Welcome to the Public Information Centre for the City of Hamilton

Elfrida Subwatershed Study

Public Information Centre # 1

June 21st, 2017

Growth Management Division
Infrastructure Planning Section
www.hamilton.ca

Study Purpose

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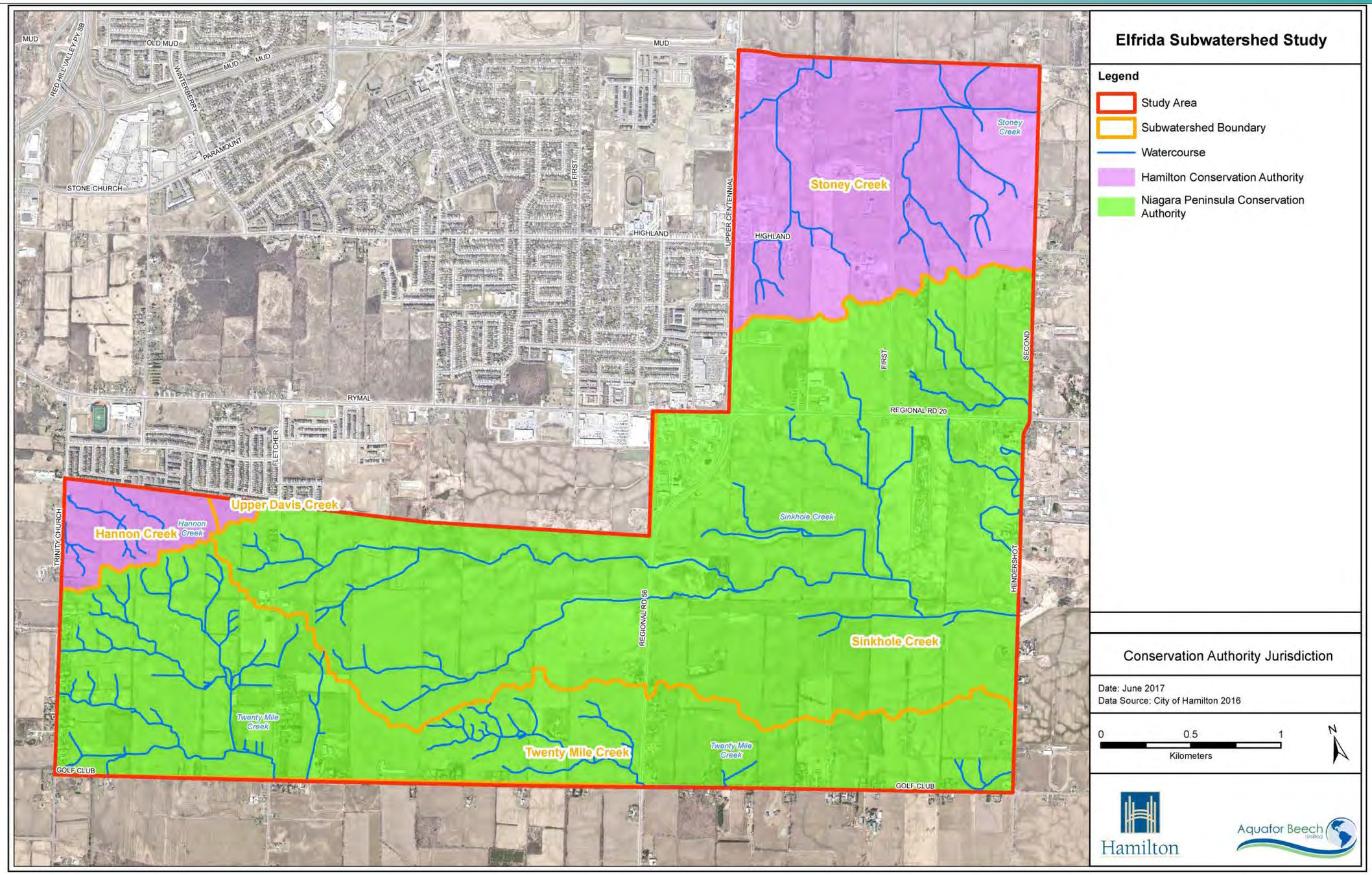
The City of Hamilton is in the process of developing the Elfrida Growth Area Secondary Plan. The Elfrida Subwatershed Study is one of several component studies which will be undertaken in support of the secondary planning process. The purpose of the Subwatershed Study is to develop a plan that allows sustainable development, while ensuring maximum benefits to the natural and human environments on a watershed basis.

