TPZ may at times be deemed necessary to facilitate construction. Some healthy trees are known to withstand construction impacts such as root cutting, soil compaction, and soil saturation; however, these individual responses are dependent on the species, site condition, and degree of impacts (Matheny & Clark 1998).

Should construction activities occur within the TPZs of some preservation trees, protection and mitigation techniques are expected to prevent these activities from impacting the long-term health of these trees. These trees would be given a modified TPZ prior to construction, which would follow the limit of construction activity. This modified TPZ will require strict adherence to the tree protection measures outlined below. If these trees cannot be adequately

protected during construction, they will be identified as removal trees and will require compensation as described in **Section 5**.

Where construction activity is proposed to occur within a TPZ, the TPZ must be properly prepared. The Project Arborist should be on site during all site alteration activities within the TPZ of live preservation trees, including tree removal, canopy or root trimming, and soil stripping, to monitor these activities and propose site-specific mitigation, where appropriate. If any accidental tree damage or encroachment into the TPZ occurs or is observed, the Project Arborist should be notified in order to take appropriate action on site. In addition, the following tree protection measures should be implemented:

- All relevant contractors should meet with the Project Arborist prior to the beginning of site alteration to review tree protection procedures.

- Low branches may be pruned back or removed to accommodate vehicular movement.

- Trees to be removed should be felled in a manner that drops the tree away from adjacent preservation trees and their TPZs.

- Any brush clearing required within the TPZs should be completed using hand-operated equipment and should be lifted out and not skidded out.

- If excavation or grading is proposed within the TPZs, affected tree roots must be cut at a 90° angle at the edge of anticipated disturbance using specialized equipment. Hydro-vac excavation will be necessary to expose the roots prior to cutting if existing conditions prevent machinery from making a clean, 90^{o} cut.

- Tree roots damaged during construction should be exposed and cut cleanly at a 90° angle using hand operated equipment to aid in root regeneration.

- Any roots exposed for longer than four hours should be kept moist using wet mulch or burlap wrap or be directly irrigated. These affected trees should have wood mulch applied to their respective TPZs at a depth of 5–10 cm to help maintain moisture and moderate soil temperature.

- Horizontal root protection should be used in locations where regular movement of equipment through the TPZ is anticipated.

- Where construction activity is proposed to occur within or near the TPZs, irrigation should be implemented during periods of drought, especially during the summer months. A slow soaking of the entire TPZ to a depth encompassing the root system is the preferred method of irrigation, but it may vary depending on the tree species and soil texture. Water should not be directed at or near the trunks. The frequency of irrigation will depend on air temperature and precipitation at the time of construction.

- Sediment control fencing should be installed to provide a protective barrier between areas intended for stockpiling of excavated soil and candidate preservation trees. The sediment control fencing should be installed to Ontario Provincial Standard 219.130.

If preservation trees cannot be adequately protected during construction or if they exhibit canopy dieback post construction, they will be identified as removal trees and will require compensation as described in **Section 5**.

4.3 Post-construction Monitoring

After grading has been completed, the City of Hamilton requires that a Post-Grading Tree Maintenance Report be prepared and submitted to the Director of Planning. The Post-Grading Tree Maintenance Report will provide the following, as applicable:

- Assessment of damage to trees that were to be preserved but have inadvertently been damaged or removed by site grading and clearing;
- Identification of a dollar value for damaged trees and proposal of a compensation plan for replacing them; and
- Recommendations for preservation methods, such as root fertilization, watering, and pruning to improve the health of remaining trees.

The Post-Grading Tree Maintenance Report will be prepared following construction activities, in accordance with City of Hamilton guidelines.

5. Compensation Requirements

The City of Hamilton requires compensation for the removal of live private trees at a ratio of 1:1. Accordingly, a total of 422 trees are proposed to be planted as compensation for those removed through the construction of the proposed development. A Landscape Plan showing new compensation plantings will be required for submission to the Director of Planning for their review; this will be prepared during the detailed design stage. All Landscape Plans must be prepared by or under the guidance of a Landscape Architect registered as a full member in good standing with the Ontario Association of Landscape Architects and must conform to the Tree Protection and Management Plan and Site Plan. Compensation trees will be native species listed in Appendix 4 of the *Tree Protection Guidelines*. Other landscape guidelines from the City of Hamilton are as follows:

- Transplanted stock should be restricted to specimens under 20 mm DBH;
- Minimum caliper for deciduous planting stock is 50 mm DBH;
- Minimum height for a conifer is 1.5 m;
- Include a mix of tree species (no monocultures); and
- Invasive species (listed in Appendix 5 of the *Tree Protection Guidelines*) should not be transplanted.

If the required number of compensation trees cannot be accommodated on site, compensation through cash-in-lieu will be discussed with the City of Hamilton in accordance with their New Developments Tree Planting Policy.

6. Summary

GEI inventoried 444 trees within the Subject Lands, of which two were dead. Of the inventoried trees, 20 are recommended for preservation and 424 are recommended for removal (including two dead trees) due to predicted construction impacts. Private live tree removals require compensation at a ratio of 1:1, for a total of 422 trees proposed to be planted. If the required number of compensation trees cannot be accommodated on site, compensation through cash-in-lieu will be discussed with the City of Hamilton.

Prepared By:

GEI Consultants

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Reviewed By:

Sara Ross, ISA Certified Arborist ON-2084A
Environmental Specialist
416-294-6658
sross@geiconsultants.com

REFERENCES AND BACKGROUND MATERIALS

City of Hamilton 2010. Tree Protection Guidelines. Hamilton, ON: City of Hamilton.

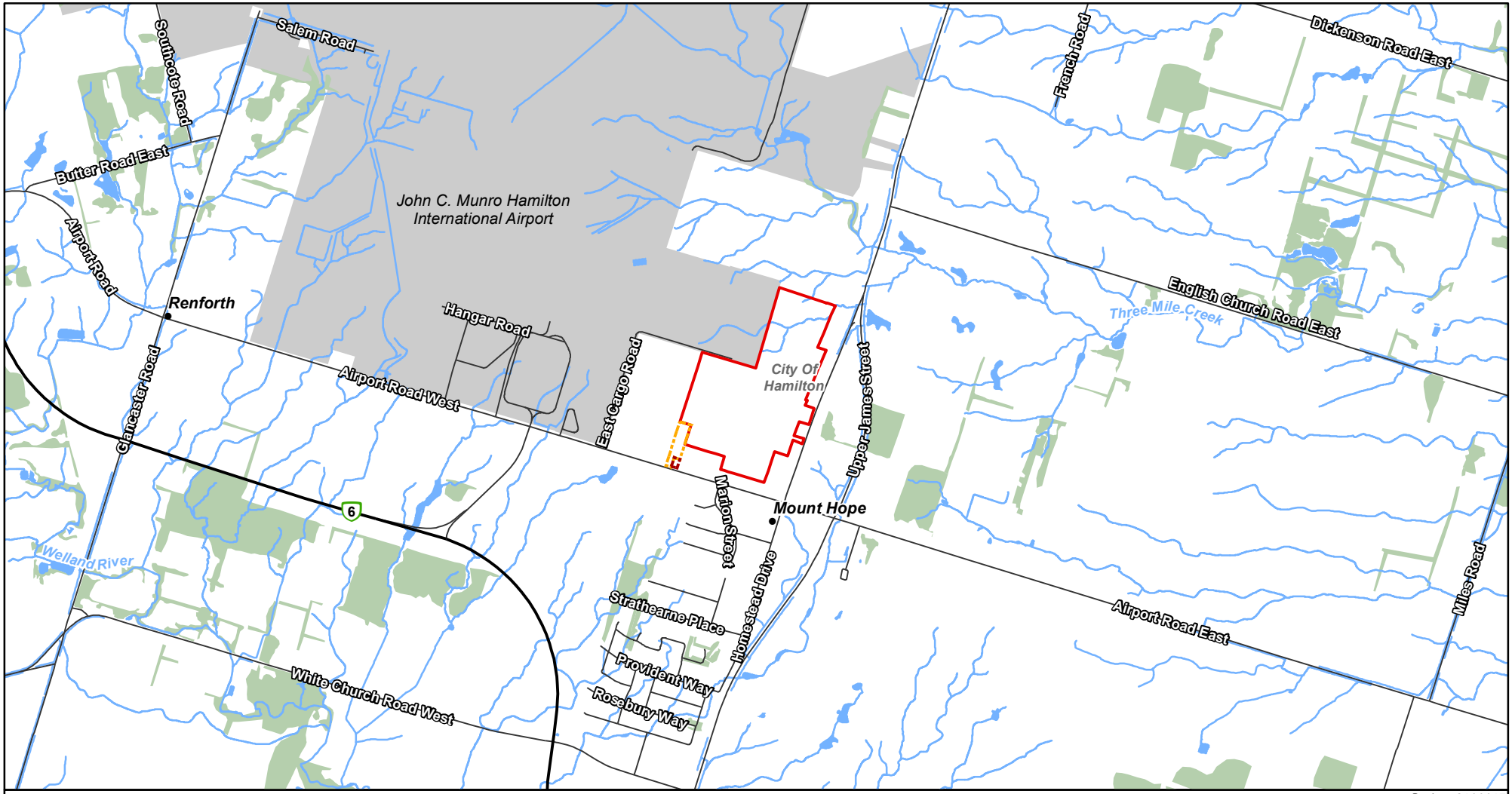
Hamilton Conservation Authority (HCA) 2014. Hamilton Natural Areas Inventory Project, 3rd Edition. Species Checklist Document. Hamilton, ON: Hamilton Conservation Authority.

Matheny, N.P. and J.R. Clark 1998. Trees and Development: A Technical Guide to Preservation of Trees During Land Development. Denver, CO, U.S.A.: Dream Books Company.

Toronto and Region Conservation Authority 2019. Erosion and Sediment Control Guide for Urban Construction. Available online at: https://sustainabletechnologies.ca/app/uploads/2020/01/ESC-Guide-for-Urban-Construction_FINAL.pdf.

Appendix A

Figures



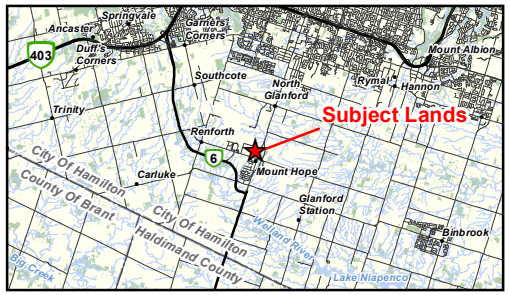
Project 2100017

3054 Homestead Drive, 9166 and 9174 Airport Road
Tree Preservation and Management Plan
Fengate Asset Management

Figure 1
Location of Subject Lands

NOTES:
1. Coordinate System: NAD 1983 UTM Zone 17N.
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2023; © Niagara Peninsula Conservation Authority, 2023.

Legend
- 3054 Homestead Drive
- 9174 Airport Road
- 9166 Airport Road
- Highway
- Road
- Watercourse
- Waterbody
- Wooded Area
- Airport



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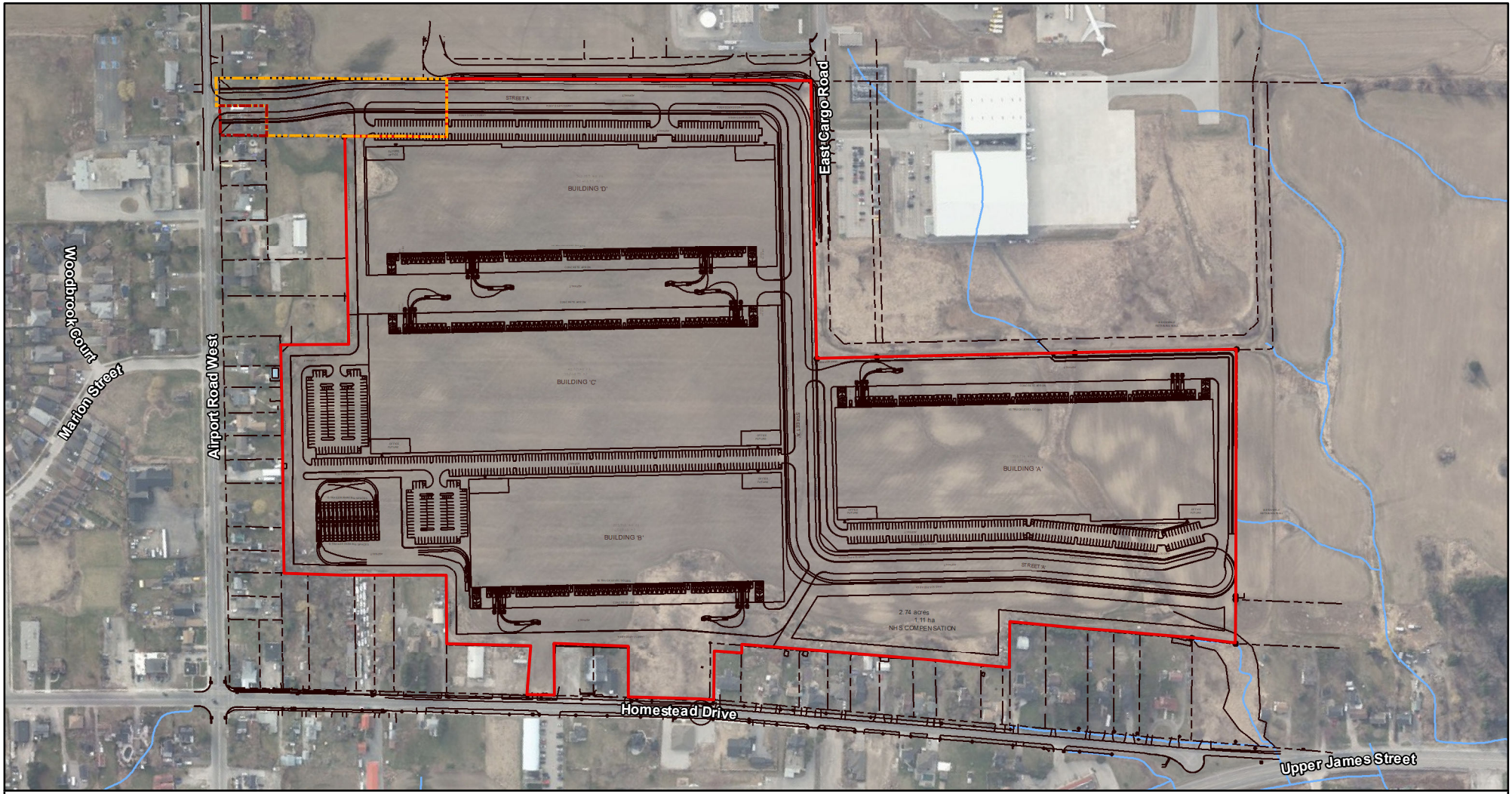

Project 2100017

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4. Concept Plan: '413-21-Concept Plan-2023-01-31.dwg'

Legend

- 3054 Homestead Drive
- 9174 Airport Road
- 9166 Airport Road
- Watercourse (NPCA)

3054 Homestead Drive, 9166 and 9174 Airport Road
Tree Preservation and Management Plan
Fengate Asset Management

Figure 2
Concept Plan

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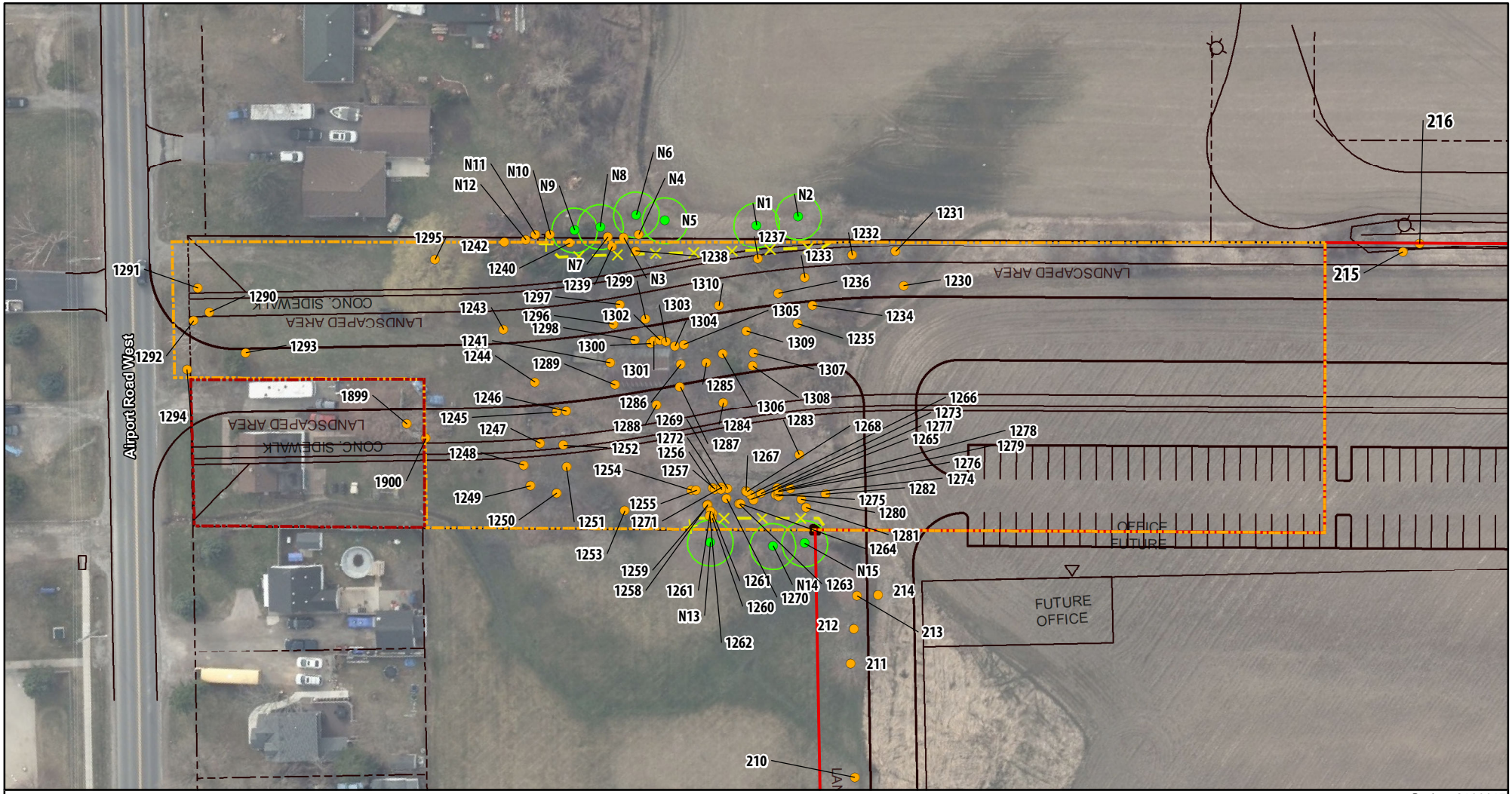
GEI Consultants



Project 2100017

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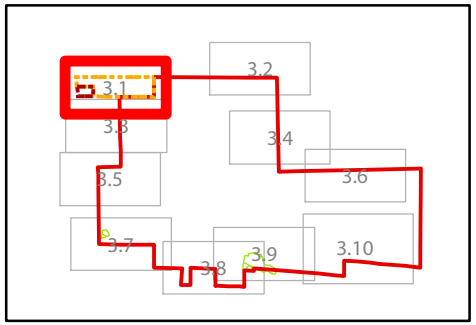
4. Concept Plan: '413-21-Concept Plan-2023-01-31.dwg'

Legend

- Watercourse (NPCA)
- Hoarding Fence
- Tree Protection Zone

Tree Inventory

- Preservation - Live
- Removal - Alive



3054 Homestead Drive, 9166 and 9174 Airport Road TPMP
Tree Preservation and Management Plan
Fengate Asset Management

Figure 3.1
Tree Inventory

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1:1,000

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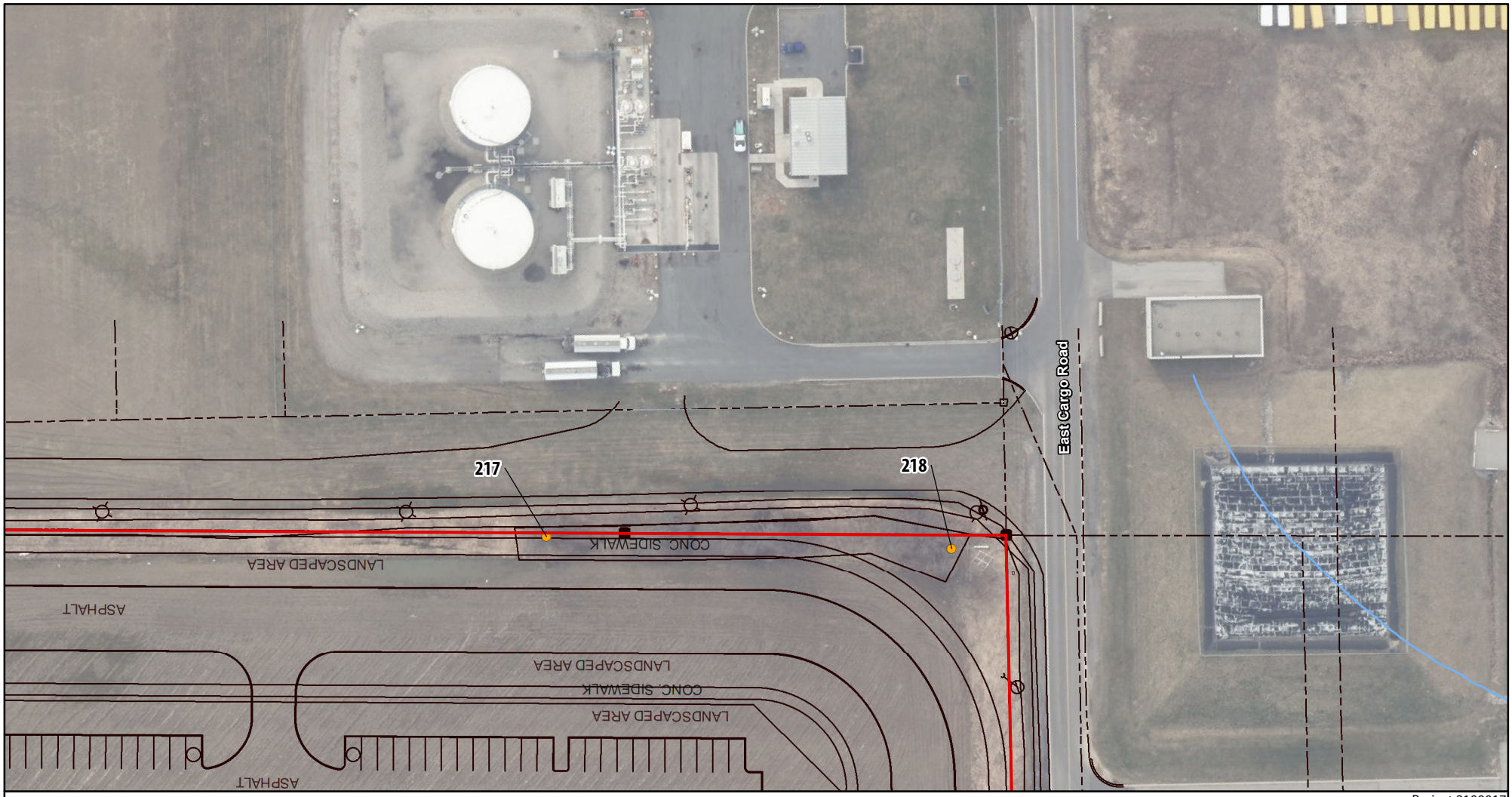
GEI Consultants



Project 2100017

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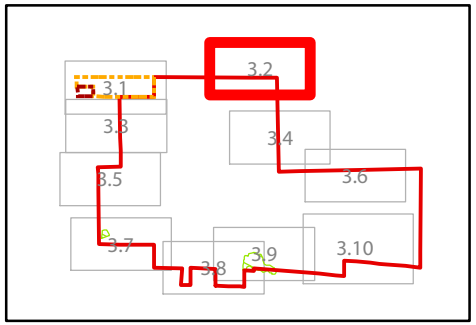
4. Concept Plan: '413-21-Concept Plan-2023-01-31.dwg'

Legend

Watercourse (NPCA)

Tree Inventory

Removal - Alive



3054 Homestead Drive, 9166 and 9174 Airport Road TPMP
Tree Preservation and Management Plan
Fengate Asset Management

Figure 3.2
Tree Inventory

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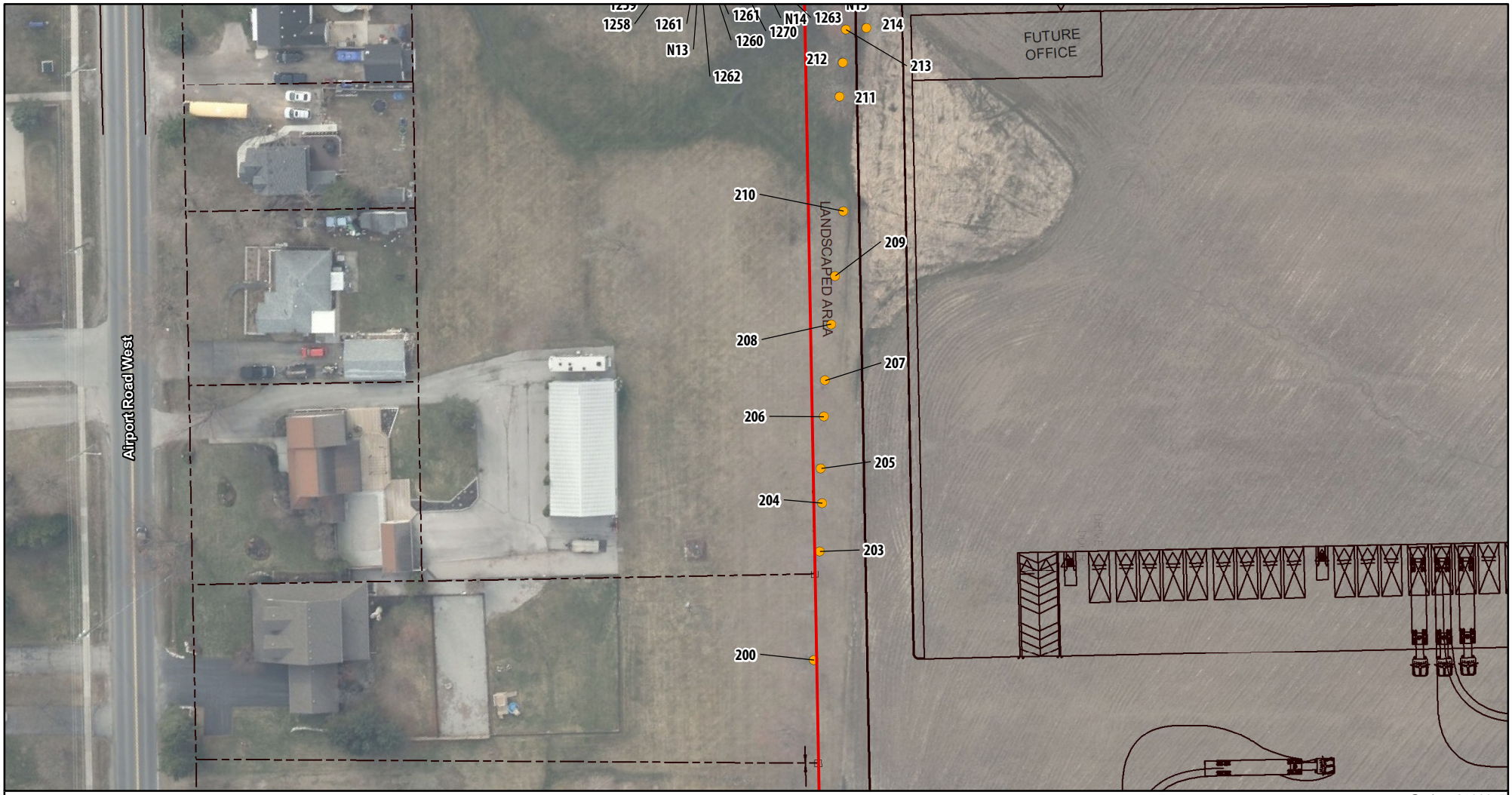

