

# Water and Wastewater Servicing Master Plan

Elfrida Secondary Plan



Prepared for:  
Elfrida Community Builders Group Inc.

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Prepared by:  
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Project/File:  
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## Revision Record

Revision	Description	Author	Date	Quality Check	Date	Independent Review	Date

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<sup>1</sup> Referred to in UHOP policy F.1.2.8(g)(ix) as the Master Servicing Plan

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## **Acronyms / Abbreviations**

<b>Acronym / Abbreviation</b>	<b>Full Name</b>
ADD	Average Day Demand
AEGD	Airport Employment Growth District
City	City of Hamilton
Client / ECBG	Elfrida Community Builders Group Inc.
CSA	Cost Sharing Agreement
DC	Development Charge
EGSE	Existing Ground Surface Elevation
FF	Fire Flow
FSR	Functional Servicing Report
GRIDS	Growth Related Integrated Development Strategy
ha	Hectare(s)
HCA	Hamilton Conservation Authority
HGL	Hydraulic Grade Line
kPa	Kilopascal(s)
l/s	Liters per second
m	Meter(s)
m/s	Meters per Second
MLD	Million Liters per Day
MDD	Maximum Day Demand
MECP	Ontario Ministry of the Environment, Conservation and Parks
mm	Millimeter(s)
NHS	Natural Heritage System
NPCA	Niagara Region Conservation Authority
PD	Pressure District
PHD	Peak Hour Demand
PS	Pumping Station
psi	Pounds per Square Inch
Stantec	Stantec Consulting Ltd.
Study Area	Elfrida Secondary Plan Lands
SWP	Subwatershed Plan
UBE	Urban Boundary Expansion
WTP	Water Treatment Plant
WWSMP	Water Wastewater Servicing Master Plan
WWTP	Wastewater Treatment Plant



# 1 Introduction

Stantec Consulting Ltd. (“Stantec”) has been retained by the Elfrida Community Builders Group Inc. (“ECBG”) to prepare this Water and Wastewater Servicing Master Plan (“WWSMP”) in support of the Elfrida Secondary Plan located in the City of Hamilton (“City”). The Elfrida Secondary Plan is being prepared in support of a request by the ECBG for an expansion of the City’s Urban Boundary to include the Elfrida Secondary Plan Lands (“Study Area”)

The Elfrida Urban Boundary Expansion (“UBE”) application was submitted in 2024, following which City Council denied the application, as noted in City staff Report PED25179.

The servicing strategies presented in this WWSMP are consistent with the City development guidelines, design and construction drawings, standards and specifications, as required. This WWSMP is to be read in conjunction with the background reports outlined in Section 1.3 of this report, and other technical documents submitted as part of the Secondary Plan application.

## 1.1 Historical Context of the Secondary Plan Lands

The Study Area has been planned to accommodate residential growth in the City, as documented in the City’s 2006 Growth Related Integrated Development Strategy (“GRIDS”) and the City’s 2006 Water and Wastewater Master Plan Class Environmental Assessment Report (“Master Plan”). The GRIDS study identified urban expansion areas around the John C. Munro Hamilton International Airport to accommodate employment growth and in the Study Area to accommodate residential growth. In reviewing opportunities for potential future growth areas, the Study Area was selected, among other factors, because of its potential to use existing infrastructure more efficiently and with current infrastructure having capacity to accommodate growth. In 2009, the City initiated financial planning to fund servicing infrastructure required to support growth of the Study Area, with key water and wastewater projects identified in the 2011, 2019, and 2023-2024 Development Charge (“DC”) Background Studies. As such, the Study Area has been included in the City’s municipal servicing strategies for urban growth since 2006.

In 2018, the City began the process of updating GRIDS in coordination with the Municipal Comprehensive Review process to update the City’s long term growth strategy to the Year 2041 (since revised to 2051). GRIDS 2 was undertaken by the City and is still being formalized along with the updated Water and Wastewater Master Plans for the City.

Throughout the years (2006 to present), the City has undertaken a number of studies related to the future development of the Study Area in which some studies refer to the Study Area as the Elfrida UBE Lands and the Southeast Mountain UBE Lands. For the purposes of this report the Elfrida UBE Lands, Southwest Mountain UBE Lands and the Study Area are considered to be the same lands.