Purpose of this Meeting

- Introduce the study area
- Define the Subwatershed Study purpose
- Review the Subwatershed Study process
- Provide an opportunity for the public to review the work completed to date as well as upcoming work
- Allow the public to provide input to the study, and to discuss questions and issues with the staff of the City of Hamilton and the members of the Project Team

Study Area

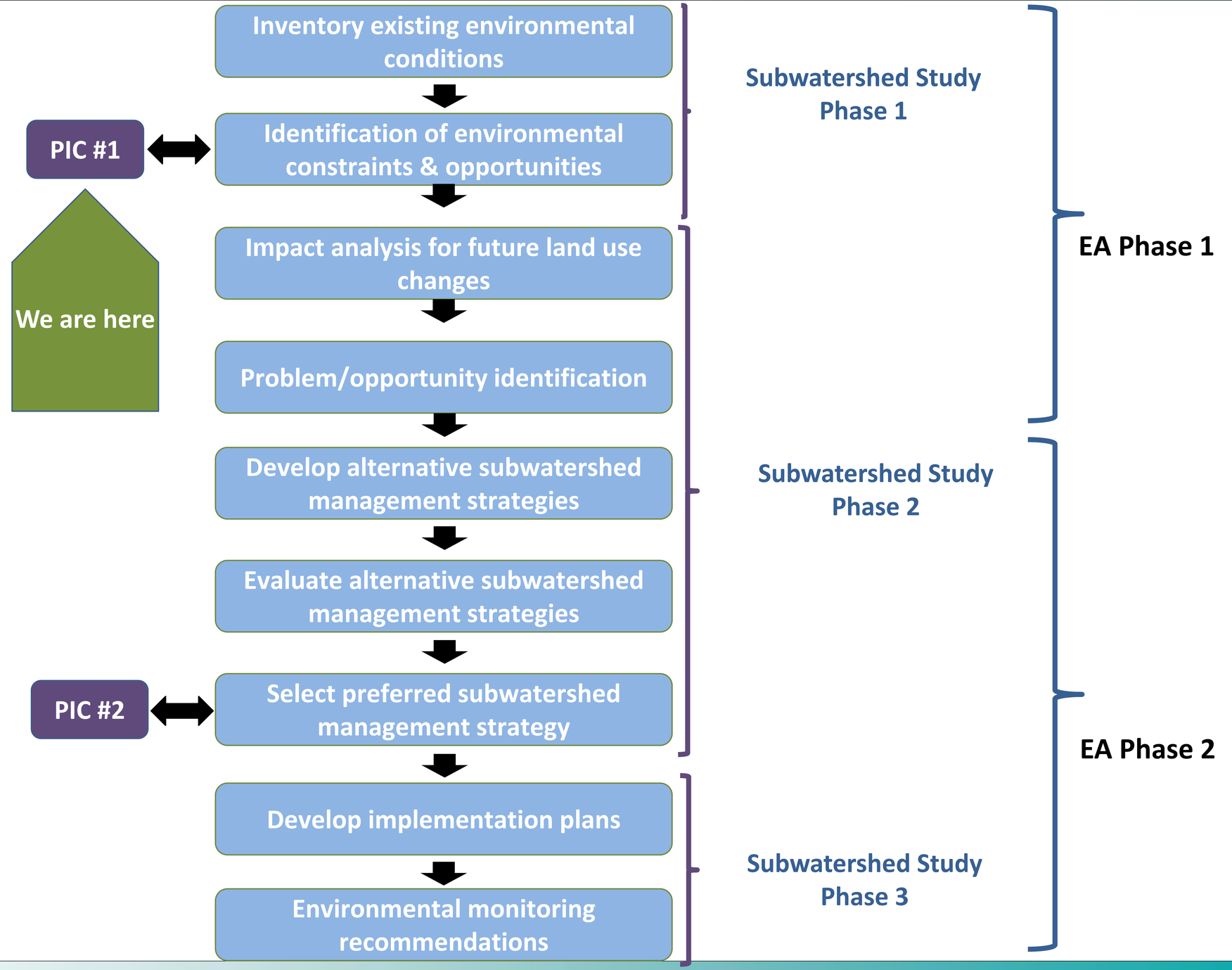

Elfrida Subwatershed Study
Legend
Study Area
Subwatershed Boundary
Watercourse
Hamilton Conservation Authority
Niagara Peninsula Conservation Authority
Conservation Authority Jurisdiction
Date: June 2017
Data Source: City of Hamilton 2016
0
0.5
1
Kilometers
N
Hamilton
Aquafor Beech Limited
Stoney Creek
Upper Davis Creek
Hannon Creek
Sinkhole Creek
Twenty Mile Creek
HIGHLAND
RYMAL
STONE CHURCH
REGIONAL RD 20
REGIONAL RD 56
GOLF CLUB
MUD
OLD MUD
PARAMOUNT
WINTERBERRY
RED HILL VALLEY PY SB
FIRST
SECOND
UPPER CENTENNIAL
FLETCHER
TRINITY CHURCH
HENDERSHOT

Subwatershed Study/ Environmental Assessment Process

The Subwatershed Study is being conducted as a Master Plan and is intended to satisfy Phases 1 and 2 of the Municipal Class Environmental Assessment Act (Class EA) process.