Project 2100017

3054 Homestead Drive, 9166 and 9174 Airport Road TPMP
Tree Preservation and Management Plan
Fengate Asset Management

Figure 3.3
Tree Inventory

NOTES:

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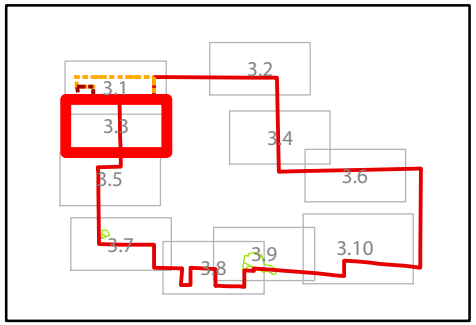
3. Orthoimagery © First Base Solutions, 2023. Imagery taken in 2019.
4. Concept Plan: '413-21-Concept Plan-2023-01-31.dwg'

Legend

Watercourse (NPCA)

Tree Inventory

Removal - Alive



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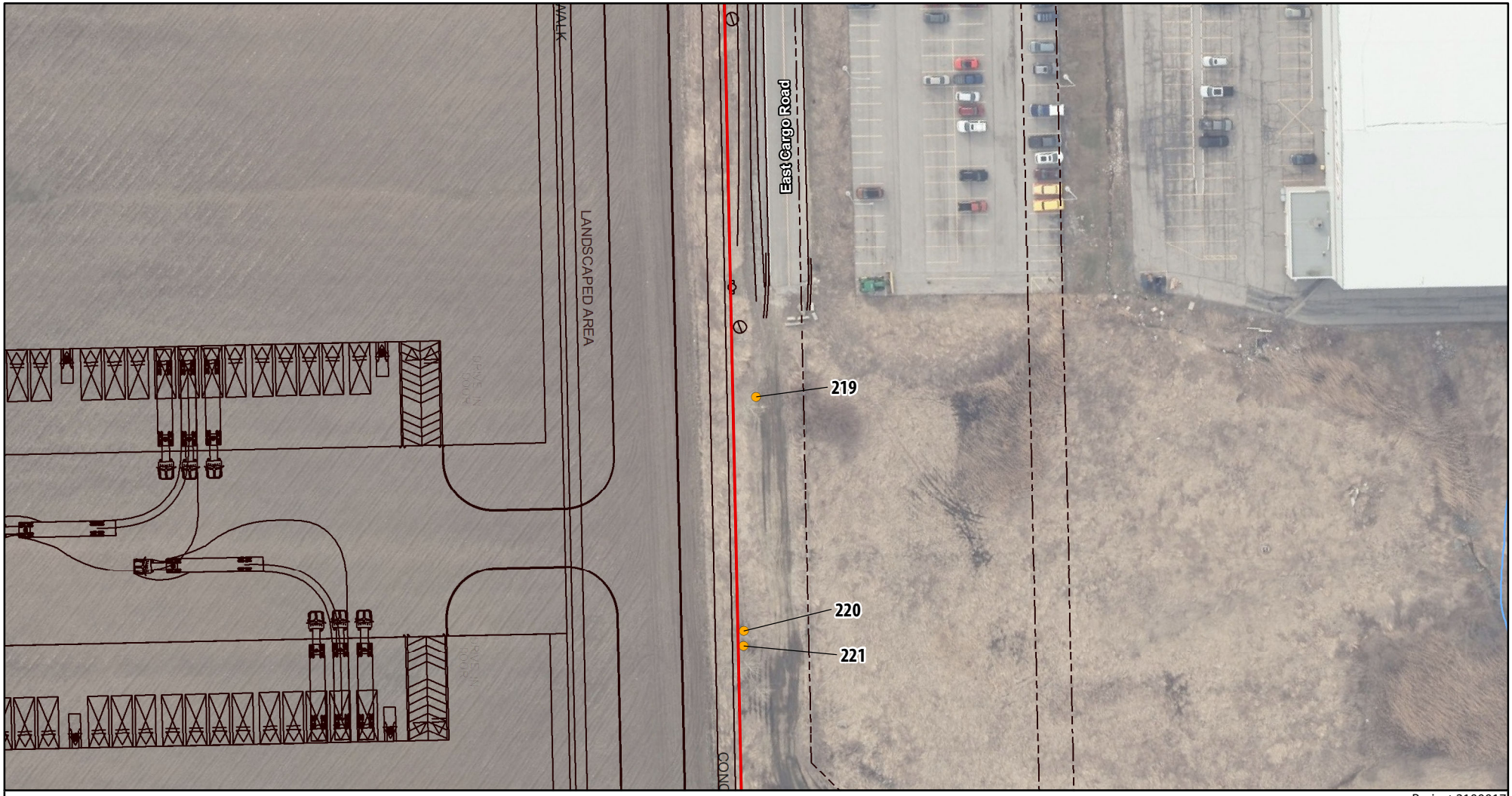

Project 2100017

3054 Homestead Drive, 9166 and 9174 Airport Road TPMP
Tree Preservation and Management Plan
Fengate Asset Management

Figure 3.4
Tree Inventory

NOTES:

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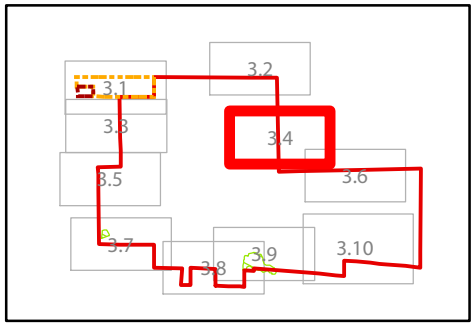
4. Concept Plan: '413-21-Concept Plan-2023-01-31.dwg'

Legend

Watercourse (NPCA)

Tree Inventory

Removal - Alive



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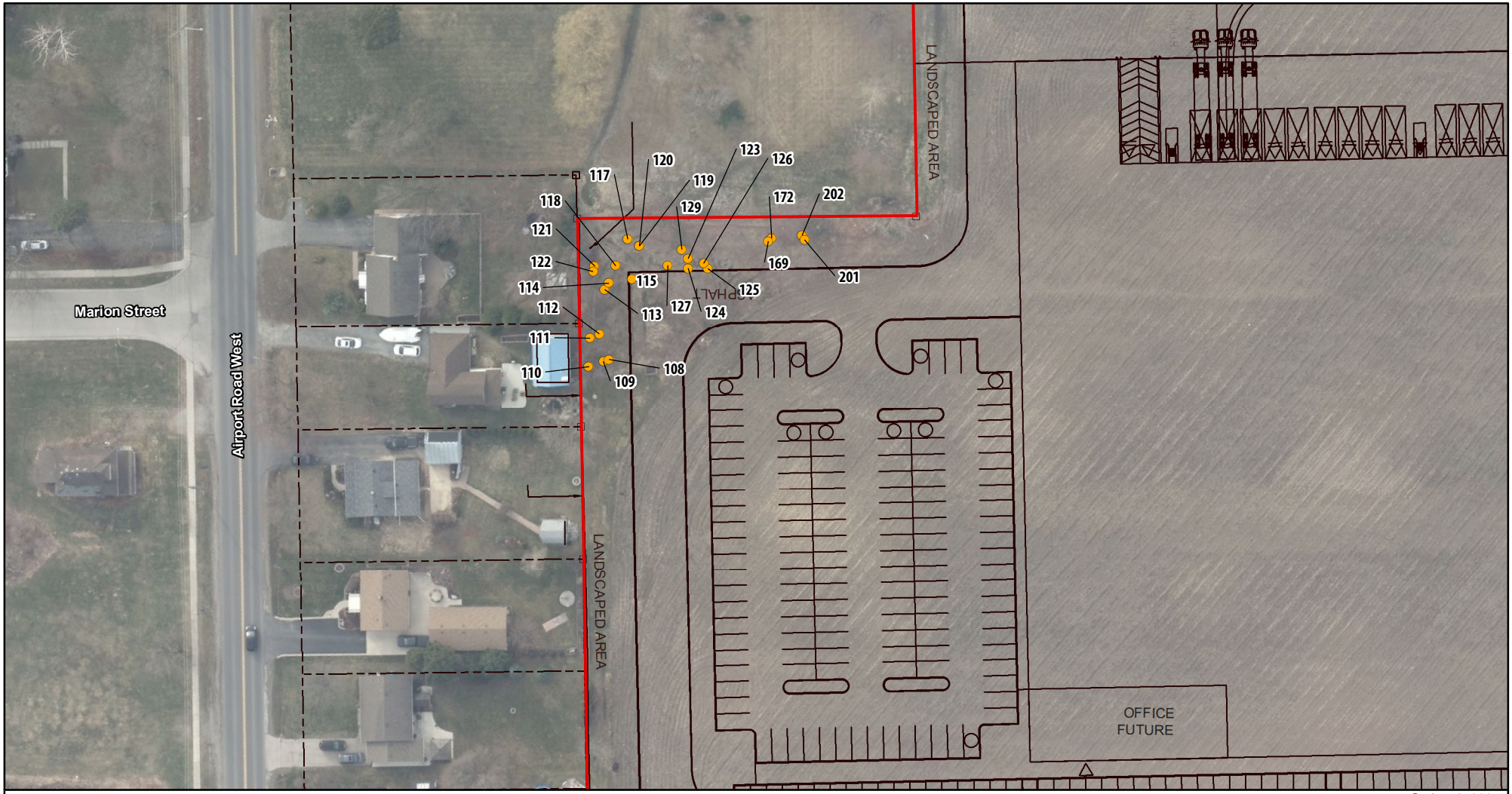

NOTES:

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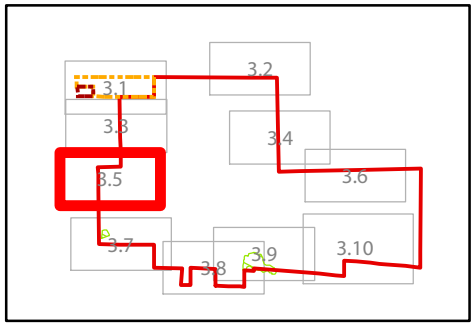
4. Concept Plan: '413-21-Concept Plan-2023-01-31.dwg'

Legend

Watercourse (NPCA)

Tree Inventory

Removal - Alive



Project 2100017

3054 Homestead Drive, 9166 and 9174 Airport Road TPMP
Tree Preservation and Management Plan
Fengate Asset Management

Figure 3.5
Tree Inventory

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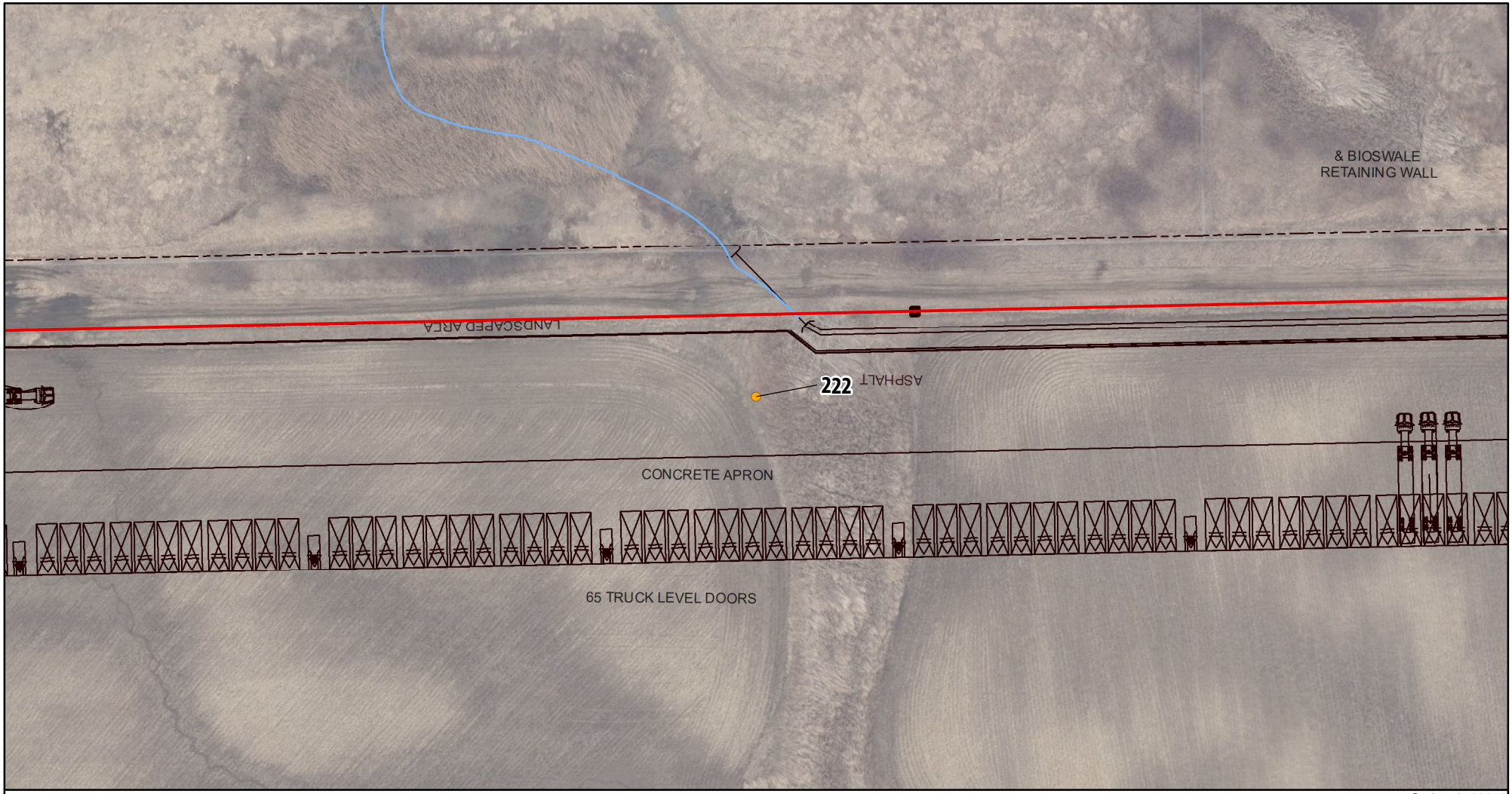

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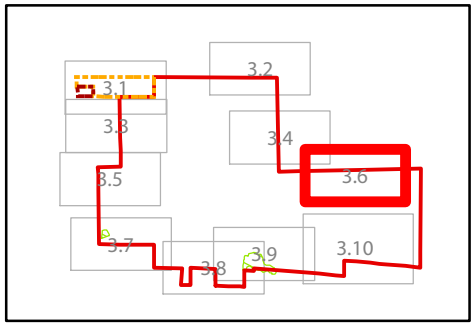
4. Concept Plan: '413-21-Concept Plan-2023-01-31.dwg'

Legend

Watercourse (NPCA)

Tree Inventory

Removal - Alive



3054 Homestead Drive, 9166 and 9174 Airport Road TPMP
Tree Preservation and Management Plan
Fengate Asset Management

Figure 3.6
Tree Inventory

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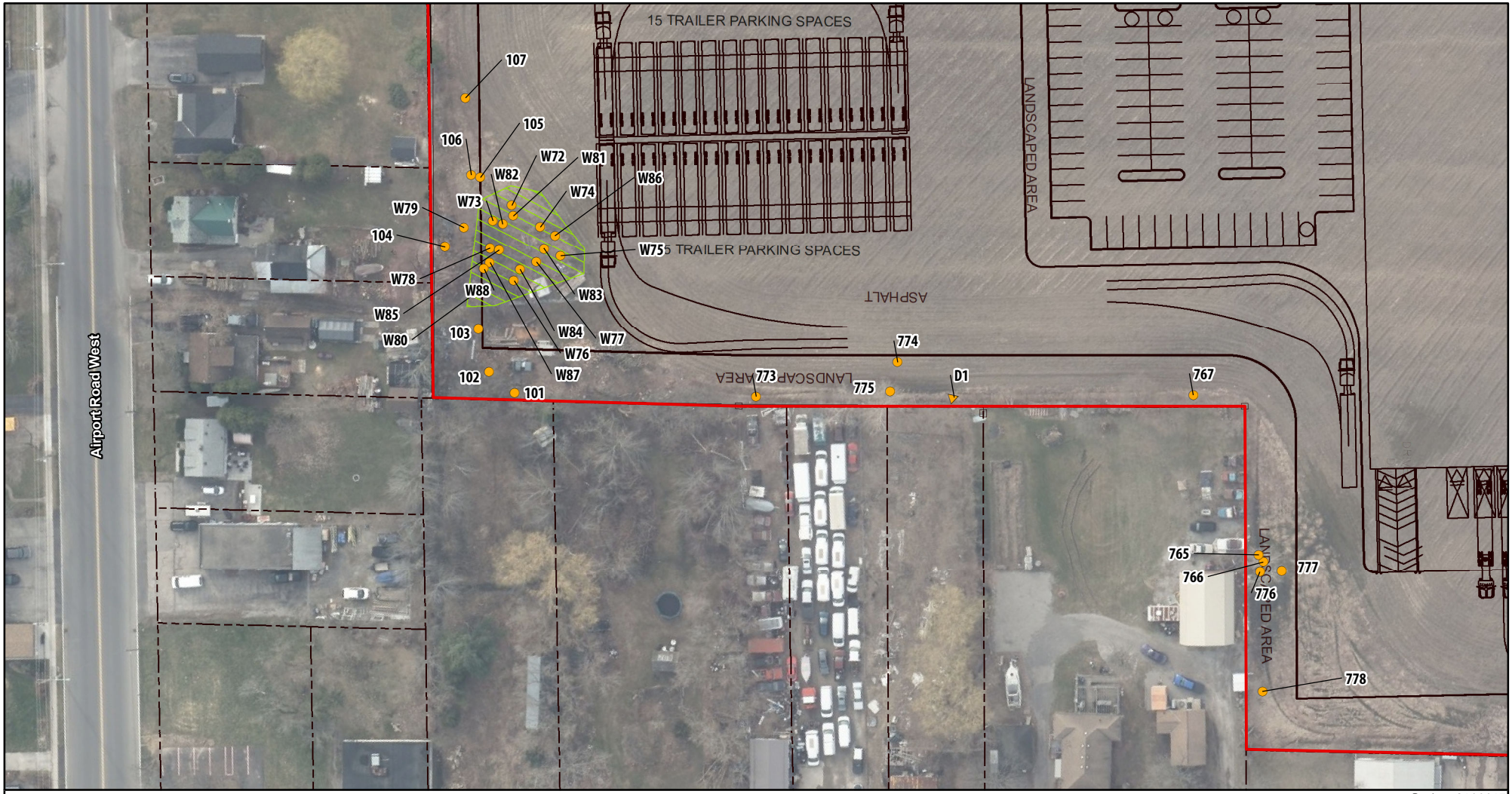

Project 2100017

3054 Homestead Drive, 9166 and 9174 Airport Road TPMP
Tree Preservation and Management Plan
Fengate Asset Management

Figure 3.7
Tree Inventory

NOTES:

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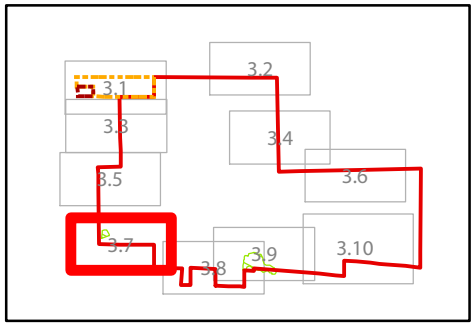
4. Concept Plan: '413-21-Concept Plan-2023-01-31.dwg'

Legend

- Watercourse (NPCA)
- Woodland (per 2021 ELC)

Tree Inventory

- Removal - Alive
- Removal - Dead



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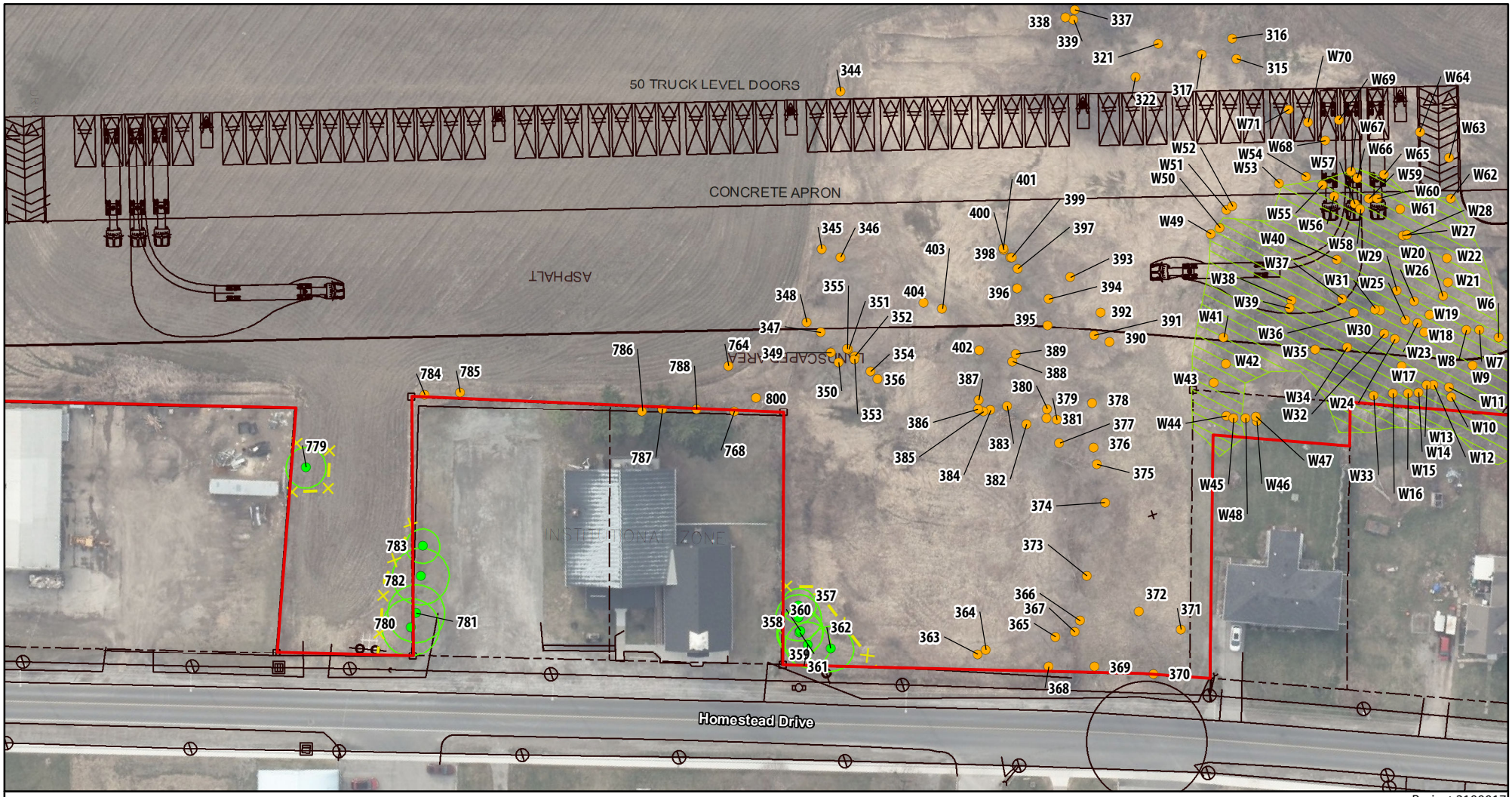

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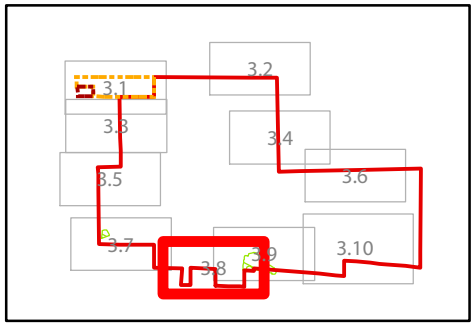
3. Orthoimagery © First Base Solutions, 2023. Imagery taken in 2019.
4. Concept Plan: '413-21-Concept Plan-2023-01-31.dwg'

Legend

- Watercourse (NPCA)
- Woodland (per 2021 ELC)
- Hoarding Fence
- Tree Protection Zone

