



2004 Hamilton Road Subject Lands Status Report

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NATURAL RESOURCE SOLUTIONS INC.

Aquatic, Terrestrial and Wetland Biologists

2004 Hamilton Road Subject Lands Status Report

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1.0 Introduction

Natural Resource Solutions Inc. (NRSI) was retained in April 2021 by Innovative Canadian Capital Growth Inc. to complete a Subject Lands Status Report (SLSR) and subsequent impact assessment for the proposed development of the property located at 2004 Hamilton Road in London, Ontario.

This report summarizes the work completed and includes background species information for the subject lands, the results of original field surveys including surveys for reptiles and amphibians, migratory and breeding birds, bat habitat, insects, vegetation communities and vascular flora, fish, benthic invertebrates, and aquatic habitat assessments. This report also identifies the sensitive and significant features of the study area. This information is intended to inform the Draft Plan, with development impacts assessed in a subsequent Environmental Impact Study (EIS).

This SLSR has been prepared in accordance with the updated City of London's Environmental Management Guidelines (EMG) (2021) and consistent with the City of London's Official Plan, referred to as the London Plan (2020).

For the purposes of this report, the term "subject lands" refers to the southern portion of a property owned by the proponent, that is proposed for development. As per the EMGs, the subject lands are typically the limits of the lands owned by the proponent, but can also be the limits of disturbance associated with the proposed works, as in this case. The term "study area" refers to the subject lands plus the adjacent lands (120m and natural heritage features that extend beyond, included within the property) for which additional information was collected and reviewed, as could be gathered without direct access to these areas) (Map 1). Legacy data collected from agencies encompassed an area of approximately 1km around the property to ensure that all surrounding natural features were considered. Data from the wildlife atlases was collected from the 10km x 10km square that overlaps with the subject lands (17MH85).

The study area, shown on Map 1, is approximately 45ha in area, with the subject lands being approximately 16ha in area. The subject lands are located on the east side of London, bordering Veterans Memorial Parkway and agricultural fields to the east; Hamilton Road and industrial lands with some agricultural fields to the south; a horse race track, stables, and agricultural fields to the west; and forest to the north. The property borders the Thames River on the north side. The subject lands are currently characterized by cultural meadow, with

mature woodland on the northern edge and along the Fekete Drain, and small wetlands within the meadow. The Meadowlily Woods Environmentally Significant Area (ESA) is identified within the mature woodland. Hedgerows and landscape trees in the southeast corner of the subject lands indicated the location of a former homestead.

1.1 Project Scoping

1.1.1 Background Information Review

In order to determine a study approach for the SLSR, existing natural heritage information was first gathered and reviewed to identify key natural heritage features and species that are reported from, or have potential to occur within, the study area. This included the following background information sources:

- Upper Thames River Conservation Authority (UTRCA),
- Ministry of Natural Resources and Forestry (MNRF), Aylmer District,
- Ministry of Environment, Conservation and Parks (MECP),
- City of London,
- Natural Heritage Information Centre (NHIC) database (MNRF 2022),
- Middlesex Natural Heritage System Study (UTRCA 2014),
- Aquatic Species at Risk Mapping (DFO 2022),
- Ontario Breeding Bird Atlas (Bird Studies Canada et al. 2006),
- Ontario Reptile and Amphibian Atlas (Ontario Nature 2019),
- Atlas of the Mammals of Ontario (Dobbyn 1994),
- Ontario Butterfly Atlas (Macnaughton et al. 2022),
- Ontario Odonate Atlas Database (OOAD 2022),
- Aquatic Resources Area Data (Government of Canada 2022),
- eBird (eBird 2022), and
- iNaturalist (iNaturalist 2022).

Initial wildlife species lists were compiled to provide information on species reported from the vicinity of the study area using the various data sources listed above. These species lists were used to guide the scope and type of wildlife field surveys required as outlined in the following sections.

Based on the findings of the background review, a draft Environmental Study Scoping Checklist (ESSC) was completed. An environmental scoping meeting was held on June 7, 2022 with the

City (Shane Butnari, Jeff Hachey), UTRCA (Stefanie Pratt), LDS Consultants (Rebecca Walker), Development Engineering (Jason Fleury), and NRSI (Gina MacVeigh). The final ESSC was received from the City on October 13, 2022. Appendix I provides the ESSC and correspondence from City Ecologist, Shane Butnari.

1.1.2 Significant Species and Habitat Screening

Species at Risk (SAR) are those listed on the Species at Risk in Ontario List (MECP 2022). These include species identified by the Committee on the Status of Species at Risk in Ontario (COSSARO) as provincially Endangered, Threatened, or Special Concern. Species listed as Endangered or Threatened are protected under the Endangered Species Act, which includes protection to their habitat.

Species considered Special Concern are included in the definition of Species of Conservation Concern (SCC), which includes the following:

- species designated provincially as Special Concern,
- species that have been assigned a conservation status (S-Rank) of S1 to S3 or SH by the Natural Heritage Information Centre (MNRF 2022), and
- species that are designated federally as Threatened or Endangered by the Committee for the Status of Endangered Wildlife in Canada (COSEWIC), but not provincially by the COSSARO. These species may be protected by the federal Species at Risk Act (SARA) if they are listed as Threatened or Endangered on Schedule 1 of the SARA.

Habitat for SCC is considered Significant Wildlife Habitat (SWH) (MNRF 2015), which is afforded protection under the Provincial Policy Statement (OMMAH 2020) and City natural heritage protection policies. For the purposes of this report, the term “SAR” will refer to provincially Threatened and Endangered species regulated under the Endangered Species Act, while provincial species of Special Concern will be considered SCC.

The Significant Wildlife Habitat Technical Guide (SWHTG) outlines the types of habitats that the MNRF considers significant in Ontario as well as criteria to identify these habitats for Ecoregion 7E (OMNR 2000, MNRF 2015). The SWHTG groups SWH into four broad categories: seasonal concentration areas, rare vegetation communities and specialized wildlife habitat, habitats of SCC, and animal movement corridors.

A preliminary screening for SAR, SCC, and SWH was completed based on the background review and a preliminary site visit. These screenings helped scope the study, and were updated following the field work completed in 2022.

Appendix II and III contain the screening tables.

2.0 Relevant Policies, Legislation, and Planning Studies

For the purposes of this report, information on the natural heritage features within the proposed development area and adjacent lands was collected and assessed for significance. To help inform suitable land-use concepts, guide the layout of development, and identify areas to be protected, these features are evaluated against the relevant policies, legislation, and planning studies outlined in Table 1.

Table 1. Relevant Policies, Legislation and Planning Studies

Policy/Legislation/Plan	Description	Project Relevance
Provincial Policy Statement (OMMAH 2020).	• Issued under the authority of Section 3 of the Planning Act and in effect since May 1, 2020, replacing earlier versions. • Section 2.1 of the PPS – Natural Heritage establishes clear direction on the adoption of an ecosystem approach and the protection of resources that have been identified as 'significant'. • The Natural Heritage Reference Manual (OMNR 2010) and the Significant Wildlife Habitat Technical Guide (OMNR 2000) and associated criteria schedules (OMNR 2015) were prepared by the MNRF to provide guidance on identifying natural features and in interpreting the Natural Heritage sections of the PPS.	• Natural features that occur or may occur within the study area, and which receive protection under the PPS, include: • Significant Wetlands, • Significant Woodlands, • Significant Valleylands, • Fish Habitat, • Potential Significant Wildlife Habitat, and • Potential habitat for Endangered and Threatened species. • Section 2.1.2 of the PPS states that the connectivity of natural features in an area should be maintained, restored, or where possible, improved. • Section 2.1.4 of the PPS states that development or site alteration shall not be permitted in Significant Wetlands located in Ecoregion 7E (in which the study area is located). • Section 2.1.5 of the PPS states that development or site alteration shall not be permitted in Significant Woodlands, Significant Valleylands, and Significant Wildlife Habitat unless it has been demonstrated that there will be no negative impacts on the features or their ecological functions. • Section 2.1.6 of the PPS states that development or site alteration shall not be permitted in fish habitat except in accordance with provincial and federal requirements. • Section 2.1.7 of the PPS states that development or site alteration shall not be permitted in SAR habitat except in accordance with provincial and federal requirements.

Policy/Legislation/Plan	Description	Project Relevance
		Section 2.1.8 of the PPS states that development and site alteration shall not be permitted on adjacent lands to the natural features described above, unless it is demonstrated that there will be no negative impacts to the natural features or their ecological functions.
Endangered Species Act (2007)	Prohibits the killing, harming, harassing, or capturing of Endangered and Threatened species and protects their habitats from damage and destruction.	Multiple SAR were identified as having the potential to occur within the study area based on presence of suitable habitat.
Migratory Birds Convention Act (1994)	Prohibits the disturbance, destruction, or taking of a nest or eggs of migratory birds.	Any vegetation removal required for construction of the proposed development must have regard for this legislation in the form of timing window restrictions or other suitable mitigation measures.
Fish and Wildlife Conservation Act (1997)	Provides protection for certain bird species not protected under the Migratory Birds Convention Act (e.g. raptors), as well as many furbearing mammals and their dens or habitual dwellings.	Construction activities must have consideration for bird nesting and den sites of furbearing mammals.
Canadian Fisheries Act (1985)	- Manages threats to all fish and fish habitats in Canada. - The Act prohibits harmful alteration, disruption, or destruction of fish habitat (HADD). - DFO has developed an assessment tool, where proponents can determine whether their project activities require DFO review based on the type of water body the work is occurring in and the nature of the proposed activity.	- Fekete Drain provides Fish Habitat. - Any works within Fekete Drain must have regard for this legislation and review through DFO may be required.
The London Plan (2020)	- The London Plan is the City of London's Official Plan. It was adopted by City Council in June 2016 and approved by the Minister December 2016. The most recent version was consolidated in October 2020. It outlines current policies for the protection of natural features within the City of London. - The Natural Heritage policies establish requirements for the identification, delineation and protection of the natural heritage features and areas that form the City of London's Natural Heritage System.	- Map 1 of the Plan identifies portions of the subject lands as Green Space and Light Industrial. - Map 5 of the Plan indicates the presence of Environmentally Significant Area (Meadowlily Woods), Unevaluated Wetland, Significant Valleylands, and a watercourse (Fekete Drain)