## **1.2 Site Description**

The Study Area is comprised of approximately 1,1226 hectares located atop of the Hamilton Escarpment, adjacent to the southeast limits of the City's current urban boundary. The lands are configured in the shape of a reverse "L" and are bisected by the existing Hamilton South Trunk Hydro Corridor running east/west. The lands north of the hydro corridor are roughly bordered by Mud Street at the north, Upper Centennial Parkway and Swayze Road to the west and Second Road East and Hendershot Road to the east. Lands south of the hydro corridor are roughly bordered by Trinity Church Road to the west, Hendershot Road at the east, and Golf Club Road to the south. Existing surrounding land uses include urban areas to the west of Upper Centennial and Trinity Road, and north of the hydro corridor. Rural areas are located north of Mud Street, east of Second Road East/Hendershot Road, and south of Golf Club Road. The location of the Study Area is illustrated in **Figure 1.1**.

### **1.2.1 Existing Conditions Land Use**

The Study Area is comprised predominantly of agricultural fields and residential land uses with some fragmented commercial and industrial uses. Agricultural uses vary from crop production to livestock and horse farms. There are pockets of residential development fronting Trinity Church Road, Fletcher Road, Golf Club Road and Upper Centennial Parkway, Regional Road 20 and Highland Road East. There are also scattered single family homes typically associated with existing farms scattered throughout the Study Area. A small employment park is located at Swayze Road and Portside Street with a strip of commercial lands fronting onto Rymal Road East to the north which are included in the Study Area. Institutional uses include Our Lady of the Assumption Catholic Elementary School and Our Lady of the Assumption Roman Catholic Church.

The Hamilton South Trunk Hydro Corridor traverses the northern limit of the Study Area from west to east between Trinity Church Road and Regional Road 56 and continues eastward through the Study Area lands south of Regional Road 20 between Regional Road 56 and Hendershot Road. The utility corridor lands are owned by the Ontario Government (Infrastructure Ontario) and currently is occupied by overhead hydro electric transmission lines managed by Hydro One Networks Inc. and two underground natural gas pipelines managed by TC Energy Corporation (formerly Trans-Canada Pipe Lines Limited).

### **1.2.2 Proposed Conditions Land Use**

Proposed future land uses within the Study Area consist of the following.

- Residential (Medium and Low Density)
- Mixed Use (High and Medium Density)
- Park Lands (Neighborhood, Public Square, Community Parks)
- Schools (Elementary and Secondary Schools)
- Stormwater Management Ponds
- Utility (Hydro Corridor)
- Natural Open Space (Constraint Areas – Non-Developable Areas, Natural Heritage Areas)
- Existing Cemetery

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- Road Right-of-Ways (Existing and Proposed Roads)

The proposed land use for the Study Area is consistent with the historical planning documents for the area as documented in the City's 2006 GRIDS and Master Plan, which anticipated the Study Area to develop primarily for community use as residential, and supporting uses such as retail, schools, parks and community facilities.

The Study Area will be developed with full municipal services including water, sanitary sewers, storm sewers, stormwater management, utilities (electricity, telecommunications and natural gas) and road works meeting the design and construction standards and guidelines of the City, Ontario Ministry of the Environment, Conservation and Parks ("MECP"), Niagara Peninsula Conservation Authority ("NPCA"), Hamilton Conservation Authority ("HCA") and utility providers, as required.

A copy of the proposed Elfrida Secondary Plan as prepared by Bousfields Ltd. is included in **Appendix A**. The Study Area consists of 994.45 net developable hectares of lands and an anticipated residential population of 64,392 persons and 5,975 employees, total equivalent population of 70,367.

### 1.3 Related Studies

A number of previous and concurrent studies have been undertaken in support of the Elfrida Secondary Plan and the Study Area. These studies are relied on to provide the appropriate criteria that apply to this WWSMP. The studies include:

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### Related Studies

- “*Growth Related Integrated Development Strategy: Growth Report*”, prepared by Dillon Consulting Ltd., May 2006.
- “*City of Hamilton Water and Wastewater Master Plan, Class Environmental Assessment Report*”, KMK Consultants Limited, November 22, 2006.
- “*City of Hamilton Development Charges Background Study*”, Watson & Associates Economists Ltd., 2006, 2011, 2019 and 2023/2024 versions.
- “*City of Hamilton Stormwater Master Plan – Class Environmental Assessment Report (City-Wide)*”, Aquafer Beech Limited, May 2007.
- “*Hamilton Southeast Mountain Water Servicing Strategy – FINAL*”, Stantec Consulting Ltd., October 2013
- “*Elfrida Growth Area Study, Existing Conditions Report*”, WSP., September 20, 2017.
- “*Elfrida Subwatershed Study, Final Phase 1 Report*”, Aquafor Beech Limited, May 24, 2018.
- “*City of Hamilton Comprehensive Development Guidelines and Financial Policies Manual*”, 2019.
- “*Urban Hamilton Official Plan*”, May 22, 2022 (including amendments to November 2022).
- “*Rural Hamilton Official Plan*”, February 2021 (including amendments to November 2022).
- “*City of Hamilton – AEGD Sanitary Sewer Flow Calculation – Future Dickenson Rd and Centennial Parkway Trunk Sewer*”, November 21, 2023
- “*City of Hamilton Sewer Design Criteria*”, 2024.
- “*City of Hamilton Watermain Design Guidelines*”, 2024.
- “*Transportation Assessment, Elfrida Urban Boundary Expansion*”, C.F. Crozier & Associates Inc., November 2024.
- “*City of Hamilton WaterCAD Model User Guide Final Report*”. November 11, 2025.
- “*Elfrida Subwatershed Plan*”, Stantec Consulting Ltd., GeoProcess Research Associates, Landtek Limited, SLR Consulting, April 2026.

## 2 Conceptual Grading and Road Access

### 2.1 Existing Site Topography and Land Use

The Study Area is comprised of predominantly agricultural fields and residential land uses with some fragmented commercial and industrial uses. Agricultural uses vary from crop production to livestock and horse farms.

The Study Area traverses the following four watersheds:

- Stoney Creek,
- Hannon Creek,
- Twenty Mile Creek, and
- Sinkhole Creek.

**Figure 2.1** illustrates the existing watersheds within the Study Area.

Hannon Creek and Twenty Mile Creek originate within the Study Area. Stoney Creek and Sinkhole Creek headwaters originate within the existing urbanizing lands to the west which drain into the Study Area across Centennial Parkway and Highway 56. The watercourses are generally ephemeral, headwater features.

The watersheds of Stoney Creek and Hannon Creek drain northward towards Lake Ontario and are under the jurisdiction of the HCA. The watersheds of Twenty Mile Creek and Sinkhole Creek drain southwesterly and are under the jurisdiction of the NPCA.

Topography of the Study Area is generally flat as described below.

- Lands within the Stoney Creek watershed generally fall from south (existing ground surface elevation (“EGSE”) 218.2 m) to north (EGSE 204.85 m), at approximately a 0.8% grade for the lands between Upper Centennial Parkway and First Road East. For the lands between First Road East and Second Road East the lands generally fall from south (EGSE 215.0 m) to the northeast (EGSE 204.8 m) at approximately a 0.7% grade.
- Lands within the Hannon Creek watershed generally fall from southeast (EGSE 218.4 m) to northwest (EGSE 208.5 m) at approximately a 1.7% grade.
- Lands within the Twenty Mile Creek watershed generally fall from northwest (EGSE 218.4 m) to southeast (EGSE 218.0 m) at approximately a 0.8% grade for the lands west of Regional Road 56 and 1.3% from northwest (EGSE 212.0 m) to southeast (EGSE 204.8 m) for lands east of Regional Road 56.

- Lands within the Sinkhole Creek watershed generally fall from west (EGSE 219.2 m) to east (EGSE 207.8 m) at approximately a 0.5% grade for the lands west of Regional Road 56 and 0.2% from west (EGSE 207.8 m) to east (EGSE 204.0 m) for lands east of Regional Road 56.

## **2.2 Existing Soil Conditions - Geotechnical Information**

A summary of the area geology as outlined in the *Elfrida Subwatershed Plan: Existing Conditions Characterization, April 2026*, is provided as follows.