Tree Inventory

- Preservation - Live
- Removal - Alive



Project 2100017

3054 Homestead Drive, 9166 and 9174 Airport Road TPMP
Tree Preservation and Management Plan
Fengate Asset Management

Figure 3.8
Tree Inventory

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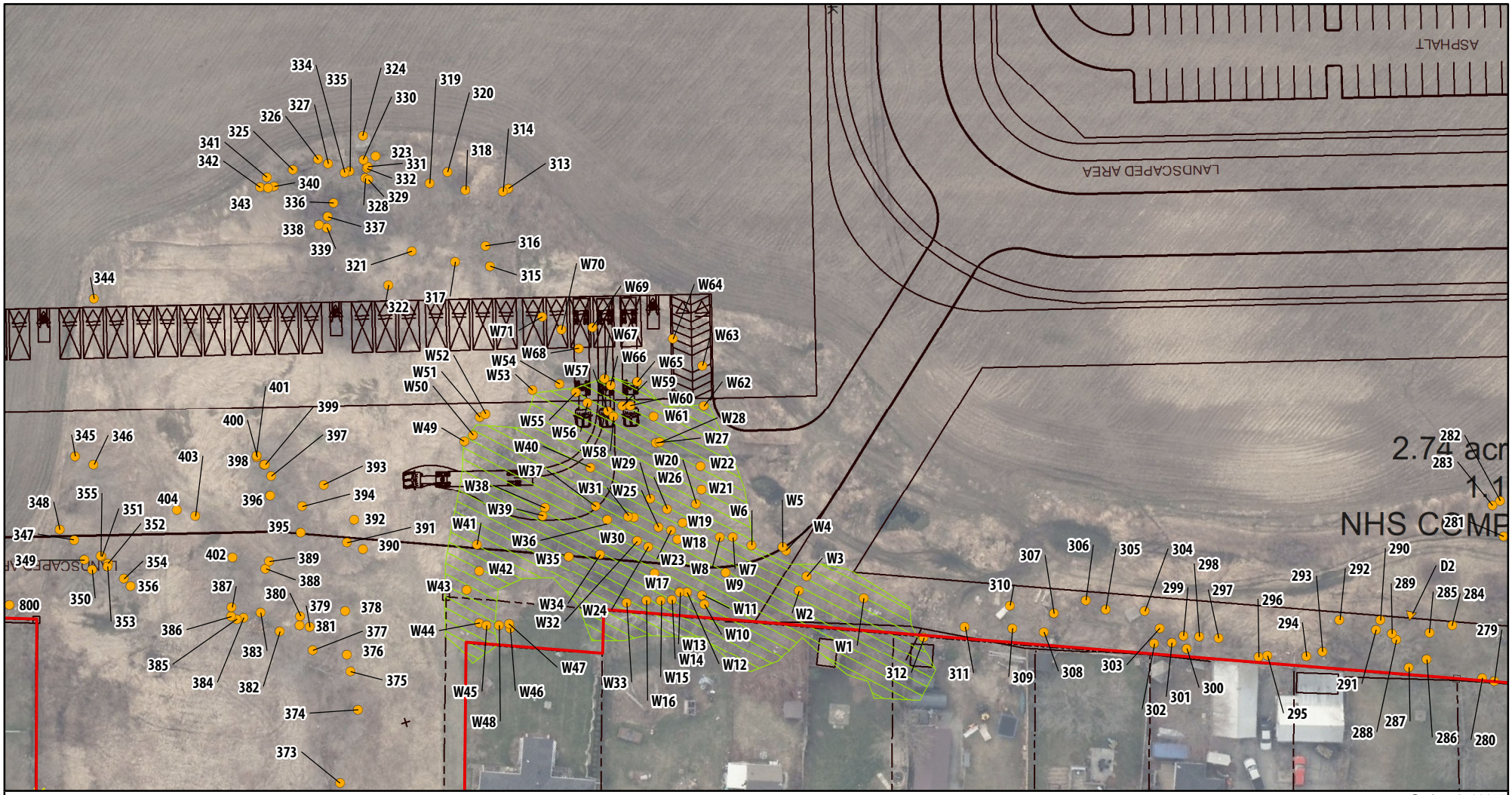

Project 2100017

3054 Homestead Drive, 9166 and 9174 Airport Road TPMP
Tree Preservation and Management Plan
Fengate Asset Management

Figure 3.9
Tree Inventory

NOTES:

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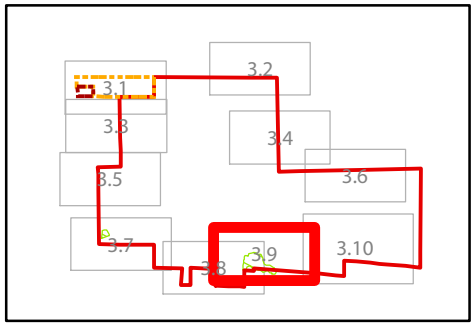
3. Orthoimagery © First Base Solutions, 2023. Imagery taken in 2019.
4. Concept Plan: '413-21-Concept Plan-2023-01-31.dwg'

Legend

- Watercourse (NPCA)
- Woodland (per 2021 ELC)

Tree Inventory

- Removal - Alive
- Removal - Dead



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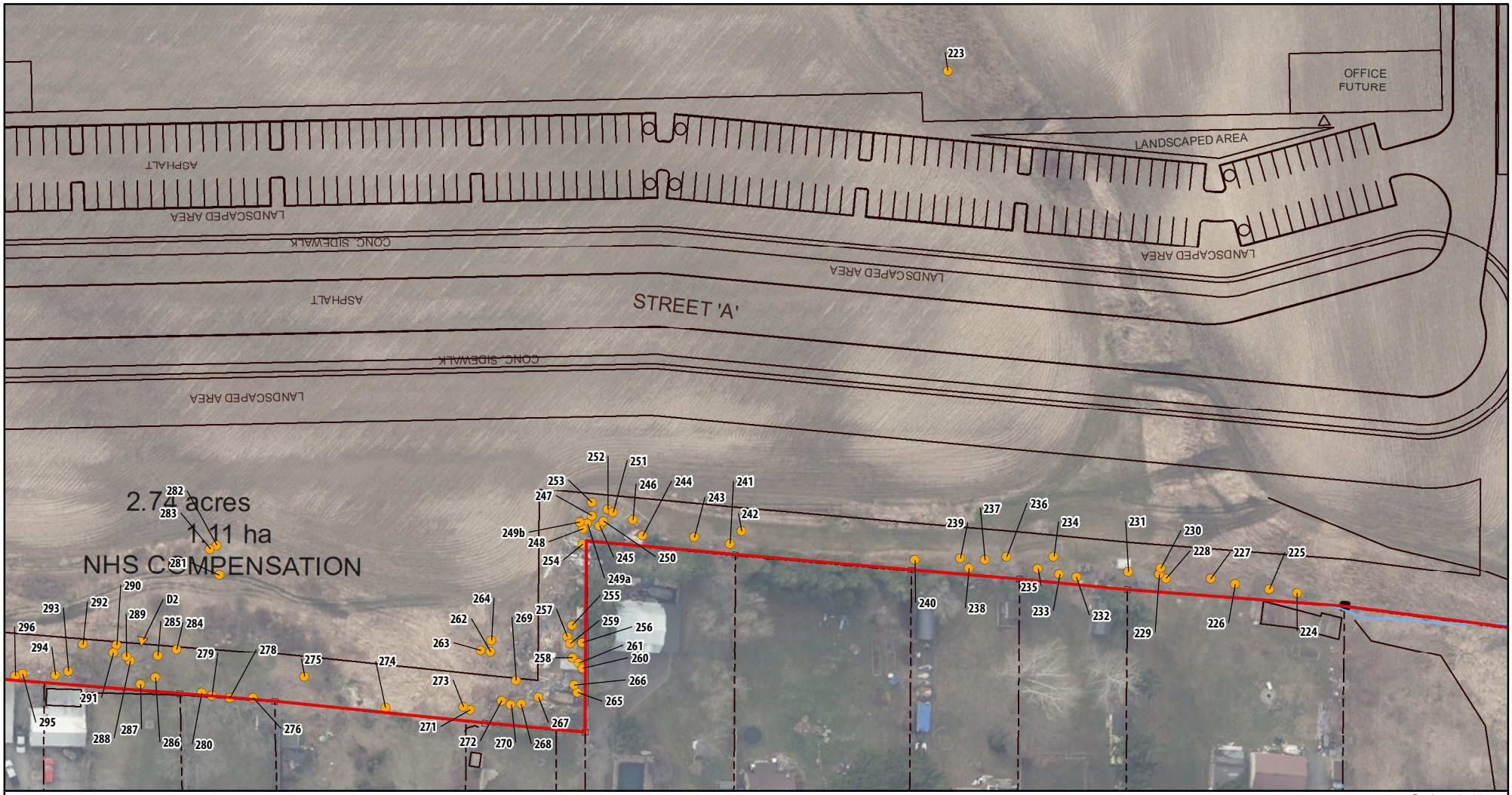

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NOTES:

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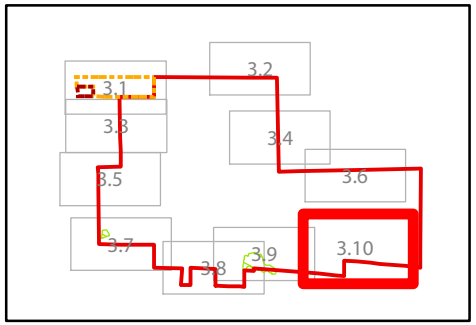
3. Orthoimagery © First Base Solutions, 2023. Imagery taken in 2019.
4. Concept Plan: '413-21-Concept Plan-2023-01-31.dwg'

Legend

Watercourse (NPCA)

Tree Inventory

- Removal - Alive
- Removal - Dead



3054 Homestead Drive, 9166 and 9174 Airport Road TPMP
Tree Preservation and Management Plan
Fengate Asset Management

Figure 3.10
Tree Inventory

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Appendix B

Tables

Tree ID Number	Species Common Name	Species Scientific Name	Multi-stem DBH[1] (cm)	DBH 1 (cm)	DBH 2 (cm)	DBH 3 (cm)	DBH 4 (cm)	DBH 5 (cm)	Crown Radius (m)	Biological Health	Structural Health	Overall Health	TPZ (m)	Recommended Action	Rationale for Removals	Ownership	Notes
101	Green Ash	*Fraxinus pennsylvanica*	12	12	0	0	0	0	1.5	Poor	Poor	Poor	0	Remove	Located within development footprint	Private	EAB, almost dead, one live limb
102	Silver Maple	*Acer saccharinum*	28	25	12	0	0	0	3	Good	Fair	Fair	0	Remove	Located within development footprint	Private	Multiple stems, included bark
103	Green Ash	*Fraxinus pennsylvanica*	58	54	21	0	0	0	5	Fair	Poor	Fair	0	Remove	Located within development footprint	Private	On lean, dead and broken limbs and branches
104	Green Ash	*Fraxinus pennsylvanica*	18	14	12	0	0	0	2.5	Poor	Poor	Poor	0	Remove	Located within development footprint	Private	Suckering, almost dead
105	Black Walnut	*Juglans nigra*	14	14	0	0	0	0	2.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
106	Manitoba Maple	*Acer negundo*	22	22	0	0	0	0	2.5	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	On lean, two stems, broken limb
107	Black Walnut	*Juglans nigra*	16	16	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
108	Black Walnut	*Juglans nigra*	12	12	0	0	0	0	2.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
109	Black Walnut	*Juglans nigra*	11	11	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
110	Black Walnut	*Juglans nigra*	16	12	10	0	0	0	3	Good	Fair	Fair	0	Remove	Located within development footprint	Private	Multiple stems
111	Black Walnut	*Juglans nigra*	16	11	11	0	0	0	2.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
112	Black Walnut	*Juglans nigra*	14	14	0	0	0	0	2.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
113	Black Walnut	*Juglans nigra*	17	17	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
114	Black Walnut	*Juglans nigra*	19	19	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
115	Manitoba Maple	*Acer negundo*	11	11	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
117	Silver Maple	*Acer saccharinum*	15	15	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
118	Silver Maple	*Acer saccharinum*	12	12	0	0	0	0	1	Good	Good	Good	0	Remove	Located within development footprint	Private	
119	Silver Maple	*Acer saccharinum*	15	15	0	0	0	0	1.5	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Suckering
120	Silver Maple	*Acer saccharinum*	13	13	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
121	Silver Maple	*Acer saccharinum*	13	13	0	0	0	0	1.5	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Multiple stems
122	Silver Maple	*Acer saccharinum*	15	15	0	0	0	0	1.5	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Multiple stems
123	Silver Maple	*Acer saccharinum*	15	15	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
124	Silver Maple	*Acer saccharinum*	14	14	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
125	Silver Maple	*Acer saccharinum*	15	15	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
126	Silver Maple	*Acer saccharinum*	16	16	0	0	0	0	2	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Girdling from rope wrapped around
127	Silver Maple	*Acer saccharinum*	15	15	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
129	Silver Maple	*Acer saccharinum*	17	17	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
169	Black Walnut	*Juglans nigra*	12	12	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
172	Black Walnut	*Juglans nigra*	10	10	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
200	Silver Maple	*Acer saccharinum*	35	35	0	0	0	0	4	Good	Good	Good	0	Remove	Located within development footprint	Boundary	
201	Manitoba Maple	*Acer negundo*	22	22	0	0	0	0	3	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Wounds along stem, on lean
202	Black Walnut	*Juglans nigra*	18	13	12	0	0	0	2	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Codominant stems, peeling bark
203	Silver Maple	*Acer saccharinum*	49	32	30	22	0	0	4	Good	Fair	Fair	0	Remove	Located within development footprint	Boundary	Codominant stems
204	Manitoba Maple	*Acer negundo*	28	28	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Boundary	
205	Silver Maple	*Acer saccharinum*	28	28	0	0	0	0	4	Good	Good	Good	0	Remove	Located within development footprint	Boundary	
206	Silver Maple	*Acer saccharinum*	30	30	0	0	0	0	4	Good	Good	Good	0	Remove	Located within development footprint	Private	
207	Silver Maple	*Acer saccharinum*	35	35	0	0	0	0	4	Good	Good	Good	0	Remove	Located within development footprint	Private	
208	Silver Maple	*Acer saccharinum*	27	27	0	0	0	0	4	Good	Good	Good	0	Remove	Located within development footprint	Private	
209	Silver Maple	*Acer saccharinum*	40	40	0	0	0	0	4	Good	Fair	Fair	0	Remove	Located within development footprint	Private	Codominant stems, included bark
210	Silver Maple	*Acer saccharinum*	31	31	0	0	0	0	4	Good	Fair	Fair	0	Remove	Located within development footprint	Private	Codominant leaders, included bark
211	Silver Maple	*Acer saccharinum*	37	37	0	0	0	0	4	Good	Good	Good	0	Remove	Located within development footprint	Private	
212	Silver Maple	*Acer saccharinum*	31	31	0	0	0	0	4	Good	Fair	Fair	0	Remove	Located within development footprint	Private	Codominant leaders, included bark
213	Silver Maple	*Acer saccharinum*	32	32	0	0	0	0	4	Good	Good	Good	0	Remove	Located within development footprint	Private	
214	Cottonwood	*Populus deltoides*	37	37	0	0	0	0	4	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Branch dieback
215	Black Walnut	*Juglans nigra*	36	36	0	0	0	0	4	Poor	Fair	Poor	0	Remove	Located within development footprint	Boundary	Crown dieback
216	Black Walnut	*Juglans nigra*	20	20	0	0	0	0	3	Poor	Fair	Poor	0	Remove	Located within development footprint	Boundary	Crown dieback
217	Common Apple	*Malus pumila*	55	55	0	0	0	0	4	Poor	Poor	Poor	0	Remove	Located within development footprint	Boundary	Stem split open, standing portion of stem bent
218	Manitoba Maple	*Acer negundo*	36	28	17	15	0	0	4	Fair	Poor	Poor	0	Remove	Located within development footprint	Boundary	Multiple stems, on lean
219	Cottonwood	*Populus deltoides*	33	33	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Boundary	
220	Cottonwood	*Populus deltoides*	27	19	19	0	0	0	3	Good	Fair	Fair	0	Remove	Located within development footprint	Boundary	Codominant stems
221	Cottonwood	*Populus deltoides*	37	26	26	0	0	0	3	Good	Fair	Fair	0	Remove	Located within development footprint	Boundary	Codominant stems
222	Cottonwood	*Populus deltoides*	17	17	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
223	Willow	*Salix sp.*	35	20	20	20	0	0	1.5	Good	Fair	Fair	0	Remove	Located within development footprint	Private	Spreading stems, colony
224	Manitoba Maple	*Acer negundo*	19	12	10	10	0	0	1.5	Good	Fair	Fair	0	Remove	Located within development footprint	Private	Multiple stems, suckering
225	Silver Maple	*Acer saccharinum*	35	35	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
226	Silver Maple	*Acer saccharinum*	42	30	30	0	0	0	4.5	Good	Fair	Fair	0	Remove	Located within development footprint	Private	Codominant stems
227	Silver Maple	*Acer saccharinum*	40	25	22	18	14	0	4	Good	Fair	Fair	0	Remove	Located within development footprint	Private	Multiple stems
228	Black Walnut	*Juglans nigra*	25	25	0	0	0	0	2	Poor	Poor	Poor	0	Remove	Located within development footprint	Private	Crown dieback, missing and peeling bark, diseased
229	Black Walnut	*Juglans nigra*	22	22	0	0	0	0	2	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Crown dieback
230	Black Walnut	*Juglans nigra*	15	15	0	0	0	0	2	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Crown dieback
231	Manitoba Maple	*Acer negundo*	32	25	20	0	0	0	2	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Codiminant stems
232	Black Walnut	*Juglans nigra*	30	30	0	0	0	0	2.5	Good	Fair	Fair	0	Remove	Located within development footprint	Private	Included bark
233	Manitoba Maple	*Acer negundo*	15	15	0	0	0	0	2.5	Good	Fair	Fair	0	Remove	Located within development footprint	Private	On lean
234	Manitoba Maple	*Acer negundo*	15	15	0	0	0	0	2.5	Good	Fair	Fair	0	Remove	Located within development footprint	Private	On lean
235	Manitoba Maple	*Acer negundo*	45	45	0	0	0	0	3	Good	Fair	Fair	0	Remove	Located within development footprint	Private	On lean, suckering
236	Manitoba Maple	*Acer negundo*	38	38	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
237	Manitoba Maple	*Acer negundo*	28	28	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
238	Manitoba Maple	*Acer negundo*	37	37	0	0	0	0	3	Good	Fair	Fair	0	Remove	Located within development footprint	Private	On lean
239	Manitoba Maple	*Acer negundo*	30	30	0	0	0	0	3	Good	Fair	Fair	0	Remove	Located within development footprint	Private	On lean
240	Manitoba Maple	*Acer negundo*	22	22	0	0	0	0	2	Good	Fair	Fair	0	Remove	Located within development footprint	Private	On lean
241	Manitoba Maple	*Acer negundo*	30	30	0	0	0	0	2.5	Fair	Poor	Poor	0	Remove	Located within development footprint	Private	On lean, crown dieback, rot on stem, holes in trunk
242	Manitoba Maple	*Acer negundo*	18	18	0	0	0	0	2	Good	Fair	Fair	0	Remove	Located within development footprint	Private	On lean
243	Manitoba Maple	*Acer negundo*	40	40	0	0	0	0	2.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
244	Manitoba Maple	*Acer negundo*	22	17	14	0	0	0	2.5	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Codominant stems, on lean

Tree ID Number	Species Common Name	Species Scientific Name	Multi-stem DBH[1] (cm)	DBH 1 (cm)	DBH 2 (cm)	DBH 3 (cm)	DBH 4 (cm)	DBH 5 (cm)	Crown Radius (m)	Biological Health	Structural Health	Overall Health	TPZ (m)	Recommended Action	Rationale for Removals	Ownership	Notes
245	Manitoba Maple	*Acer negundo*	20	16	12	0	0	0	2.5	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Codominant stems, on lean, debris
246	Manitoba Maple	*Acer negundo*	20	16	12	0	0	0	2.5	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Codominant stems, on lean, debris
247	Manitoba Maple	*Acer negundo*	20	20	0	0	0	0	3	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	On lean, debris
248	Manitoba Maple	*Acer negundo*	23	23	0	0	0	0	2	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	On lean, debris
250	Manitoba Maple	*Acer negundo*	26	17	15	12	0	0	2.5	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	On lean, debris
251	Manitoba Maple	*Acer negundo*	17	17	0	0	0	0	3	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	On lean, debris
252	Manitoba Maple	*Acer negundo*	11	11	0	0	0	0	3	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Codominant stems, on lean, debris
253	Manitoba Maple	*Acer negundo*	16	12	10	0	0	0	3	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Codominant stems, on lean, debris
254	Manitoba Maple	*Acer negundo*	46	36	28	0	0	0	3.5	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	On lean, debris
255	Manitoba Maple	*Acer negundo*	25	25	0	0	0	0	1.5	Poor	Poor	Poor	0	Remove	Located within development footprint	Private	On lean, debris, crown dieback
256	Manitoba Maple	*Acer negundo*	20	20	0	0	0	0	1.5	Poor	Poor	Poor	0	Remove	Located within development footprint	Private	On lean, debris, crown dieback
257	Manitoba Maple	*Acer negundo*	11	11	0	0	0	0	1	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Debris
258	Black Walnut	*Juglans nigra*	20	20	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
259	Manitoba Maple	*Acer negundo*	11	11	0	0	0	0	1	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Debris, dead secondary stem
260	Black Walnut	*Juglans nigra*	21	21	0	0	0	0	2	Good	Fair	Good	0	Remove	Located within development footprint	Private	Debris
261	Black Walnut	*Juglans nigra*	20	20	0	0	0	0	2	Good	Fair	Good	0	Remove	Located within development footprint	Private	Debris
262	Silver Maple	*Acer saccharinum*	21	12	10	10	10	0	2.5	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Multiple stems
263	Silver Maple	*Acer saccharinum*	25	25	0	0	0	0	2.5	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Included bark
264	Willow	*Salix sp.*	10	10	0	0	0	0	1.5	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Crown dieback
265	Black Walnut	*Juglans nigra*	15	15	0	0	0	0	2	Good	Fair	Good	0	Remove	Located within development footprint	Private	Debris
266	Black Walnut	*Juglans nigra*	18	18	0	0	0	0	2	Good	Fair	Good	0	Remove	Located within development footprint	Private	Debris
267	Manitoba Maple	*Acer negundo*	15	15	0	0	0	0	1	Poor	Poor	Poor	0	Remove	Located within development footprint	Private	Almost dead, debris
268	Black Walnut	*Juglans nigra*	15	15	0	0	0	0	2	Good	Fair	Good	0	Remove	Located within development footprint	Private	Debris
269	Manitoba Maple	*Acer negundo*	30	30	0	0	0	0	2	Good	Fair	Good	0	Remove	Located within development footprint	Private	Debris
270	Black Walnut	*Juglans nigra*	20	20	0	0	0	0	2	Good	Fair	Good	0	Remove	Located within development footprint	Private	Debris
271	Willow	*Salix sp.*	35	35	0	0	0	0	3	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Crown dieback, peeling bark, burn marks at base of trunk
272	Manitoba Maple	*Acer negundo*	21	15	15	0	0	0	3	Poor	Poor	Poor	0	Remove	Located within development footprint	Private	Almost dead, debris
273	Willow	*Salix sp.*	49	35	35	0	0	0	3	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Crown dieback, peeling bark, burn at base of trunk, codominant stems
274	Black Walnut	*Juglans nigra*	25	25	0	0	0	0	3.5	Fair	Fair	Fair	0	Remove	Located within development footprint	Boundary	Included bark in limb fork with moisture, peeling bark
275	Common Apple	*Malus pumila*	29	15	13	13	12	12	2.5	Good	Fair	Fair	0	Remove	Located within development footprint	Private	Multiple stems
276	Black Walnut	*Juglans nigra*	63	63	0	0	0	0	7	Fair	Fair	Fair	0	Remove	Located within development footprint	Boundary	Broken limbs; included bark
278	Black Walnut	*Juglans nigra*	35	35	0	0	0	0	6	Good	Good	Good	0	Remove	Located within development footprint	Boundary	
279	Black Walnut	*Juglans nigra*	50	50	0	0	0	0	6	Poor	Poor	Poor	0	Remove	Located within development footprint	Boundary	Metal grown into trunk in cavity, water damage, missing limb
280	Black Walnut	*Juglans nigra*	52	52	0	0	0	0	7	Good	Good	Good	0	Remove	Located within development footprint	Boundary	
281	Green Ash	*Fraxinus pennsylvanica*	21	12	12	12	0	0	2	Poor	Poor	Poor	0	Remove	Located within development footprint	Private	Crown dieback, lower branch growth
282	Cottonwood	*Populus deltoides*	45	45	0	0	0	0	2	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Oozing wound on trunk
283	Willow	*Salix sp.*	33	27	19	0	0	0	4	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Split at base
284	Black Walnut	*Juglans nigra*	10	10	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
285	Black Walnut	*Juglans nigra*	20	20	0	0	0	0	2.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
286	Black Walnut	*Juglans nigra*	16	16	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
287	Black Walnut	*Juglans nigra*	26	21	16	0	0	0	2.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
288	Manitoba Maple	*Acer negundo*	16	16	0	0	0	0	2	Poor	Poor	Poor	0	Remove	Located within development footprint	Private	Dead stems
289	Manitoba Maple	*Acer negundo*	15	15	0	0	0	0	2	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Crown dieback, on lean
290	Manitoba Maple	*Acer negundo*	21	16	13	0	0	0	2	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Crown dieback, codominant stems
291	Manitoba Maple	*Acer negundo*	25	25	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
292	Manitoba Maple	*Acer negundo*	25	19	17	0	0	0	2.5	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Codominant stems
293	Black Walnut	*Juglans nigra*	25	25	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
294	Manitoba Maple	*Acer negundo*	25	25	0	0	0	0	2.5	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	On lean, crown dieback
295	Black Walnut	*Juglans nigra*	28	28	0	0	0	0	2.5	Good	Fair	Fair	0	Remove	Located within development footprint	Private	Debris
296	Manitoba Maple	*Acer negundo*	42	30	30	0	0	0	3	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Debris, dead limbs, growing against shed
297	Manitoba Maple	*Acer negundo*	13	13	0	0	0	0	3	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	On severe lean
298	Black Walnut	*Juglans nigra*	33	33	0	0	0	0	4	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Debris, multiple stems
299	Black Walnut	*Juglans nigra*	16	16	0	0	0	0	1.5	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Debris
300	Black Walnut	*Juglans nigra*	11	11	0	0	0	0	1.5	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Debris, multiple stems
301	Black Walnut	*Juglans nigra*	22	22	0	0	0	0	2	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Debris, multiple stems
302	Black Walnut	*Juglans nigra*	20	12	12	10	0	0	2	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Debris, multiple stems
303	Black Walnut	*Juglans nigra*	20	13	12	10	0	0	2.5	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Debris, multiple stems
304	Black Walnut	*Juglans nigra*	22	18	12	0	0	0	2.5	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Debris, multiple stems
305	Black Walnut	*Juglans nigra*	18	13	13	0	0	0	2.5	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Debris, multiple stems
306	Black Walnut	*Juglans nigra*	21	15	15	0	0	0	2.5	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Codominant stems
307	Black Walnut	*Juglans nigra*	13	13	0	0	0	0	2.5	Good	Fair	Fair	0	Remove	Located within development footprint	Private	Debris
308	Black Walnut	*Juglans nigra*	18	11	10	10	0	0	2.5	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Debris, multiple stems
309	Manitoba Maple	*Acer negundo*	32	32	0	0	0	0	3	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Tree house, on lean
310	Black Walnut	*Juglans nigra*	20	20	0	0	0	0	2.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
311	Manitoba Maple	*Acer negundo*	20	20	0	0	0	0	4	Good	Good	Good	0	Remove	Located within development footprint	Private	
312	Black Walnut	*Juglans nigra*	26	26	0	0	0	0	4	Fair	Fair	Fair	0	Remove	Located within development footprint	Boundary	Debris
313	Black Walnut	*Juglans nigra*	11	11	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
314	Manitoba Maple	*Acer negundo*	15	11	10	0	0	0	2	Good	Fair	Fair	0	Remove	Located within development footprint	Private	Multiple stems, bent stem
315	Black Walnut	*Juglans nigra*	17	12	12	0	0	0	2	Good	Fair	Fair	0	Remove	Located within development footprint	Private	Codominant stems
316	Black Walnut	*Juglans nigra*	12	12	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
317	Black Walnut	*Juglans nigra*	10	10	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
318	Black Walnut	*Juglans nigra*	11	11	0	0	0	0	2	Good	Fair	Fair	0	Remove	Located within development footprint	Private	Codominant stems
319	Black Walnut	*Juglans nigra*	12	12	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
320	White Mulberry	*Morus alba*	32	15	15	14	14	14	3.5	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Multiple stems