This will involve a process of problem/opportunity identification, evaluation of alternative solutions, and selection of a preferred solution. Stakeholder consultation is an important part of the EA process and a key component of the study.

Consultation with Stakeholders, the Public, and Agencies



Existing Groundwater Resources

Objectives

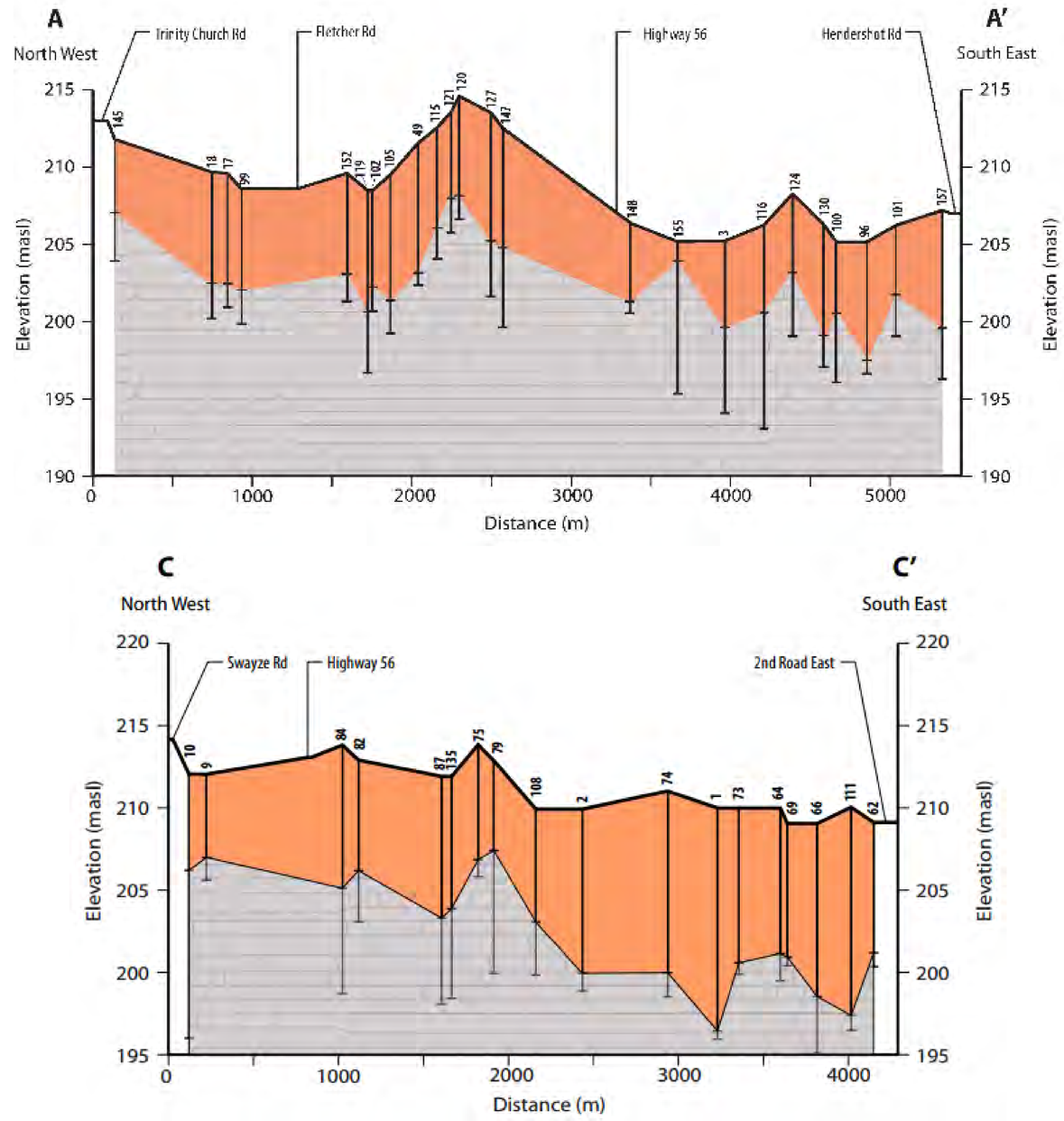
- Compilation and review of existing information and datasets related to hydrogeologic conditions;
- To identify critical gaps in the current knowledge base; and,
- To provide recommendations for the next steps.

Study Tasks

- Assessment of the existing geological and hydrogeological conditions within the sub-watershed;
- Review of shallow and regional groundwater systems; and,
- Identification of significant groundwater recharge and discharge areas.

