

November 15, 2024

Elfrida Community Builders Group Inc.  
% Delta Urban Inc.  
8800 Dufferin St., Unit 104  
Vaughan, ON L4K 0C5

**Re: Preliminary Opportunities and Constraints Mapping  
Elfrida Lands Proposed Urban Boundary Expansion: Stoney Creek, Twenty Mile Creek,  
Hannon Creek, Upper Davis, and Sinkhole Creek Subwatersheds**

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Dear Mustafa Ghassan,

GeoProcess Research Associates Inc. (GeoProcess), Palmer Environmental Consulting Group part of SLR Consulting Ltd. (Palmer/SLR), and Stantec Consulting Ltd. (Stantec) have prepared preliminary constraints mapping and linework for the lands formerly identified as an Urban Expansion Area (Neighbourhoods) within the City of Hamilton Official Plan (i.e., study area). This memorandum has been prepared in part to support an application for the study area to be designated Urban Boundary Expansion (UBE) area.

The information provided within this memorandum outlines the assumptions and limitations based on preliminary data gathered in 2023 and 2024, and builds upon the findings documented within the report entitled, "*Elfrida Subwatershed Study: Final Phase 1 Report*", prepared by Aquafor Beech and dated 2018 (i.e., 2018 Report). This memorandum is intended to provide a reasonable representation of natural heritage constraints identified to date within the study area, including erosion/hazard opportunities and constraints, as well as an assessment associated with watercourses, headwater drainage features, and natural features within the study area. The preliminary mapping outlined within the attached figures is based on the field investigations and analyses completed in fall 2023 and spring and summer 2024. The feature and boundary GIS linework has been provided in digital format (i.e., shapefiles), and data are illustrated in the following figures, which should be reviewed concurrently with this memo:

**Figure 1:** Site Location

**Figure 2a:** Preliminary Summary of Existing Natural Heritage Features and Vegetation Protection Zones (HDFs and Floodlines)

**Figure 2b:** Preliminary Summary of Existing Natural Heritage Features and Vegetation Protection Zones (including Wildlife Features)

**Figure 3:** Preliminary Summary of Existing Constraints and Unconstrained Areas

It should be noted that the attached figures are preliminary in nature, considered to be a work-in-progress, and are subject to change based on further field surveys and analyses to be completed in 2024 and 2025. In

addition, this information will inform the future Subwatershed Study (Phase 1 Report) anticipated to be completed in fall 2025 to help inform the development of a future Secondary Plan application.

Regards,

**GEOPROCESS RESEARCH ASSOCIATES INC.**



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**PALMER ENVIRONMENTAL CONSULTING GROUP (PART OF SLR)**



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## 1. Overview

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The study area is generally bounded by Trinity Church Road to the west, Golf Club Road to the southwest/south, Hendershot Road to the southeast/east, Mud Street to the northeast, and the existing Urban Boundary to the north. GeoProcess, Palmer/SLR, and Stantec have completed preliminary ecological, fluvial geomorphological, and hydrological field investigations and assessments for the study area. Field studies were initiated in August 2023, prior to the Province reversing its decision to expand the City's urban boundary in October 2023, following which the project was temporarily placed on hold. At this point a preliminary constraints analysis was conducted, and associated feature and setback GIS linework was prepared based on field observations and the data collected.

The project resumed in spring (May) 2024, at which time additional ecological, fluvial geomorphological, and hydrological field studies were conducted within the appropriate timing windows, where possible. Early spring (April) timing windows were missed for some surveys and, as such, these surveys will be completed in April 2025. It should be noted that a the parcel of land bounded by Regional Road 56 to the south/east, Swayze Road to the west, and Rymal Road to the north was added to the UBE area in fall 2024 (please refer to *Additional Lands (Unsurveyed)* outlined within Figures 1 through 3). These lands are designated Rural Industrial – Business Park and are currently developed with industrial and commercial buildings and were not assessed in 2023 and/or 2024; however, the study team will coordinate with the City and Conservation Authority to determine if field investigations are required for these lands, if any.

The preliminary constraints analysis and associated mapping have been updated to reflect data collected to date as summarized below.

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## 2. Work Completed to Date and Outstanding Assessments

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The following work was completed and used to inform the preliminary constraints analysis. Outstanding assessments are being completed in the fall of 2024 and the spring/summer of 2025.