Policy/Legislation/Plan	Description	Project Relevance
	In the review of any planning and development application, an initial review of the lands (SLSR) shall be undertaken to confirm the presence or absence of any natural features and areas that may be present that have not been mapped to determine if further evaluation of the feature is required.	- Map 6 of the Plan indicates the presence of Significant Groundwater Recharge Areas and Highly Vulnerable Aquifers - London Plan has Environmental Policies for the protection, management, and enhancement of environmental features. - Policy 1323 & 1324 refer to Fish Habitat - Policy 1325 to 1329 refer to SAR Habitat - Policy 1330 to 1336 refer to wetlands. Policy 1332 identifies the need for OWES on unevaluated wetland features. Policy 1334 identifies that for non-Provincially Significant Wetlands the City may consider replacement on at least a 1:1 ratio. - Policy 1337 to 1343 refer to Significant Woodlands and Woodland features. Policy 1341 identifies how to determine Significance of a Woodland - Policy 1344 to 1350 refer to Significant Valleylands. - Policy 1351 refers to Alteration to River, Stream Valleys and Watercourses. - Policy 1352 to 1355 refer to SWH - Policy 1361 to 1366 refer to Water Resource Systems. - Policy 1367 to 1371 refer to ESAs.
Middlesex Natural Heritage Systems Study (UTRCA 2014)	- The study provides a landscape level assessment of natural heritage features and functions. - The study incorporates the most current information available from the MNRF to identify areas that meet components of the PPS definition of significant. The methodology is intended to be a local approach to identifying elements of the natural heritage system.	Figure 20 of the Study indicates that the treed areas along Fekete Drain and the woodland along the north of the subject lands are significant.
City of London Environmental	Outlines policy guidelines, standards, processes and procedures for the preparation and review of SLSR and EIS,	In preparing this SLSR, the EMG were followed including data collection standards

Policy/Legislation/Plan	Description	Project Relevance
Management Guidelines (2021)	determination of buffers and setbacks, and evaluation of significant woodlands, as required by the City of London.	and guidelines for determining setbacks and ecological buffers. Provides Significant Woodland Evaluation Criteria.
Conservation Authorities Act (1990) Ontario Regulation 41/24: Prohibited Activities, Exemptions and Permits	This Minister's regulation replaced Ontario Regulation 157/06 (and all other individual conservation authority regulations) as of April 1, 2024.	- The UTRCA will continue to require permit applications for development, interference, and alteration activities in regulated areas, as defined under the CA Act and in O.Reg. 41/24. - The Regulation Limit is considered to be 30m for wetlands and 15m for watercourses.
Aquatic Habitat Assessment of Fekete Drain Memo (BioLogic 2019)	Memo report summarizing the aquatic habitat assessments on the Fekete Drain.	Utilized to determine aquatic assessment locations.

3.0 Field Methods

Terrestrial and aquatic field surveys were undertaken within the subject lands and adjacent lands where applicable to characterize natural heritage features and identify significant and sensitive features and species that have potential to be adversely affected by development. Surveys focused on areas outside of the Meadowlily Woods ESA as the significance of that area is already known. Surveys conducted were undertaken in accordance with provincial and local guidance documents as indicated below. Surveys to inventory the site were primarily conducted in 2021. Additional site visits were conducted in 2022 to confirm the wetland delineation with agency staff, as well as to capture the April anuran survey. Table 2 summarizes the field site investigations completed for the subject lands.

3.1 Terrestrial Field Surveys

A total of nine site visits were completed between May and September 2021, with an additional three visits in 2022. A variety of field surveys were undertaken which are described in detail below.

3.1.1 Vegetation Surveys and Ecological Land Classification Mapping

Vegetation community delineation was completed using aerial photography prior to field verification on May 20, 2021. Communities were subsequently refined during detailed seasonal vascular plant inventories and are shown on Map 2. The standard Ecological Land Classification (ELC) System for southern Ontario was applied (Lee et al. 1998). Details of vegetation communities were recorded including species composition, dominance, uncommon species or features, and evidence of human impact.

All observed species of vascular flora were recorded during field surveys on May 20, July 29, and September 19, 2021. These surveys correspond to spring, summer, and fall-based botanical inventories.

Table 2. Field Investigations Completed Within the Subject Lands and Study Area

Survey Type	Date (2021)*	Time	Weather Conditions				Staff
			Air Temp. (°C)	Precipitation	Cloud Cover (%)	Wind (Beaufort Scale)	
Terrestrial Field Surveys							
Vegetation Inventories and Ecological Land Classification	May 20	10:15 – 16:30	20	None	20	2	K. Richter, T. Sieg
	July 29	10:00 – 14:15	21	Intermittent	25	2	P. Deacon, K. Higgins
	September 19	10:00 – 13:15	16	None	0	0	P. Deacon, H. Manoharan
Woodland Dripline/ Wetland Delineation	September 19	10:00 – 13:15	16	None	0	0	P. Deacon, H. Manoharan
Woodland and Wetland Delineation with Agency Staff (UTRCA & City of London)	May 10, 2022	13:00 – 14:15	--	None	--	--	P. Deacon
	June 21, 2022	13:00 – 16:15	--	None	--	--	P. Deacon, G. MacVeigh
Migratory Bird Survey	May 19	06:47 – 07:20	10	None	5	1	I. Apkarian
Breeding Bird Survey	June 8	08:16 – 09:45	24	None	80	1	T. Brenton
	June 23	09:00 – 11:00	22	None	10	2	M.E. Gosnell, E. Gosnell
Snake Surveys	June 8	08:16-09:45	24	None	80	1	T. Brenton
	June 10	19:30 – 20:30	20	None	50	2	N. Allen
	June 23	09:00 – 10:45	22	None	10	3	M.E. Gosnell, E. Gosnell
	July 29	10:00 – 12:30	21	Intermittent prior to survey	25	2	P. Deacon, K. Higgins
Anuran Call Surveys	May 19	21:35 – 21:55	26	None	70	4	B. Baldwin
	June 10	20:50 – 21:10	19	None	60	2	N. Allen

Survey Type	Date (2021)*	Time	Weather Conditions				Staff
			Air Temp. (°C)	Precipitation	Cloud Cover (%)	Wind (Beaufort Scale)	
	April 12, 2022	20:35 – 21:10	18	None	20	2-3	B. Baldwin
Odonata and Lepidoptera Surveys	May 20	10:15 – 16:30	20	None	20	2	K. Richter, T. Sieg
	July 29	10:00 – 12:30	21	Intermittent prior to survey	25	2	P. Deacon, K. Higgins
Bat Cavity Tree Assessments	May 20	10:15 – 16:30	20	None	20	2	K. Richter, T. Sieg
<i>Aquatic Field Surveys</i>							
Benthic Macroinvertebrate Survey	October 28	10:00 – 12:30	8	None	75	3	B. Baldwin, S. Henderson
Thermal monitoring of Fekete Drain	Deployed May 19	13:00	26	None	100	3	B. Baldwin
	Retrieved October 28	12:30	8	None	75	3	B. Baldwin, S. Henderson
Aquatic Habitat Assessment	May 19	18:00 – 20:00	26	None	70	0	B. Baldwin
Fish Community Survey	September 2	10:00 – 12:30	20	None	40	0	B. Baldwin; S. Catry

*All surveys completed in 2021, unless otherwise noted.

3.1.2 Woodland Dripline / Wetland Delineation

NRSI biologists delineated and surveyed the tree dripline using a SXBlue II GNSS GPS unit with sub-meter accuracy, in order to accurately delineate the woodland boundary. This survey was completed on September 19, 2021.

A site visit with agency staff was conducted on May 10 and June 21, 2022 to verify woodland and wetland boundaries. The wetland boundary was surveyed June 21, 2022.

3.1.3 Migratory Bird Survey

A single migratory bird survey was conducted on May 19, 2021 to document use of the subject lands by migratory birds. The survey included area searches throughout the subject lands to document species and the total number observed. The survey route is shown on Map 3.

3.1.4 Breeding Bird Surveys

Breeding bird surveys were completed on June 8 and July 23, 2021. Surveys methods primarily followed the Ontario Breeding Bird Atlas protocol (OBBA 2021a, OBBA 2021b), with modifications from the Forest Bird Monitoring Program (Cadman et al. 1998). This modified approach allowed for improved field data collection by tailoring survey methods to the specific conditions and requirements of the study area. The breeding bird surveys consisted of area searches located throughout the subject lands and occurred in the early morning beginning no earlier than 30 minutes prior to sunrise and extending to four hours after sunrise. All birds observed, as well as the highest level of breeding evidence exhibited for each species, were recorded by an avian biologist. The survey route is shown on Map 3.

3.1.5 Snake Surveys

Cover board surveys and active searches for snakes were undertaken to identify snake species present within the subject lands. A Wildlife Scientific Collectors Authorization was obtained from the MNRF, Aylmer district office (Permit #109756) in order to undertake these surveys.

A total of 5 snake cover boards were placed within the subject lands on May 19, 2021 and are shown on Map 3. Each board measured 4ft x 4ft, with the upper surface painted black to absorb heat. Boards were checked a total of 4 times between June 8 and July 28, 2021 for the presence of snakes. When checking boards, biologists lifted each board slowly to check for

snakes underneath, taking care to replace the board to its original position. All snake species, number of individuals, approximate length, and behaviour were recorded.

3.1.6 Anuran Call Surveys

Evening anuran (frog and toad) call surveys were conducted on May 19 and June 10, 2021, and on April 12, 2022 according to the Marsh Monitoring Program protocol (BSC 2009) at 3 stations (Map 3). The May 2021 survey was conducted in the second half of the month due to air temperatures and weather conditions not being conducive to the monitoring program protocol earlier. Monitoring focused on calling frogs and toads during 3-minute surveys, which included call intensity and an estimated number of individuals. Additional information, including survey time, air and water temperature, wind speed, and cloud cover were recorded at each survey station.

3.1.7 Odonata and Lepidoptera Surveys

Targeted area searches for Odonata (dragonflies and damselflies) and Lepidoptera (butterflies) were conducted on two dates during the spring and summer of 2021. All data including species observed, numbers, and weather conditions were recorded on a standardized area search data form.

3.1.8 Bat Cavity Tree Assessment

An inventory of cavity trees that may provide suitable habitat for bats was conducted on May 20, 2021 in areas where there was potential for tree removal. This was completed when canopy cover was still light enough in order to determine if the trees had crevices or exfoliating bark. The assessment was focused on the cultural woodland in the southwest corner of the subject lands and the hedgerow of trees in the southeast corner.

3.1.9 Additional Wildlife

During all site visits, wildlife habitat was assessed within the subject lands with an emphasis on any features that could be indicative of SWH or habitat for SAR. Any potentially significant habitats were documented, photographed, and georeferenced using a hand-held GPS unit. Any incidental observations (i.e. tracks, scat, etc.) of wildlife were also recorded during all site visits including observations of mammals, herpetofauna, birds butterflies and odonates.