Findings

- The geology of the Elfrida study area is comprised of low permeability clay and silts overlying dolostone bedrock.
- The groundwater recharge potential for the Elfrida soils is quite low, the existing groundwater recharged rate is approximately 48mm per year.



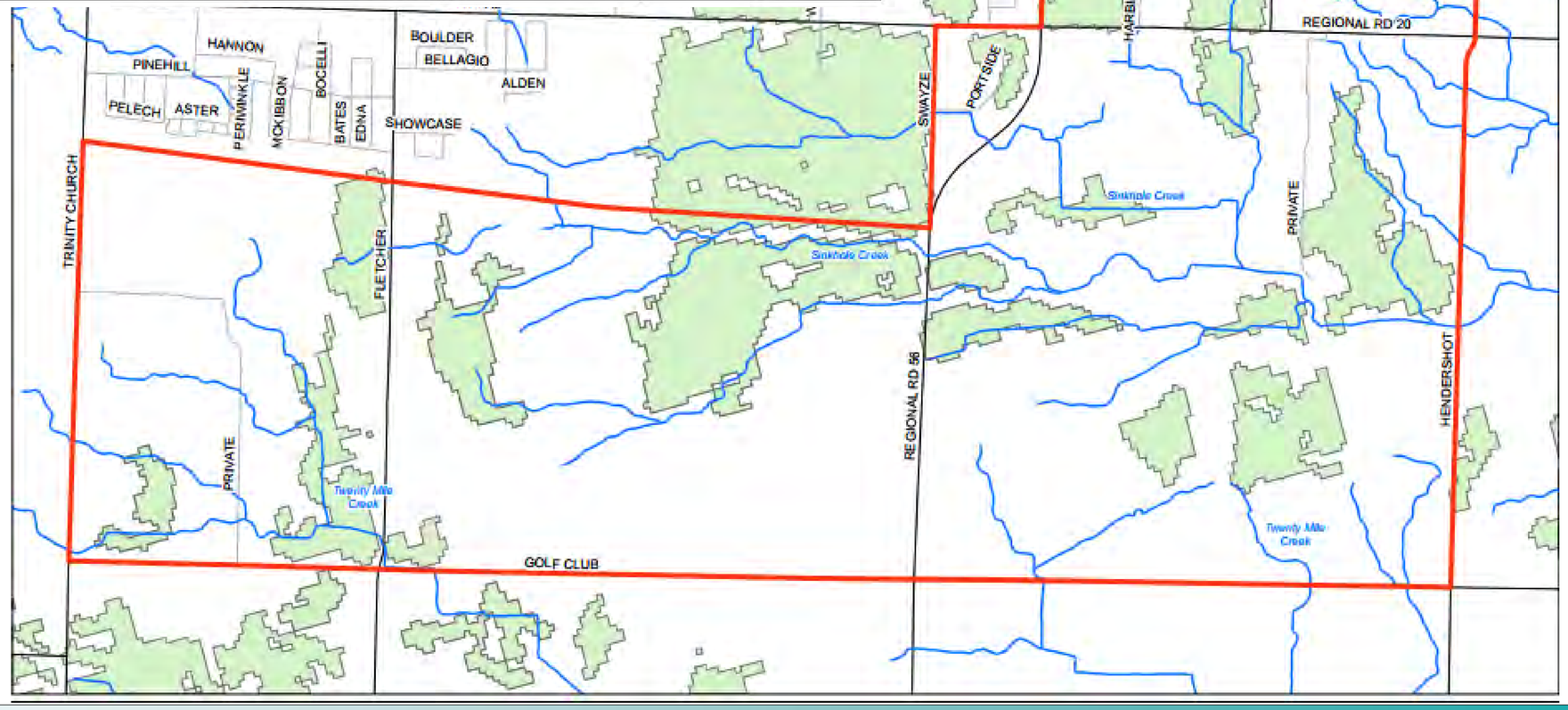
Geologic cross sections at Golf Club Rd. (AA') and Highway 20 (CC')

Existing Groundwater Recharge & Water Budget

Water Budget Component	Source of Information	Value (mm/year)
Annual Precipitation (P)	Environment Canada climate normal for Vineland-Rittenhouse meteorological station	930
Actual Evapotranspiration (ET)	Thornthwaite model monthly calculation	598
Water Surplus	P – ET	332
Recharge	Average groundwater recharge per Aqua Resource and NPCA, 2009 (Haldimand Clay Plain)	48
Runoff	Water surplus – Recharge	284

The above table illustrates the primary components of the water budget for the Elfrida Subwatresheds.

The accompanying map shows areas of significant groundwater recharge.