- **Geomorphic Assessments:** Completed in 2023.
- **Headwater Drainage Feature (HDF) Assessments:** Partially completed in 2024; one additional round of HDF assessments (spring freshet) will be completed in spring 2025.
- **Vegetation Surveys:** Mostly completed in 2024; one additional round of vegetation surveys will be completed in fall 2024.
- **Hedgerow Assessments:** Completed in 2023 and 2024 to identify potential ecological functions such as linkage opportunities. Further review is required prior to confirming linkage corridors.
- **Amphibian Surveys:** Mostly completed in 2024; one additional round of amphibian surveys will be completed in spring (April) 2025.
  - Two rounds of amphibian surveys were completed in early May and June 2024 following the Marsh Monitoring Program protocol for amphibians (MMP and BBS 2000), which requires three surveys to be completed between mid-April to the end of June at the proper air temperature triggers and weather conditions. Surveys were completed at most stations identified in the 2018 Report, in addition to new stations identified during current field

mapping exercises. Due to project timing, the first round could not be completed in 2024 and thus will be conducted in 2025.

- **Breeding Bird Surveys:** Completed in 2024.
  - Two breeding bird surveys were completed following the Ontario Breeding Bird Atlas (OBBA) protocol between May 24 and July 10, 2024, during the appropriate timing and weather conditions. Point surveys were conducted at all previously identified stations (Aquafor Beech, 2018), and a roving method was used along / within hedgerows, agricultural fields, meadows, wetlands, and woodlots/forested areas. A third breeding bird survey was conducted within communities where grassland, avian Species at Risk (SAR) had the potential to inhabit, as per the protocols for these species (Bobolink and Eastern Meadowlark).
- **Fish Community Sampling:** Completed in 2024.
  - An assessment of fish community composition and habitat availability was completed following the Ontario Stream Assessment Protocol (OSAP) fish community sampling procedures. Four sampling locations were assessed within the Stoney Creek and Twenty Mile Creek subwatersheds. Two additional sampling locations were assessed within the Sinkhole Creek subwatershed. Stream stations were identified based on previously completed studies (Aquafor Beech, 2018) for consistency, as well as appropriate locations that were identified during current surveys. Sampling locations were restricted to parcels for which access was granted by participating landowners.
- **Benthic Invertebrate Sampling:** Completed in 2024.
  - An assessment of benthic invertebrate community composition was completed in fall 2023 and spring 2024 following the Ontario Benthos Biomonitoring Network (OBBN) protocols. Stream sampling stations were identified based on previously completed studies (Aquafor Beech, 2018) for consistency, as well as appropriate locations that were identified during current surveys. Sampling locations were restricted to parcels for which access was granted by participating landowners.
- **Winter Wildlife Surveys:** Scheduled to be completed in winter 2024/2025.
  - Two winter wildlife surveys will be undertaken within 24 to 48 hours of a snowfall of a least 2 cm. These surveys will be undertaken as area searches to identify suitable wildlife habitat and wildlife movement corridors, as well as identifying species based on direct observations, tracks, and other signs.
- **Preliminary Geotechnical and Hydrogeological Investigations:** Currently ongoing and scheduled to be completed in late fall 2024 (drilling operations) / summer 2025 (monitoring/reporting).
  - An extensive series of boreholes and groundwater monitoring wells have been proposed to characterize the subsurface soils and groundwater conditions throughout the study area. The extensive field drilling program is currently in progress at the time of this memorandum issuance and is expected to be completed later this fall. Groundwater monitoring wells will be instrumented and monitored quarterly so that the spring freshet in 2025 is captured and properly documented. Opinions related to onsite infiltration potential will also be documented as part of the existing conditions characterization. In addition, field confirmation of any karst topography throughout the study area will be further confirmed and documented by Landtek Limited.

- **Hydrology & Hydraulic Assessments:** To commence in Fall 2024 following consultation with the City and Conservation Authorities.
  - An updated topographic survey has been collected by the Elfrida Community Builders Group, which will be utilized to better define the existing surface water catchment areas throughout the study area. These updated catchments will be intersected with the underlying soils and existing land uses to establish an updated hydrology model. Peak flows from the updated hydrology model will be inserted into a hydraulic model that will be developed for all existing onsite watercourses. The updated existing conditions hydraulic model will refine the existing floodplain limits throughout the study area and be used to assess the hydraulic performance/capacity of existing municipal roadway crossings. A meeting with the City and Conservation Authorities is anticipated to confirm the methodology for developing updated existing conditions hydrology and hydraulic models and ultimately provide updated flood hazard mapping throughout the study area. However, it is noted that the interim flood hazard mapping presented herein utilizes the mapping produced as part of the previous 2018 Report. The interim flood hazard mapping doesn't reflect the detailed topographic information that was recently collected. Although this flood hazard mapping will be updated in 2025 to make use of the better available topographic data, the interim mapping provided herein, is considered a reasonable representation of the existing flood risks throughout the study area.

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### 3. Preliminary Constraints Mapping

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Preliminary geomorphological, ecological, and hydrological constraint limits have been prepared to reflect the work completed to date, as described in Section 2). A high-level description of constraints analysis is provided below, with a more detailed description of methodologies to be provided in future submissions.