Tree ID Number	Species Common Name	Species Scientific Name	Multi-stem DBH[1] (cm)	DBH 1 (cm)	DBH 2 (cm)	DBH 3 (cm)	DBH 4 (cm)	DBH 5 (cm)	Crown Radius (m)	Biological Health	Structural Health	Overall Health	TPZ (m)	Recommended Action	Rationale for Removals	Ownership	Notes
321	Manitoba Maple	*Acer negundo*	20	20	0	0	0	0	2.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
322	Black Walnut	*Juglans nigra*	16	16	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
323	Manitoba Maple	*Acer negundo*	27	16	15	15	0	0	3	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Debris, multiple stems
324	Manitoba Maple	*Acer negundo*	27	16	15	15	0	0	3	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Debris, multiple stems
325	Manitoba Maple	*Acer negundo*	35	20	20	20	0	0	4	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Debris, multiple stems
326	Manitoba Maple	*Acer negundo*	25	25	0	0	0	0	4	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Debris, multiple stems
327	Manitoba Maple	*Acer negundo*	48	30	28	25	0	0	4	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Debris, multiple stems
328	Manitoba Maple	*Acer negundo*	24	24	0	0	0	0	3	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Debris, on lean
329	Manitoba Maple	*Acer negundo*	24	24	0	0	0	0	3	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Debris, on lean
330	Manitoba Maple	*Acer negundo*	22	18	13	0	0	0	3	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Debris, on lean, twisted stem
331	Manitoba Maple	*Acer negundo*	24	24	0	0	0	0	3	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Debris, on lean
332	Manitoba Maple	*Acer negundo*	22	22	0	0	0	0	3	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Debris, on lean
334	Manitoba Maple	*Acer negundo*	18	18	0	0	0	0	2	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Debris, on lean
335	Manitoba Maple	*Acer negundo*	15	15	0	0	0	0	2	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Debris, on lean
336	Manitoba Maple	*Acer negundo*	24	15	13	13	0	0	4	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Debris, multiple stems, on lean
337	Manitoba Maple	*Acer negundo*	18	18	0	0	0	0	3	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Debris
338	Manitoba Maple	*Acer negundo*	18	18	0	0	0	0	3	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Debris, on lean
339	Manitoba Maple	*Acer negundo*	18	18	0	0	0	0	3	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Debris, on lean
340	Manitoba Maple	*Acer negundo*	35	22	20	18	0	0	4.5	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Debris, multiple stems
341	Manitoba Maple	*Acer negundo*	12	12	0	0	0	0	3	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Debris, multiple stems
342	Manitoba Maple	*Acer negundo*	27	22	15	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
343	Manitoba Maple	*Acer negundo*	13	13	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
344	Black Walnut	*Juglans nigra*	15	15	0	0	0	0	3	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Overgrown with vines
345	Black Walnut	*Juglans nigra*	15	15	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
346	Manitoba Maple	*Acer negundo*	59	35	35	25	20	0	5	Good	Fair	Fair	0	Remove	Located within development footprint	Private	Spreading branches
347	Manitoba Maple	*Acer negundo*	28	28	0	0	0	0	3	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	On lean, bent stem
348	Manitoba Maple	*Acer negundo*	28	28	0	0	0	0	3	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	On lean, bent stem
349	Manitoba Maple	*Acer negundo*	23	18	15	0	0	0	2.5	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	On lean, multiple stems
350	Manitoba Maple	*Acer negundo*	42	42	0	0	0	0	4	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Codominant limbs, included bark
351	Black Walnut	*Juglans nigra*	12	12	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
352	Manitoba Maple	*Acer negundo*	16	16	0	0	0	0	2	Good	Fair	Fair	0	Remove	Located within development footprint	Private	Codominant stems
353	Manitoba Maple	*Acer negundo*	15	15	0	0	0	0	2	Good	Fair	Fair	0	Remove	Located within development footprint	Private	On lean
354	Manitoba Maple	*Acer negundo*	21	15	15	0	0	0	2.5	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Codominant stems
355	Black Walnut	*Juglans nigra*	16	16	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
356	Manitoba Maple	*Acer negundo*	13	13	0	0	0	0	2	Good	Fair	Fair	0	Remove	Located within development footprint	Private	On lean, curved stem
357	Manitoba Maple	*Acer negundo*	13	13	0	0	0	0	2	Good	Good	Good	3	Preserve		Private	
358	Manitoba Maple	*Acer negundo*	28	28	0	0	0	0	3	Good	Good	Good	4	Preserve		Private	
359	Manitoba Maple	*Acer negundo*	28	28	0	0	0	0	3	Good	Good	Good	4	Preserve		Private	
360	Manitoba Maple	*Acer negundo*	28	28	0	0	0	0	3	Good	Good	Good	4	Preserve		Private	
361	Silver Maple	*Acer saccharinum*	12	12	0	0	0	0	3	Fair	Fair	Fair	4	Preserve		Private	Peeling bark
362	Black Walnut	*Juglans nigra*	18	18	0	0	0	0	3	Good	Good	Good	4	Preserve		Private	
363	Black Walnut	*Juglans nigra*	12	12	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
364	Black Walnut	*Juglans nigra*	15	15	0	0	0	0	2.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
365	Manitoba Maple	*Acer negundo*	25	25	0	0	0	0	3	Good	Fair	Fair	0	Remove	Located within development footprint	Private	On lean
366	Black Walnut	*Juglans nigra*	11	11	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
367	Black Walnut	*Juglans nigra*	12	12	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
368	Sugar Maple	*Acer saccharum*	60	60	0	0	0	0	2.5	Poor	Poor	Poor	0	Remove	Located within development footprint	Private	Mostly dead, one live limb
369	Horse Chestnut	*Aesculus hippocastanum*	55	55	0	0	0	0	2.5	Poor	Poor	Poor	0	Remove	Located within development footprint	Private	Mostly dead, lower limbs live
370	Horse Chestnut	*Aesculus hippocastanum*	45	45	0	0	0	0	2.5	Fair	Fair	Fair	0	Remove	Located within development footprint	Boundary	Crown dieback
371	Horse Chestnut	*Aesculus hippocastanum*	30	30	0	0	0	0	2	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Crown dieback
372	Tulip Tree	*Liriodendron tulipifera*	50	50	0	0	0	0	4	Good	Good	Good	0	Remove	Located within development footprint	Private	
373	Manitoba Maple	*Acer negundo*	50	50	0	0	0	0	4	Fair	Poor	Poor	0	Remove	Located within development footprint	Private	Missing limbs, sprawling branches
374	Norway Maple	*Acer platanoides*	52	30	25	20	20	20	5	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Multiple stems
375	Manitoba Maple	*Acer negundo*	15	15	0	0	0	0	3	Good	Fair	Fair	0	Remove	Located within development footprint	Private	On lean
376	Black Walnut	*Juglans nigra*	15	15	0	0	0	0	2.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
377	Manitoba Maple	*Acer negundo*	28	28	0	0	0	0	3	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Broken limbs
378	Black Walnut	*Juglans nigra*	15	15	0	0	0	0	2.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
379	Black Walnut	*Juglans nigra*	12	12	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
380	Black Walnut	*Juglans nigra*	10	10	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
381	Black Walnut	*Juglans nigra*	15	15	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
382	Black Walnut	*Juglans nigra*	15	15	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
383	Black Walnut	*Juglans nigra*	20	20	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
384	Black Walnut	*Juglans nigra*	18	18	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
385	Black Walnut	*Juglans nigra*	18	18	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
386	Black Walnut	*Juglans nigra*	14	14	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
387	Black Walnut	*Juglans nigra*	13	13	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
388	Black Walnut	*Juglans nigra*	11	11	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
389	Black Walnut	*Juglans nigra*	10	10	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
390	Black Walnut	*Juglans nigra*	21	15	15	0	0	0	2	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Codominant stems
391	Black Walnut	*Juglans nigra*	21	15	15	0	0	0	2	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Codominant stems
392	Black Walnut	*Juglans nigra*	10	10	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
393	Manitoba Maple	*Acer negundo*	10	10	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
394	Manitoba Maple	*Acer negundo*	14	14	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
395	Manitoba Maple	*Acer negundo*	17	17	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	

Tree ID Number	Species Common Name	Species Scientific Name	Multi-stem DBH[1] (cm)	DBH 1 (cm)	DBH 2 (cm)	DBH 3 (cm)	DBH 4 (cm)	DBH 5 (cm)	Crown Radius (m)	Biological Health	Structural Health	Overall Health	TPZ (m)	Recommended Action	Rationale for Removals	Ownership	Notes
396	Manitoba Maple	*Acer negundo*	20	20	0	0	0	0	3	Good	Fair	Fair	0	Remove	Located within development footprint	Private	Multiple stems
397	Manitoba Maple	*Acer negundo*	22	18	13	0	0	0	3	Good	Fair	Fair	0	Remove	Located within development footprint	Private	Multiple stems
398	Manitoba Maple	*Acer negundo*	17	17	0	0	0	0	3	Good	Fair	Fair	0	Remove	Located within development footprint	Private	Multiple stems
399	Manitoba Maple	*Acer negundo*	22	22	0	0	0	0	3	Good	Fair	Fair	0	Remove	Located within development footprint	Private	On lean
400	Manitoba Maple	*Acer negundo*	17	17	0	0	0	0	2.5	Good	Fair	Fair	0	Remove	Located within development footprint	Private	On lean
401	Manitoba Maple	*Acer negundo*	34	22	18	18	0	0	3	Good	Fair	Fair	0	Remove	Located within development footprint	Private	On lean
402	Manitoba Maple	*Acer negundo*	40	40	0	0	0	0	5	Good	Fair	Fair	0	Remove	Located within development footprint	Private	Spreading branches
403	Black Walnut	*Juglans nigra*	11	11	0	0	0	0	2.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
404	Black Walnut	*Juglans nigra*	13	13	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
764	Black Walnut	*Juglans nigra*	13	13	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
765	Cottonwood	*Populus deltoides*	34	34	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
766	Cottonwood	*Populus deltoides*	34	34	0	0	0	0	2.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
767	Black Walnut	*Juglans nigra*	14	14	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
768	Norway Maple	*Acer platanoides*	42	30	30	0	0	0	4	Fair	Fair	Fair	0	Remove	Located within development footprint	Boundary	Rust spots on leaves, codominant stems, on slight lean; grown into fence
773	Green Ash	*Fraxinus pennsylvanica*	20	20	0	0	0	0	1.5	Fair	Fair	Fair	0	Remove	Located within development footprint	Boundary	EAB, peeling bark, branch dieback
774	Cottonwood	*Populus deltoides*	17	17	0	0	0	0	2.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
775	Cottonwood	*Populus deltoides*	46	46	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
776	Cottonwood	*Populus deltoides*	26	26	0	0	0	0	2.5	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Epicormic branches; covered in grape vines
777	Cottonwood	*Populus deltoides*	38	38	0	0	0	0	2.5	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Epicormic branches
778	Manitoba Maple	*Acer negundo*	20	17	11	0	0	0	2	Good	Fair	Fair	0	Remove	Located within development footprint	Boundary	Two stems
779	Silver Maple	*Acer saccharinum*	17	17	0	0	0	0	2.5	Good	Fair	Fair	3.5	Preserve		Boundary	Multiple stems
780	Manitoba Maple	*Acer negundo*	31	25	19	0	0	0	4	Fair	Fair	Fair	5	Preserve		Boundary	Two stems; grown into fence; knot hole; included bark
781	Manitoba Maple	*Acer negundo*	40	23	22	19	14	0	4	Fair	Fair	Fair	5	Preserve		Boundary	Multiple sprawling stems; grown into fence; twig dieback
782	Manitoba Maple	*Acer negundo*	42	24	22	22	15	0	4	Fair	Fair	Fair	5	Preserve		Boundary	Multiple sprawling stems; grown into fence; twig dieback
783	Black Walnut	*Juglans nigra*	24	24	0	0	0	0	2	Good	Good	Good	3	Preserve		Private	
784	Green Ash	*Fraxinus pennsylvanica*	13	13	0	0	0	0	1	Good	Good	Good	0	Remove	Located within development footprint	Private	
785	Silver Maple	*Acer saccharinum*	17	17	0	0	0	0	1	Good	Fair	Good	0	Remove	Located within development footprint	Boundary	Grown into fence
786	Norway Maple	*Acer platanoides*	27	27	0	0	0	0	4	Fair	Fair	Fair	0	Remove	Located within development footprint	Boundary	Rust spots on leaves; branches growing to one side, grown into fence
787	Norway Maple	*Acer platanoides*	24	14	14	13	0	0	2.5	Poor	Poor	Poor	0	Remove	Located within development footprint	Boundary	Rust spots on leaves; multiple stems; dead and broken limbs; cracks, knot holes, and decay on stems; grown into fence
788	Manitoba Maple	*Acer negundo*	37	26	24	12	0	0	4	Fair	Poor	Fair	0	Remove	Located within development footprint	Boundary	Multiple stems; epicormic branches; on lean; grown into fence
800	Norway Maple	*Acer platanoides*	41	25	33	0	0	0	4	Fair	Fair	Fair	0	Remove	Located within development footprint	Boundary	Rust spots on leaves, two stems, included bark; grown into fence
1230	Silver Maple	*Acer saccharinum*	21	21	0	0	0	0	2.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
1231	Manitoba Maple	*Acer negundo*	29	29	0	0	0	0	2.5	Fair	Poor	Poor	0	Remove	Located within development footprint	Boundary	Peeling bark, fungal growth
1232	Manitoba Maple	*Acer negundo*	60	60	0	0	0	0	4	Fair	Poor	Poor	0	Remove	Located within development footprint	Boundary	Spreading limbs, cracked at base of limbs, dead limb
1233	Manitoba Maple	*Acer negundo*	19	19	0	0	0	0	2.5	Good	Good	Good	0	Remove	Located within development footprint	Private	Spreading limbs, cracked at base of limbs, dead limb
1234	Manitoba Maple	*Acer negundo*	25	25	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
1235	Manitoba Maple	*Acer negundo*	26	21	16	0	0	0	2.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
1236	Manitoba Maple	*Acer negundo*	39	32	23	0	0	0	2.5	Good	Fair	Fair	0	Remove	Located within development footprint	Private	Hollow at base of stem, spreading limbs
1237	Manitoba Maple	*Acer negundo*	65	54	28	22	0	0	4	Good	Poor	Fair	0	Remove	Located within development footprint	Boundary	Hollow at base of stem, spreading limbs
1238	Manitoba Maple	*Acer negundo*	25	25	0	0	0	0	3	Good	Fair	Fair	0	Remove	Located within development footprint	Boundary	On lean
1239	Norway Spruce	*Picea abies*	42	42	0	0	0	0	4	Good	Good	Good	0	Remove	Located within development footprint	Boundary	
1240	Norway Spruce	*Picea abies*	60	60	0	0	0	0	4	Good	Good	Good	0	Remove	Located within development footprint	Boundary	
1241	Manitoba Maple	*Acer negundo*	29	21	14	14	0	0	2	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	On lean, growing into shed structure
1242	Norway Spruce	*Picea abies*	37	37	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Boundary	
1243	Manitoba Maple	*Acer negundo*	27	27	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
1244	Silver Maple	*Acer saccharinum*	37	31	21	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
1245	Silver Maple	*Acer saccharinum*	25	18	18	0	0	0	3	Good	Fair	Fair	0	Remove	Located within development footprint	Private	Codominant stems
1246	Silver Maple	*Acer saccharinum*	34	24	24	0	0	0	3	Good	Fair	Fair	0	Remove	Located within development footprint	Private	Codominant stems
1247	Manitoba Maple	*Acer negundo*	26	26	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
1248	Silver Maple	*Acer saccharinum*	33	21	20	15	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
1249	Black Walnut	*Juglans nigra*	23	23	0	0	0	0	4	Good	Good	Good	0	Remove	Located within development footprint	Private	
1250	Black Walnut	*Juglans nigra*	21	21	0	0	0	0	4	Good	Good	Good	0	Remove	Located within development footprint	Private	
1251	Common Apple	*Malus pumila*	37	37	0	0	0	0	3.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
1252	Manitoba Maple	*Acer negundo*	19	19	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
1253	Norway Spruce	*Picea abies*	22	22	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
1254	Silver Maple	*Acer saccharinum*	18	18	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
1255	Silver Maple	*Acer saccharinum*	15	15	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
1256	Silver Maple	*Acer saccharinum*	13	13	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
1257	Silver Maple	*Acer saccharinum*	17	17	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
1258	Silver Maple	*Acer saccharinum*	18	18	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
1259	Silver Maple	*Acer saccharinum*	16	16	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
1260	Silver Maple	*Acer saccharinum*	16	16	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
1261	Silver Maple	*Acer saccharinum*	18	18	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
1261	Silver Maple	*Acer saccharinum*	18	18	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
1262	Silver Maple	*Acer saccharinum*	16	16	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
1263	Silver Maple	*Acer saccharinum*	13	13	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
1264	Silver Maple	*Acer saccharinum*	15	15	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
1265	Silver Maple	*Acer saccharinum*	15	15	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
1266	Silver Maple	*Acer saccharinum*	19	19	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
1267	Silver Maple	*Acer saccharinum*	10	10	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
1268	Silver Maple	*Acer saccharinum*	11	11	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
1269	Silver Maple	*Acer saccharinum*	13	13	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
1270	Silver Maple	*Acer saccharinum*	11	11	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	

Tree ID Number	Species Common Name	Species Scientific Name	Multi-stem DBH[1] (cm)	DBH 1 (cm)	DBH 2 (cm)	DBH 3 (cm)	DBH 4 (cm)	DBH 5 (cm)	Crown Radius (m)	Biological Health	Structural Health	Overall Health	TPZ (m)	Recommended Action	Rationale for Removals	Ownership	Notes
1271	Silver Maple	*Acer saccharinum*	14	14	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
1272	Silver Maple	*Acer saccharinum*	10	10	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
1273	Silver Maple	*Acer saccharinum*	15	15	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
1274	Silver Maple	*Acer saccharinum*	19	19	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
1275	Silver Maple	*Acer saccharinum*	13	13	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
1276	Silver Maple	*Acer saccharinum*	15	15	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
1277	Silver Maple	*Acer saccharinum*	11	11	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
1278	Silver Maple	*Acer saccharinum*	18	18	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
1279	Silver Maple	*Acer saccharinum*	28	21	18	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
1280	Silver Maple	*Acer saccharinum*	15	11	10	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
1281	Silver Maple	*Acer saccharinum*	14	14	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
1282	Silver Maple	*Acer saccharinum*	32	28	16	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
1283	Silver Maple	*Acer saccharinum*	41	23	18	18	18	14	5	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Multiple stems
1284	Silver Maple	*Acer saccharinum*	60	60	0	0	0	0	5	Good	Good	Good	0	Remove	Located within development footprint	Private	
1285	Black Walnut	*Juglans nigra*	10	10	0	0	0	0	4	Good	Good	Good	0	Remove	Located within development footprint	Private	
1286	Manitoba Maple	*Acer negundo*	10	10	0	0	0	0	4	Good	Good	Good	0	Remove	Located within development footprint	Private	
1287	Manitoba Maple	*Acer negundo*	16	16	0	0	0	0	4	Good	Good	Good	0	Remove	Located within development footprint	Private	
1288	Black Walnut	*Juglans nigra*	16	16	0	0	0	0	4	Good	Good	Good	0	Remove	Located within development footprint	Private	
1289	Manitoba Maple	*Acer negundo*	23	16	16	0	0	0	4	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Codominant stems
1290	Northern Catalpa	*Catalpa speciosa*	55	55	0	0	0	0	4	Good	Good	Good	0	Remove	Located within development footprint	Private	
1291	Manitoba Maple	*Acer negundo*	32	32	0	0	0	0	4	Good	Good	Good	0	Remove	Located within development footprint	Private	
1292	White Birch	*Betula papyrifera*	39	23	20	18	17	0	4	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Multiple stems; oozing sap on one stem
1293	Eastern White Cedar	*Thuja occidentalis*	33	33	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
1294	Horse Chestnut	*Aesculus hippocastanum*	56	56	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
1295	Weeping Willow	*Salix x sepulcralis*	100	100	0	0	0	0	2	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Cracks at base of limbs
1296	Manitoba Maple	*Acer negundo*	11	11	0	0	0	0	2	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	On lean, growing into shed structure
1297	Hybrid Butternut	*Juglans cinerea x Juglans*	18	18	0	0	0	0	4	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Canker
1298	Hybrid Butternut	*Juglans cinerea x Juglans*	25	25	0	0	0	0	4	Good	Good	Good	0	Remove	Located within development footprint	Private	
1299	Black Walnut	*Juglans nigra*	21	21	0	0	0	0	4	Good	Good	Good	0	Remove	Located within development footprint	Private	
1300	Manitoba Maple	*Acer negundo*	23	23	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
1301	Manitoba Maple	*Acer negundo*	22	22	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
1302	Manitoba Maple	*Acer negundo*	15	15	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
1303	Manitoba Maple	*Acer negundo*	17	17	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
1304	Manitoba Maple	*Acer negundo*	11	11	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
1305	Black Walnut	*Juglans nigra*	18	18	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
1306	Eastern White Cedar	*Thuja occidentalis*	20	20	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
1307	Manitoba Maple	*Acer negundo*	14	14	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
1308	Manitoba Maple	*Acer negundo*	13	13	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
1309	Manitoba Maple	*Acer negundo*	16	16	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
1310	Manitoba Maple	*Acer negundo*	100	100	0	0	0	0	2	Poor	Poor	Poor	0	Remove	Located within development footprint	Private	Crown dieback, most of crown missing, hollowed out stem, rot inside stem
1899	Silver Maple	*Acer saccharinum*	91	65	63	0	0	0	8	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Dead limb has been removed, dead branches present, growing between garage and shed
1900	Silver Maple	*Acer saccharinum*	61	61	0	0	0	0	7	Fair	Good	Fair	0	Remove	Located within development footprint	Private	Metal object grown into stem, dead branches present
249a	Manitoba Maple	*Acer negundo*	13	13	0	0	0	0	1	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	On lean, debris
249b	Manitoba Maple	*Acer negundo*	15	15	0	0	0	0	1.5	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	On lean, debris
D1	Dead		0	0	0	0	0	0	0			Dead	0	Remove	Located within development footprint	Private	
D2	Dead		0	0	0	0	0	0	0			Dead	0	Remove	Located within development footprint	Private	
N1	Black Walnut	*Juglans nigra*	17	17	0	0	0	0	3	Good	Good	Good	4	Preserve		Neighbour	
N10	Norway Spruce	*Picea abies*	25	25	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Boundary	
N11	Norway Spruce	*Picea abies*	40	40	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Boundary	
N12	Norway Spruce	*Picea abies*	24	24	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Boundary	
N13	Silver Maple	*Acer saccharinum*	25	25	0	0	0	0	3	Good	Good	Good	4	Preserve		Neighbour	
N14	Silver Maple	*Acer saccharinum*	30	30	0	0	0	0	3	Good	Good	Good	4	Preserve		Neighbour	
N15	Silver Maple	*Acer saccharinum*	30	30	0	0	0	0	3	Good	Good	Good	4	Preserve		Neighbour	
N2	Black Walnut	*Juglans nigra*	17	17	0	0	0	0	3	Good	Good	Good	4	Preserve		Neighbour	
N3	Manitoba Maple	*Acer negundo*	34	34	0	0	0	0	3	Good	Fair	Fair	0	Remove	Located within development footprint	Boundary	On lean
N4	Manitoba Maple	*Acer negundo*	33	24	23	0	0	0	3	Good	Fair	Fair	0	Remove	Located within development footprint	Boundary	On lean
N5	Black Walnut	*Juglans nigra*	17	17	0	0	0	0	3	Good	Good	Good	4	Preserve		Neighbour	
N6	Manitoba Maple	*Acer negundo*	24	24	0	0	0	0	3	Good	Good	Good	4	Preserve		Neighbour	
N7	Manitoba Maple	*Acer negundo*	34	34	0	0	0	0	3	Good	Poor	Poor	0	Remove	Located within development footprint	Boundary	1 m wound on stem
N8	Manitoba Maple	*Acer negundo*	36	36	0	0	0	0	3	Good	Fair	Fair	4	Preserve		Neighbour	On lean
N9	Manitoba Maple	*Acer negundo*	34	34	0	0	0	0	3	Good	Fair	Fair	4	Preserve		Neighbour	On lean
W1	Manitoba Maple	*Acer negundo*	15	15	0	0	0	0	4	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Debris, on lean
W10	Black Walnut	*Juglans nigra*	12	12	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W11	Black Walnut	*Juglans nigra*	22	22	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
W12	Black Walnut	*Juglans nigra*	12	12	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W13	Black Walnut	*Juglans nigra*	12	12	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W14	White Poplar	*Populus alba*	70	70	0	0	0	0	4	Poor	Poor	Poor	0	Remove	Located within development footprint	Private	Grown into fence, dead limbs, rubbing limbs
W15	White Poplar	*Populus alba*	57	40	40	0	0	0	3	Poor	Poor	Poor	0	Remove	Located within development footprint	Private	Bent stems, codominant stems, debris, broken stem
W16	White Poplar	*Populus alba*	45	45	0	0	0	0	3	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Bent stem, debris
W17	Manitoba Maple	*Acer negundo*	16	11	11	0	0	0	3	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Codominant stems
W18	Black Walnut	*Juglans nigra*	15	15	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W19	Black Walnut	*Juglans nigra*	15	15	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W2	Manitoba Maple	*Acer negundo*	41	28	25	17	0	0	4	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Debris, included bark, hollows in stem