Existing Fluvial Geomorphologic Resources

Objectives

- Characterize existing conditions for Elfrida drainage features and channels, including tributaries of Twenty Mile, Sinkhole, and Stoney creeks
- Define the geomorphic constraints for development around watercourses and the stream erosion potential under existing and future conditions
- Provide recommendations for stream restoration opportunities

Study Tasks

- Geomorphic field inventories of channels within the Elfrida study area in conjunction with the Headwater Drainage Feature (HDF) assessment
- Evaluate erosion hazards for sustainable geomorphic corridors and erosion thresholds for sediment transport and future impacts
- Identify locations for stream restoration, including improved drainage, geomorphic function, and aquatic and riparian habitat

Findings

- Channels are predominantly modified headwater swales and ditches, characterized by fine sediment, vegetated beds, and ephemeral flows
- “Freedom space[1]” corridors 30 to 60 metres wide; erosion potential is limited by low-energy and vegetation; recommend future monitoring downstream
- Opportunities to realign and renaturalize some channels away from roads

“[1]Freedom space is the stream corridor width required to accommodate gradual erosion and channel movement over time and thus is the space for free movement within the stream erosion hazard limits."

Existing Conditions – Hydrology

Objectives

- Define flow rates within various areas of the Elfrida subwatersheds

Study Tasks

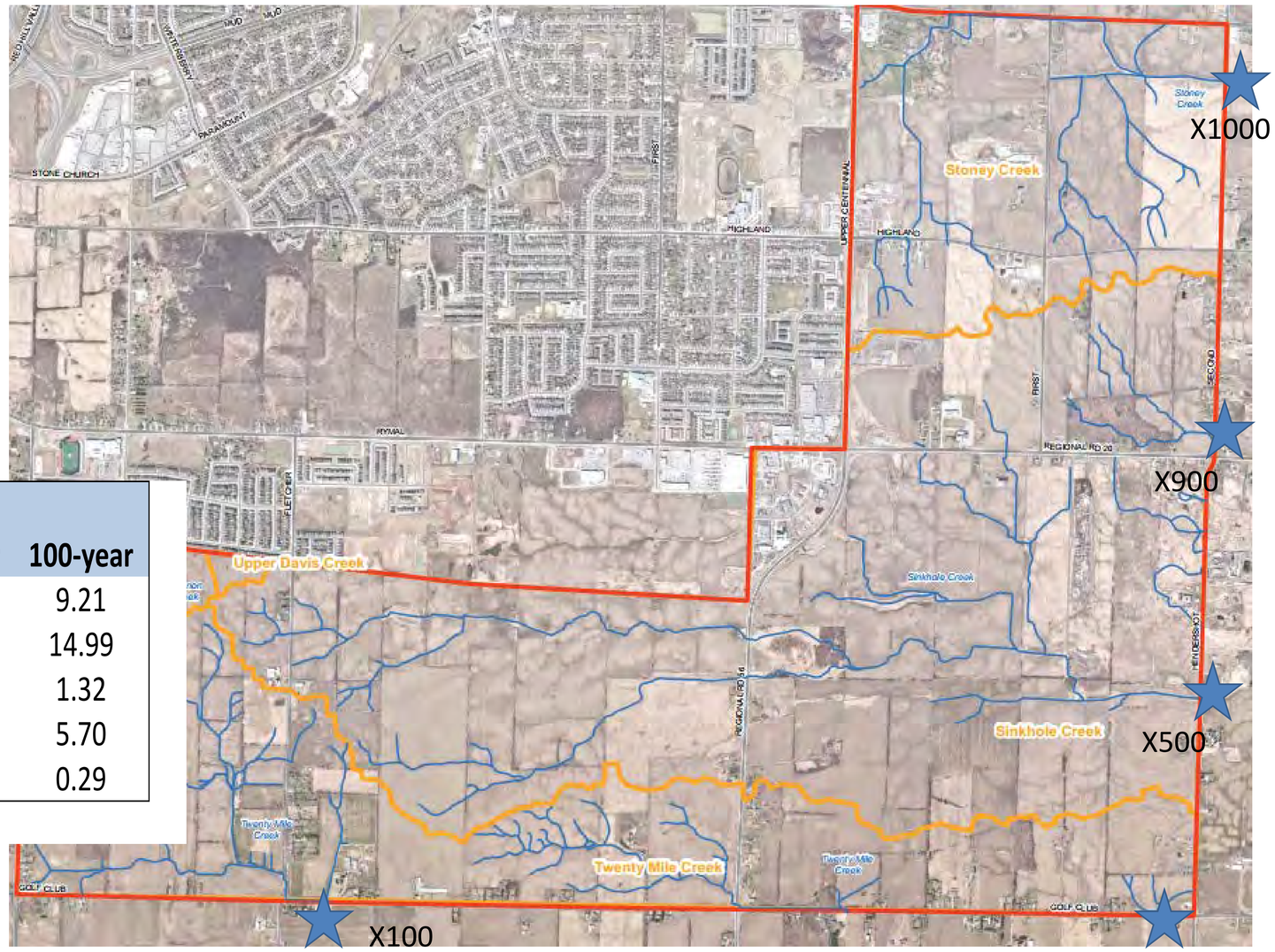
- The hydrological PCSWMM model was developed to determine flow rates at key locations along Stoney, Sinkhole, Twenty Mile and Hannon Creeks for various design storms.
- Flow rates were used to establish the flood lines using the HEC-RAS hydraulic model.