- The geology of the Study Area is comprised of a low permeability glaciolacustrine clay and silt deposits overlying a dolostone bedrock aquifer. The clay deposits consist predominantly of interbedded clays and silts which partially cover the Niagara Falls Moraine.
- The Niagara Falls Moraine is described as a gently sloping ridge which traverses the Study Area from approximately Highland Road East in the east to just south of Rymal Road East in the western end of the Study Area. The Niagara Falls Moraine consists of the low permeability clays and clayey silts associated with the Halton Till. The thickness of the low permeability clay ranges across the Study Area from 2 to 3 m at Highland Road East near Centennial Parkway, to greater than 10 m along Highway 20 near Second Road East.
- The ridge associated with the Niagara Falls Moraine acts as the surface water drainage divide between the lands within the Subject Area draining northwards towards Lake Ontario, and those lands that drain to the southeast which form the upper reaches of Twenty Mile Creek.
- The underlying dolostone is identified by the MECP as a Regional Aquifer for the Study Area. The dolostone is from the Guelph Formation and the Eramosa Member of the Lockport Formation both from the Silurian Era. The Eramosa Member is described as light brown to black in color and is thin to moderately layered. It is known to be both fossiliferous and bituminous.
- Bedrock depth below existing ground surface level ranges from between approximately 3.0 m in the north and west of the Study Area and approximately 8.0 m in the south of the Study Area.
- The Eramosa Member of the Lockport Formation is known to be karstic north of the western section of the Study Area within the Davis Creek and Hannon Creek subwatershed areas, especially where the Eramosa Escarpment is exposed at, or near, surface. This area, which is outside of the Study Area to the northwest, has been extensively mapped for the presence of sinkholes and emergent springs.
- One known sinkhole is reported to be present in the northwest corner of the Study Area within the Hannon Creek subwatershed. It is located in the eastern ditch of Trinity Church Road near the electrical transmission lines. An additional minor sinkhole is also noted in the north of the Study Area.
- Based on a review of the MECP Water Well Information System online database, 325 of the 333 wells located within the Study Area are completed in bedrock and two wells are completed in superficial deposits. The well records also indicate that 291 of 333 wells located within the Study Area were constructed for domestic water use, and that the water quality is classified by the well records as being predominantly “fresh”. Other groundwater well uses reported by the database include ‘limited commercial’, ‘irrigation’, ‘livestock’ and ‘industrial’, though no further details are provided.

## **2.3 Preliminary Grading Design**

A preliminary grading design for the Study Area was prepared based on the grading design constraints outlined below and the design criteria outlined in Sections 2.3.1 below. As the road network shown on the Secondary Plan illustrates collector and arterial roads only (local road network is not illustrated), internal grading within future development blocks has not been undertaken. The preliminary Study Area grading design is illustrated on **Figures 2.2 to 2.6**.

The preliminary road grades and elevations shown on **Figures 2.2 to 2.6** are proposed to address the following design constraints and the City's Design Criteria:

- Match existing grades along the perimeter of the Study Area.
- Match existing road elevations of Mud Street East, Golf Club Road, Trinity Church Road, Regional Road 56, Centennial Parkway, Second Road East and Hendershot Road.
- Where feasible match existing road elevations of Highland Road East, Regional Road 20, Fletcher Road and First Road East.
- Maintain proposed road elevations crossing the Hamilton South Trunk Hydro Corridor within +1.0m of existing ground.
- Provide road elevations to direct and convey the Study Area minor and major storm water flows to Stormwater Management ("SWM") facilities identified in the Study Area.
- Satisfy the City's requirements for minimum and maximum road grades.
- Provide major overland flow routes for flows in excess of the storm sewer capacity with conveyance to the SWM facilities identified in the Study Area.
- Provide pond permanent pool elevations and outfall above the adjacent receiving watercourse.
- Maintain storm sewer outlet elevations to the SWM facilities above the SWM pond permanent pool elevations.
- Maintain adequate cover over proposed and existing storm, sanitary sewers, and watermains.

### **2.3.1 Grading Design Criteria**

The preliminary road grades and elevations for the Subject Area are to be designed to meet City requirements. Within development parcels, earthwork slopes are again to be designed to the requirements of the City, typically between a minimum of 2.0% and 8.0% and 3:1 slopes to accommodate various grade changes necessitated within the Study Area. The use of retaining walls may be required in various locations throughout the Study Area where 3:1 sloping cannot be accommodated. This will be

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confirmed at the time of detailed design of the development parcels' site grading through Plan of Subdivision or Site Plan processes.

Grading plans for each development parcel will be detailed during the Plan of Subdivision / Site Plan stages. Each individual development block will be required to match existing grades at the perimeter of the property, with consideration for potential future grading where new development abuts lands planned for future development.