#### 3.1. Geomorphic Constraints

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In cases where the watercourse is not confined by a defined valley wall, the governing erosion hazard allowance in Ontario is the meander belt width. All watercourses within the study area are considered unconfined features and are therefore governed by the meander belt width. Protection-level HDFs also require the delineation of an erosion hazard. GeoProcess and Palmer/SLR delineated the meander belt axes following the TRCA protocol (TRCA 2004) and applied the calculated belt widths to these axes to delineate the DRAFT preliminary geomorphic constraints shapefile, which have been included with this memo.

#### 3.2. Ecological Constraints

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Preliminary limits of ecological constraints identified within Figures 2a, 2b, and 3 include the following natural heritage features: wetlands, woodlands, HDFs, fish-bearing watercourses, and Bobolink/Eastern Meadowlark habitat. Minimum Vegetation Protection Zones (VPZs) outlined in the Urban Hamilton Official Plan (UHOP), Policy C.2.5.10, have also been applied to applicable natural heritage features (i.e., wetlands, woodlands, etc.) given that the study area lands are proposed for UBE. In addition, Figures 2a and 2b outline preliminary areas of proposed conceptual linkage opportunities (i.e., hedgerows), which would contribute to the Natural Heritage System (NHS) and provide connectivity between natural heritage features. It should be noted that while hedgerows have been identified within Figure 2b (see attached), they are not considered a constraint

at this time. Potential linkage opportunities are subject to further review and discussion with the project team, which will be completed as part of the future Secondary Plan process.

### 3.3. Hydrological Constraints

As noted above, flood hazards for both the 100-year storm and regional flood events were digitized and extracted from Figure 4.1 of the 2018 Report, and no additional buffering has been applied. As outlined above, flood hazards will be updated using the detailed topographic survey recently collected by the Elfrida Community Builders Group. Updated hydrology and hydraulic models and associated floodplain mapping will be advanced in 2024 and 2025, which will further refine the flood hazard information presented herein. However, the information presented herein is considered to be a reasonable approximation at this time for the purpose of an Urban Boundary Expansion application.

## 4. Summary of Mapping Updates for 2024

Preliminary constraint and feature limit mapping were initially documented within the memorandum entitled, “*Preliminary Summary of Detailed Constraints and Opportunities to Development, Elfrida Subwatershed Study*”, prepared by GeoProcess, Palmer/SLR, and Stantec, dated November 3, 2023. Additional data was attained via field surveys conducted in 2024, which has resulted in revisions to the 2023 mapping. The following constraints were updated based on the results of the 2024 field survey data collected to date.

**Headwater Drainage Features:** HDFs are typically assessed over the course of three site visits as per the *Evaluation, Classification and Management of Headwater Drainage Feature Guidelines* (2014) developed by the Credit Valley Conservation Authority (CVC) and the Toronto and Region Conservation Authority (TRCA). These surveys are completed during three specific timing windows that include spring freshet (March-April), post-freshet (April-May), and summer (July-August). Summer surveys were conducted in 2023 to provide a preliminary classification of HDFs. Post-freshet surveys were conducted in 2024 to further inform this classification, resulting in some changes. Based on the results of the post-freshet surveys, some recommended HDF management strategies were downgraded from *Protection*. These changes are reflected in the updated 2024 opportunities and constraints mapping. The first round of HDF surveys (freshet) will be completed early in 2025 to confirm the recommended HDF management strategy and provide final classification results.

**Meander Belts:** In 2023, meander belt limits were assigned to watercourses, as well as HDFs that were classified as *Protection*-level during the HDF assessments. Given some HDF management strategies were downgraded based on the 2024 HDF surveys, some meander belt delineations were removed in the updated mapping.

**Floodplain Mapping:** The consultant team will look to pre-consult with the City and Conservation Authorities to confirm an agreed upon method for updating hydrology, hydraulic and floodplain mapping for the study area using the recently collected topographic survey information. The flood hazard mapping presented herein will be refined using the more detailed and up-to-date information and shall be provided in support of future Secondary Planning initiatives, which will include an updated Phase 1 Subwatershed Study that will comprehensively characterize the existing natural heritage hazards and constraints for the overall study area.

**Karst Topography:** An extensive series of boreholes and groundwater monitoring wells are being advanced to further characterize the subsurface soils and groundwater conditions throughout the study area. Field confirmation of any karst topography throughout the study area will be further confirmed and documented as part of the subsurface investigations currently in-progress.

**Species at Risk Habitat:** Breeding bird surveys conducted in 2024 revealed the presence of Bobolink and/or Eastern Meadowlark habitat. Both bird species are classified as *Threatened* on the Species at Risk in Ontario (SARO) list. The area of identified breeding habitat for Bobolink and Eastern Meadowlark was added as a constraint as it is subject to O.Reg. 242/08, which outlines special requirements for Bobolink and Eastern Meadowlark habitat compensation. Should development be proposed in this area, compensation will be required in the form of a cash in lieu payment as part of the conservation fund and/or the development of Bobolink and Eastern Meadowlark habitat elsewhere. Eastern Wood-Pewee, an avian species classified as *Special Concern* on the SARO list, was also documented in various ELC communities throughout the Elfrida Secondary Plan study area (see Figure 2). These sitings; however, were documented in natural heritage features (i.e., woodlands) which are already afforded protection through UHOP policies.