3.2 Aquatic Field Surveys

3.2.1 Aquatic Habitat Assessment and Temperature Monitoring

Aquatic habitat assessments were conducted on May 19, 2021 within Fekete Drain where present within the subject property and adjacent areas, and the tributary located just north of the subject lands (Map 4). The following information was recorded for each aquatic habitat segment within the subject lands, where possible:

- substrate type;
- channel depth, width, etc.;
- water temperature;
- dissolved oxygen;
- bank stability;
- aquatic vegetation cover; and
- critical life stage areas (i.e. spawning, nursery habitat, etc.).

In addition to the habitat assessments, temperature monitoring within the Fekete Drain was performed to further characterize the aquatic conditions within the study area and assist in the determination of sensitivity and potential habitat suitability for aquatic species. Air temperature measurements were taken as well. Surface water temperature and air temperature monitoring was completed through the instillation of continuous temperature data loggers at 5 locations between May 19 and October 28, 2021. The air temperature logger was installed beside the Fekete Drain on a tree. Following the removal of temperature loggers on October 28, 2021, the air and water temperature data was compared to precipitation levels recorded by Environment and Climate Change Canada monitoring station 6144478 within the City of London, in order to determine trends in surface water temperatures within the study area.

3.2.2 Fish Community Sampling

Fish community sampling was conducted on September 2, 2021 by a two-person crew using a Smith-Root LR-20B Electrofishing unit and dip nets to capture fish present following the single-pass screening level assessment based on the Ontario Stream Assessment Protocol at 5 sampling stations shown on Map 4 (Stanfield 2017). Sampling generally followed the same habitat reaches within the extent of the drain present to fully assess the fish community. No electrofishing was completed within the Unnamed Tributary as no water was present to support fish. All fish collected were identified, enumerated, and released live shortly after capture.

The fish community survey was undertaken under a *License to Collect Fish for Scientific Purposes*, as obtained from the MNRF, Aylmer District Office, on June 15, 2021 (Permit #1098542).

Electrofishing conditions from the September 2, 2021 survey are provided in Table 3.

Table 3. Electrofishing Conditions

	EMS-00	EMS-002	EMS-003	EMS-004	EMS-005
Sampling start time (hrs)	10:15	10:40	11:00	11:25	12:10
Sampling end time (hrs)	10:35	11:00	11:20	12:10	12:30
Air temperature (°C)	22	21			
Water temperature (°C)	18				
Voltage (V)	150	150	200	200	150
Pulsating Frequency (Hz)	90				
Shocking time (sec)	239	207	239	405	405

3.2.3 Benthic Invertebrate Survey/Monitoring

Benthic macro-invertebrate surveys were carried out October 28, 2021 to assess the general health of the aquatic habitats within the study area using the benthos as indicators of water quality. Three benthic macro-invertebrate monitoring stations (as shown on Map 4) were assessed following the standard Ontario Benthos Biomonitoring Network (OBBN) sampling protocol (Jones et al. 2007). Stations were established at the same locations assessed by BioLogic (2019) to further characterize the environmental water quality and provide a baseline for future monitoring. Sampling station BTH-001 is located within the lower reaches of Fekete Drain upstream of the Tributary, within habitat assessment reach AHP-003.

Sampling station BTH-002 is located downstream of Hamilton Road and is approximately analogous with the BioLogic's (2019) Station 2. BTH-003 is located south of the study area, and upstream of the Hamilton Road Stormwater Management Pond outlet, and is approximately analogous with the BioLogic's (2019) Station 1.

Each monitoring station was comprised of 3 sub-stations: 2 from riffle habitat and 1 from pool habitat, to allow for qualitative sampling of benthic macro-invertebrate communities. Each sub-station was assessed following the OBBN "Traveling Transect Kick and Sweep" method, where each subsample was comprised of a 10m linear sampling transect sampled over a 30-minute period. Resulting samples were preserved in a buffered 70% ethanol solution for identification in NRSI's benthic invertebrate laboratory.

3.2.3.1 Benthic Invertebrate Data Analysis

Benthic samples were processed and analyzed in NRSI's laboratory. Samples were sub-sampled using the weight-based sub-sampling procedure described by Sebastien et al. (1988) to accurately represent the makeup of the benthic community. Sub-samples were sorted using a dissection microscope to collect all invertebrate individuals within the sub-sample. All benthic invertebrates within the sample were enumerated. Using both compound and dissecting microscopes, the samples were identified to the lowest taxonomic level practical. A total of 12 metrics and indices were calculated to assess the benthic invertebrate community for each reach. These metrics and indices included:

- Taxa Richness – the number of taxa generally increases with habitat diversity and water quality (Jones et al. 2007).
- Ephemeroptera, Plecoptera, Tricoptera (EPT) Taxa Richness – the number of taxa from orders sensitive to pollution, specifically the orders Ephemeroptera, Plecoptera, and Tricoptera (Barbour et al. 1999; Weber 1973).
- Percent EPT – percent composition of a community by taxa from orders sensitive to pollution, specifically the orders Ephemeroptera, Plecoptera, and Tricoptera (Barbour et al. 1999; Weber 1973).
- Percent Oligochaetes – % composition of a community of aquatic worms, a group tolerant to pollutants (Jones et al. 2007).
- Percent Diptera – % composition of a community of fly larvae which provides a context for other analysis (Jones et al. 2007).
- Percent Chironomidae – % composition of a community of larval midges, a highly tolerant family, the family Chironomidae is a highly tolerant portion of the Order Diptera (Jones et al. 2007).
- Shannon-Wiener Index (H') – an index used to measure the diversity in categorical data, taking into account the number of species and evenness of the species.
- Simpson's Diversity Index (D) – a measure that takes into account the abundance patterns and taxonomic richness of the benthic community. The formula determines the proportion of individuals of each taxonomic group at a station that contribute to the total number of individuals at that station (Simpson 1949).

- Hilsenhoff Biotic Index (BI) – a measure of water quality based on the species-level “tolerance values”, the number of individuals of each species and the total number of individuals within the sample.
 - Family Biotic Index (FBI) – a measure of water quality based on the family-level “tolerance values” and the number of individuals within each family and the total number of individuals within the sample (Hilsenhoff 1988).
 - Dominant/Subdominant Taxa – highest and second highest number of species by taxa sampled.
 - Percent Functional Feeding Groups – the percent composition of a community by Collector-Filterers, Collector-Gatherers, Predators, Scrapers, and Shredders.
- Feeding groups can provide an indication of habitat conditions (Merritt et al. 2008).

The results of these metrics were then compared to a set range of ‘Potentially Unimpaired’ conditions and ‘Potentially Impaired’ conditions. The OBBN defines impaired as, “showing a biological response to imposed stressors; exhibiting a changed biological community brought about by degradation in water or habitat quality” (Jones et al. 2007). ‘Potentially Unimpaired’ conditions indicate a low probability of significant anthropogenic impact, and ‘Potentially Impaired’ conditions indicate a high probability of significant anthropogenic impact within an aquatic environment. These ranges can be used as measures of the environmental water quality and serve as potential indicators of ongoing environmental impacts. They also provide added context for the results of the benthic assessment. The ranges are based on the results of benthic rapid assessment methodologies developed by the MNRF, MECP, the Ministry of Municipal Affairs and Housing (MMAH), and the Toronto and Region Conservation Authority (TRCA). Table 3 provides the range of results that can be attributed to the ‘Potentially Unimpaired’ and ‘Potentially Impaired’ categories within an ecosystem (Vannote et al. 1980).

Table 4. General Benthic Invertebrate Assessment Ranges

Water Quality Index	Potentially Unimpaired	Potentially Impaired	Source
• Taxa Richness	>13	<13	David et al. 1998
• EPT Richness	>10	<10	David et al. 1998 and Kilgour 2000
• % EPT	>10	>10	David et al. 1998 and Kilgour 2000
• % Oligochaetes	<10%	>10%	David et al. 1998 and Griffiths 1998
• % Diptera	20-45%	<20 or >50%	David et al. 1998
• % Chironomidae	<10%	>10%	Griffiths 1998
• Shannon-Wiener Index	1.5-3.5	<1.5 or >3.5	MacDonald 2003

Water Quality Index	Potentially Unimpaired	Potentially Impaired	Source
• Hilsonhoff Biotic Index	<7	>7	Kilgour 1998
• Family Biotic Index	<6	>6	Kilgour 1998

4.0 Existing Conditions

4.1 Soils, Terrain, and Drainage

The subject lands lie within the Upper Thames River watershed, which falls under the jurisdiction of the UTRCA through Ontario Regulation 41/24. The Upper Thames watershed is 3,420 km² and includes 28 subwatersheds (UTRCA 2017). The Dorchester Corridor subwatershed, where the study area is located, contains many significant groundwater recharge areas and highly vulnerable aquifers, as identified within the UTRCA Watershed Report Card (2017).

The overall topography of the subject lands is relatively flat, with a gradual decline toward the Fekete Drain. Existing surface water flows northwest towards the Thames River. As described in the Soils of Middlesex County (Hagerty and Kingston 1992), and confirmed by soil auger samples taken on site, the soil within the subject lands is generally described as very fine sandy loam that is well to imperfectly drained. Soil profiles that were examined by NRSI biologists noted the effective soil within the upland to be sandy loam underlain by silty loam.

NRSI identified 4 wetland units within the subject lands, with additional wetlands present within the study area. Soil probes that were taken from various locations within the wetlands indicated a shallow depth of loam over an effective layer of poorly drained silty loam. Soil mottling was evident in the upper 30cm of the soil profile, which is a characteristic used to aid in the delineation of the wetland boundaries. All 4 wetlands are palustrine and associated with the watercourse or headwater drainage features leading to the watercourse.

Fekete Drain is a permanent watercourse that flows towards the northwest through the subject lands. Fekete Drain originates as headwaters approximately 2km upstream of Hamilton Road, and it connects to the Thames River South Branch approximately 1km downstream from the subject lands. An unnamed tributary flow into Fekete Drain along the northern edge of the subject lands, located within the woodland. The tributary originates from drainage in the agricultural field just east of Veterans Memorial Parkway (Map 2).

4.2 Designated Natural Areas

Information on designated natural areas (ANSI's, ESA's, etc.), was obtained from the UTRCA, NHIC (MNRF 2022), the London Plan (City of London 2020), and the Natural Heritage Systems Study (UTRCA 2014). The Meadowlily Woods ESA is situated along the south side of the Thames River, encompassing a large portion of the property. The mapped ESA is located north of the subject lands, immediately north of the unnamed tributary.

Significant Valleyland is identified within the London Plan along Fekete Drain.

Wetland features within the subject lands are identified as 'Unevaluated Wetland' in The London Plan (2020), and are unmapped according to the Land Information Ontario database. These features are shown on Map 1.