The existing roads within the Study Area are currently constructed to a rural standard. It is anticipated that upgrading of the existing roadways within the Study Area to the City's urban standard will be undertaken during development of the adjacent lands.

### **2.3.2 Earthworks**

Preliminary earthwork cut/fill calculations to determine if the Study Area is in a net deficit (import) or excess (export) of earth materials have been completed using the preliminary grading design. Based on the existing topography and preliminary proposed grades, the Study Area will be in a net deficit and the import of fill will be required. The average depths of fill vary across the Study Area, ranging from 0.50 m to 2.5 m of fill with an overall average of 1.2 m as illustrated on **Figure 2.7**.

Detailed grading plans and corresponding earthworks quantity analysis will be completed in support of future Plan of Subdivision and Site Plan applications for the individual developments within the Study Area.

## **2.4 Roads**

For a description of the existing and proposed road network to provide access and vehicle distribution through the Study Area and associated road cross-sections, please refer to the Transportation Management Study prepared by C.F. Crozier Associates Inc. accompanying the Secondary Plan submission.

## 3 Water Supply and Distribution

The urban area of the City is supplied with treated potable water from the Woodward Avenue Water Treatment Plant, which draws raw water from Lake Ontario. The Woodward Avenue Water Treatment Plant, in combination with various pumping stations and distribution watermains, provides potable water to all the Pressure Districts (“PD”) located throughout the City. The Study Area will be located within PD 7 with ground elevations ranging between approximately 195 m to 219 m.

The following sections identify the existing watermains located immediately adjacent to the Study Area and planned water infrastructure required to service the Study Area, as outlined in the 2006 *City of Hamilton Water and Wastewater Master Plan, Class Environmental Assessment Report* and the 2013 *Hamilton Southeast Mountain Water Servicing Strategy*.

### 3.1 Existing conditions

There is no current water infrastructure servicing the Study Area with the exception of a 200mm diameter watermain on Mud Street East between Upper Centennial Parkway and First Road East within the City’s PD 5. Existing water infrastructure in the vicinity of the Study Area includes the following:

- Study Area lands fronting Mud Street East between Upper Centennial Parkway and First Road East, are currently serviced by a 200 mm diameter watermain from the City’s PD 5.
- The City of Hamilton’s PD7 is located northwest of the Study Area.
- The area north of Rymal Road, within PD 7, is serviced by a watermain network ranging in diameter from less than 150 mm to 400 mm.
- A 400 mm diameter watermain on Trinity Church Road south from Rymal Road to approximately 1.2 kilometers south of Rymal Road where it reduces to 300mm diameter to approximately 140 m south of Golf Club Road.
- A 400mm watermain running north-south along Regional Road 56 and Swayze Road which currently provides water supply to the community of Binbrook in PD 23. The community of Binbrook is located south of the Study Area and includes the HDT23 Elevated Storage Tank, HD023 Pumping Station and watermains ranging from less than 150mm to 400mm in diameter.
- PD 7 is currently serviced through the HD007 Highland Pumping Station (“PS”), which pumps water from PD 5. The HD007 PS is located at 293 Highland Road in Stoney Creek and feeds from the HDR07 Highland Reservoir. The facility includes a pump house, a reservoir access house and a two-cell reservoir (HDR07). There are four pumps at the station, each with a rated capacity of 250 psi, discharging to a common 600 mm diameter discharge header which splits into two 600 mm diameter discharge headers to supply the distribution system. The existing area water distribution system is shown in Figure 38 of the *Elfrida Growth Area Study, Existing Conditions Report*, WSP., September 20, 2017, reproduced herein as **Figure 3.1**.

### **3.1.1 Existing Water Supply**

The urban area of the City of Hamilton is supplied with treated potable water from the Woodward Ave. Water Treatment Plant (“WTP”) which draws raw water from Lake Ontario. It is our understanding that the Woodward Ave. WTP has a rated capacity of approximately 650 MLD.

As mentioned above, PD 7 is currently serviced through PD 5. PD 5 is fed from PD 1 through two pumping stations, HD005 and HD05A.

## **3.2 Proposed Conditions**

The Study Area has been included in the City’s municipal servicing strategies for urban growth since 2006. The Study Area is to be included within the City’s PD 7 with ground elevations ranging from approximately 195 m to 219 m.