Tree ID Number	Species Common Name	Species Scientific Name	Multi-stem DBH[1] (cm)	DBH 1 (cm)	DBH 2 (cm)	DBH 3 (cm)	DBH 4 (cm)	DBH 5 (cm)	Crown Radius (m)	Biological Health	Structural Health	Overall Health	TPZ (m)	Recommended Action	Rationale for Removals	Ownership	Notes
W20	Black Walnut	*Juglans nigra*	17	17	0	0	0	0	1	Good	Good	Good	0	Remove	Located within development footprint	Private	
W21	Black Walnut	*Juglans nigra*	15	15	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W22	Black Walnut	*Juglans nigra*	13	13	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W23	Black Walnut	*Juglans nigra*	20	20	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
W24	Black Walnut	*Juglans nigra*	25	25	0	0	0	0	2.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W25	Black Walnut	*Juglans nigra*	12	12	0	0	0	0	1	Good	Good	Good	0	Remove	Located within development footprint	Private	
W26	Black Walnut	*Juglans nigra*	16	12	11	0	0	0	1	Good	Good	Good	0	Remove	Located within development footprint	Private	
W27	Black Walnut	*Juglans nigra*	12	12	0	0	0	0	1	Good	Good	Good	0	Remove	Located within development footprint	Private	
W28	Black Walnut	*Juglans nigra*	13	13	0	0	0	0	1	Good	Good	Good	0	Remove	Located within development footprint	Private	
W29	Black Walnut	*Juglans nigra*	20	20	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
W3	Black Walnut	*Juglans nigra*	22	22	0	0	0	0	3.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W30	Black Walnut	*Juglans nigra*	18	18	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
W31	Black Walnut	*Juglans nigra*	13	13	0	0	0	0	2	Good	Good	Good	0	Remove	Located within development footprint	Private	
W32	Black Walnut	*Juglans nigra*	23	23	0	0	0	0	2.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W33	Black Walnut	*Juglans nigra*	34	23	20	15	0	0	3	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Multiple stems
W34	Black Walnut	*Juglans nigra*	25	25	0	0	0	0	3	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Tree fallen onto it, included bark
W35	Manitoba Maple	*Acer negundo*	30	30	0	0	0	0	5	Poor	Poor	Poor	0	Remove	Located within development footprint	Private	Broken limbs, large wounds on main stem
W36	Manitoba Maple	*Acer negundo*	25	25	0	0	0	0	4.5	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Dead branches, wounds on stem
W37	Manitoba Maple	*Acer negundo*	10	10	0	0	0	0	2	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Multiple stems
W38	Manitoba Maple	*Acer negundo*	42	30	30	0	0	0	5	Poor	Poor	Poor	0	Remove	Located within development footprint	Private	Limbs growing horizontally and sprawling, broken limbs at base, splits and wounds
W39	Norway Maple	*Acer platanoides*	28	28	0	0	0	0	2	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Wound along stem
W4	Black Walnut	*Juglans nigra*	22	22	0	0	0	0	3	Good	Good	Good	0	Remove	Located within development footprint	Private	
W40	Manitoba Maple	*Acer negundo*	45	45	0	0	0	0	4	Poor	Poor	Poor	0	Remove	Located within development footprint	Private	Growing horizontally, twisted and bent stem, suckering
W41	Black Walnut	*Juglans nigra*	12	12	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W42	Black Walnut	*Juglans nigra*	15	15	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W43	Manitoba Maple	*Acer negundo*	15	15	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W44	Black Walnut	*Juglans nigra*	17	17	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W45	Manitoba Maple	*Acer negundo*	34	30	15	0	0	0	2.5	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	On lean
W46	Manitoba Maple	*Acer negundo*	25	25	0	0	0	0	2.5	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	On lean
W47	Manitoba Maple	*Acer negundo*	22	22	0	0	0	0	2.5	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	On lean
W48	Manitoba Maple	*Acer negundo*	15	15	0	0	0	0	1.5	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	On lean
W49	Black Walnut	*Juglans nigra*	12	12	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W5	Black Walnut	*Juglans nigra*	15	15	0	0	0	0	1.5	Good	Fair	Good	0	Remove	Located within development footprint	Private	Debris
W50	Black Walnut	*Juglans nigra*	12	12	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W51	Black Walnut	*Juglans nigra*	10	10	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W52	Black Walnut	*Juglans nigra*	11	11	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W53	Black Walnut	*Juglans nigra*	13	13	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W54	Black Walnut	*Juglans nigra*	11	11	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W55	Black Walnut	*Juglans nigra*	11	11	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W56	Black Walnut	*Juglans nigra*	15	15	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W57	Black Walnut	*Juglans nigra*	17	17	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W58	Black Walnut	*Juglans nigra*	14	14	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W59	Black Walnut	*Juglans nigra*	12	12	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W6	Black Walnut	*Juglans nigra*	13	13	0	0	0	0	1.5	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Debris
W60	Black Walnut	*Juglans nigra*	15	15	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W61	Black Walnut	*Juglans nigra*	23	18	15	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W62	Black Walnut	*Juglans nigra*	20	20	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W63	Black Walnut	*Juglans nigra*	15	15	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W64	Black Walnut	*Juglans nigra*	16	12	10	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W65	Black Walnut	*Juglans nigra*	17	12	12	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W66	Black Walnut	*Juglans nigra*	12	12	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W67	Black Walnut	*Juglans nigra*	17	17	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W68	Black Walnut	*Juglans nigra*	14	14	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W69	Black Walnut	*Juglans nigra*	20	20	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W7	Black Walnut	*Juglans nigra*	15	15	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W70	Black Walnut	*Juglans nigra*	21	15	15	0	0	0	1.5	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Codominant stems
W71	Black Walnut	*Juglans nigra*	15	15	0	0	0	0	1.5	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Codominant stems
W72	Silver Maple	*Acer saccharinum*	10	10	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W73	Silver Maple	*Acer saccharinum*	10	10	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W74	Silver Maple	*Acer saccharinum*	13	13	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W75	Silver Maple	*Acer saccharinum*	10	10	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W76	Silver Maple	*Acer saccharinum*	10	10	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W77	Silver Maple	*Acer saccharinum*	10	10	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W78	Silver Maple	*Acer saccharinum*	15	15	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W79	Silver Maple	*Acer saccharinum*	10	10	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W8	Black Walnut	*Juglans nigra*	15	15	0	0	0	0	1.5	Fair	Fair	Fair	0	Remove	Located within development footprint	Private	Stem rot
W80	Silver Maple	*Acer saccharinum*	10	10	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W81	Silver Maple	*Acer saccharinum*	13	13	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W82	Silver Maple	*Acer saccharinum*	10	10	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W83	Silver Maple	*Acer saccharinum*	17	17	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W84	Silver Maple	*Acer saccharinum*	10	10	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W85	Silver Maple	*Acer saccharinum*	10	10	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W86	Silver Maple	*Acer saccharinum*	15	15	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	

Tree ID Number	Species Common Name	Species Scientific Name	Multi-stem DBH[1] (cm)	DBH 1 (cm)	DBH 2 (cm)	DBH 3 (cm)	DBH 4 (cm)	DBH 5 (cm)	Crown Radius (m)	Biological Health	Structural Health	Overall Health	TPZ (m)	Recommended Action	Rationale for Removals	Ownership	Notes
W87	Silver Maple	*Acer saccharinum*	15	15	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W88	Silver Maple	*Acer saccharinum*	10	10	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	
W9	Black Walnut	*Juglans nigra*	20	20	0	0	0	0	1.5	Good	Good	Good	0	Remove	Located within development footprint	Private	

Notes:

1: Square root of the sum of each stem squared

Appendix C

Hybrid Butternut Laboratory Results

CANADIAN CENTRE FOR DNA BARCODING

DNA Testing Laboratory Report

Date of issue: April 12, 2022

CLIENT INFORMATION

Client Name: James Leslie, Senior Vegetation Ecologist
Client Address: GEI Consultants
100 Ahrens St. West | Suite 201 Kitchener, ON N2H 4C3
Contact Name: James Leslie (jleslie@geiconsultants.com)

ITEMS

Description: Six samples (twigs) from putative butternut submitted for hybrid detection.

Sample ID	Sample ID provided	Process ID
CCDBFR0695	Hamilton 1	ABCBF714-22
CCDBFR0696	Hamilton 2	ABCBF715-22
CCDBFR0697	Pickering BN1	ABCBF716-22
CCDBFR0698	Pickering BN2	ABCBF717-22
CCDBFR0699	Pickering BN3	ABCBF718-22
CCDBFR0700	Pickering BN4	ABCBF719-22

Dates Received: March 22, 2022

Sample Received by: Maria Kuzmina – Research Associate, Plant Lead in person from James Leslie

Dates of Analysis: March 29-April 07, 2022

Analyzed by: Nguyen NguyenTX. / Canadian Centre for DNA Barcoding, Biodiversity of Ontario, University of Guelph, 50 Stone Road East, Guelph

METHODS

To ascertain the identity of the species from the submitted samples, an approximate 2mm by 2mm area of bud from each sample was subsampled using sterile techniques. The samples were ground to a fine powder and then lysed. Total genomic DNA was extracted using validated spin column DNA extraction protocol. Two target genetic markers: the second internal transcribed spacer from the nuclear ribosomal DNA (ITS2), and an intergenic spacer between the chloroplast genes *trnL* and *trnF* (*trnL-trnF*) were amplified by using the Polymerase Chain Reaction (PCR) with the primers ITS_S2F/ITS4 and *trnLUAA-c/trnFGAA-f*, respectively; followed by cycle sequencing with standardized commercially available BigDye Terminator v3.1 kit. Sequencing reactions were analyzed by high-voltage capillary electrophoresis using the automated ABI 3730xL DNA Analyzer. Bidirectional forward and reverse sequences were generated for each amplicon. Resulting trace files were assembled into contigs and consensus sequences, and then manually edited in CodonCode Aligner (version 4.1.1.) software. The sequences of ITS2 and *trnL-trnF* were compared against the BOLD reference libraries. Based on the percentage of nucleotide sequence divergence (a number of nucleotide substitutions) between sequence from the test sample and reference DNA barcode, the closest match was used to infer species identity of the corresponding test samples provided by the contributor. The quality of the sequence traces for ITS2 was done by visual inspection to resolve hybridization. Images, sequences, and their associated trace files with quality scores were uploaded to the secure BOLD project called “CCDB forensic sampling [ABCBF]”.

IMAGING

The items were photographed in the Photography Lab Area by Nguyen NguyenTX., using a Canon ELPH 300 HS, 12.1 megapixels. Pictures were uploaded to the BOLD website into a secure project called “CCDB forensic sampling [ABCBF]”. See Appendix 1 for item images.

INTERPRETATION

Based on the number of nucleotide substitutions between sequence from the test sample and reference DNA barcode, the closest match was used to infer species identity for the corresponding test samples provided by the contributor. The ITS2 base calls for diagnostic sites in the trace file chromatograms were used to resolve hybridization.

The ITS2 marker demonstrated five nucleotide substitutions between *Juglans cinerea* (white walnut) and *Juglans ailantifolia* (Japanese walnut) reference sequences across the amplified ~344 base pair length. Unlike the plastid genome, ribosomal nuclear DNA is inherited by both maternal and paternal organisms. Thus, hybridization event is reflected in the trace file chromatograms as mixed signals at the characteristic nucleotide positions. Therefore, the ITS2 DNA barcode is useful for detection of hybridization event between species.

The *trnL-trnF* marker demonstrated five nucleotide substitutions between *Juglans cinerea* (white walnut) and *Juglans ailantifolia* (Japanese walnut) reference sequences across the target ~950 base pair length. This marker is used as a supplementary marker to confirm species identity for the provided samples. Because it is a part of the chloroplast genome, it is inherited maternally. It confirms the maternal lineage in a hybrid but on its own does not detect hybridization event.

RESULTS

Sample ID	Sample ID provided	Process ID	Lab Results/Hybridity detected
CCDBFR0695	Hamilton 1	ABCBF714-22	Yes
CCDBFR0696	Hamilton 2	ABCBF715-22	Yes (F2 backcross hybrid)
CCDBFR0697	Pickering BN1	ABCBF716-22	No
CCDBFR0698	Pickering BN2	ABCBF717-22	No
CCDBFR0699	Pickering BN3	ABCBF718-22	No
CCDBFR0700	Pickering BN4	ABCBF719-22	No

The full length ITS2 and *trnL-trnF* genetic markers (~344 base pairs and ~950 base pairs, respectively) for all samples were aligned against the known reference sequences for *Juglans cinerea* (white walnut, butternut)*, Juglans ailantifolia* (Japanese walnut), and their hybrid *Juglans cinerea* x *Juglans ailantifolia.* The alignments were analyzed by visual comparison, and by building the Neighbor Joining (NJ) phylogenetic trees using BOLD (Figures 1-8).

ITS2

The chromatograms for the sample CCDBFR0695 matched the reference chromatograms for the hybrid *Juglans cinerea x Juglans ailantifolia* (Figures 1, 2, and 3). The analyzed samples revealed mixed base calls at the nucleotide positions, which are diagnostic for two species in question. This base call pattern is consistent with hybridization between two parental organisms of *Juglans cinerea* and *Juglans ailantifolia*.

The chromatograms for the samples from CCDBFR0696 to CCBDFR700 matched with the references of *Juglans cinerea* (white walnut), showing no evidence of mixed base calls at the nucleotide positions, which are diagnostic for two species in question (Figures 1, 2, 3, and 4).

trnL-trnF

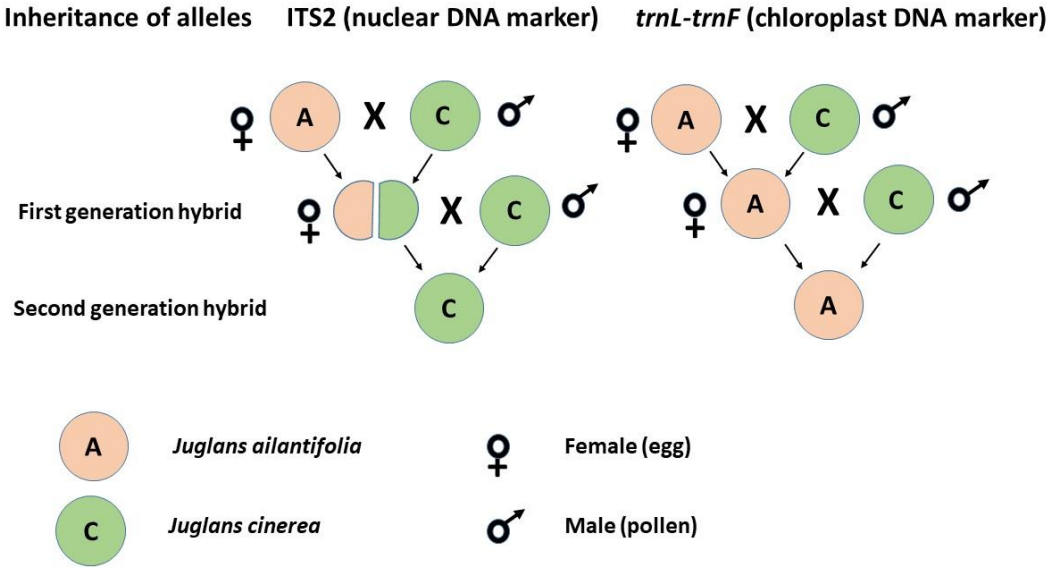
The analysis of *trnL-trnF* sequences showed that the maternal organism for the provided samples CCDBFR0695 and CCDBFR0696 belong to *Juglans ailantifolia* with five nucleotide substitutions (across the amplified length of the marker) differentiating it from *Juglans cinerea*. As shown in Figures 5, 6, 7, and 8 samples CCDBFR0695 and CCDBFR0696 match those of reference sequences for *Juglans ailantifolia.*

The analysis of *trnL-trnF* sequences confirmed that the four provided samples (CCDBFR0697-CCBDFR700) match with *Juglans cinerea* (white walnut) with five nucleotide substitutions (across the amplified length of the marker) differentiating it from *Juglans ailantifolia* (Japanese walnut) as shown in Figure 5, 6, 7 and 8.

CONCLUSIONS

The present testing indicated that the provided sample CCDBFR0695 is a first-generation hybrid between *Juglans cinerea x Juglans ailantifolia*. The maternal organism for this sample was *Juglans ailantifolia* (Japanese walnut).

The sample CCDBFR0696 inherited its nuclear (ITS2) and chloroplast (*trnL-trnF*) DNA copies from two different species: *Juglans cinerea* (ITS2) and *Juglans ailantifolia* (*trnL-trnF*). Because the trace chromatograms for this sample showed no evidence of mixed base calls, it indicates that it is a a second generation cross between the first-generation hybrid *Juglans cinerea x Juglans ailantifolia* with paternal *Juglans cinerea* (or another hybrid with heterozygous alleles of ITS2). The maternal parental hybrid carried heterozygous alleles of ITS2 (*Juglans cinerea* and *Juglans ailantifolia*) and inherited the maternal allele from *Juglans ailantifolia.* In this case the specimen CCDBFR0696 inherited the same chloroplast DNA from its maternal hybrid organism (*trnL-trnF* from *Juglans ailantifolia*) and the allele of ITS2 from *Juglans cinerea.* The second allele of ITS2 came from the other parent, presumably *Juglans cinerea*. Two identical alleles did not show any evidence of mixed base calls in the chromatograms. The diagram below illustrates two types of inheritance for the nuclear (ITS2) and chloroplast (*trnL-trnF*) DNA markers and provides graphical explanation of the observed test results. Therefore, our analysis showed that the sample CCDBFR0696 is the hybrid backcross with one parental species.



Both ITS2 and *trnL-trnF* sequences for the samples CCDBFR0697, CCDBFR0698, CCDBFR0699, and CCDBFR0700 are identical to the reference sequences for *Juglans cinerea*, known as white walnut. The trace chromatograms showed no evidence of hybridization in these samples. The samples CCDBFR0697, CCDBFR0698, CCDBFR0699, and CCDBFR0700 are not hybrids.

RESULTS REPORTED BY:

Nguyen NguyenT.X., MSc; Forensic Technician

RESULTS REVIEWED BY:

Maria Kuzmina, PhD; Plant Lead

Evgeny V. Zakharov, PhD; Director, CCDB

FIGURES

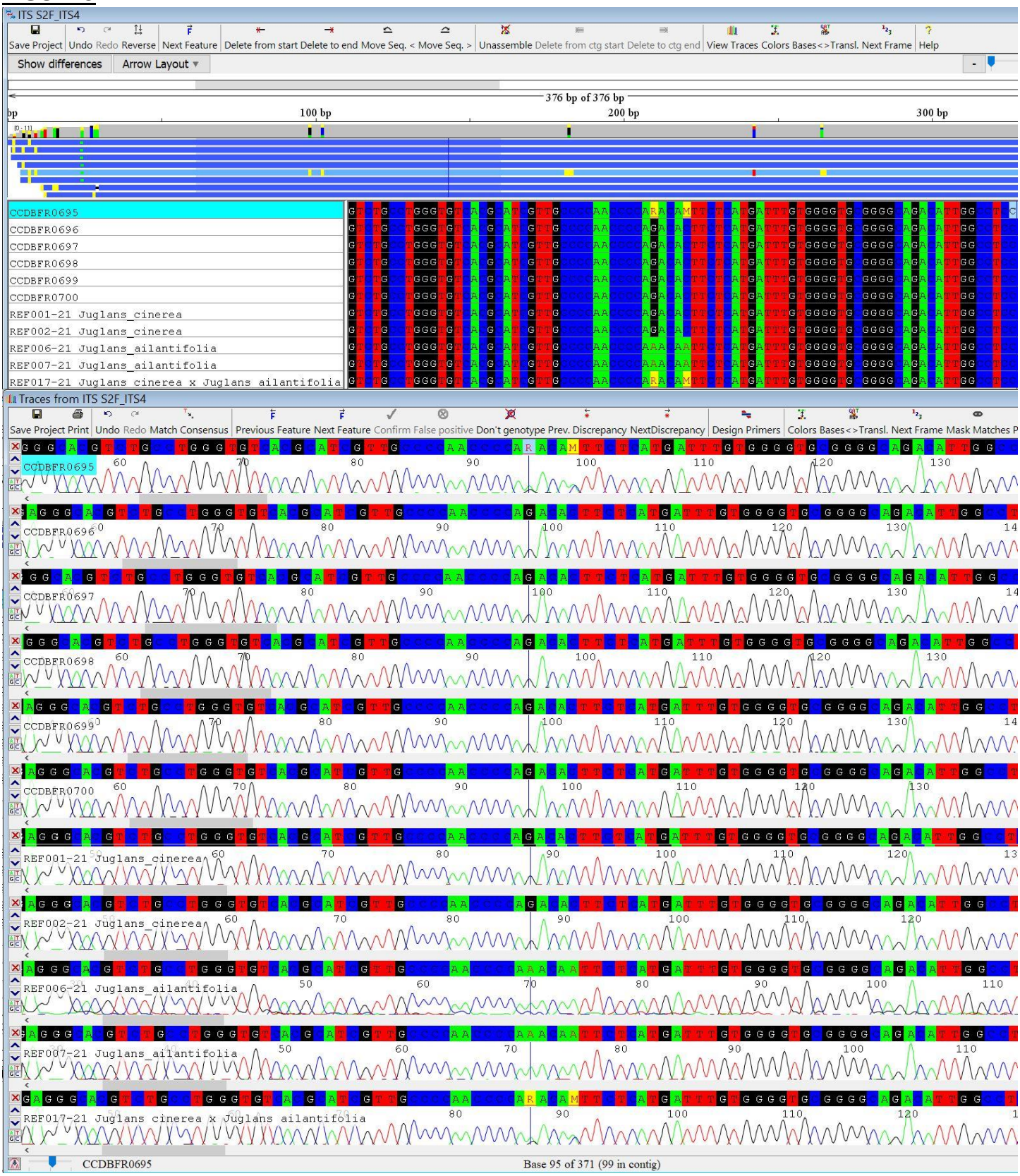


Figure 1. ITS2 sequence comparison of samples CCDBFR0695 – CCDBFR700 and *Juglans cinerea*, *Juglans ailantifolia*, and hybrid *Juglans cinerea x Juglans ailantifolia* reference sequences from the BOLD reference library at the base ~99 and ~103.

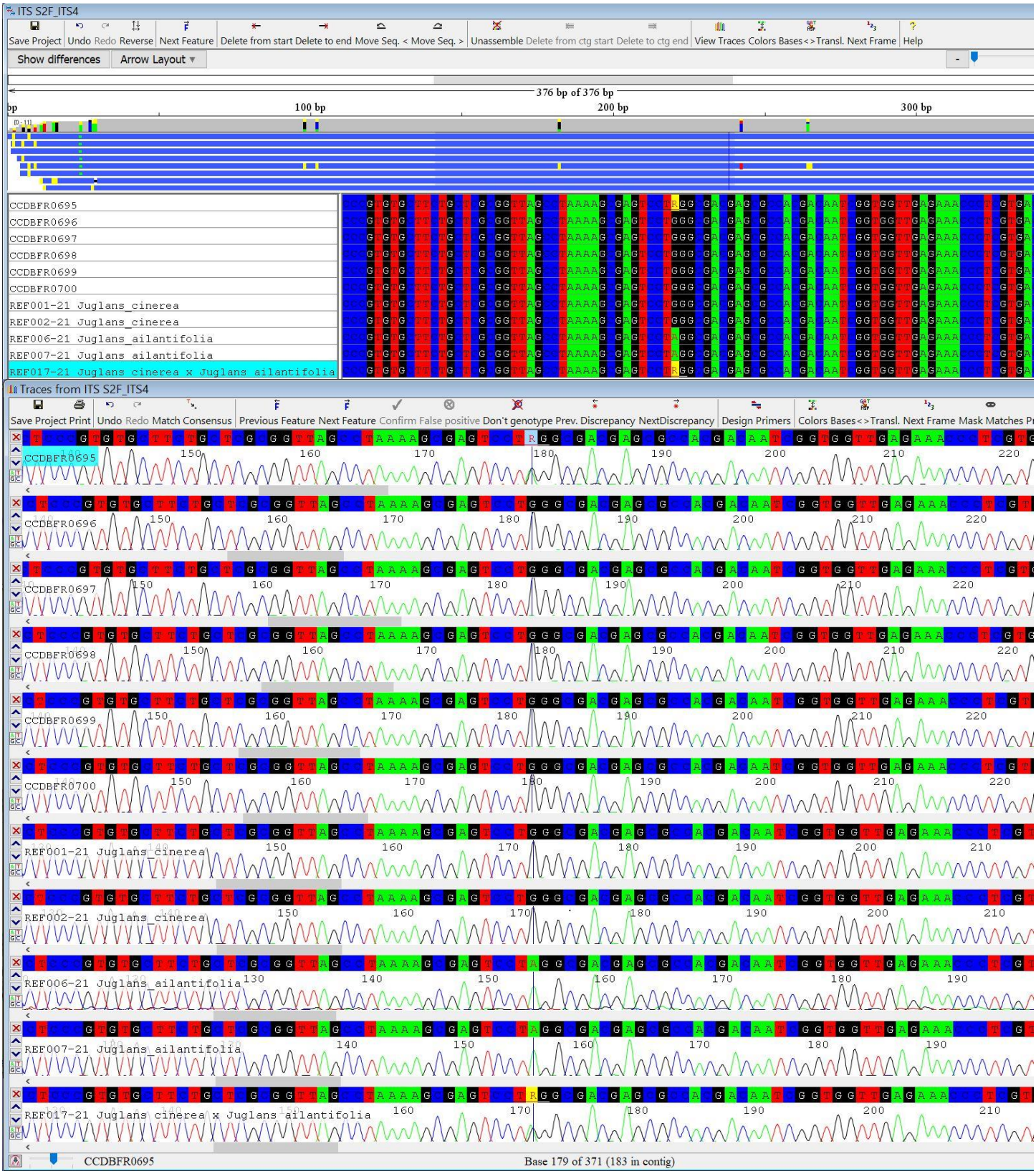


Figure 2. ITS2 sequence comparison of samples CCDBFR0695 – CCDBFR700 and *Juglans cinerea*, *Juglans ailantifolia*, and hybrid *Juglans cinerea x Juglans ailantifolia* reference sequences from the BOLD reference library at the base ~182.