4.3 Vegetation

4.3.1 Vegetation Communities

The subject lands consist of cultural meadow, forest (including a naturalized plantation), and wetland. The Cultural Plantation within the subject lands used to extend out into the majority of the subjects, but clearing had occurred within the spring of 2016. A summary of ELC communities identified within the study area is provided in Table 4. ELC communities are described in the table and shown on Map 2, including the surveyed dripline and wetland boundaries. ELC field forms have been provided in Appendix IV.

Table 5. Vegetation Communities Identified within the Study Area

ELC Ecosite Type	ELC Description	Environmental Characteristics
Cultural		
CUM	Cultural Meadow	The cultural meadow comprises a large portion of the proposed development area. The meadow surrounds the former homestead, and is also present along the western subject lands boundary. All buildings have been removed from the subject lands. The meadow is dominated by non-native cool season grasses, along with abundant Tall Goldenrod (<i>Solidago altissima</i>) and Queen Anne's Lace (<i>Daucus carota</i>). Adjacent to the location of the former homestead, the hedgerow to the west is comprised entirely of White Pine (<i>Pinus strobus</i>), and the eastern hedgerow is comprised entirely of Norway Spruce (<i>Picea abies</i>). A few isolated landscape trees are present within the overgrown lawn to the south of the former homestead site.
CUS	Cultural Savannah	The cultural savannah is dominated by mature Eastern Cottonwood (<i>Populus deltoides</i>). Manitoba Maple (<i>Acer negundo</i>) are found occasionally in the subcanopy. Due to the

ELC Ecosite Type	ELC Description	Environmental Characteristics
		discontinuous canopy, the groundcover is a meadow, dominated by non-native cool season grasses with an abundance of forbs, including Dame's Rocket (<i>Hesperis matronalis</i>), Goldenrods (<i>Solidago</i> spp.), and patches of European Common Reed (<i>Phragmites australis</i> ssp. <i>australis</i>). Grey Dogwood (<i>Cornus racemosa</i>) and Glossy Buckthorn (<i>Frangula alnus</i>) are occasional in the understorey.
CUW	Cultural Woodland	This small woodland, located at the southwest corner of the subject lands is dominated by Manitoba Maple, with occasional Eastern Cottonwood. Similar to the cultural savannah, the canopy is fairly open, allowing a meadow to flourish in the ground layer. The meadow is dominated by grasses with a variety of forbs, including Dame's Rocket, Asters (<i>Symphyotrichum</i> spp.), and Goldenrods. Staghorn Sumac (<i>Rhus typhina</i>) is abundant in the understorey.
Wetland		
MAM2	Mineral Meadow Marsh Ecosite	All four of the meadow marsh features are dominated by wetland forbs and graminoids such as Dark Green Bulrush (<i>Scirpus atrovirens</i>), Swamp Milkweed (<i>Asclepias incarnata</i>), Blue Vervain (<i>Verbena hastata</i>), and several Rush species (<i>Juncus</i> spp.). These areas are low-lying in comparison to the surrounding meadow community but do not hold standing water for a prolonged period in the spring. Three of the marshes direct surface water toward Fekete Drain, while fourth is isolated and holds some surface water. The hydrology of the marsh along Fekete Drain has been influenced by 2 Beaver dams at the south edge of the treed riparian area. Near the edge of the watercourse, a well-established stand of Lakebank Sedge (<i>Carex lacustris</i>) indicates the permanency of marsh in the area closer to the creek bank with the area further east comprised of a mixture of upland and wetland species.
SWT3	Organic Thicket Swamp Ecosite	The thicket swamps are inclusions within the forested communities to the north of the subject lands. The swamps have formed along topographic depressions, including the tributary to Fekete Drain. Near the centre of the features, the organic soils are deeper than 40cm. The community is dominated by Skunk Cabbage (<i>Symplocarpus foetidus</i>), with abundant Fowl Mannagrass (<i>Glyceria striata</i>), and associations of Sensitive Fern (<i>Onoclea sensibilis</i>), Sweet-scented Bedstraw (<i>Galium triflorum</i>), Field Horsetail (<i>Equisetum arvense</i>), and Spotted Jewelweed (<i>Impatiens capensis</i>) among other species. Trembling Aspen (<i>Populus tremuloides</i>) is found scattered in the canopy, along with few Eastern Cottonwood. European Buckthorn (<i>Rhamnus cathartica</i>) and Glossy Buckthorn are found occasionally in the understorey, along with a few Willow species (<i>Salix</i> sp.).
Forest		
CUP 3-2	White Pine Coniferous Plantation Type	The plantation in the northeast is dominated by White Pine, but is naturalizing with early establishment of hardwoods and native shrubs seeding-in from the forest communities to the north. Black Cherry (<i>Prunus serotina</i>) is found occasionally within the forest, along with a variety of other deciduous trees. The understory is

ELC Ecosite Type	ELC Description	Environmental Characteristics
		comprised of Glossy Buckthorn and young White Ash (<i>Fraxinus americana</i>), both of which form a very dense stand along the southern edge of the feature. These two species are also abundant in the ground layer, along with a variety of forbs, such as Woodland Agrimony (<i>Agrimonia gryposepala</i>), Jack-in-the-pulpit (<i>Arisaema triphyllum</i>), and Enchanter's Nightshade (<i>Circaea canadensis</i>).
CUP 3-3	Scotch Pine Coniferous Plantation Type	The plantation along Fekete Drain and along the western portion of the woodland, has a similar species composition as the White Pine plantation, but is dominated by Scot's Pine (<i>Pinus sylvestris</i>) in the canopy. Somewhat more isolated from the forest communities to the north, hardwood recruitment is less evident here but some native tree and shrub species can be found among the overstocked and declining Scot's Pine.
FOD 3-1	Fresh Poplar Deciduous Forest Type	This community is dominated by Trembling Aspen, along with small amounts of mid-age Black Cherry, Sugar Maple (<i>Acer saccharum</i>), and Red Maple (<i>A. rubrum</i>). The sub-canopy is comprised of Sugar Maple and scattered Trembling Aspen. White Ash dominates the understorey and groundcover, along with a variety of common forbs including Enchanter's Nightshade and White Avens (<i>Geum canadense</i>). The forested communities (FOD3-1 and FOD5-7) contain many trails that are used by hikers, mountain bikes, and ATVs.
FOD 5-7	Fresh Sugar Maple-Black Cheery Deciduous Forest Type	This forest is dominated by Sugar Maple and Black Cherry. All mature Ash trees are dead and include standing snags and deadfall. American Beech (<i>Fagus grandifolia</i>) and Hop Hornbeam (<i>Ostrya virginiana</i>) are also present. Given the separation between this community and the proposed development area, it was not assessed in detail.

Vascular Flora

A three-season vegetation inventory was conducted with a total of 188 species recorded by NRSI biologists. A complete list of these species is attached to this report (Appendix V). No federally or provincially significant plant species were observed within the subject lands.

A total of seven regionally significant plant species (Oldham 2017) were observed within the subject lands, as listed in Table 5.

Table 6. Regionally Significant Vascular Flora Observed in the Subject Lands

Common Name	Scientific Name	S-Rank ¹	COSSARO ² / COSEWIC ³	County Status ⁴	ELC Community
Drooping Sedge	<i>Carex prasina</i>	S4	-	R	SWT3
Evergreen Wood Fern	<i>Dryopteris intermedia</i>	S5	-	R	FOD3-1

Common Name	Scientific Name	S-Rank ¹	COSSARO ² / COSEWIC ³	County Status ⁴	ELC Community
Great Duckweed	<i>Spirodela polyrhiza</i>	S5	-	R	Fekete Drain
Jointed Rush	<i>Juncus articulatus</i>	S5	-	R	MAM2
Perennial Evening-primrose	<i>Oenothera perennis</i>	S5	-	R	CUM1
Tender Sedge	<i>Carex tenera</i>	S5	-	U	CUM1
Virginia Mountain-mint	<i>Pycnanthemum virginianum</i>	S4	-	R	CUM1

^{1,3}MNRF 2022, ²MECP 2022, ³Government of Canada 2022, ⁴Oldham 2017

S-Rank	Middlesex County Status
S5 Secure	U Uncommon
S4 Apparently secure	R Rare and native

4.4 Wildlife

4.4.1 Birds

In total, 92 species are reported from the vicinity of the study area based on the OBBA (BSC et al. 2008). A total of 49 species were documented within the study area during field surveys by NRSI biologists.

Breeding Birds

28 species observed within the study area displayed evidence of possible (15 species), probable (9 species), or confirmed breeding (4 species) within the study area. Most of the observed bird species are relatively common and have secure populations in Ontario. Of note, was confirmed breeding of Red-tailed Hawk (*Buteo jamaicensis*) within the CUP3-2 near the northeast edge of the subject lands.

Migratory Birds

A total of 35 species and an approximated count of 173 individuals were documented during the migratory bird survey. All species are common and typical of a forest and cultural meadow landscape. The survey documented 4 warbler species: Common Yellowthroat (*Geothlypis trichas*), Pine Warbler (*Setophaga pinus*), Tennessee Warbler (*Leiothlypis peregrina*), and Yellow Warbler (*Setophaga petechia*).

Refer to Appendix V for a list of bird species recorded within in the subject lands and vicinity.

Significant Bird Species

Bank Swallow

Bank Swallow (*Riparia riparia*) is listed as Threatened provincially, affording individuals and their habitat protection under the *Endangered Species Act*. Bank Swallows can be found along rivers and lakes where there are vertical faces for nesting (OMNR 2000). One Bank Swallow was observed foraging within the Fekete Drain corridor on June 23, 2021. There was no evidence of nesting within the subject lands. As no nests were documented, breeding habitat for this SAR is not present within the subject lands.

Barn Swallow

As of January 25, 2023, Barn Swallow (*Hirundo rustica*) has been provincially downlisted from Threatened to Special Concern. As a result, its nesting habitat is no longer regulated under the *Endangered Species Act*. Barn Swallows can be found in rural areas near bodies of water. They nest in buildings or other man-made structures (OMNR 2000). One Barn Swallow was observed flying over the cultural meadow during the migratory bird survey on May 19, 2021. During the second breeding bird survey on June 23, Barn Swallows were also observed foraging over the cultural meadow and along the Fekete Drain corridor, including 2 fledged young. The observed Barn Swallows are presumed to be nesting in the barn located to the west of the subject lands, where multiple individuals were observed flying in and out. The subject lands do not contain nesting habitat for Barn Swallow.