**Linkages:** Hedgerow assessment work continued into 2024. The results of this assessment have further refined the locations of potential natural heritage system linkages and hedgerow functions (as illustrated in Figure 2). Potential linkage locations have been updated; however, further review is required to determine the most appropriate connections and potential incorporation of other hedgerow functions.

**Ecological Land Classification Communities:** Wetland and woodland community boundaries were further refined using the Ontario Wetland Evaluation System (OWES) protocol for wetlands and tree driplines for woodlands. OWES certified ecologists completed this work during the 2024 growing season (June to August) for the wetlands. Delineation of these natural heritage feature boundaries and their subsequent MPZs has resulted in mapping updates within parcels 14, 22, 31, 34, 35, 36, 37, and 66. It is important to note that further site level features staking of feature limits will be required as the development approval process advances. Feature limit adjustments and refinements can be expected on a site-specific basis.

The following table includes a summary of parcels with updated preliminary constraints linework based on the 2024 field investigation results.

Table 1. Summary of Parcels with Updated Preliminary Constraints Linework

Survey	Survey Completed in 2023	Survey Completed in 2024	Parcels with Updated Preliminary Constraints Linework
Meander Belt Assessment*	Yes	No	1, 2, 3, 10, 28, 47
Wildlife Survey Mapping - Birds	No	Yes	46, 47, 51
Wildlife Survey Mapping - Amphibians	No	Partial	N/A
Headwater Drainage Feature (HDF) Assessments	Partial	Partial	1, 2, 3, 10, 28, 47
Fish & Fish Habitat Assessment	No	Yes	N/A

Survey	Survey Completed in 2023	Survey Completed in 2024	Parcels with Updated Preliminary Constraints Linework
Vegetation Community Mapping (ELC)**	Partial	Partial	14, 22, 31, 34, 35, 36, 37, 66
Hedgerow Assessment Mapping**	Partial	Partial	1, 2, 3, 5, 6, 7, 8, 10, 11, 13, 14, 48
Unclassified Wetland Characterization	No	Fall 2024	N/A
Winter Wildlife Surveys	No	Winter 2024	N/A

\* Updated preliminary constraints linework based on 2024 HDF assessment results

\*\* Includes presence of *Crataegus chrysocarpa* and *Categaegus mollis* (regional rare species)

## 5. Assumptions and Limitations

The preliminary opportunities and constraints mapping have been prepared using the data available as described in Section 2. In some parts of the study area (i.e., the non-participating landowner properties), permission to access was not granted, and the constraints mapping was performed based on publicly available data alone and desktop review such as aerial photo interpretation. Drainage areas, flows, and channel gradients were sourced from the 2018 Report, where possible. All current vegetation data was collected during the summer 2023/2024 and spring 2024 seasons. An additional fall survey is required to fully characterize the vegetation communities within the study area, as per ELC protocol, and will be completed in late 2024. Wildlife surveys completed include breeding bird surveys, breeding amphibian surveys, fish community/habitat assessments, and benthic invertebrate sampling and assessments. Outstanding assessments within the study area to be completed in late 2024 or 2025 include an April amphibian survey, a freshet HDF assessment (April), field characterization of unclassified wetlands, winter wildlife surveys and updated existing conditions flood hazard mapping.

Findings from these surveys, or the identification of SAR during the subsequent surveys, may further alter the opportunities and constraints outlined in Figures 2 and 3. The provided mapping therefore remains subject to change until the remaining data can be collected and assessed. Should the above-referenced parameters be revised following the outstanding assessments, the constraints GIS linework will also need to be updated accordingly.

## 6. References

- Aquafor Beech. 2018. Elfrida Subwatershed Study: Final Phase 1 Report. City of Hamilton.
- City of Hamilton. 2022. Urban Hamilton Official Plan. City of Hamilton.
- GeoProcess, Palmer/SLR, Stantec. 2023. Preliminary Constraints and Opportunities Mapping Memo.
- MMP, BBS. 2000. The Marsh Monitoring Program Quality Assurance Project Plan. Port Rowan, Ontario: prepared by Marsh Monitoring Program and Bird Studies Canada for U.S. Environmental Protection Agency Great Lakes National Program Office.
- TRCA. 2004. Belt Width Delineation Procedures. Toronto and Region Conservation Authority Report No.: 98- 023. <https://sustainabletechnologies.ca/app/uploads/2013/01/Belt-Width-Delineation-Procedures.pdf>.