As outlined in the 2013 *Hamilton Southeast Mountain Water Servicing Strategy*, the following works were identified for servicing PD 7, including the Study Area, and PD23:

- Project W-10 - HD007 Highland Pumping Station Upgrades
- Project W-11 – HDR07 Highland Reservoir Expansion
- Project W-13 – Centennial Parkway Feedermain
- Project W-20 – HD019 Binbrook Hwy 56 Pumping Station Upgrades and PD23 Additional Storage
- Project W-21 – New PD7 Pumping Station HD07A
- Project W-22 – HD07A Feedermain
- Project W-23 – PD 7 Elevated Tank
- Project W-24 – Stone Church Trunk Feedermain
- Project W-28 – HD05A Greenhill PS Upgrades
- Project W-30 – Binbrook Trunk Feedermain

The above projects have been included in the City’s DC Background Studies since 2013. **Table 3.1** below lists the projects above with their corresponding DC Background Study Project Identification (ID) No., brief project description and current status as outlined in the 2023 *City of Hamilton Development Charges Background Study*.

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Water Supply and Distribution

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Table 3.1. PD7 and PD23 Water Supply Projects

Project No.	DC Background Report ID No.	Project Description	Project Status
W-10	SCU8-W	HD007 Highland Pumping Station Upgrades	Completed
W-11	SCU7-W-23	HDR07 Highland Reservoir Expansion	>6 Years
W-13	SCU11-W	Centennial Parkway Feedermain between Barton St. and HD05A	Completed
W-20	B2-W-23	HD019 Binbrook Hwy 56 Pumping Station Upgrades and PD23 Additional Storage	0 to 5 years
W-21	SCU21-W-23	New PD7 PS HD07A – Upper Centennial Parkway and Regional Road 20	>6 Years
W-22	SCU22-W-23	HD07A Feedermain – Mud Street to New PS HD07A	>6 Years
W-23	HM28-W-23	PD 7 Elevated Tank – 420 Trinity Church Road	0 to 5 years Design Tender Awarded
W-24	HM20-W-23	Stone Church Trunk Feedermain – First Road West to HD06B	0 to 5 years Tender Closed Sept. 24, 2024
W-28	SCU18-W-23	HD05A Greenhill PS Upgrades	0 to 5 years
W-30	B7-W-23	Binbrook Trunk Feedermain – Fletcher's Rd. & Cemetery Road from Hydro Corridor to HD019	0 to 5 years

A schematic of the existing water distribution system for the Hamilton Mountain and Upper Stoney Creek area including the above-mentioned projects is provided on **Figure 3.2**.

### **3.2.1 Water System Design Requirements**

Servicing of the Study Area will require extension of the adjacent existing local water distribution system to and throughout the Area as anticipated in the Master Plan. A hydraulic analysis for the Study Area was undertaken using the City of Hamilton’s water distribution system model, as provided by the City and documented in the *City of Hamilton WaterCAD Model User Guide Final Report* (dated November 11, 2025).

#### **3.2.1.1 Design Criteria**

The Average Day Demand (“ADD”), Maximum Day Demand (“MDD”) Peak Hour Demand (“PHD”) and Fire Flow Demand are calculated based on the *City of Hamilton Comprehensive Development Guidelines and Financial Policies Manual*, 2019 and the *City of Hamilton Watermain Design Criteria*, 2024. The City’s 2019 manual indicates that Domestic and Fire Flow Demand design flows shall meet the intent of the latest edition of the “*Ontario Ministry of the Environment, Conservation and Parks (MECP), Guidelines for the Design of Water Distribution Systems*”. Fire flows are to be determined in accordance with the latest edition of the Fire Underwriters Survey (“FUS”).

The maximum operating pressure of the distribution system piping shall not exceed 700 KPa. The distribution system shall be sized to meet the greater of the Peak Hour Demand (“PHD”) or the Maximum Day Demand (“MDD”) plus Fire Flow (“FF”), whichever is greater, and the pressure in the system shall not drop below 140 Kpa at any time.

Water distribution system design parameters for the Study Area are summarized in **Table 3.2**.