Flow Location (Junction ID)	Drainage Area (ha)	Flood Flow (m^3/s)					
		2-year	5-year	10-year	25-year	50-year	100-year
X1000	350.9	1.36	3.17	2.43	6.14	7.52	9.21
X500	656.15	1.85	4.57	6.68	9.47	11.83	14.99
X900	61.68	0.14	0.37	0.56	0.80	1.02	1.32
X100	250.6	0.62	1.62	2.43	3.56	4.48	5.70
X4000	9.82	0.04	0.09	0.13	0.18	0.23	0.29

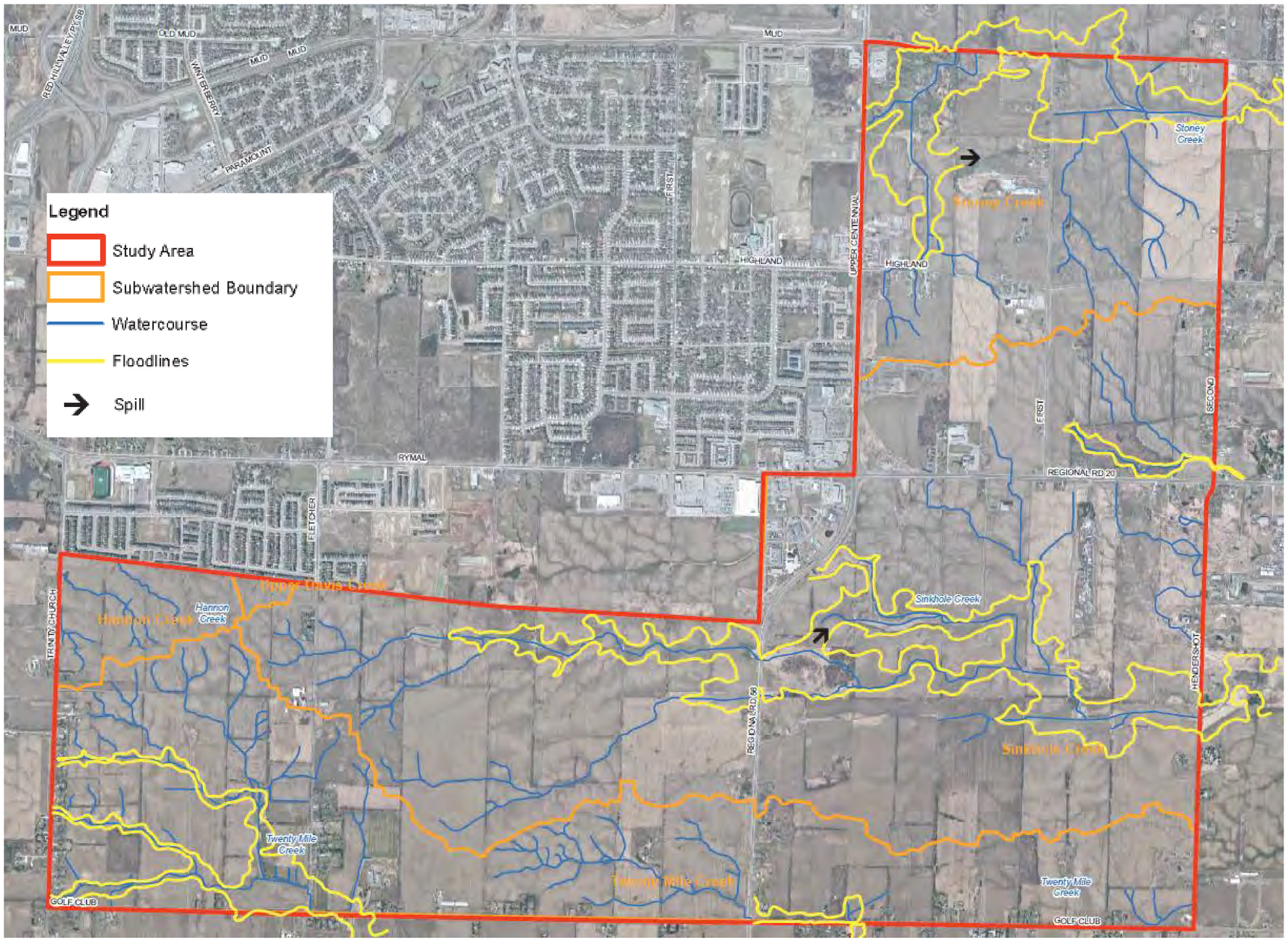
Table above shows flow rates for various storms at the locations shown on the accompanying map.