Eastern Wood-pewee

Eastern Wood-pewee (*Contopus virens*) listed as Special Concern and therefore its habitat is not regulated under the *Endangered Species Act*. The species is afforded protection under the Provincial Policy Statement as breeding habitat is considered SWH. For habitat they require mid-canopy layer of forest clearings and edges of deciduous and mixed forests, abundant in intermediate-age mature forest stands with little understory vegetation (OMNR 2000). Eastern Wood-pewee was documented within the interior area of the woodland (FOD3-1) during the migratory bird survey and the first breeding bird survey. One individual was documented singing during each of the surveys, and the interior woodland provides suitable habitat. Although nesting was not confirmed, SWH for this species is present within the interior forest, which likely supports at least one breeding pair.

Wood Thrush

Wood Thrush (*Hylocichla mustelina*) is listed as Special Concern provincially, and threatened federally. Therefore, its habitat is protected as SWH, but it is not protected by the *Endangered Species Act*. Wood Thrush can be found in undisturbed moist mature deciduous or mixed forest with deciduous sapling growth. They can be found in close proximity to ponds or swamps, and typically require trees greater than 12m in height within the woodland. Three Wood Thrush were heard during the migratory survey within the woodland north of the subject lands, but were not documented during the two breeding bird surveys. As no breeding evidence was observed, SWH has not been identified for this species.

4.4.2 Herpetofauna

According to the Ontario Reptile and Amphibian Atlas (Ontario Nature 2019), 23 species of herpetofauna are reported from within 10km of the subject lands. NRSI field investigations confirmed the presence of 6 species within the study area. A complete list of herpetofauna reported from the study area, based on background information and observations made as part of this study, is included in Appendix V. The results of species-specific surveys are detailed in the following sections.

4.4.2.1 Anurans

Anuran call surveys were conducted to identify the presence of breeding frog and toad species within the subject lands. Table 6 presents the anuran call survey results.

Table 7. Anuran Call Survey Results

Station	Date	Call Abundance (Number of Individuals) *			
		Spring Peeper	Tetraploid Gray Treefrog	American Toad	Green Frog
ANR-001	April 12, 2022	2(6)	--	2(2)	--
	May 19, 2021	--	--	2(5)	2(4)
	June 10, 2021	--	--	--	--
ANR-002	April 12, 2022	--	--	--	--
	May 19, 2021	--	--	--	--
	June 10, 2021	--	--	--	--
ANR-003	April 12, 2022	2(4)	--	--	--
	May 19, 2021	--	--	2(4)	1(2)
	June 10, 2021	1(1)	2(5)	1(1)	1(1)

*Call abundance refers to the Marsh Monitoring Programs call codes (Bird Studies Canada 2009).

Evening anuran call surveys and incidental observations documented American Toad (*Anaxyrus americanus*), Gray Treefrog (*Hyla versicolor*), Northern Green Frog (*Lithobates clamitans melanota*), and Spring Peeper (*Pseudacris crucifer*). No anurans were heard at ANR-002. ANR-001 had 3 species heard throughout the surveys, and ANR-003 had 4 species heard. Northern Leopard Frog (*Lithobates pipiens*) was observed during the spring vegetation survey in the creek corridor, but was not recorded during call surveys. No significant anurans were observed from the subject lands.

4.4.2.2 Snakes

Only Eastern Gartersnake (*Thamnophis sirtalis sirtalis*) was observed within the subject lands during the field surveys. This species was observed under one snake board (SNK-02, located along the creek corridor), only one time, during snake coverboard surveys. Given the lack of snake observations during the site visits, it can be deduced that a snake hibernaculum is not present. No significant snake species were observed from the subject lands.

4.4.3 Mammals

According to the Mammal Atlas of Ontario (Dobbyn 1994), 46 mammal species are reported from within 10km of the subject lands. During the various field surveys, 8 of these species were observed. During the snake cover board surveys, Meadow Vole (*Microtus pennsylvanicus*) was observed under some of the boards. Additional mammal species documented within the subject lands included: Beaver (*Castor canadensis*), Coyote (*Canis latrans*), Eastern Cottontail (*Sylvilagus floridanus*), Eastern Chipmunk (*Tamias striatus*), Eastern Gray Squirrel (*Sciurus carolinensis*), Raccoon (*Procyon lotor*), and White-tailed Deer (*Odocoileus virginianus*). Appendix V provides a complete list of mammal species reported from the study area.

Bat Habitat

Three bat SAR, Little Brown Myotis (*Myotis lucifungus*), Northern Myotis (*Myotis septentrionalis*), and Tri-colored Bat (*Perimyotis subflavus*), were screened as having potential to occur within the study area. Based on the assessment conducted by NRSI staff in 2021, no suitable habitat trees are located within the CUW or the hedgerows associated with the former residence. Following a conservative approach, the cultural plantations (CUP3-2 and CUP3-3) have been identified as candidate habitat for SAR bats.

4.4.4 Insects

4.4.4.1 Butterflies

According to the Ontario Butterfly Atlas (Macnaughton et al. 2022), 31 butterfly species are reported from the study area (Appendix V). NRSI biologists observed 9 butterfly species during surveys within the subject property including Baltimore Checkerspot (*Euphydryas phaeton*), Cabbage White (*Pieris rapae*), Common Wood-Nymph (*Cercyonis pegala*), Eastern Tiger Swallowtail (*Papilio glaucus*), European Skipper (*Thymelicus lineola*), Inornate Ringlet (*Coenonympha tullia inornata*), Least Skipper (*Ancyloxypha numitor*), Monarch (*Danaus plexippus*), and Mourning Cloak (*Nymphalis antipoa*). Butterfly observations were concentrated along forest and field edges and in areas of cultural meadow.

Monarch was the only significant butterfly species to be documented from the area during the field surveys. As many as 2 individuals were observed at one time within the CUM and CUS area. Common Milkweed (*Asclepias syriaca*) is found occasionally within the subject lands and a variety of nectar plants, both agricultural weeds as well as Asters and Goldenrods, are present. Areas containing large amounts of Milkweed (*Asclepias spp.*) and nectaring plants are considered SWH. Based on the vegetation surveys and the low number of Monarch butterflies within suitable nectaring habitat, SWH for Monarch is not present within the subject lands.

4.4.4.2 Odonata

Information obtained from the Ontario Odonata Atlas Database (OOAD 2022) indicates that 54 species of dragonflies and damselflies are reported from the study area vicinity. During field surveys, NRSI biologists documented 4 species from the subject lands: Common Whitetail (*Plathemis lydia*), Double-striped Bluet (*Enallagma basidens*), Eastern Forktail (*Ischnura verticalis*), and Ebony Jewelwing (*Calopteryx maculata*). Most of the odonata observations were noted in areas of cultural meadow and wetland pockets. A complete list of odonata species observed and reported from the study area and vicinity is provided in Appendix V. No significant Odonates were observed from the subject lands.

4.4.5 Additional Wildlife

During the 2021 surveys, two Terrestrial Crayfish chimneys were observed in the vicinity of the Fekete Drain corridor, within the northern end of the meadow marsh community that formed as a result of the Beaver dam. During the June 2022 site visit, an additional three chimneys were

observed in the meadow marsh at the northern end of the meadow, adjacent to the conifer plantations (Map 3).

4.5 Aquatic Resources

4.5.1 Aquatic Habitat

Fekete Drain

The primary watercourse within the subject lands is the Fekete Drain. This permanent watercourse is approximately 500m long within the subject lands, flowing northwest to the Thames River South Branch, approximately 1km downstream of the subject property. Fekete Drain is considered a Class C municipal drain. Class C drains are characterized by permanent flow with potential spring spawning habitat and no sensitive freshwater fish species (Kavanagh et al. 2018). Four reaches were assessed within Fekete Drain, two within the subject lands, one upstream (south) of Hamilton Road, and one downstream (north) of the subject lands. These reaches are shown on Map 4. Water parameter measurements were taken within the four reaches during the assessment on May 19, 2021 and are provided in Table 7 below. Water temperatures decreased within Fekete Drain from the upstream reach to the furthest downstream reach assessed.

Table 8. Water Parameter Measurements in Fekete Drain

Reach	Time Taken (hrs)	Air Temp (°C)	Water Temp (°C)	Conductivity (mS/m)	TDS (ppt)	pH
Reach 1 (AHP-001)	18:00	26	17	0.85	0.9	6.79
Reach 2 (AHP-003)	19:00	26	19	0.87	0.9	7.2
Reach 3 (AHP-004)	19:30	26	19	0.87	0.9	7.2
Reach 4 (AHP-005)	20:00	26	21	0.87	0.9	6.9

Reach AHP-001

At the downstream most extent of Reach AHP-001, Fekete Drain is characterized as a relatively shallow, straight channel (0.05 - 0.15m depth) with wetted widths ranging from 0.5 to 1.5m. This reach is immediately downstream of the confluence with the Unnamed Tributary to Fekete Drain. Bankfull widths ranged from 3.0 to 4.0m, with bankfull depths ranging between 0.3 and 0.5m. No instream vegetation was observed, and there were sparse patches of filamentous

algae throughout. Substrates within this reach were observed to be predominantly silt and sand with deposits of detritus and traces of gravel. The channel in this reach is an entrenched drain, flowing along the edge of the thicket and cultural savannah communities. Banks were observed to be steeply sloped (ranging from 90° to 125°) with evidence of ongoing erosion and undercutting that suggest periodic high flow conditions. Bank vegetation was observed to be sparse, consisting primarily of patches of terrestrial grasses and exposed roots. Traces of iron staining along the exposed banks suggest shallow groundwater upwelling throughout the vicinity of Fekete Drain.

Reach AHP-003

Reach AHP-003 extends south from the confluence of the Unnamed Tributary to the Beaver dams (Map 4), immediately upstream of Reach AHP-001. This reach is characterized as a relatively shallow straight channel (0.05 - 0.15m deep) with wetted widths ranging from 0.4 to 2.5m. Bankfull widths ranged from 3.0 to 7.0m, with bankfull depths ranging between 0.5 to 0.75m. Pockets of Broad-leaved Cattail (*Typha latifolia*) and sparse patches of filamentous algae were observed throughout the reach. Substrates were predominantly silt, sand, and gravel with deposits of detritus and traces of cobble. This reach is an entrenched channelized drain within the coniferous plantation. The creek banks were observed to be steeply sloped (ranging from 90° to 125°) with evidence of ongoing erosion and undercutting, as well as rills suggesting periodic high flows. Bank vegetation was observed to be sparse, consisting primarily of patches of terrestrial grasses and exposed roots. Traces of iron staining along the exposed banks suggest shallow groundwater upwelling throughout this reach.