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Water Supply and Distribution

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Table 3.2. Study Area Water System Design Parameters

Parameter	Value	Reference
Study Area Population (2051) Residential Employment Total equivalent population	64,392 5,975 70,367	Planning Justification Report, Bousfields Inc.
Average Day Demand (ADD) Residential Employment	360 L/cap/day 260 L/emp/day	City – Southeast Mountain Water Servicing Strategy
MDD Residential Employment	1.9 x ADD 1.9 x ADD	City – Southeast Mountain Water Servicing Strategy
PHD Residential Employment	3.0 x ADD 3.0 x ADD	City – Southeast Mountain Water Servicing Strategy
FF	250 L/s	City – Southeast Mountain Water Servicing Strategy

### 3.2.1.2 System Pressure Requirements

Although not explicitly stated in the City of Hamilton's watermain design guidelines, normal operating pressures were assessed with reference to the Ontario Ministry of the Environment ("MECP") Design Guidelines for Drinking-Water Systems. In accordance with these guidelines, typical operating pressures within the distribution system should generally range between 350 and 480 kPa (50 to 70 psi) and should not fall below 275 kPa (40 psi). Maximum system pressures should not exceed 700 kPa (100 psi) to avoid potential damage to household plumbing and appurtenances. Furthermore, minimum system pressures of 140 kPa (20 psi) at ground level are to be maintained throughout the distribution network under maximum day plus fire flow (MDD+FF) conditions.

The Ontario Building code requires individual pressure regulating valves within buildings if pressures are above 80 psi (550 kPa).

### 3.2.1.3 System Velocity Requirements

As outlined in Section WM2.3.1 of the City's Guidelines, the design velocity for distribution mains under PHD conditions should not exceed 2.0 m/s, while the allowable velocity during fire flow conditions may reach up to 3.0 m/s.

## 3.2.2 Hydraulic Analysis

### 3.2.2.1 Water Demands

Water demands for the Study Area were calculated for both the development scenarios currently under consideration. The population projections, and associated water demands are summarized in **Table 3.3** as follows.

*Table 3.3.* Estimated Water Demands

Parameter	2031	2041	2051
Population	21,464	42,928	64,392
Employment Jobs	1,992	3,983	5,975
Total Population	23,456	46,911	70,367
Total ADD (l/s)	95	191	286
Total MDD (l/s)	181	363	544

The demand projections were assessed for the City's 2051 planning horizon. To facilitate evaluation of the Study Area within the context of the City of Hamilton's existing water distribution system and PD 7, the incremental 2051 water demands associated with the Study Area were incorporated into the City's hydraulic model. These incremental demands represent the difference between the calculated Study Area demands and the 2051 PD 7 demands currently included in the City's model. More details on the City's model are provided in **Section 3.2.2.2**.

The Study Area Lands demands were then evenly distributed across all model nodes located within the Study Area. This approach provides a reasonable representation of spatial water demands distribution for the purposes of a master servicing level assessment.

### 3.2.2.2 Hydraulic Model Development & Assumptions

The City of Hamilton's water distribution system model includes existing conditions (2021), as well as future planning horizons, namely 2031, 2041, and 2051. Based on Stantec's review of the model, with a focus on infrastructure within PD 7, the future scenarios include infrastructure upgrades previously identified through various servicing and planning studies and included in the City's DC Background Studies. In particular, the 2013 *Hamilton Southeast Mountain Water Servicing Strategy* identified several projects required to service growth within PD 7. These projects have been reflected in the City's DC Background Studies since 2013 and are summarized in **Table 3.5**. Additional watermain upgrade projects within or servicing PD 7, also included in the City's DC program, are not listed herein. All the upgrade projects are assumed to be implemented before the 2051 planning horizon.

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Table 3.4. Planned Water Infrastructure Improvements for PD 7

Project Description	Project No.	DC Background Report ID No.	Project Status
HDR07 Highland Reservoir Expansion	W-11	SCU7-W-23	>6 Years
New PD7 PS HD07A – Upper Centennial Parkway & Regional Road 20	W-21	SCU21-W-23	>6 Years
PD7 Elevated Tank – 420 Trinity Church Road	W-23	HM28-W-23	0 to 5 years Design Tender Awarded

In addition to the future infrastructure already represented in the City’s model, several assumptions were adopted in the development of future hydraulic model scenarios regarding major infrastructure. These assumptions are detailed below.

- Future PD 7 Elevated Tank: A water level of 252 m was assumed for the future elevated storage tank, consistent with the low water level target used in the received model under 2051 conditions. This assumed level is lower than the existing operating hydraulic grade line (“HGL”) for PD 7 and therefore represents a conservative assumption. The adequacy of the future storage capacities associated with the projected growth remains to be validated.
- Future PD 7 Pumping Station HD07A: Pumps at future pumping station were assumed to have hydraulic characteristics similar to those of the existing pumps at PS HD07. The adequacy of the future pumping capacities associated with the projected growth remains to be validated.