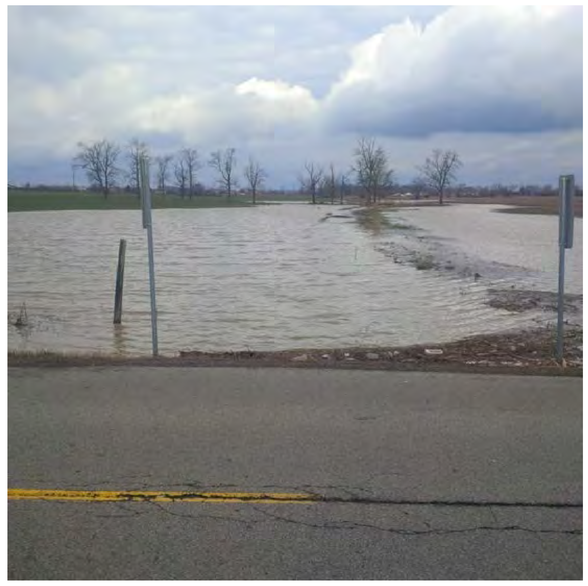
Findings

- Interim floodlines are shown on Board 9.



Existing Floodlines (100-Year Storm)





Stoney Creek at Second Road – spring 2016

Sinkhole Creek at Hendershot Rd. - spring 2016

Existing Terrestrial Ecology

Objectives

Define and characterize terrestrial natural heritage features and functions

- Terrestrial flora and fauna
- Significant Wildlife Habitat
- Species-at-risk and other species of conservation concern
- Preliminary identification of restoration and rehabilitation opportunities.

Study Tasks

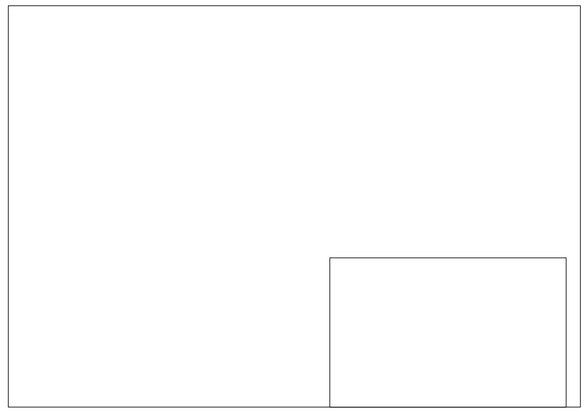
- Background information review
- Vegetation community classification
- 3-season botanical inventories
- Amphibian Surveys (anurans & salamanders)
- Breeding Bird Surveys
- Reptile Surveys
- Incidental wildlife observations
- Species-at-risk screening
- Significant Wildlife Habitat assessment
- Significant Woodland assessment
- Wetland evaluations

Findings

Terrestrial natural heritage features are generally isolated from one another within a primarily agricultural landscape. As a means of connecting disjunct natural heritage features and strengthening the ecologic form and function of the Natural Heritage System, several areas have been identified for restoration. As illustrated on Board 12, terrestrial natural heritage features within the study area consist of the following:

- Woodlands;
- Wetlands;
- Significant Wildlife Habitat;.
- Areas of Natural and Scientific Interest (Earth Science);
- Corridors and Linkages; and,
- Restoration Areas