Reach AHP-004

Reach AHP-004 extends north from Hamilton Road to the Beaver dams, flowing through a small wetland. Reach AHP-004 of Fekete Drain is characterized as a moderately deep, slow flowing, poorly defined channel (0.5 - 1.25m deep) with wetted widths ranging between 1.5 to 8.5m. Bankfull widths ranged from 2.0 to 10.0m, with bankfull depths ranging between 1.0 and 2.0m. Dense patches of Broad-leaved Cattail and Common Reed (*Phragmites australis*) were observed along the edges of Fekete Drain. Substrates within this reach were observed to be predominantly sand, with deposits of detritus and silt. The channel was observed to be poorly defined, with back flooding due to the Beaver dams.

Reach AHP-005

Located upstream of the subject lands, Reach AHP-005 extends south from Hamilton Road approximately 90m, alongside a stormwater management pond. Reach AHP-005 is characterized as a channelized, moderately shallow meandering, poorly defined channel (0.5 - 0.75m deep) with wetted widths ranging from 1.5 to 3.5m. Bankfull widths ranged from 2.5 to 5.4m, with bankfull depths ranging from 1.0 to 2.0m. Dense patches of Broad-leaved Cattail and Common Reed were observed along the edges of Fekete Drain. Substrates within this reach were predominantly sand, with deposits of detritus and silt. Banks were observed to be steeply sloped (ranging from 90° to 125°). Bank vegetation was observed to be very dense consisting primarily of terrestrial grasses and Common Reed.

Unnamed Tributary of Fekete Drain

This intermittent watercourse is classified as an F type drain. Class F drains are characterized by as having intermittent periods of flow with limited fish presence (Kavanagh et al. 2018). The tributary flows west, across the width of the study area, flowing into Fekete Drain approximately 370m downstream from Veterans Memorial Parkway. East of the road, the tributary is identified as being a closed/tiled system. One reach (AHP-002), immediately upstream of Fekete Drain, was assessed and is shown on Map 4. Water parameter measurements were taken and are provided in Table 8.

Table 9. Water Parameter Measurements in the Unnamed Tributary

Reach	Time Taken (hrs)	Air Temp (°C)	Water Temp (°C)	Conductivity (mS/m)	TDS (ppt)	pH
Reach 1 (AHP-002)	18:30	26	12	0.45	0.5	6.7

Reach AHP-002

Reach AHP-002 of the Unnamed Tributary of Fekete Drain is characterized as a shallow, poorly defined feature (0.05 - 0.1m deep) with wetted widths ranging from 0.1 to 0.3m. Patches of Marsh Marigold (*Caltha palustris*) and Skunk Cabbage (*Symplocarpus foetidus*) were observed throughout the area of the Unnamed Tributary. Substrates within this reach were observed to be predominantly organic. The feature was observed to be very poorly defined through a linear wetland unit within the larger surrounding woodland habitat.

4.5.2 Thermal Regime Monitoring

The results of the 2021 water and air temperature monitoring showed a relatively consistent pattern of surface water temperatures across all stations, with characteristic variation in water temperatures associated with significant precipitation events (Figure 1). Temperature logger locations are shown on Map 4. Three loggers were placed within Fekete Drain (TMP-001, TMP-002, and TMP-005) with an additional logger placed for air temperature on a tree within the woodland (TMP-003). One logger (TMP-004) was placed within the Unnamed Tributary, but as this feature is intermittent, the temperatures are not reliable. The results shown for Fekete Drain are to be expected from a system heavily influenced by surface water runoff. The water temperature results are also highly reflective of the recorded daily air temperatures. These results are indicative of aquatic systems that are significantly influenced by stormwater management pond releases and upstream surface water inputs.

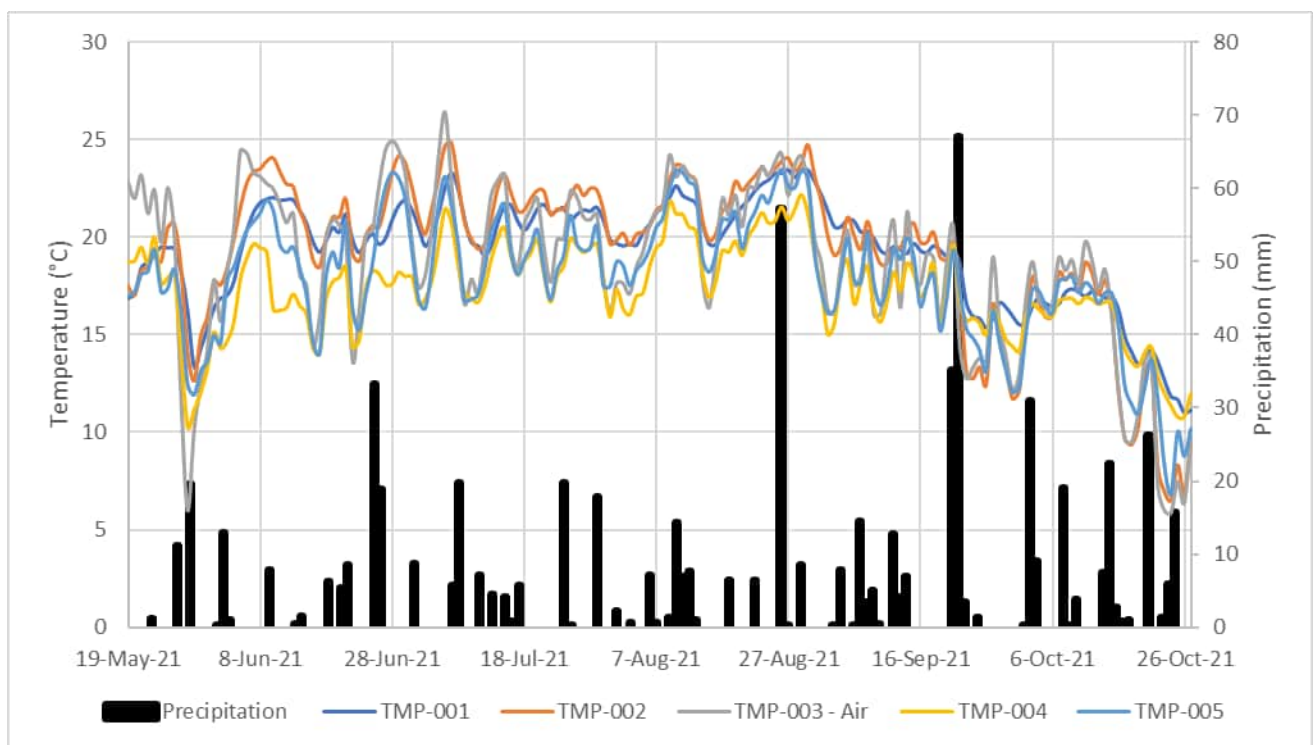


Figure 1. 2021 Surface Water Temperature Monitoring Fekete Drain and Unnamed Tributary

As shown on Figure 1, TMP-005, which is the logger furthest downstream, consistently shows slightly cooler temperatures than TMP-001. The logger within the Unnamed Tributary (TMP-004) is generally consistent with air temperature data throughout July and early August suggesting that water depths within feature may reduce significantly, exposing the temperature

logger to air and resulting in temperature monitoring results that may not accurately represent the water temperatures.

Figure 2 below, shows the thermal designations with the temperature monitoring points from the features. Baseline thermal regime determination within Fekete Drain suggests a “Warm-Cool” water thermal regime.

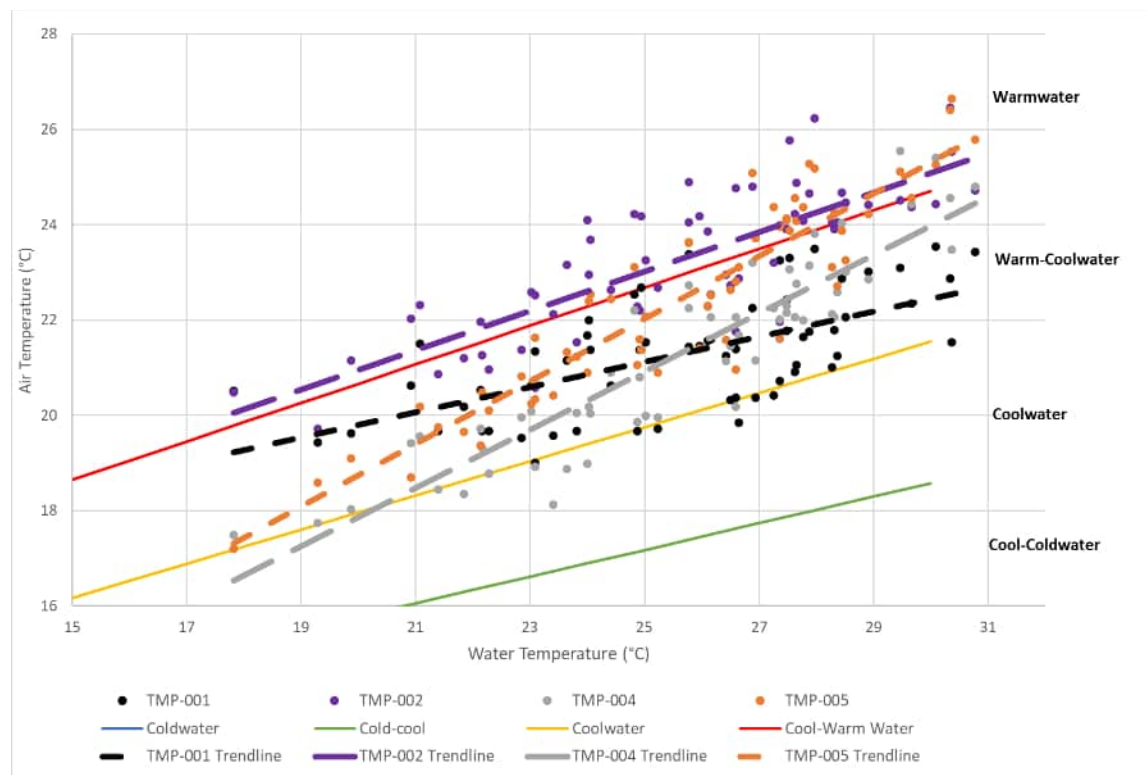


Figure 2. 2021 Thermal Regime Monitoring

4.5.3 Fish Community

In total, 10 common species of freshwater fish were captured from Fekete Drain during the survey, as shown in Table 10. None are considered to be significant species. No freshwater mussel species were observed within the drain. The species captured by NRSI are similar to the findings provided in the BioLogic memo (2019), with the exception that they observed Fathead Minnow (*Pimephales promelas*) in very small numbers, as well as from the UTRCA background information for Fekete Drain. A complete list of fish species and mussel species reported from the study area (including Thames River) is provided in Appendix V.