Figure 3. ITS2 sequence comparison of samples CCDBFR0695 – CCDBFR700 and *Juglans cinerea*, *Juglans ailantifolia*, and hybrid *Juglans cinerea x Juglans ailantifolia* reference sequences from the BOLD reference library at the base ~242 and ~264.

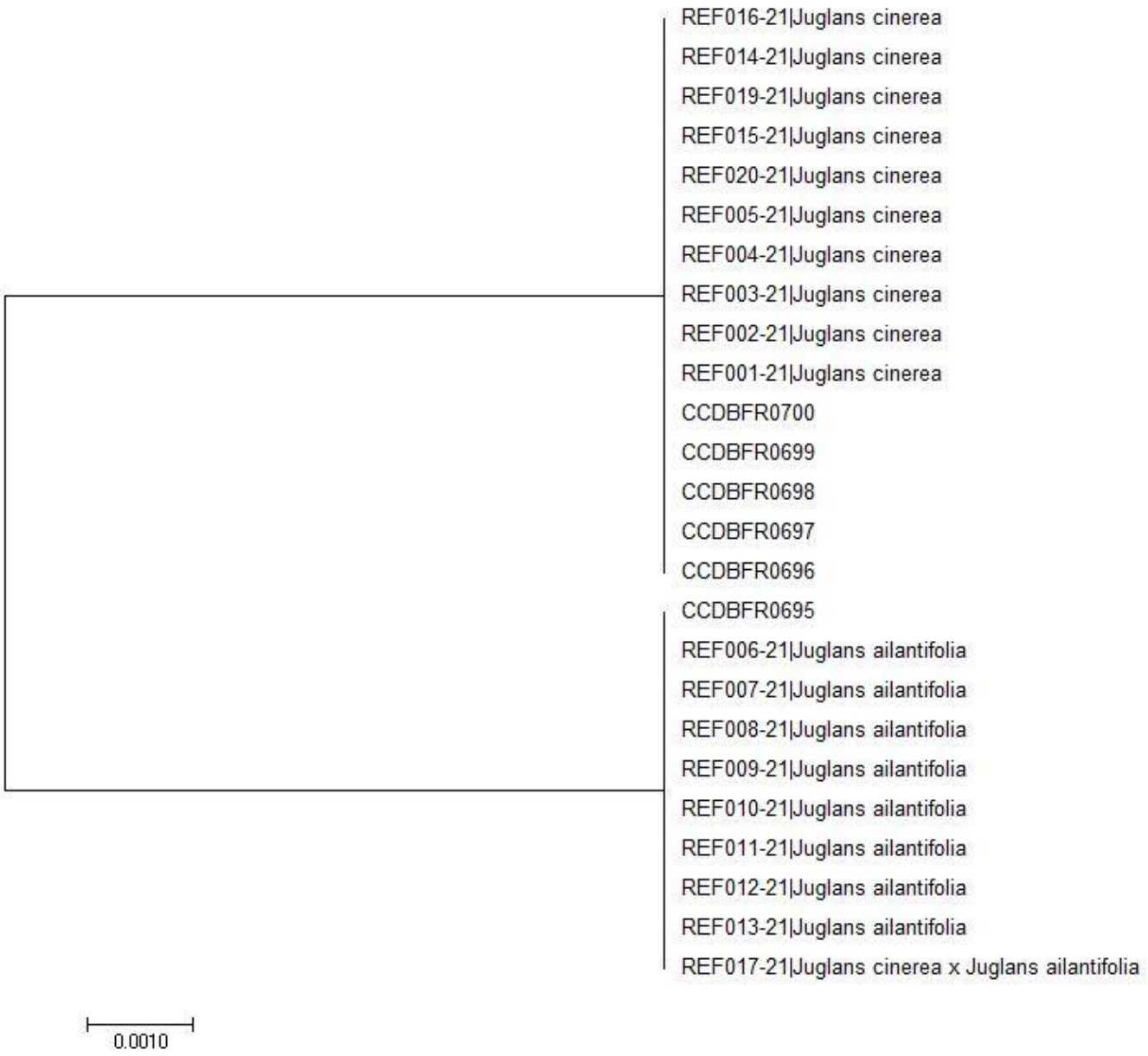


Figure 4. NJ phylogenetic tree of ITS2 sample sequences CCDBFR0695 – CCDBFR700 and *Juglans cinerea*, *Juglans ailantifolia*, and hybrid *Juglans cinerea* x *Juglans ailantifolia* reference sequences from the BOLD reference library.

Figure 5. *trnL-trnF* sequence comparison of samples CCDBFR0695 – CCDBFR700 and *Juglans cinerea*, *Juglans ailantifolia*, and hybrid *Juglans cinerea x Juglans ailantifolia* reference sequences from the BOLD reference library at the base ~200 and ~276.

Figure 6. *trnL-trnF* sequence comparison of samples CCDBFR0695 – CCDBFR700 and *Juglans cinerea*, *Juglans ailantifolia*, and hybrid *Juglans cinerea x Juglans ailantifolia* reference sequences from the BOLD reference library at the base ~436.

Figure 7. *trnL-trnF* sequence comparison of samples CCDBFR0695 – CCDBFR700 and *Juglans cinerea*, *Juglans ailantifolia*, and hybrid *Juglans cinerea x Juglans ailantifolia* reference sequences from the BOLD reference library at the base ~595 and ~678.

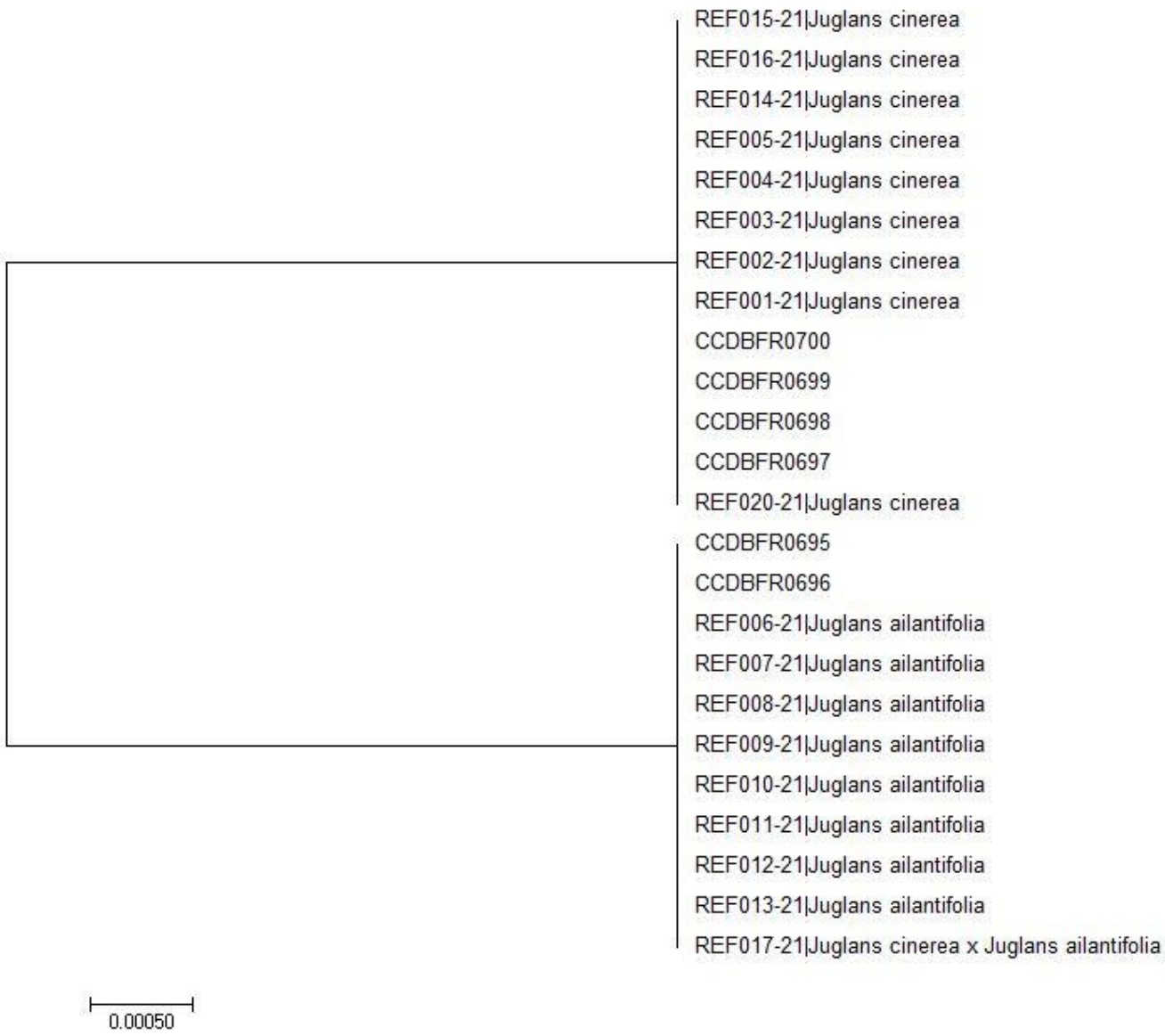


Figure 8. NJ phylogenetic tree of *trnL-trnF* sample sequences CCDBFR0695 – CCDBFR700 and *Juglans cinerea*, *Juglans ailantifolia*, and hybrid *Juglans cinerea x Juglans ailantifolia* reference sequences from the BOLD reference library.

Appendix 1. Image Inventory

Image 1 – Samples CCDBFR0695.

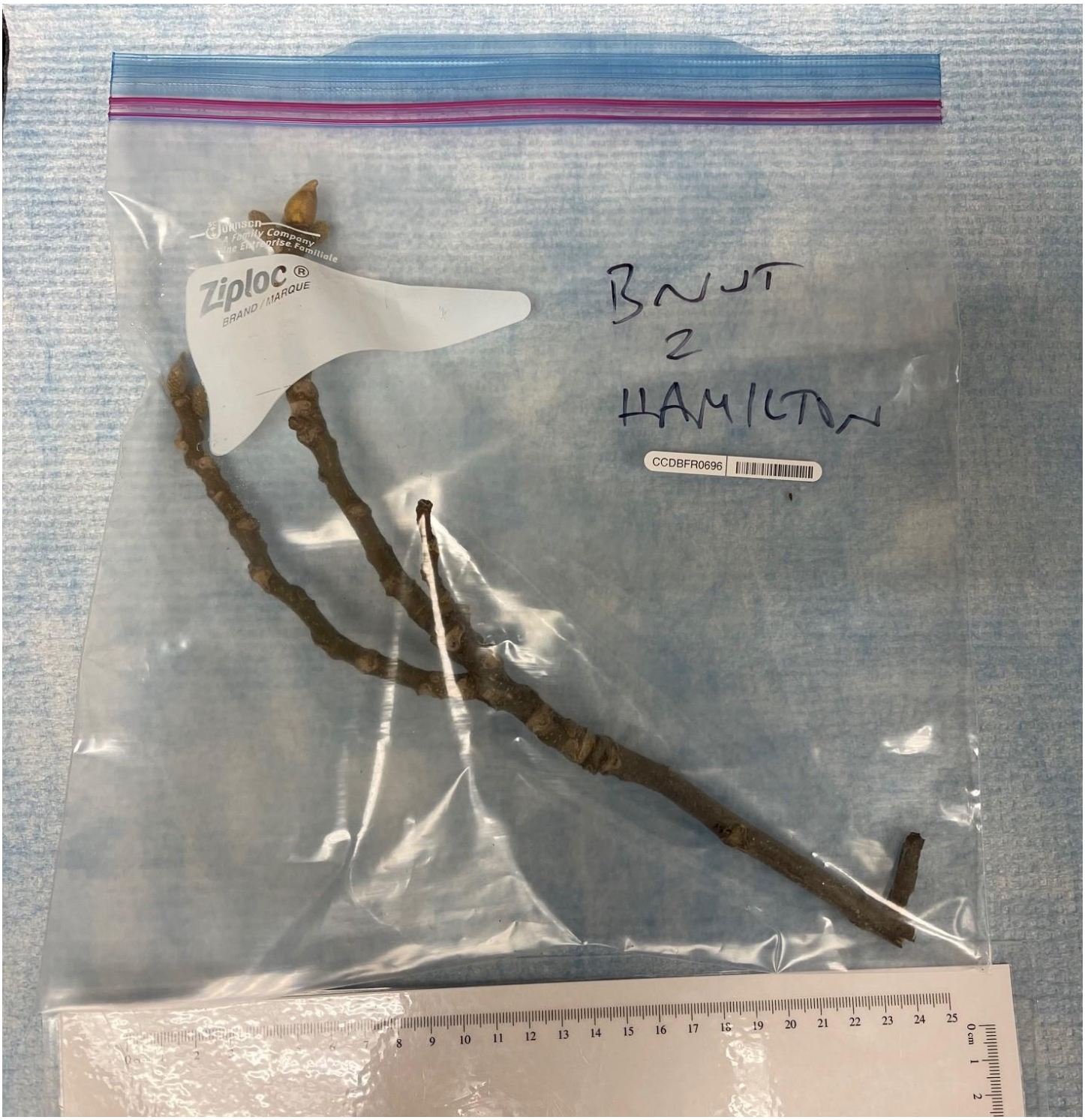


Image 2 – Sample CCDBFR0696.

Image 3 – Sample CCDBFR0697.

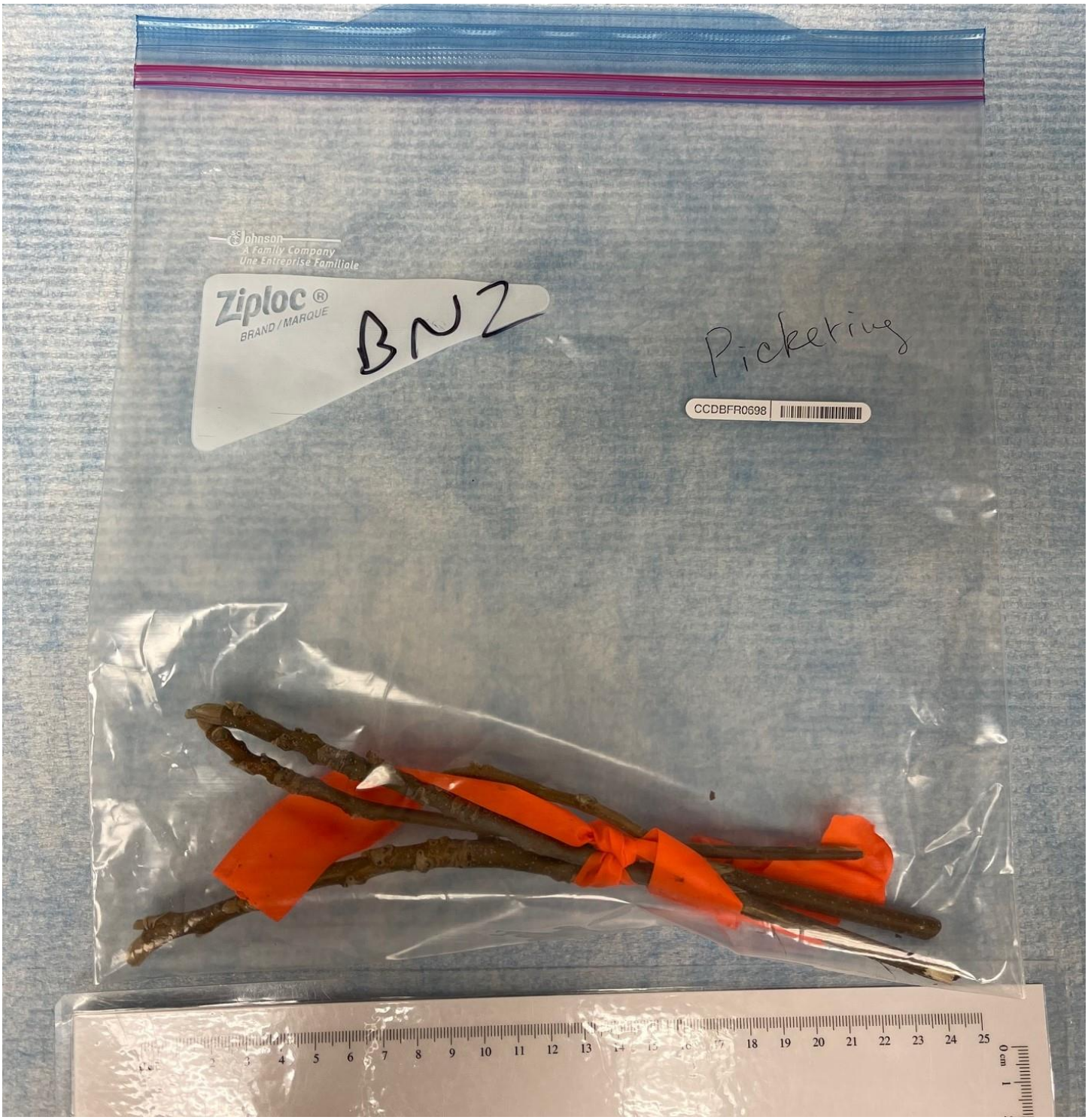


Image 4 – Sample CCDBFR0698.

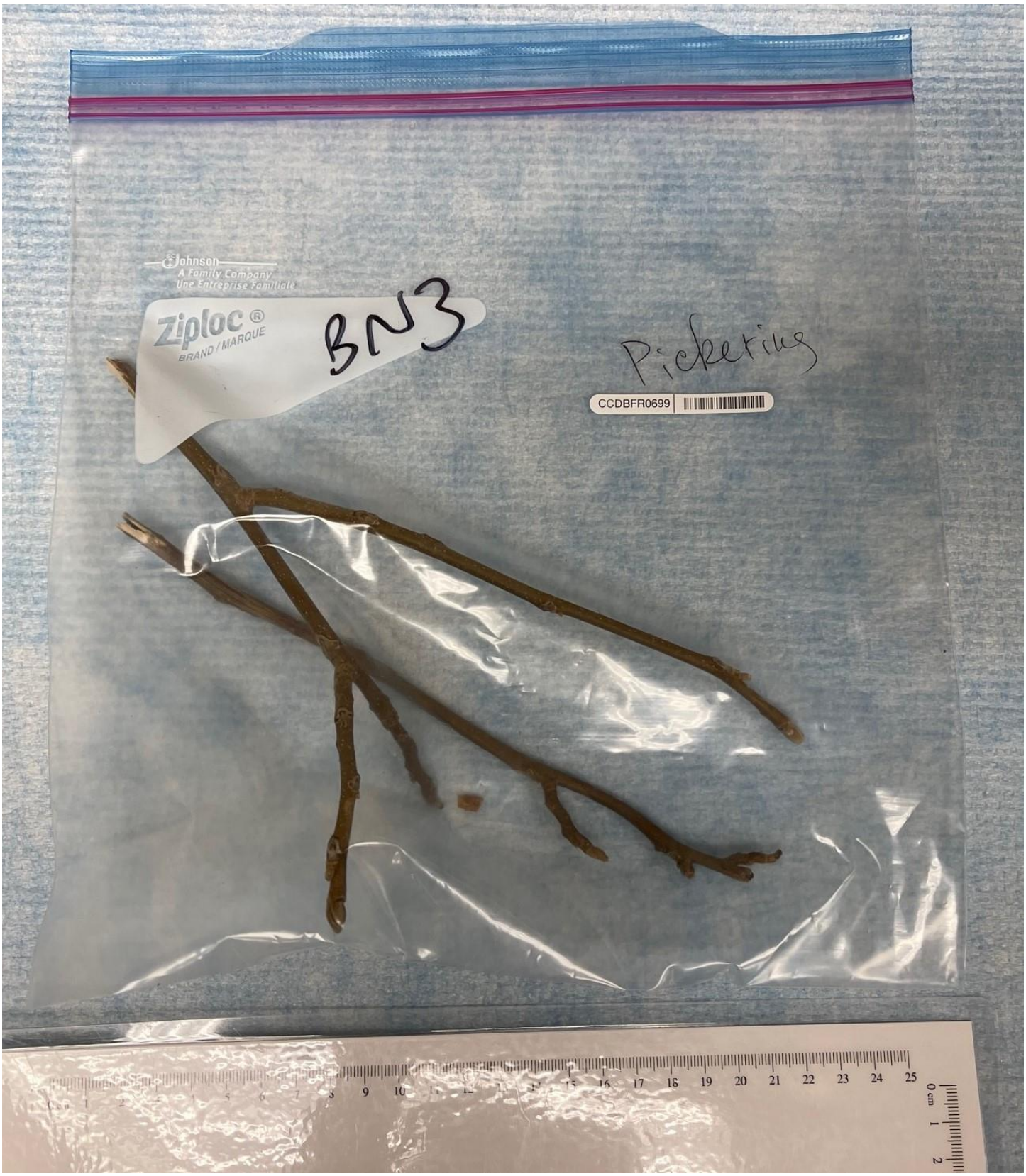


Image 5 – Sample5 CCDBFR0699.