# Preliminary Constraints Mapping Stoney Creek, Twenty Mile Creek, Hannon Creek, Upper Davis, and Sinkhole Creek Subwatersheds

Prepared for Elfrida Community Builders Group Inc.

## Memo Version History

Version	Date	Issue	Description	Affiliation	Author
1	2024-10-25	Draft	Memo outlining the assumptions and limitations associated with the updated preliminary constraints deliverable	GeoProcess	KG, JM
				Palmer/SLR	JS, DJ
				Stantec	DA, TG
2	2024-11-18	Final	Revisions and finalization of memo based on stakeholder comments	GeoProcess	IR
				Palmer/SLR	JS, DJ
				Stantec	DA, TG

## Disclaimer

We certify that the services performed by GeoProcess Research Associates, Palmer Environmental Consulting Group, and Stantec Consulting Ltd. were conducted in a manner consistent with the level of care, skill and diligence to be reasonably exercised by members of the engineering and science professions.

Information obtained during the site investigations or received from third parties does not exhaustively cover all possible environmental conditions or circumstances that may exist in the study area. If a service is not expressly indicated, it should not be assumed that it was provided. Any discussion of the environmental conditions is based upon information provided and available at the time the conclusions were formulated.

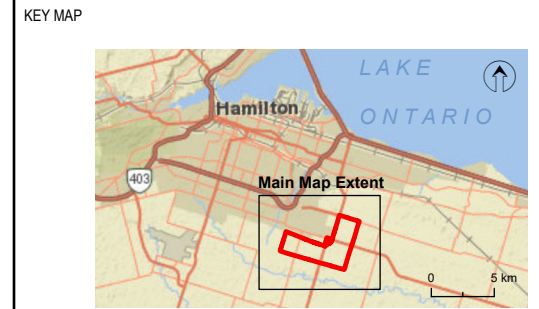
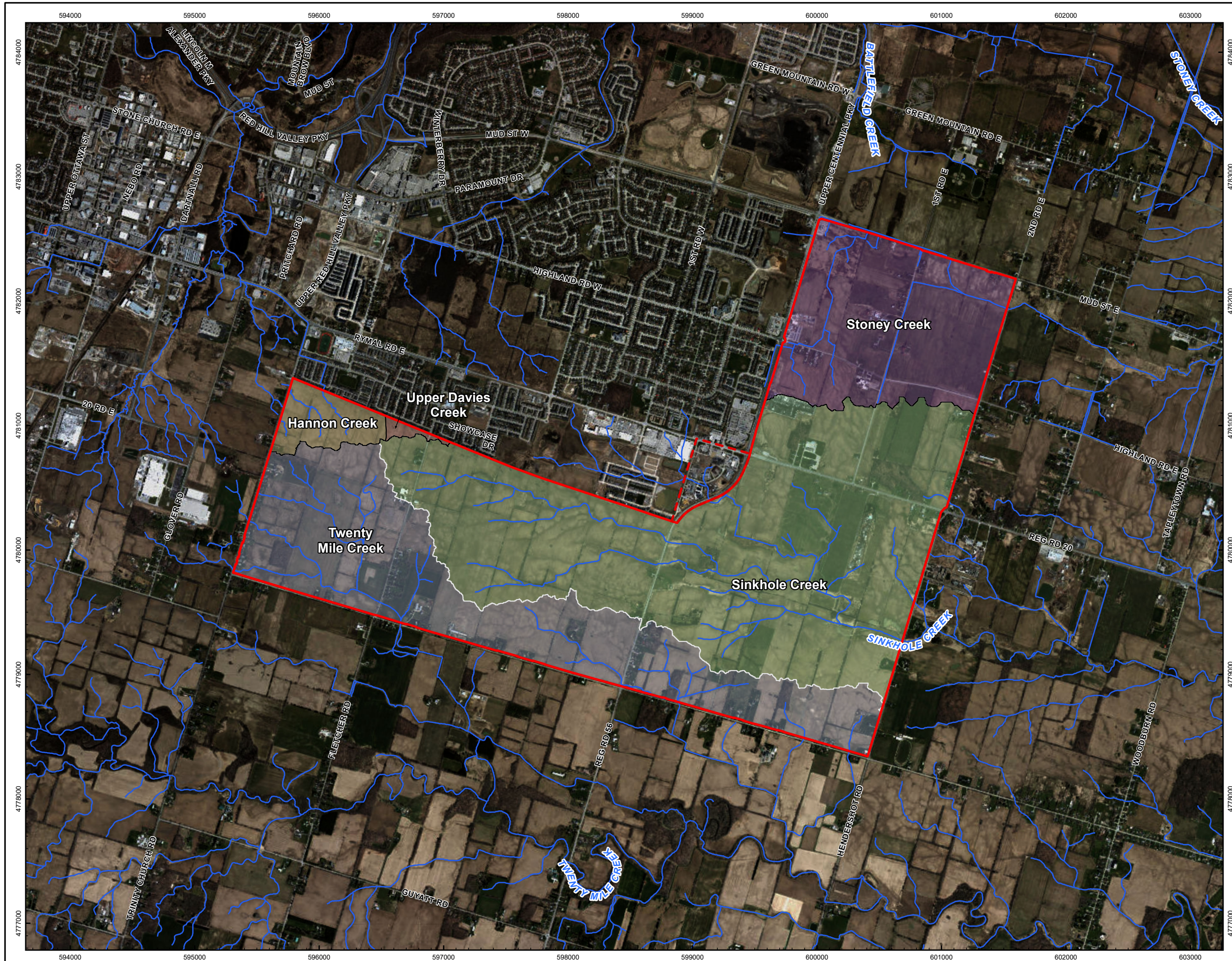
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Project Number P2023-770