Table 10. Fekete Drain Fish Capture Results 2021

Common Name	Scientific Name	Thermal Regime ¹	Tolerance ¹	EMS-001	EMS-002	EMS-003	EMS-004	EMS-005
Bluntnose Minnow	<i>Pimephales notatus</i>	Warmwater	Intermediate	19	1	4	16	
Brook Stickleback	<i>Culaea inconstans</i>	Coolwater	Intermediate		2		2	
Central Stoneroller	<i>Campostoma anomalum</i>	Coolwater	Intermediate	1		3	8	
Common Shiner	<i>Luxilus cornutus</i>	Coolwater	Intermediate	1			5	
Creek Chub	<i>Semotilus atromaculatus</i>	Coolwater	Intermediate	28	37	47	55	7
Iowa Darter	<i>Etheostoma exile</i>	Coolwater	Intermediate			1		
Northern Redbelly Dace	<i>Chrosomus eos</i>	Coolwater	Intermediate			4	16	1
Pumpkinseed	<i>Lepomis gibbosus</i>	Warmwater	Intermediate				7	
Western Blacknose Dace	<i>Rhinichthys obtusus</i>	Coolwater	Intermediate	25	27	23	42	
White Sucker	<i>Catostomus commersonii</i>	Coolwater	Tolerant				3	
Species Richness				5	4	6	9	2
Total Catch				74	67	82	154	8

¹Eakins 2022

The fish community composition documented within Fekete Drain consists primarily of intermediately tolerant coolwater species, typical of a cool-warmwater watercourse. The fish community results are consistent with thermal regime monitoring of Fekete Drain. The dominant fish species captured from Fekete Drain was Creek Chub (*Semotilus atromaculatus*), which are a common, widespread coolwater fish species found throughout Ontario in a wide variety of habitats.

The tributary to Fekete Drain was dry at the time of fish community surveys. No fish or mussels were observed from the tributary during any field assessments. The tributary provides indirect fish habitat.

4.5.4 Benthic Invertebrate Sampling

Benthic macroinvertebrate monitoring stations (BTH-001 to BTH-003) are shown on Map 4 and are summarized by station in Table 11. BTH-001 is located within dense coniferous forest

habitat providing up to 100% shade. This station is located within a meadow marsh, with limited shading. BTH-002 is located within a meadow marsh, with limited shading. BTH-003 also has limited shading.

Table 11. Fall Benthic Sampling Conditions October 28, 2021

Station	BTH-001			BTH-002			BTH-003		
Time (hrs)	10:00			10:45			11:15		
Water Temperature (°C)	11.0			10.0			8.5		
Dissolved Oxygen (ppm/%)	4.74ppm / 43.5%			4.53ppm / 40.3%			3.74ppm / 32.0%		
Habitat	Riffle 1	Pool	Riffle 2	Riffle 1	Pool	Riffle 2	Riffle 1	Pool	Riffle 2
Wetted Width (m)	1.65	2.7	2.8	4.2	5.0	5.0	1.5	3.8	1.5
Maximum Depth (m)	0.11	0.3	0.1	0.5	0.5	0.5	0.31	0.5	0.45
Maximum Hydraulic Head (mm)	40	0	25	0	0	0	25	2	30
Dominant Substrate	Gravel	Gravel	Gravel	Silt	Silt	Silt	Silt	Silt	Sand
Second Dominant Substrate	Sand	Sand	Sand	Sand	Sand	Sand	Sand	Sand	Silt
Total Transect Length (m)	10	10	10	10	10	10	10	10	10
Kick & Sweep Sampling Time (min:sec)	3:00	3:00	3:00	3:00	3:00	3:00	3:00	3:00	3:00

The results for each sampling station are presented in Table 12, with raw data provided in Appendix VI. The results of 2021 monitoring will serve as baseline for future monitoring and have been compared to 2019 monitoring to further characterize the conditions at each station.

Table 12. Calculated Benthic Macroinvertebrate Metrics 2021

Benthic Invertebrate Assessment Metric	BTH-001	BTH-002	BTH-003
Taxa Richness	19	16	17
Dominant Taxa, % of total sample	15.54%	13.40%	41.74%
Subdominant Taxa, % of total sample	10.81%	10.10%	8.26%
Sensitive Groups			
EPT taxa richness	5	2	1

% EPT	5.2%	9.7%	0.7%
Tolerant Groups			
% Oligochaetes	0.0%	0.0%	0.0%
% Diptera	45.9%	40.6%	34.6%
% Chironomidae	44.6%	40.0%	32.8%
Functional Feeding Groups			
% Collector-Filterers	25.7%	28.9%	18.3%
% Collector-Gatherers	62.6%	35.7%	62.2%
% Predators	7.2%	1.9%	0.0%
% Scrapers	4.5%	8.2%	4.1%
% Shredders	0.0%	6.8%	0.0%
Diversity and Biotic Indices			
Shannon Wiener Index	2.68	2.58	2.15
Family Biotic Index	5.32	5.44	5.06
FBI Water Quality	Good	Good	Good
Biotic Index	6.72	6.18351	6.46739
BI Water Quality	Poor	Fairly poor	Fairly poor
Simpsons	0.919	0.918	0.795

Potentially Unimpaired Potentially Impaired

During 2021 benthic invertebrate community monitoring, taxonomic richness was observed to be relatively consistent across all monitoring stations, falling generally within the potentially unimpaired range. Both the richness and proportion of sensitive EPT taxa were observed to be quite low, falling within the potentially impaired range, with a slight trend toward greater richness and proportion in the lower reaches of Fekete Drain. When comparing the proportion of tolerant taxa, the lack of *Oligochaetes* across all monitoring stations indicates potentially unimpaired conditions, however, elevated proportions of *Chironomidae* across all monitoring stations falls within the potentially impaired range.

Overall, the dominant functional feeding group across all monitoring stations was observed to be the Collector-Gatherers (C-G) during 2021 monitoring, a group which consisted primarily of members of the highly tolerant family *Chironomidae* which were observed in elevated concentrations across all monitoring stations.

The Shannon-Weiner (H') Index measures diversity, taking into account the number of species and their evenness. H' Index results fall within the typical range of potentially unimpaired values (MacDonald 2003) across all monitoring stations. Overall, the H' Index calculations indicate a low to moderate benthic taxonomic richness and species evenness within the study area (MacDonald 2003). No H' calculations were below 1.5, suggesting that the benthic invertebrate communities within Fekete Drain had limited taxonomic diversity within a benthic community dominated by fewer taxa.

In general, the Family Biotic Index (FBI) values were considered to be 'Good' across all monitoring stations suggesting a potentially unimpaired system. This is consistent with the Biotic Index (BI) values ranging from 'Poor' to 'Fairly Poor' during 2021, but remaining consistently within the potentially unimpaired range in 2021. This potentially unimpaired range for BI is based on the Hilsenhoff Biotic Index. Overall, all the results of 2021 monitoring suggest potentially unimpaired environmental conditions across benthic macroinvertebrate monitoring stations, with a healthy, if limited, benthic macroinvertebrate community throughout Fekete Drain.

When compared to 2019 benthic monitoring results, the benthic macroinvertebrate community within Fekete Drain in 2021 showed a significant increase in Taxa Richness, EPT richness, and overall macroinvertebrate density and diversity. This is potentially due to the lack of standardized sampling methodologies during the 2019 monitoring, resulting in lower resolution of benthic macroinvertebrate community data. As such, the results of 2021 benthic macroinvertebrate community monitoring serve as a more complete assessment of the Fekete Drain benthic macroinvertebrate community and provide a more suitable baseline for future monitoring.

5.0 Significance and Sensitivity of Natural Features

The natural environment constraints analysis is used to identify natural heritage features that are sensitive to disturbance based on the rarity or significance of the feature or its functions/processes, and/or policies that prohibit development within them. These areas are identified as development constraints, and are discussed in the context of natural heritage policies governing their protection. Conversely, opportunities for development may occur outside of these natural environment constraints within the subject lands. Results of this analysis have been provided as input to the proposed development plan in order to avoid and reduce impacts to natural features and functions. Each potential constraint is shown on Map 5. A summary of this analysis for the proposed development lands study area is discussed below.

5.1 Significant Wetlands and Wetlands

Additional wetland areas were identified by NRSI and agency staff during field studies completed in 2021 and 2022. As outlined below, and supported by the memo on the Evaluation of the Wetlands (Appendix IV), none of the wetlands within the study area warrant Provincially Significant Wetland designation. As provided in the London Plan (2020), all wetland features, regardless of their size or designation, are subject to the Natural Heritage System policies and are protected.

Portions of the subject lands contain wetland. In order to determine if the wetlands should be considered provincially significant, a review has been completed using the Ontario Wetland Evaluation System (OWES) criteria (MNRF 2014). Preliminary discussion regarding wetland significance occurred with City of London Ecologist Shane Butnari in a memo dated March 10, 2022; however, a re-assessment was required following a review of the on-site wetlands in the summer of 2022. The memo outlining the Evaluation of the Wetland Units at 2004 Hamilton Road (dated November 8, 2022) has been included in Appendix VII. Furthermore, the 4th Edition of the OWES Manual (MNRF 2022) has been released since the evaluation was completed, which further confirms that the wetlands are not of provincial significance as the new guidelines generally no longer complex wetland units.

A catchment for the wetlands was determined as a starting point and incorporated additional wetland units to the east of Veterans Memorial Parkway for consideration (Map 1 in Appendix VII). The catchment extent is based on an automatically generated catchment layer derived using the Ontario Watershed Flow Assessment Tool. The confluence of Fekete Drain with the

Thames River presents a reasonable location for determining the catchment, which includes lands on the west and east side of Veterans Memorial Parkway. The 403.74ha catchment extends south of Bradley Avenue, almost to Highway 401.

All wetlands within this catchment were mapped using verified field data from the subject lands, as well as aerial photography interpretation and topographic mapping for wetlands offsite. A total of 6 wetland units are present within the study area (Map 1 Appendix IV), with 4 wetland units present in the upper portion of the catchment, east of Veterans Memorial Parkway. There are no provincially significant wetlands (PSW) within proximity to the subject lands. The closest PSW is the Meadowlily Woods PSW, located 1.5km to the west.