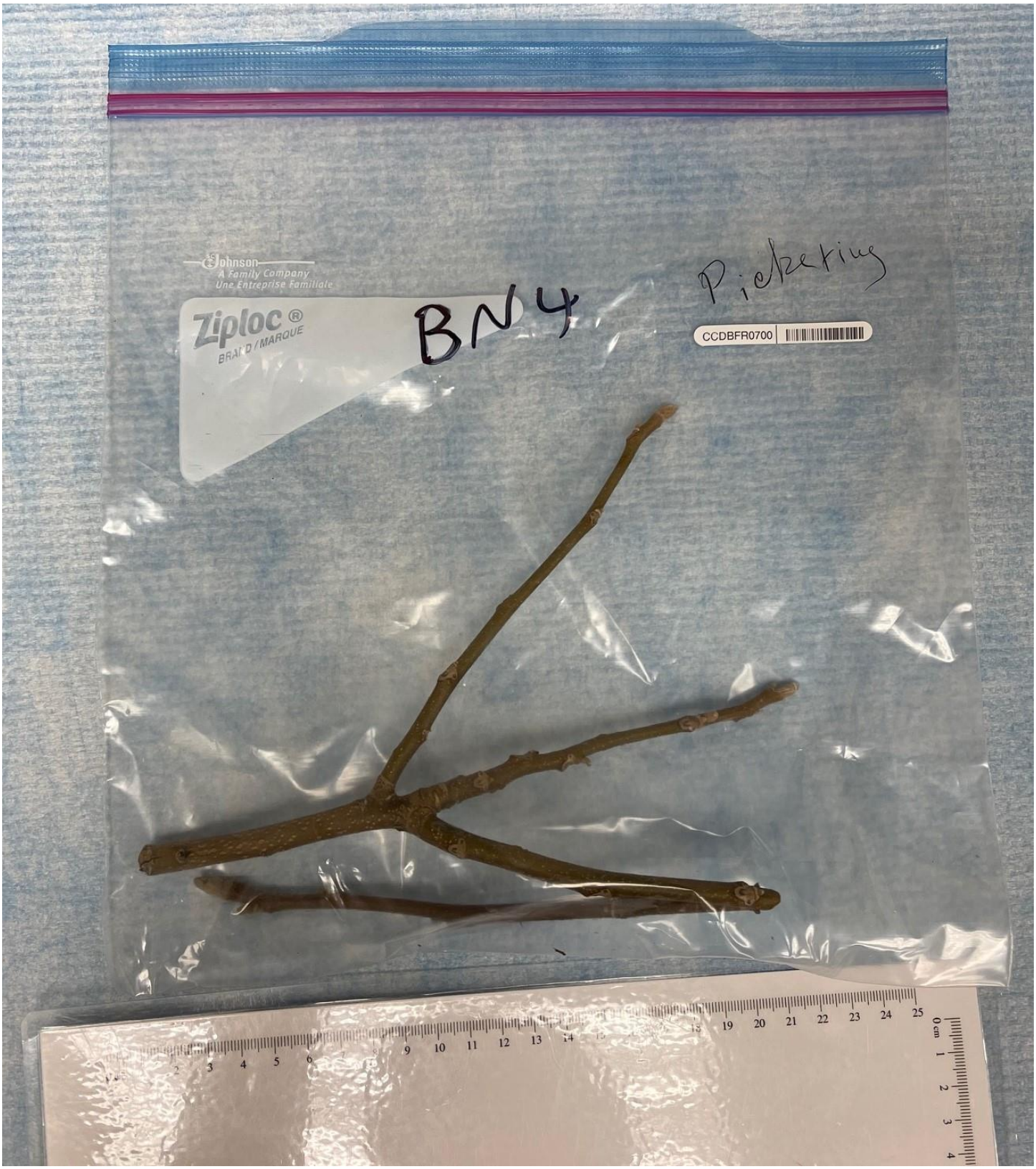


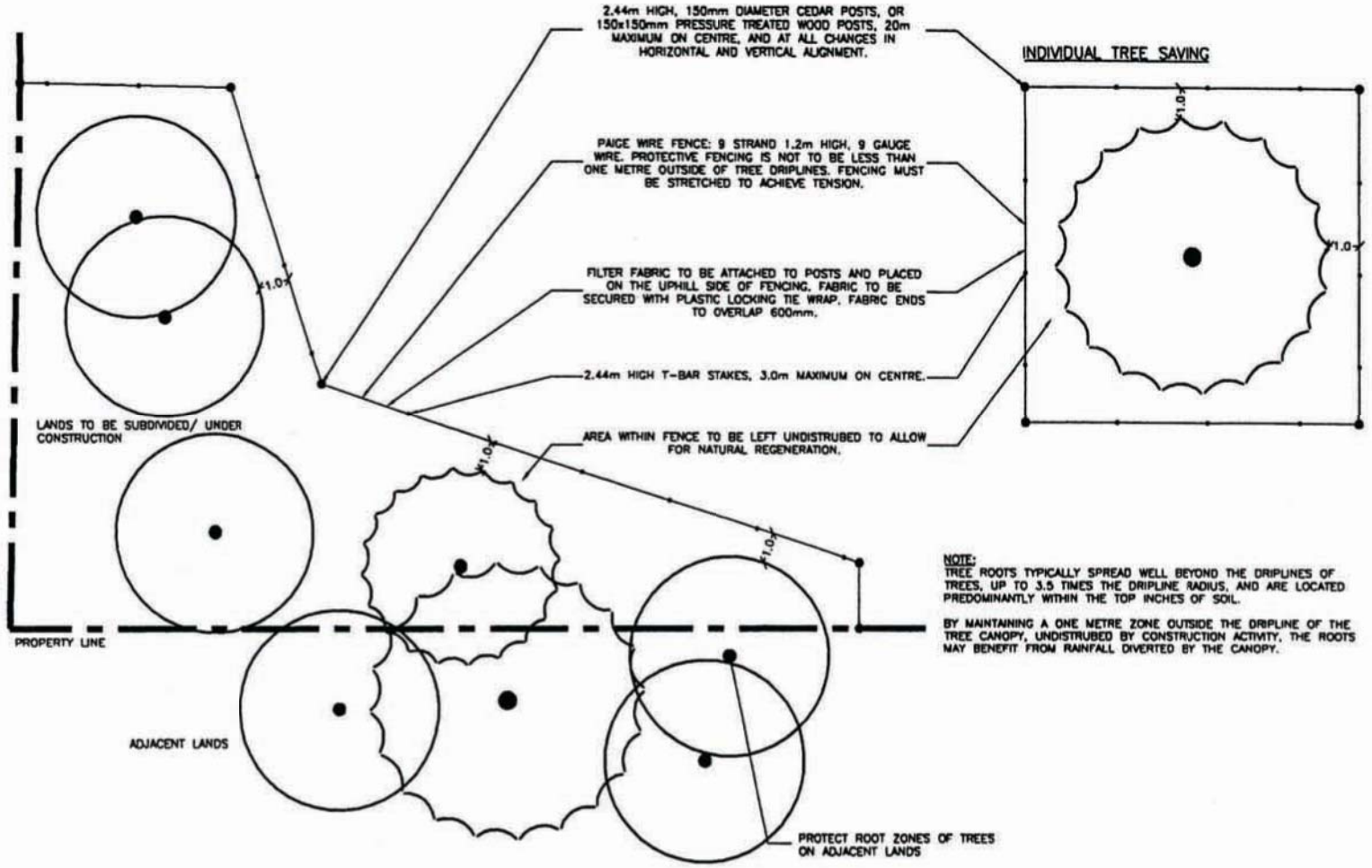
Image 6 – Sample CCDBFR700

Appendix D

Tree Preservation Details

APPENDIX 8

Tree Preservation Details



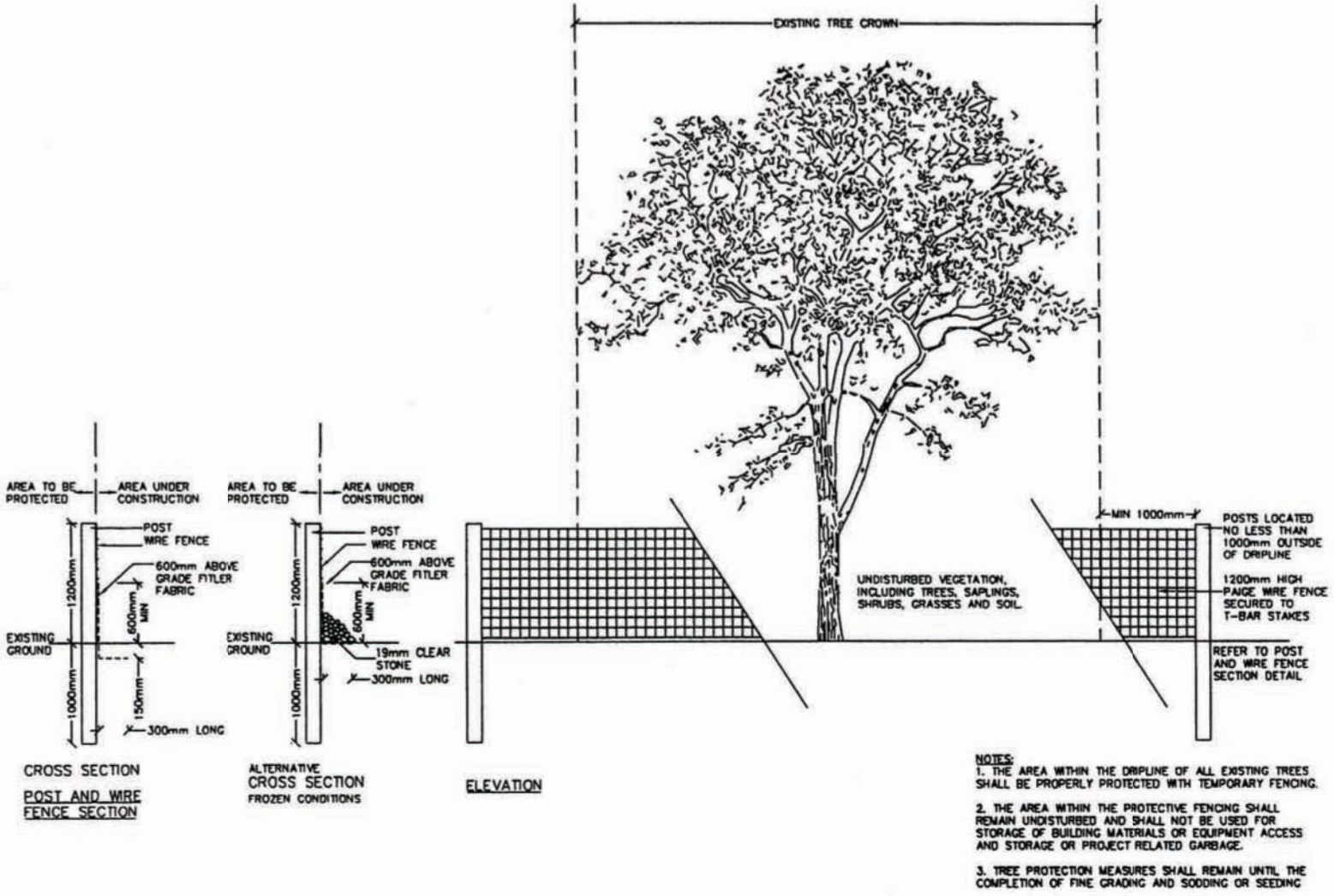
Hamilton

SITE PLAN GUIDELINES

October

TEMPORARY TREE PROTECTION FENCING

(PLAN VIEW, NTS)



Hamilton

SITE PLAN GUIDELINES

October 2003

TEMPORARY TREE PROTECTION FENCING

(POST SECTION AND ELEVATION, NTS)

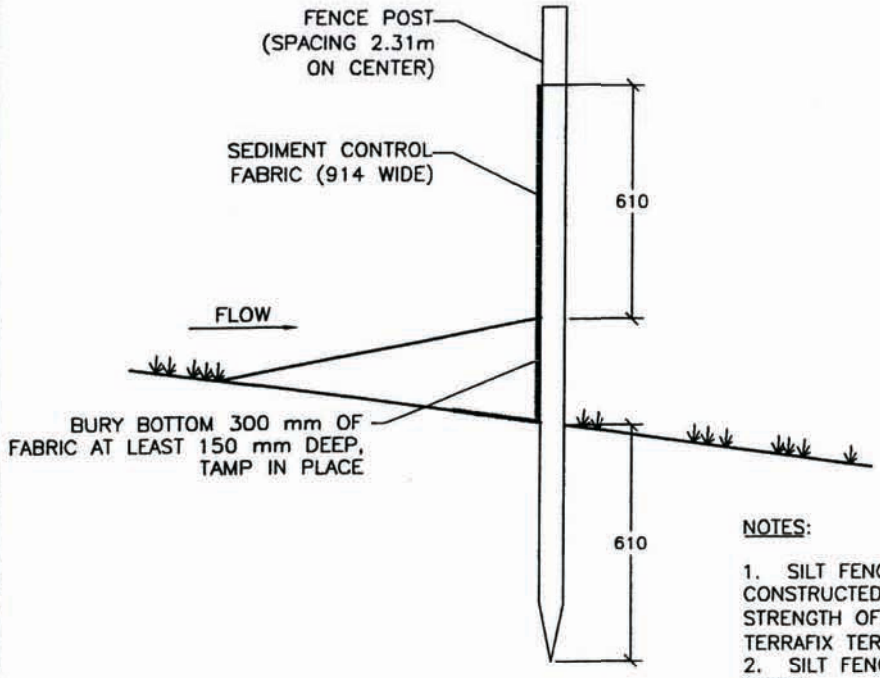


FIGURE 1

NOTES:

1. SILT FENCE HEIGHT TO BE 600 ABOVE GROUND, CONSTRUCTED OF FABRIC WITH MINIMUM TENSILE STRENGTH OF 54.43 kg (MIRAFI ENVIROFENCE, TERRAFIX TERRAFENCE OR APPROVED EQUIVALENT).
2. SILT FENCE TO HAVE FACTORY ATTACHED FENCE POSTS.
3. REFER TO DRAWING FOR LOCATION OF SILT FENCE.

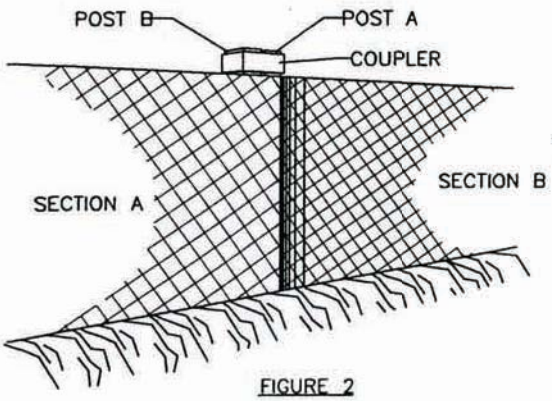


FIGURE 2

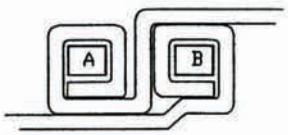


FIGURE 3

Appendix F

Butternut Test Results

CANADIAN CENTRE FOR DNA BARCODING

DNA Testing Laboratory Report

Date of issue: April 12, 2022

CLIENT INFORMATION

Client Name: James Leslie, Senior Vegetation Ecologist
Client Address: GEI Consultants
100 Ahrens St. West | Suite 201 Kitchener, ON N2H 4C3
Contact Name: James Leslie (jleslie@geiconsultants.com)

ITEMS

Description: Six samples (twigs) from putative butternut submitted for hybrid detection.

Sample ID	Sample ID provided	Process ID
CCDBFR0695	Hamilton 1	ABCBF714-22
CCDBFR0696	Hamilton 2	ABCBF715-22
CCDBFR0697	Pickering BN1	ABCBF716-22
CCDBFR0698	Pickering BN2	ABCBF717-22
CCDBFR0699	Pickering BN3	ABCBF718-22
CCDBFR0700	Pickering BN4	ABCBF719-22

Dates Received: March 22, 2022

Sample Received by: Maria Kuzmina – Research Associate, Plant Lead in person from James Leslie

Dates of Analysis: March 29-April 07, 2022

Analyzed by: Nguyen NguyenTX. / Canadian Centre for DNA Barcoding, Biodiversity of Ontario, University of Guelph, 50 Stone Road East, Guelph

METHODS

To ascertain the identity of the species from the submitted samples, an approximate 2mm by 2mm area of bud from each sample was subsampled using sterile techniques. The samples were ground to a fine powder and then lysed. Total genomic DNA was extracted using validated spin column DNA extraction protocol. Two target genetic markers: the second internal transcribed spacer from the nuclear ribosomal DNA (ITS2), and an intergenic spacer between the chloroplast genes *trnL* and *trnF* (*trnL-trnF*) were amplified by using the Polymerase Chain Reaction (PCR) with the primers ITS_S2F/ITS4 and *trnLUAA-c/trnFGAA-f*, respectively; followed by cycle sequencing with standardized commercially available BigDye Terminator v3.1 kit. Sequencing reactions were analyzed by high-voltage capillary electrophoresis using the automated ABI 3730xL DNA Analyzer. Bidirectional forward and reverse sequences were generated for each amplicon. Resulting trace files were assembled into contigs and consensus sequences, and then manually edited in CodonCode Aligner (version 4.1.1.) software. The sequences of ITS2 and *trnL-trnF* were compared against the BOLD reference libraries. Based on the percentage of nucleotide sequence divergence (a number of nucleotide substitutions) between sequence from the test sample and reference DNA barcode, the closest match was used to infer species identity of the corresponding test samples provided by the contributor. The quality of the sequence traces for ITS2 was done by visual inspection to resolve hybridization. Images, sequences, and their associated trace files with quality scores were uploaded to the secure BOLD project called “CCDB forensic sampling [ABCBF]”.

IMAGING

The items were photographed in the Photography Lab Area by Nguyen NguyenTX., using a Canon ELPH 300 HS, 12.1 megapixels. Pictures were uploaded to the BOLD website into a secure project called “CCDB forensic sampling [ABCBF]”. See Appendix 1 for item images.

INTERPRETATION

Based on the number of nucleotide substitutions between sequence from the test sample and reference DNA barcode, the closest match was used to infer species identity for the corresponding test samples provided by the contributor. The ITS2 base calls for diagnostic sites in the trace file chromatograms were used to resolve hybridization.

The ITS2 marker demonstrated five nucleotide substitutions between *Juglans cinerea* (white walnut) and *Juglans ailantifolia* (Japanese walnut) reference sequences across the amplified ~344 base pair length. Unlike the plastid genome, ribosomal nuclear DNA is inherited by both maternal and paternal organisms. Thus, hybridization event is reflected in the trace file chromatograms as mixed signals at the characteristic nucleotide positions. Therefore, the ITS2 DNA barcode is useful for detection of hybridization event between species.

The *trnL-trnF* marker demonstrated five nucleotide substitutions between *Juglans cinerea* (white walnut) and *Juglans ailantifolia* (Japanese walnut) reference sequences across the target ~950 base pair length. This marker is used as a supplementary marker to confirm species identity for the provided samples. Because it is a part of the chloroplast genome, it is inherited maternally. It confirms the maternal lineage in a hybrid but on its own does not detect hybridization event.

RESULTS

Sample ID	Sample ID provided	Process ID	Lab Results/Hybridity detected
CCDBFR0695	Hamilton 1	ABCBF714-22	Yes
CCDBFR0696	Hamilton 2	ABCBF715-22	Yes (F2 backcross hybrid)
CCDBFR0697	Pickering BN1	ABCBF716-22	No
CCDBFR0698	Pickering BN2	ABCBF717-22	No
CCDBFR0699	Pickering BN3	ABCBF718-22	No
CCDBFR0700	Pickering BN4	ABCBF719-22	No

The full length ITS2 and *trnL-trnF* genetic markers (~344 base pairs and ~950 base pairs, respectively) for all samples were aligned against the known reference sequences for *Juglans cinerea* (white walnut, butternut)*, Juglans ailantifolia* (Japanese walnut), and their hybrid *Juglans cinerea* x *Juglans ailantifolia.* The alignments were analyzed by visual comparison, and by building the Neighbor Joining (NJ) phylogenetic trees using BOLD (Figures 1-8).

ITS2

The chromatograms for the sample CCDBFR0695 matched the reference chromatograms for the hybrid *Juglans cinerea x Juglans ailantifolia* (Figures 1, 2, and 3). The analyzed samples revealed mixed base calls at the nucleotide positions, which are diagnostic for two species in question. This base call pattern is consistent with hybridization between two parental organisms of *Juglans cinerea* and *Juglans ailantifolia*.

The chromatograms for the samples from CCDBFR0696 to CCBDFR700 matched with the references of *Juglans cinerea* (white walnut), showing no evidence of mixed base calls at the nucleotide positions, which are diagnostic for two species in question (Figures 1, 2, 3, and 4).

trnL-trnF

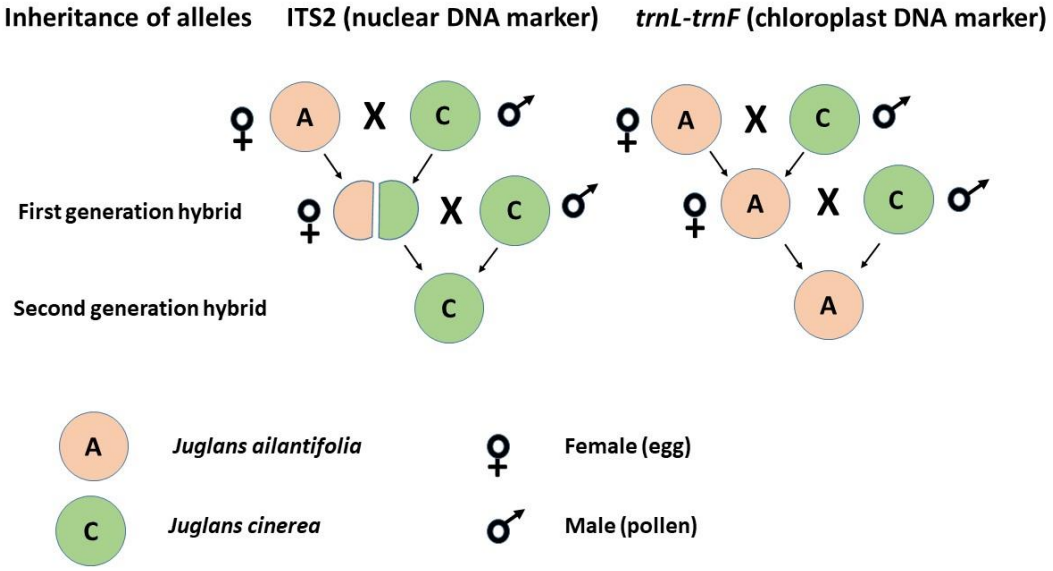
The analysis of *trnL-trnF* sequences showed that the maternal organism for the provided samples CCDBFR0695 and CCDBFR0696 belong to *Juglans ailantifolia* with five nucleotide substitutions (across the amplified length of the marker) differentiating it from *Juglans cinerea*. As shown in Figures 5, 6, 7, and 8 samples CCDBFR0695 and CCDBFR0696 match those of reference sequences for *Juglans ailantifolia.*

The analysis of *trnL-trnF* sequences confirmed that the four provided samples (CCDBFR0697-CCBDFR700) match with *Juglans cinerea* (white walnut) with five nucleotide substitutions (across the amplified length of the marker) differentiating it from *Juglans ailantifolia* (Japanese walnut) as shown in Figure 5, 6, 7 and 8.

CONCLUSIONS

The present testing indicated that the provided sample CCDBFR0695 is a first-generation hybrid between *Juglans cinerea x Juglans ailantifolia*. The maternal organism for this sample was *Juglans ailantifolia* (Japanese walnut).

The sample CCDBFR0696 inherited its nuclear (ITS2) and chloroplast (*trnL-trnF*) DNA copies from two different species: *Juglans cinerea* (ITS2) and *Juglans ailantifolia* (*trnL-trnF*). Because the trace chromatograms for this sample showed no evidence of mixed base calls, it indicates that it is a a second generation cross between the first-generation hybrid *Juglans cinerea x Juglans ailantifolia* with paternal *Juglans cinerea* (or another hybrid with heterozygous alleles of ITS2). The maternal parental hybrid carried heterozygous alleles of ITS2 (*Juglans cinerea* and *Juglans ailantifolia*) and inherited the maternal allele from *Juglans ailantifolia.* In this case the specimen CCDBFR0696 inherited the same chloroplast DNA from its maternal hybrid organism (*trnL-trnF* from *Juglans ailantifolia*) and the allele of ITS2 from *Juglans cinerea.* The second allele of ITS2 came from the other parent, presumably *Juglans cinerea*. Two identical alleles did not show any evidence of mixed base calls in the chromatograms. The diagram below illustrates two types of inheritance for the nuclear (ITS2) and chloroplast (*trnL-trnF*) DNA markers and provides graphical explanation of the observed test results. Therefore, our analysis showed that the sample CCDBFR0696 is the hybrid backcross with one parental species.



Both ITS2 and *trnL-trnF* sequences for the samples CCDBFR0697, CCDBFR0698, CCDBFR0699, and CCDBFR0700 are identical to the reference sequences for *Juglans cinerea*, known as white walnut. The trace chromatograms showed no evidence of hybridization in these samples. The samples CCDBFR0697, CCDBFR0698, CCDBFR0699, and CCDBFR0700 are not hybrids.

RESULTS REPORTED BY:

Nguyen NguyenT.X., MSc; Forensic Technician

RESULTS REVIEWED BY:

Maria Kuzmina, PhD; Plant Lead

Evgeny V. Zakharov, PhD; Director, CCDB

FIGURES

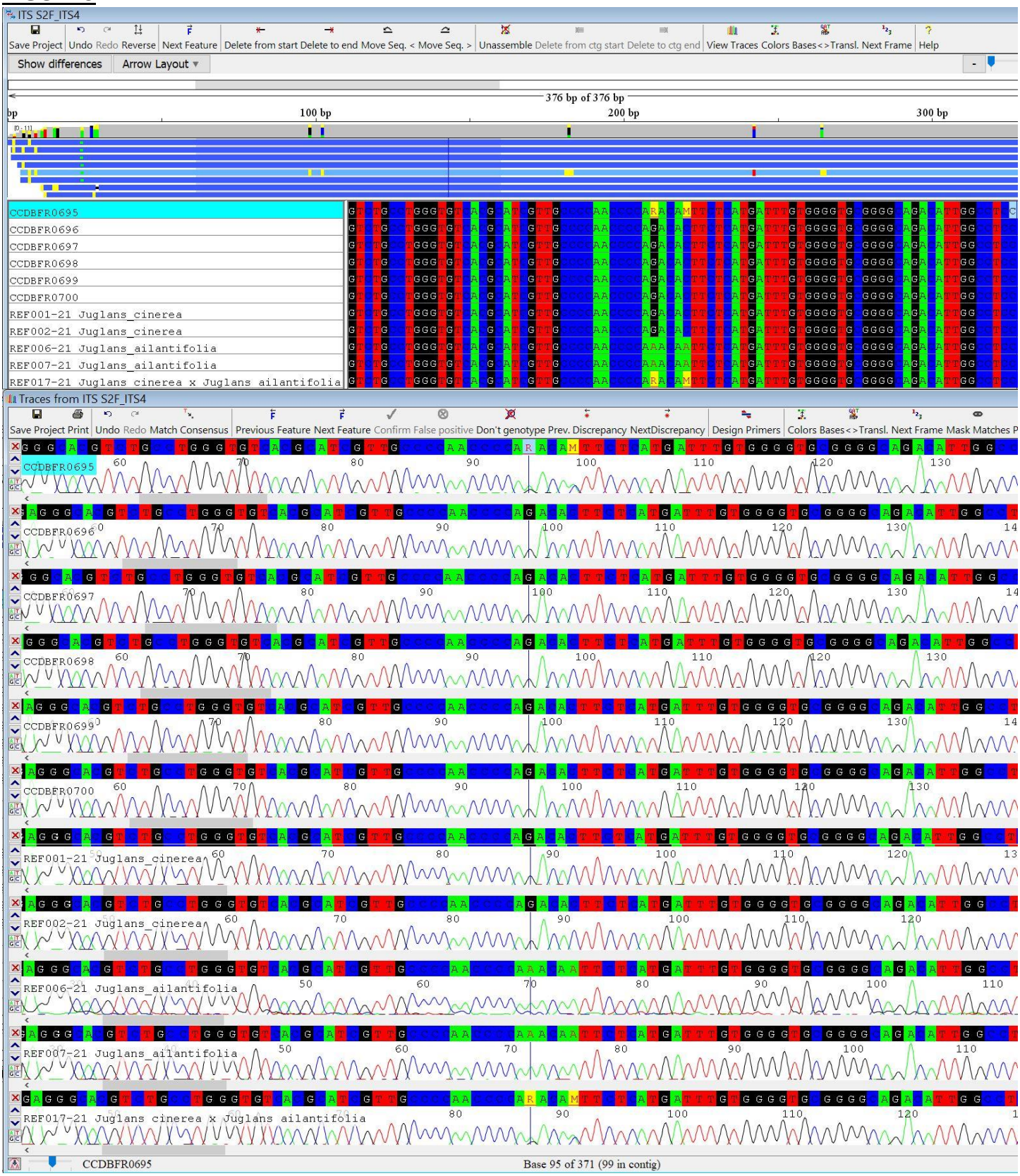


Figure 1. ITS2 sequence comparison of samples CCDBFR0695 – CCDBFR700 and *Juglans cinerea*, *Juglans ailantifolia*, and hybrid *Juglans cinerea x Juglans ailantifolia* reference sequences from the BOLD reference library at the base ~99 and ~103.

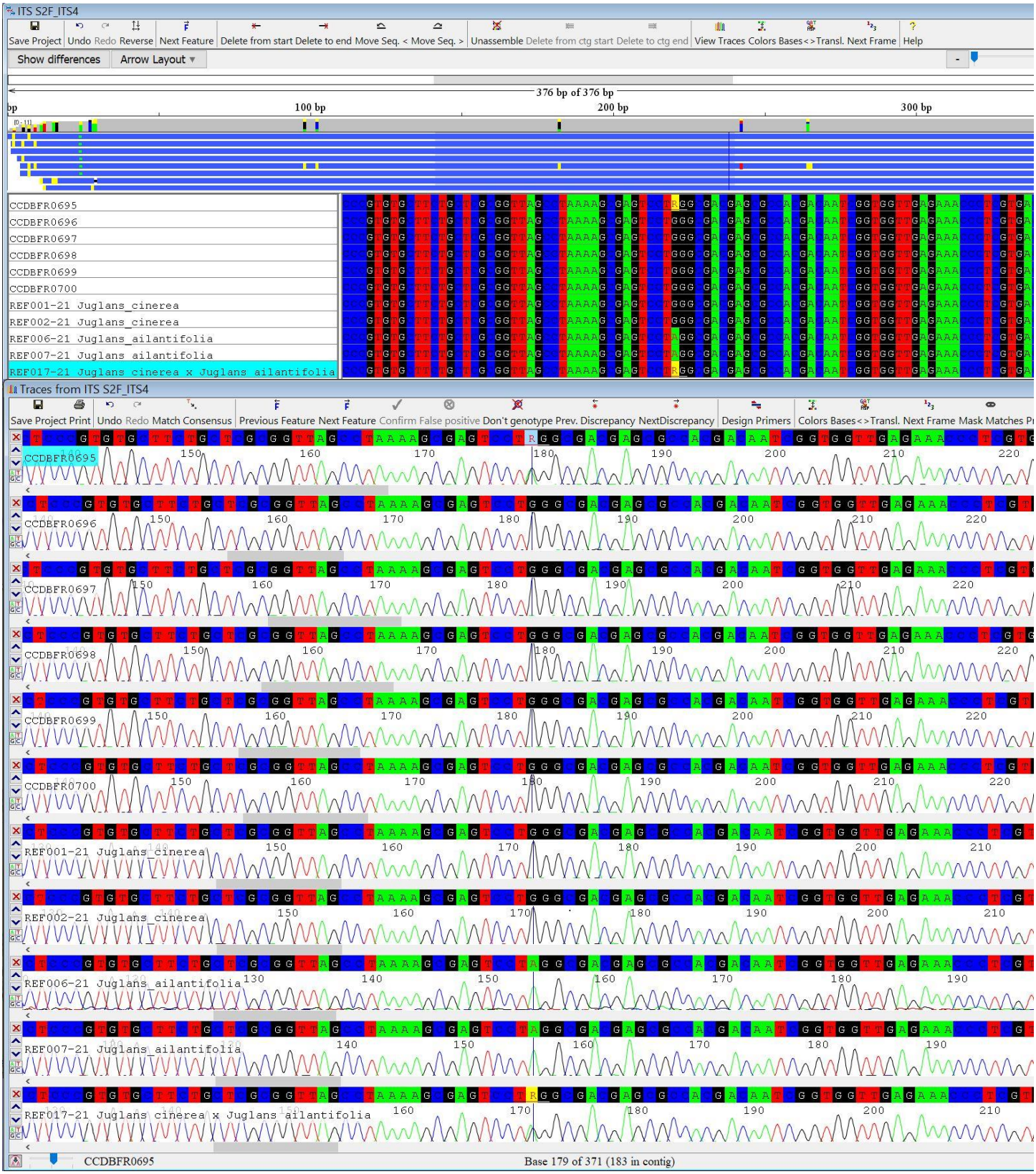


Figure 2. ITS2 sequence comparison of samples CCDBFR0695 – CCDBFR700 and *Juglans cinerea*, *Juglans ailantifolia*, and hybrid *Juglans cinerea x Juglans ailantifolia* reference sequences from the BOLD reference library at the base ~182.