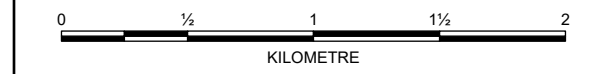




- LEGEND**
- Watercourse <sup>1</sup>
  - Study Area
  - Additional Lands (Unsurveyed)
  - Subwatersheds (SWS)<sup>2</sup>**
  - Hamilton Conservation Authority
    - Hannon Creek
    - Stoney Creek
    - Upper Davies Creek
  - Niagara Peninsula Conservation Authority
    - Sinkhole Creek
    - Twenty Mile Creek

1 - Land Information Ontario (LIO)  
 2 - Niagara Peninsula Conservation Authority / Aquafor Beech

**NOTE: The information contained within this figure is preliminary and will be refined during further study.**



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 Universal Transverse Mercator Projection Zone 17

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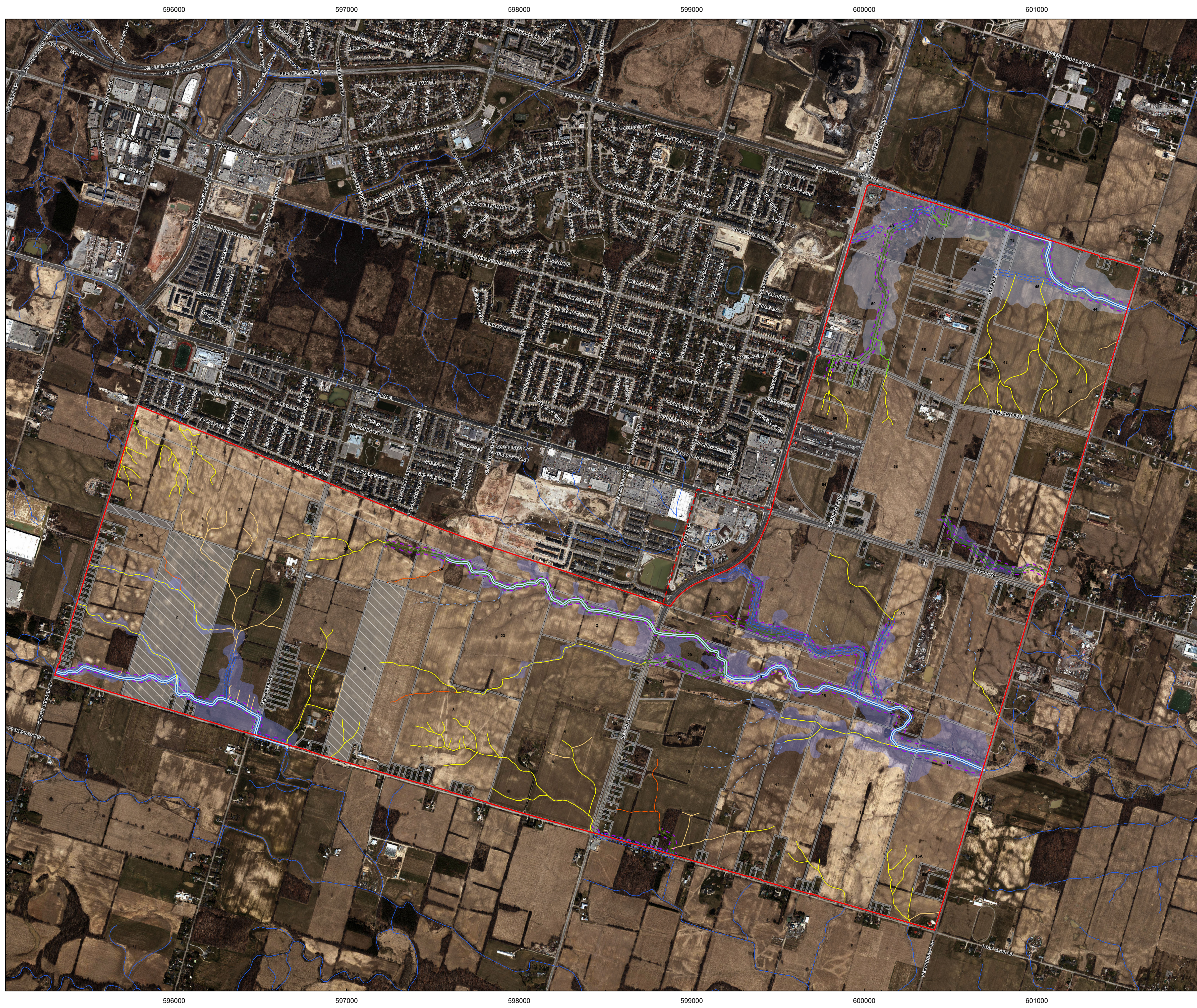
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CLIENT  
 Elfrida Community Builders Group Inc.