Area measurements of all 10 wetland units indicate that all are less than 2ha in size, with 6 being less than 0.5ha. Of the wetland units within the subject lands, only 1 unit is more than 0.5ha, with an area of 0.81ha. Based on OWES methodology (p. 48 of the manual), wetland units less than 0.5ha are to be excluded from the evaluation unless they are considered a “specialized community”, which could include a bog or fen or particular habitat for a rare species. The manual text also identifies:

“In general, wetlands smaller than 2 ha (5 acres) are not evaluated. However very small wetlands can provide habitat for wildlife or serve other ecological, hydrological, hydrogeological or social functions. This is particularly true in wetland complexes. A single contiguous wetland smaller than 2 ha, and wetland complexes less than 2 ha in size (i.e., total area of all wetland units) can be evaluated provided that the rationale for including them is attached to the Wetland Evaluation Data and Scoring Record.”

Based on the multi-season field surveys that were completed, as well as the interpretation of the vegetation composition for the off-site wetlands to the east of Veterans Memorial Parkway, none of the wetland units would be considered a specialized community.

Additionally, no SAR were documented during the surveys. The most notable observations relating to the on-site wetlands were the presence of terrestrial crayfish chimneys within some MAM2 polygons, as well as the presence of Jointed Rush (*Juncus articulatus*) and Greater Duckweed (*Spirodela polyrrhiza*), both considered rare in Middlesex County (Oldham 2017).

None of the wetland units are considered a specialized community and no SAR were documented from these wetlands during surveys. As such, the wetlands do not require further consideration and are not provincially significant.

5.2 Significant Woodlands and Woodlands

The London Plan (2020) recognizes Significant Woodlands, however none have been identified within the subject lands (as per the Natural Heritage Map 5 of the London Plan). The Middlesex Natural Heritage Systems Study (2014) indicates that the subject lands had a feature that met at least one criteria for significance, but the mapping had been completed prior to the Meadowlily Woods ESA being identified, as well as prior to clearing that occurred in early 2016 within a Plantation on the subject lands.

The ESA does not extend to the edge of the woodland, as shown on Map 1.

Woodland areas that have not been evaluated within the London Plan need to be evaluated as per the criteria for woodland significance as outlined in Policy 1341 of the London Plan.

Woodlands are to be assessed using all the ELC polygons that make up the component of the patch (which includes CUP).

The London Plan states:

“A woodland will be considered significant if it achieves a minimum of one High or five Medium criteria scores as determined by application of the City Council approved Guidelines for the Evaluation of Ecologically Significant Woodlands.”

As per the City of London Environmental Management Guidelines (2021), Woodlands that have not been evaluated should be evaluated using the criteria. NRSI has completed the Evaluation Criteria for the woodland feature as a whole, and through the feature delineation reviewed with the City in the field. This Criteria has been appended to this SLSR (Appendix VIII). Based on this evaluation, the woodland at the north end of the subject lands, including the CUP3-3 feature associated with Fekete Drain, meets the criteria for Significant Woodland. The adjacent CUS was excluded from the Significant Woodland as it was excluded from the dripline delineation reviewed in the field with City staff (Map 2). The Significant Woodland is shown on Map 5. The CUW feature in the southwest of the subject lands is not significant. The Criteria for the CUW feature has been appended to this SLSR (Appendix VIII).

5.3 Significant Valleylands

The London Plan (2020) identifies the full length of Fekete Drain within the study area as Significant Valleyland (Map 5 of the Plan). Significant Valleyland is identified as having a minimum width of 30m on each side of the watercourse measured from the high-water mark, as is shown on Map 5 of this SLSR.

5.4 Environmentally Significant Areas

The City of London recognizes Environmentally Significant Areas (ESA), which often capture a complex of wetlands, woodlands, SWH, and / or valleylands. As per Map 5 (Natural Heritage) of the London Plan (2020), the Meadowlily Woods ESA is located just north of the subject lands (see Map 1 of this report). As outlined in policy 1369 of the London Plan, certain lands adjacent to recognized ESA's may have potential for inclusion if warranted on the basis of site-specific evaluation through the application of the Environmental Management Guidelines (2021).

NRSI has completed a review of the vegetation communities adjacent to the existing ESA boundary and determined that the ESA boundary should be revised to include the Significant Woodland, Fekete Drain, and appropriate buffers as shown on Map 5 of this report. Under strict application of the boundary delineation guidelines (Section 4.8 of the EMG, 2021), all wetlands within the subject lands would be included in the ESA. However, some have not been included in order to allow for the removal and compensation of these narrow features in order to provide a usable development area, as will be discussed in the upcoming Environmental Impact Study. The ESA boundary includes 30m buffers from the Significant Woodland, 30m on either side of the Fekete Drain, and 30m from the larger MAM2 feature in line with the Fekete Drain (other than the narrow protrusion of this wetland). The ESA delineation identifies the boundaries to the Significant Valleyland.

In addition to the ESA boundary refinements already proposed, the Environmental Impact Study will explore opportunities to reduce the ESA width adjacent to Hamilton Road to allow for greater development opportunity with frontage onto the road. Alternatives to be explored will include improvements to the Fekete Drain including the crossing under Hamilton Road. Other opportunities may include compensating for ESA lands removed along the southern watercourse corridor to increase the ESA in the more northern portion of the subject lands. It is beneficial to encourage wildlife to stay within the ESA north of Hamilton Road so that they do not cross the road and because wildlife habitats south of the road are very limited. Wildlife

habitats north of Hamilton Road are contiguous with the Thames River corridor and the Meadowlily Woods ESA as a whole, which is extensive.

5.5 Watercourses and Fish Habitat

NRSI confirmed direct fish habitat within Fekete Drain, which is a permanent watercourse.

Indirect fish habitat is provided by the Unnamed Tributary to Fekete Drain. The *Fisheries Act* protects fish and fish habitat (as identified within the Act) up to the high-water mark.

Fekete Drain is regulated by the UTRCA, which will review and make decisions on applications for permits in accordance with Part VI of the Conservation Authorities Act and Ontario Regulation 41/24. Development, interference or alterations within the regulation limit (15m) of Fekete Drain may be permitted if, in the opinion of the UTRCA, the development will not affect the control of flooding, erosion, dynamic beaches, and unstable soil or bedrock.

5.6 Species at Risk Habitat

Three bat SAR, Little Brown Myotis, Northern Myotis, and Tri-colored Bat, may occur within the subject lands. Based on the site review, no candidate bat roosting trees were identified within the area where tree removals are anticipated (southeast and southwest corners). Candidate SAR bat habitat is located within the woodland, including all treed communities (FOD, CUP, CUS). The woodland is presumed habitat as acoustic SAR bat surveys were not undertaken.

5.7 Significant Wildlife Habitat

Table 13 lists the SWH types present within the study area as Confirmed or Candidate.

Table 13. Significant Wildlife Habitat

Significant Wildlife Habitat Type	Assessment Result
Raptor Wintering Area	Suitable habitat for Raptor Wintering is present within the woodland feature along the northern edge of the subject property and study area associated with the Meadowlily ESA. Specific studies to determine winter usage of the habitat was not conducted within the study area as it was determined the Forested feature was likely SWH due to its connectivity with the Thames River and known usage of Bald Eagles along the Thames River. The forested communities associated with the Meadowlily Woods ESA have been shown on Map 5 as candidate habitat. As nesting Red-tailed Hawk was observed within the CUP, this SWH is shown as candidate habitat within the subject lands.

Significant Wildlife Habitat Type	Assessment Result
Bat Maternity	Suitable habitat for Bat Maternity is present within the FOD and SWT features within the larger woodland within the study area. Suitable ecosites were not present within the subject lands. Detailed site assessments were not conducted within the FOD features within the larger woodland (associated with the Meadowlily Woods ESA) and this remains as candidate SWH as shown on Map 5.
Woodland Raptor Nesting Habitat	Stick nest surveys were completed during SWH assessments, as well as breeding bird surveys to document nesting birds. No nesting by species considered significant were observed within the subject property and as such, SWH is considered not present. Detailed surveys were not completed from the with the study area (Meadowlily Woods ESA) which is considered candidate.
Woodland Area-Sensitive Bird Breeding Habitat	Breeding bird surveys focused on the subject property rather than the study area where the ESA is present, as it is known to provide habitat to environmentally sensitive species. Bird surveys conducted on the site did not confirm presence of nesting of 3 or more of the listed wildlife species for this SWH. As detailed surveys were not conducted within the study area, this SWH is considered candidate outside of the subject lands.
Terrestrial Crayfish	Suitable habitat for Terrestrial Crayfish is present within the subject property and study area. Through field investigations two different locations were identified within the subject property as containing crayfish chimneys. These two MAM inclusions are identified as confirmed SWH and are shown on Map 5.
SCC Eastern Wood-Pewee	Eastern Wood-Pewee individuals were recorded during breeding bird surveys and other site visits within the FOD feature within the study area. Breeding habitat (SWH) for this species is considered present within the study area in FOD and SWT features (Meadowlily Woods ESA area).
SCC Barn Swallow	Barn Swallow was confirmed foraging within the subject lands. Breeding habitat for this species is considered present in the within the study area in the barns or agricultural outbuildings on the property to the immediate west of the subject lands, but not within the subject lands themselves.

5.8 Corridors and Linkages

Within the landscape context, the Fekete Drain and natural riparian cover associated with it is very important for the movement of local wildlife between larger woodland areas both to the north and south, and associated with the Thames River.

6.0 Summary and Recommendations

NRSI was retained to complete an inventory and assessment of the natural features within the 2004 Hamilton Road subject property within the City of London in accordance with the requirements of a SLSR. This report provides a summary of the natural features on the subject lands and within a larger surrounding study area, and provides an analysis of the significance and sensitivity of these natural features.

- Significant Woodland associated with Meadowlily ESA including CUP
 - 7 Regionally Significant Plants observed.
 - CUP features included within Significant Woodland designation, although they provide less diversity and significance than interior forested areas.
- Significant Valleyland associated with Fekete Drain
 - Linkage Corridor associated with Fekete Drain.
- Wetland (non-provincially significant)
- Fish Habitat associated with Fekete Drain and Unnamed Tributary to Fekete Drain
- Habitat for Endangered or Threatened Species
 - Potential for Bat SAR within forested area.
- Significant Wildlife Habitat
 - Confirmed Terrestrial Crayfish SWH within subject lands
 - Candidate Raptor Wintering Area within subject lands
 - Candidate Bat Maternity Roosts within subject lands (small area of FOD3-1)
 - Additional Candidate and Confirmed SWH for SCC within the study area
- Meadowlily Woods Environmentally Significant Area within study area
- Presence of Significant Groundwater Recharge Areas and Highly Vulnerable Aquifers

Once this SLSR is reviewed and approved, an EIS will be prepared to assess the proposed development in relation to the identified natural heritage features and functions. Potential impacts will be identified and appropriate buffer widths will be recommended to mitigate impacts. Compensation measures may be identified where direct impact may be proposed. A tree inventory and Tree Preservation Plan will be required.

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