Figure 3. ITS2 sequence comparison of samples CCDBFR0695 – CCDBFR700 and *Juglans cinerea*, *Juglans ailantifolia*, and hybrid *Juglans cinerea x Juglans ailantifolia* reference sequences from the BOLD reference library at the base ~242 and ~264.

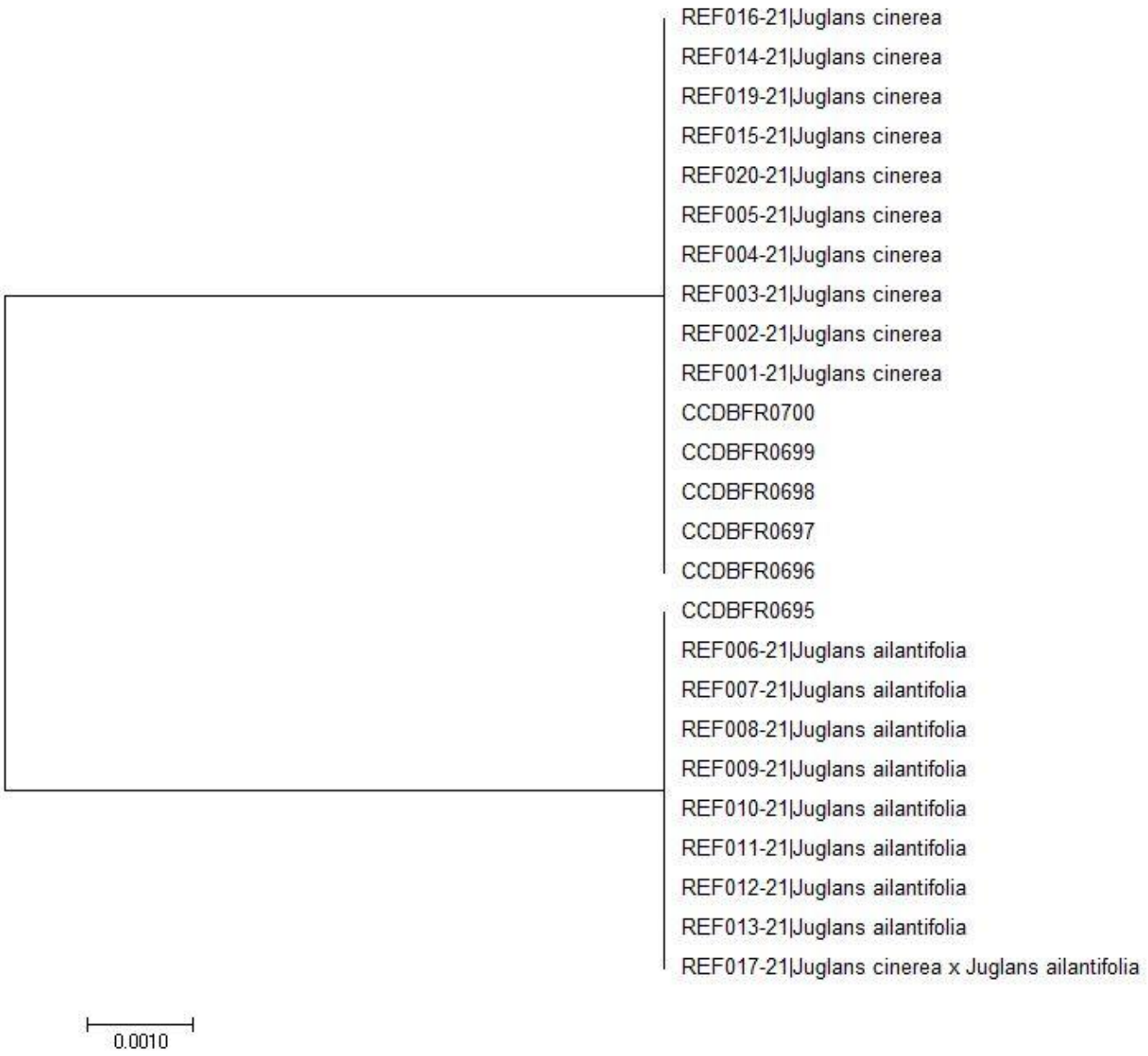


Figure 4. NJ phylogenetic tree of ITS2 sample sequences CCDBFR0695 – CCDBFR700 and *Juglans cinerea*, *Juglans ailantifolia*, and hybrid *Juglans cinerea* x *Juglans ailantifolia* reference sequences from the BOLD reference library.

Figure 5. *trnL-trnF* sequence comparison of samples CCDBFR0695 – CCDBFR700 and *Juglans cinerea*, *Juglans ailantifolia*, and hybrid *Juglans cinerea x Juglans ailantifolia* reference sequences from the BOLD reference library at the base ~200 and ~276.

Figure 6. *trnL-trnF* sequence comparison of samples CCDBFR0695 – CCDBFR700 and *Juglans cinerea*, *Juglans ailantifolia*, and hybrid *Juglans cinerea x Juglans ailantifolia* reference sequences from the BOLD reference library at the base ~436.

Figure 7. *trnL-trnF* sequence comparison of samples CCDBFR0695 – CCDBFR700 and *Juglans cinerea*, *Juglans ailantifolia*, and hybrid *Juglans cinerea x Juglans ailantifolia* reference sequences from the BOLD reference library at the base ~595 and ~678.

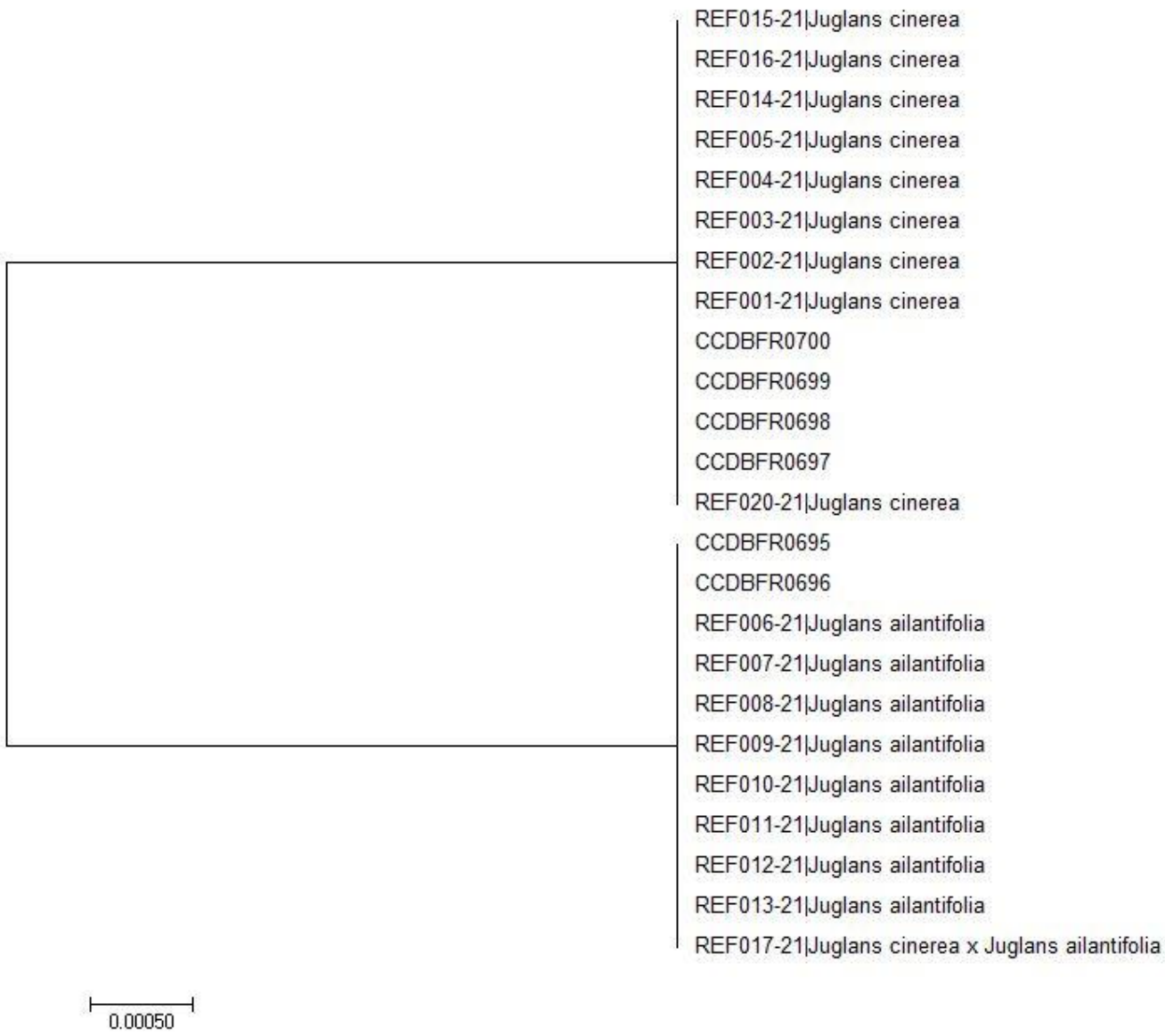


Figure 8. NJ phylogenetic tree of *trnL-trnF* sample sequences CCDBFR0695 – CCDBFR700 and *Juglans cinerea*, *Juglans ailantifolia*, and hybrid *Juglans cinerea x Juglans ailantifolia* reference sequences from the BOLD reference library.

Appendix 1. Image Inventory

Image 1 – Samples CCDBFR0695.

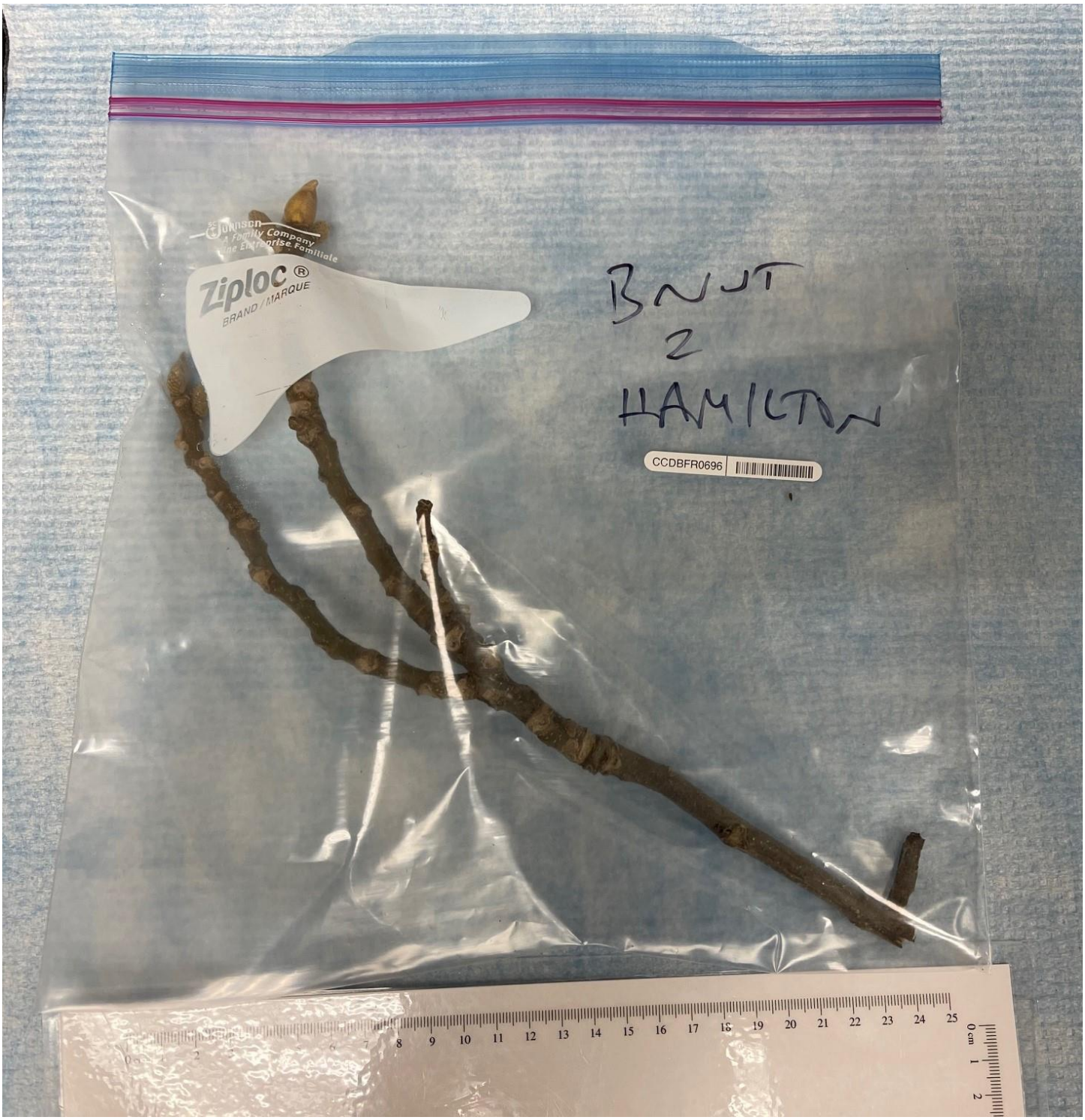


Image 2 – Sample CCDBFR0696.

Image 3 – Sample CCDBFR0697.

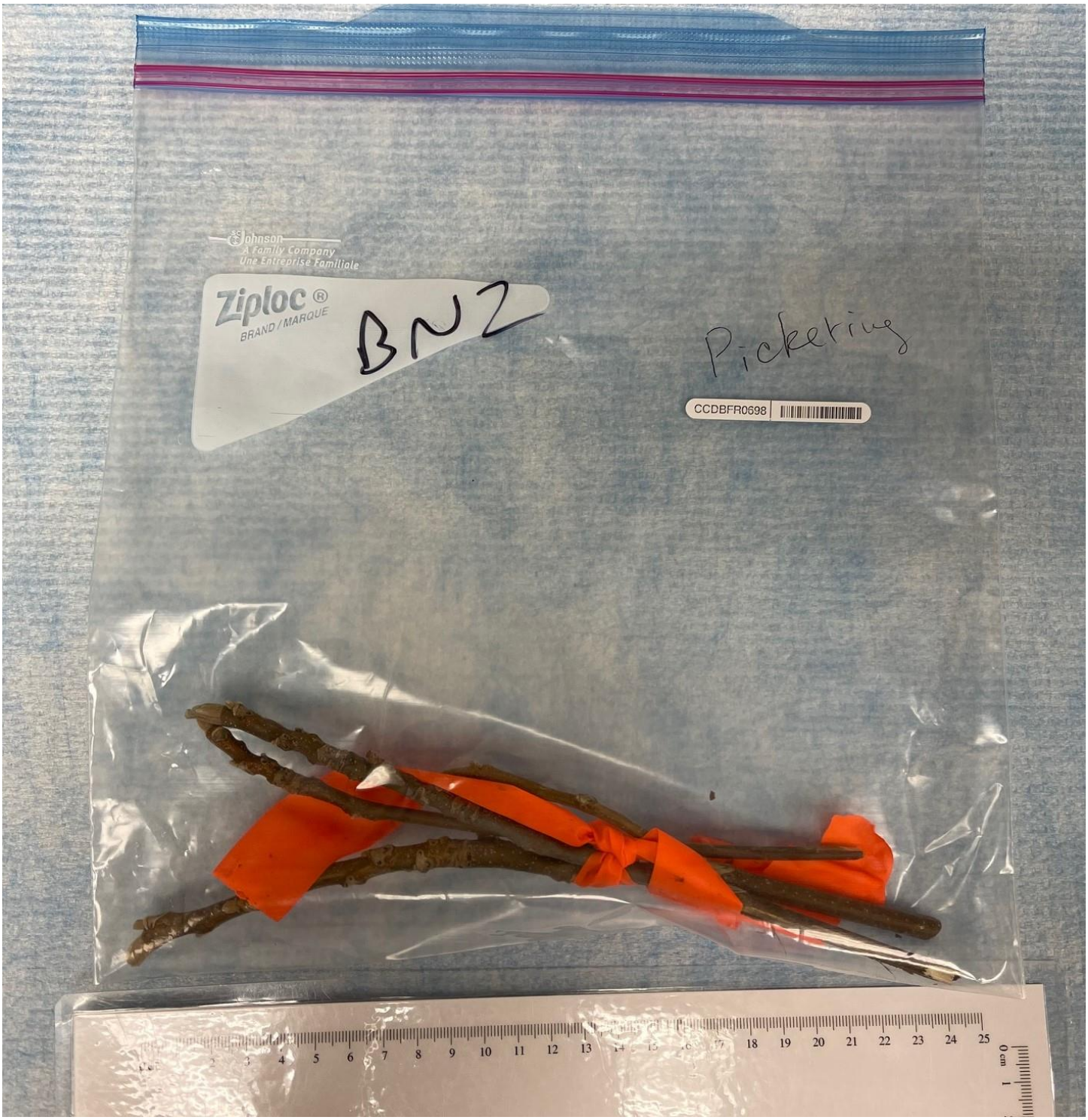


Image 4 – Sample CCDBFR0698.

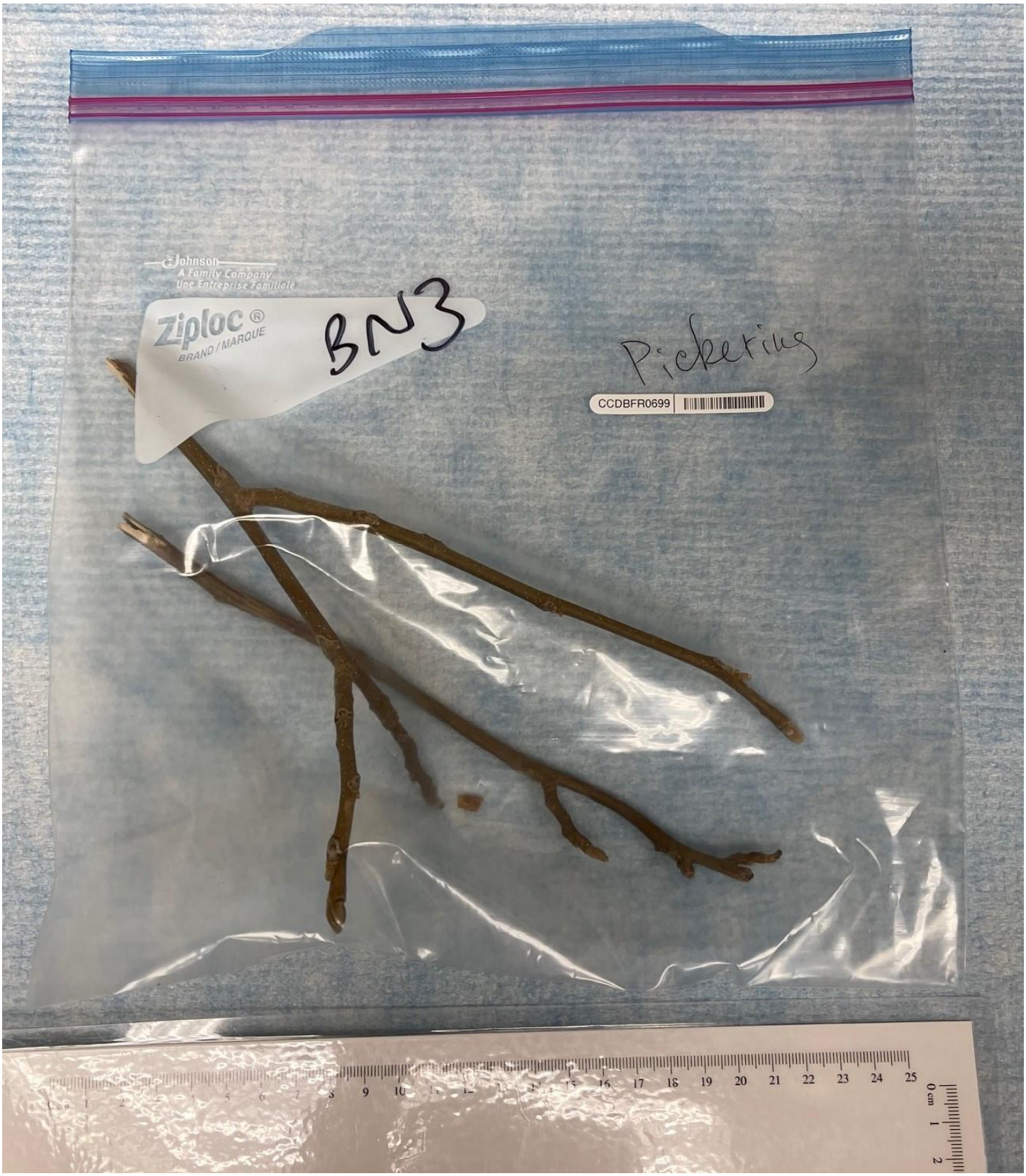


Image 5 – Sample5 CCDBFR0699.

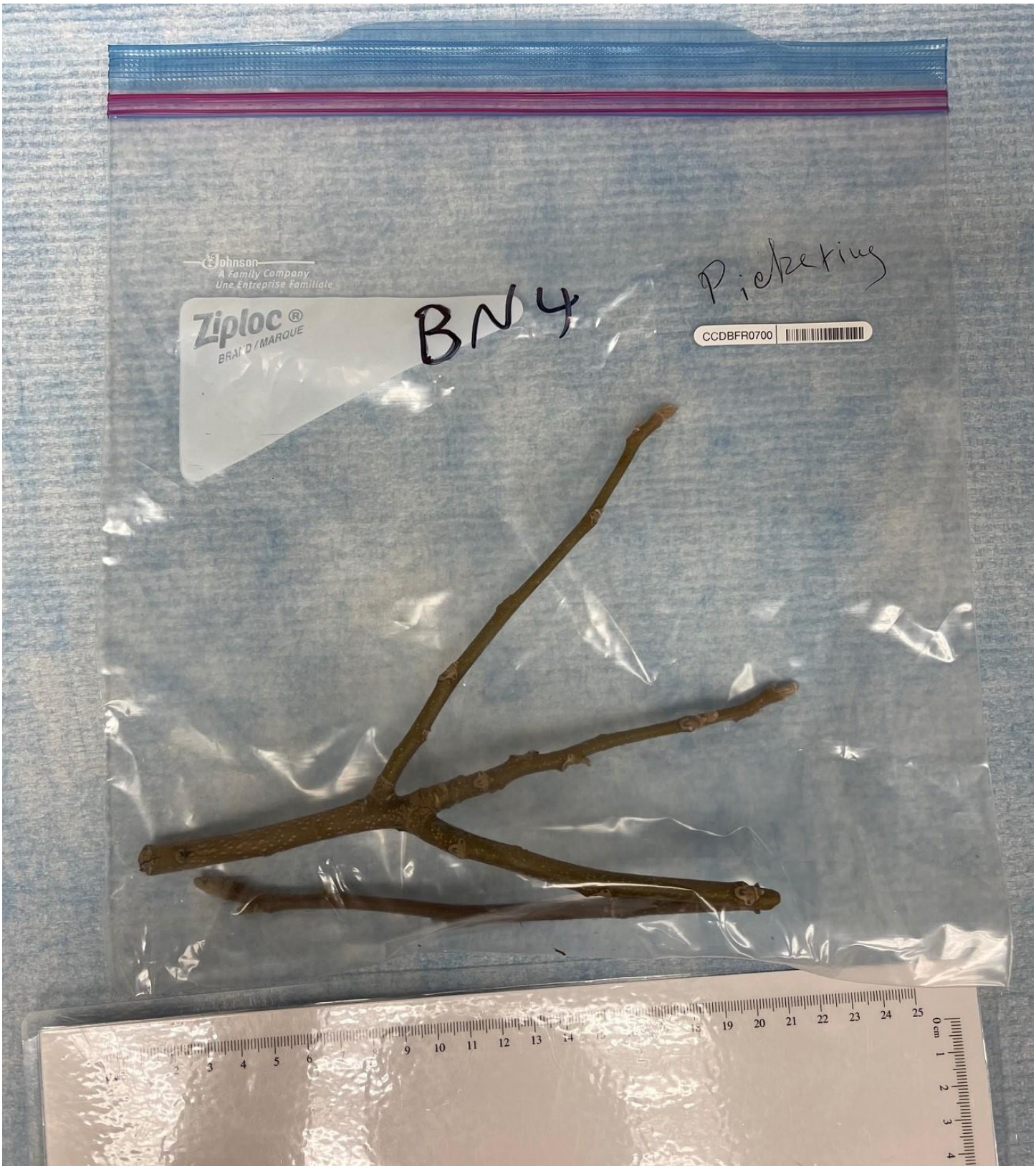


Image 6 – Sample CCDBFR700