PROJECT  
 Elfrida Subwatershed Study  
 Preliminary Natural Heritage, Hazards & Constraints Mapping

Stantec GeoProcess RESEARCH ASSOCIATES PALMER PART OF SLR	TITLE <b>Site Location</b>
	REF. NO. 2306301-1-2
	<b>Figure 1</b>





- LEGEND**
- Parcel Boundary
  - Watercourse <sup>1</sup>
  - Cooperating Property
  - Watercourse - Fish Bearing
  - Participating Property
  - Meander Belt
  - Study Area
  - Additional Lands (Unsurveyed)

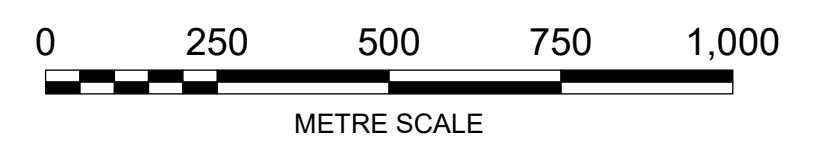
- Headwater Drainage Feature (HDF)**
- Conservation
  - Protection
  - Mitigation
  - Maintain
  - No Management Required

- Floodlines <sup>2</sup>**
- Regional Flood
  - 100 Year Flood

- Vegetation Protection Zones**
- Protected HDF VPZ (15 m)
  - Watercourse VPZ (15 m)

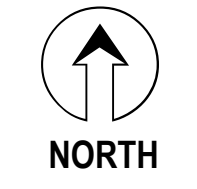
1 - Land Information Ontario (Adjusted via air photo interpretation in specific areas)  
 2 - Aquifer Beech (approximate)

**NOTE: The information contained within this figure is preliminary and will be refined during further study. \*Habitat linkages to be assessed in upcoming field season.**



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CLIENT  
 Elfrida Community Builders Group Inc.

PROJECT  
 Elfrida Subwatershed Study  
 Preliminary Natural Heritage, Hazards & Constraints Mapping

TITLE  
**Preliminary Summary of Existing Natural Heritage Features and Vegetation Protection Zones (HDFs and Floodlines)**

REF. NO.  
 2306301-2-3

**Figure 2a**





**LEGEND**

	Parcel Boundary		Karst Sinkhole
	Cooperating Property		Watercourse <sup>1</sup>
	Participating Property		
	Study Area		
	Additional Lands (Unsurveyed)		

**Natural Heritage Feature**

	Woodland		Potential Hedgerow (HR) Linkage - Further Study Required*
	Significant Woodland		Eramosa Karst Provincial Earth Science ANSI
	Locally Significant Wetland		
	Provincially Significant Wetland		

**Wildlife Feature**

	Eastern Wood Pewee Observation
	Eastern Meadowlark or Bobolink Habitat

**Vegetation Protection Zones**

	Woodland VPZ (10 m)
	Significant Woodland VPZ (15 m)
	Locally Significant Wetland VPZ (15 m)
	Provincially Significant Wetland (30 m)

1 - Land Information Ontario (Adjusted via air photo interpretation in specific areas)  
 2 - Aquifer Beech (approximate)

**NOTE: The information contained within this figure is preliminary and will be refined during further study. \*Habitat linkages to be assessed in upcoming field season.**