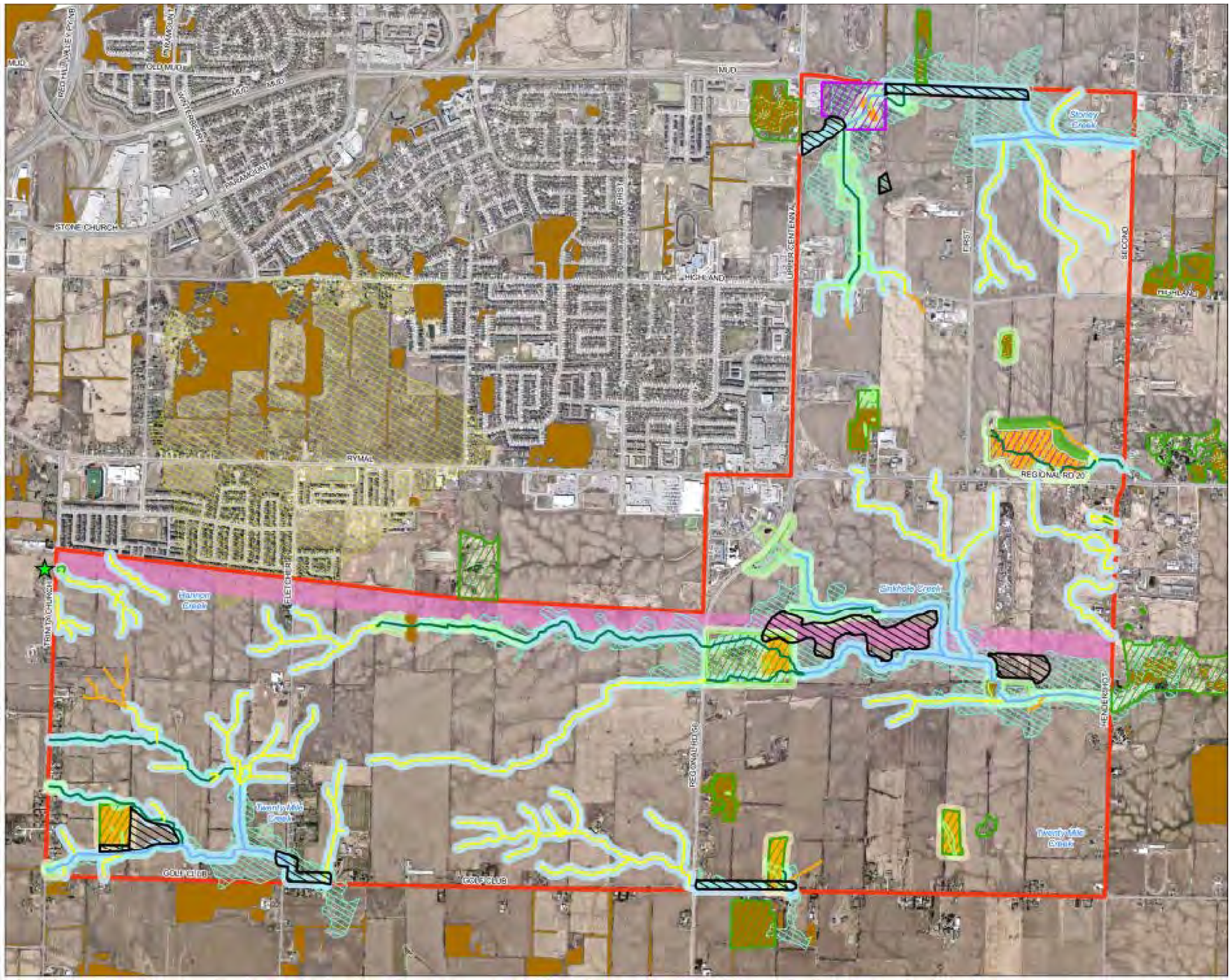
Woodland adjacent to agricultural land uses



Significant Woodland and chorus frog (inset)

Salamander monitoring

Preliminary Natural Heritage System



Legend

- Study Area
- Watercourse
- Restoration Areas
- Floodplain
- Eramosa Karst Provincial Earth Science ANSI
- Linkages (Hydro Corridor)
- Wetlands
- Significant Woodland
- Woodlands

Significant Wildlife Habitat

- Candidate
- Confirmed

HDF Management Recommendations

- Protection
- Conservation
- Mitigation
- No Access

Vegetation Protection Zones

- Wetland VPZ (60m)
- Wetland VPZ (30m)
- Woodland VPZ (15m)
- Significant Woodland VPZ (30m)
- Watercourse VPZ (30m)
- Karst Sinkhole

The map illustrates a preliminary assessment of hazard lands and natural heritage features within the Elfrida subwatershed, as identified through this study. The mapping is subject to refinement following consultation with the City of Hamilton, Niagara Peninsula Conservation Authority, Hamilton Conservation Authority, and the Ministry of Natural Resources and Forestry; as applicable.

Next Steps

- Preferred land use strategy to be developed (Winter 2018)

Subwatershed Study Phase 2

- Evaluation of potential impacts of land uses on the Natural Heritage System
- Development and evaluation of preferred subwatershed management strategies
- Selection of preferred subwatershed management strategy
- Present preferred strategy

Subwatershed Study Phase 3

- Implementation

Bur Oak Mineral Deciduous Swamp

Lands north of the Sinkhole Creek crossing of Hendershot Road (centre & right), and at the Hendershot Road crossing (left) have been converted into agriculture.

Thank You for Participating!

After this Public Information Centre, the study team will consider verbal and written comments in order to refine tasks taken as part of the Environmental Assessment.

For more information on this project, please submit your comments or feedback, by July 7th to one of the following contacts:

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