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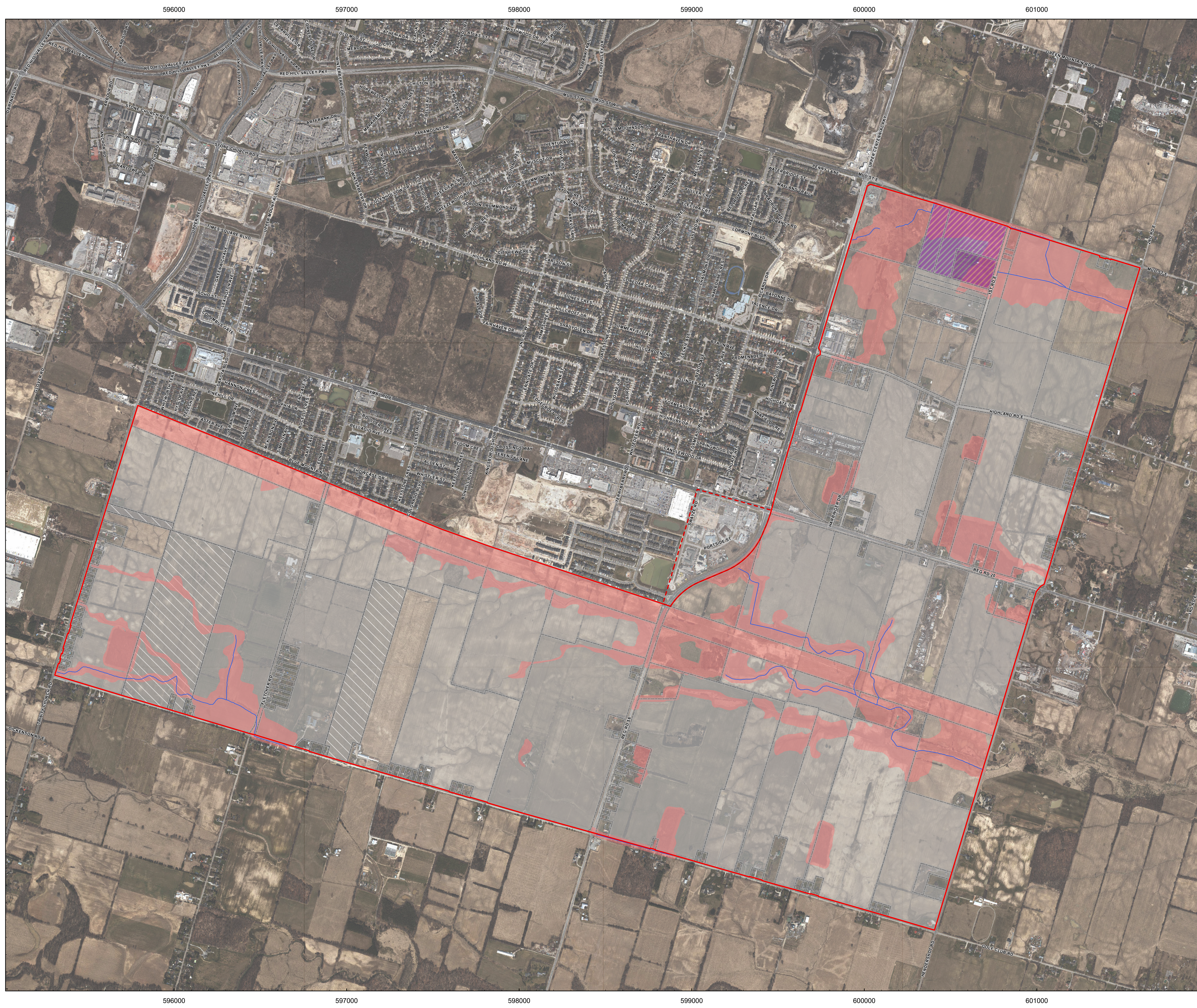
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NORTH









Source Notes:  
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CLIENT	Elfrida Community Builders Group Inc.	
PROJECT	Elfrida Subwatershed Study Preliminary Natural Heritage, Hazards & Constraints Mapping	
  	TITLE	Preliminary Summary of Existing Natural Heritage Features and Vegetation Protection Zones (Including Wildlife Features)
	REF. NO.	2306301-2-3
		<b>Figure 2b</b>





**LEGEND**

-  Watercourse<sup>1</sup>
-  Meadow Community - Potential Species at Risk Habitat
-  Parcel Boundary
-  Cooperating Property
-  Participating Property
-  Study Area
-  Additional Lands (Unsurveyed)
-  Area of Existing Constraint

4783000  
4782000  
4781000  
4780000  
4779000  
4778000

1 - Land Information Ontario (Adjusted via air photo interpretation in specific areas)

**NOTE: The information contained within this figure is preliminary and will be refined during further study. \*Habitat linkages to be assessed in upcoming field season.**

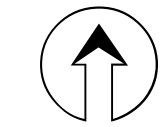
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Date: Aug 23, 2024

  
NORTH

Source Notes:  
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CLIENT	Elfrida Community Builders Group Inc.	
PROJECT	Elfrida Subwatershed Study Preliminary Natural Heritage, Hazards & Constraints Mapping	
  	TITLE	<b>Preliminary Summary of Existing Constraints and Unconstrained Areas</b>
	REF. NO.	2306301-3-4
		<b>Figure 3</b>