Additional assumptions were applied in representing the internal water distribution system within the Study Area, as described below.

- Model Node Elevations: Model node elevations were assigned based on the latest available CAD drawing, accounting for preliminary road grading through the development lands.
- Model Pipe Locations: Proposed watermains were added to the model following the alignment of the planned collector road network within the Study Area. Watermain sizing along local roads was not considered as part of this master servicing–level analysis.
- Model Pipe Roughness: Hazen-Williams C-factors for new watermains were assigned in accordance with the MECP’s Design Guidelines for Drinking-Water Systems. A C-Factor coefficient of 120 was used for new watermains ranging from 300 to 600 mm in diameter.
- Watermain Sizing: Watermains within the Study Area were sized to satisfy the following governing criteria. It should be noted that the proposed watermain sizes should be reviewed and updated as part of subsequent stages of assessment and design.
  - 2051 MDD
  - A required fire flow of 250 l/s, and

- A maximum allowable velocity of 3.0 m/s under MDD+FF conditions, in accordance with the City of Hamilton Watermain Design Guidelines.

### **3.2.2.3 Proposed Watermain Layout**

A conceptual potable water distribution network has been developed to service the Study Area lands. The proposed network, illustrated on **Figure 3.3**, is comprised of 400 mm diameter watermains, which forms the primary backbone of the system, supplemented by 300 mm diameter watermains to provide internal distribution and system looping. Additional internal looping will be provided by watermains along local roads, but those are not considered at this master servicing level stage of work.

The proposed watermain network represents a conceptual layout developed based on the assumed Study Area population, and available information at the time of preparation of this WWSMP. As such, the proposed watermain sizes should be reviewed and refined as part of subsequent planning and design phases. Updates may be required to reflect refinements to road alignments, land use plans, population projections, and servicing strategies (phasing).

## 4 Wastewater System

The Study Area is located within the sewershed tributary to the Woodward Avenue Wastewater Treatment Plant (“WWTP”) on Woodward Avenue in the City of Hamilton. The Woodward Avenue WWTP discharges its treated effluent into Red Hill Creek, which flows directly into Hamilton Harbor.

The following section identifies the existing trunk sanitary sewers located immediately adjacent to the Study Area and proposed wastewater infrastructure required to service the Study Area.

### 4.1 Existing Conditions

The Upper Centennial Parkway Trunk Sewer constructed within the road allowances of Regional Road 56 and Upper Centennial Parkway from Golf Club Road North to King Steet, was identified as required wastewater infrastructure in the 2006 Master Plan to support growth of the Study Area, Binbrook, and a portion of the Airport Employment Growth District (“AEGD”). The trunk sewer is an 1800 mm diameter pipe constructed at depth with various access shafts along its length where connections for future sewers to service the Study Area may connect. The Trunk Sewer currently discharges to the existing 600 mm diameter sanitary sewer along King Street, which currently has a theoretical ‘spare’ capacity of approximately 100 l/s. As constructed, the depth of the trunk sewer is anticipated to be sufficient to accommodate the wastewater servicing of the majority of the Study Area via a system of local gravity sewers.

The Dickenson Road Trunk Sanitary Sewer extending west to east from Upper James Street to Regional Road 56 is required to support growth beyond the City’s existing Urban Boundary, which includes the Study Area. The City awarded construction of this project in/around October 2022 with an expected completion date in/around Summer 2027. The Dickenson Road Trunk Sanitary Sewer section through the Study Area is located within the Golf Club Road right of way between Trinity Church Road and outlets into the Upper Centennial Parkway Trunk at Regional Road 56. This section of the trunk sewer is a 1500 mm diameter pipe constructed at depth with various access shafts along its length which may accommodate for future sanitary sewer connections servicing the Study Area. When designed and constructed the depth of the trunk sewer is anticipated to service a portion of the Study Area via a system of local gravity sewers.

Depending on the final development plans for the Study Area, the connection points to the Upper Centennial Parkway and Dickenson Road Trunk Sewers will be confirmed, as well as if all the land can drain by gravity to the trunks. If not, specific areas within the Study Area may require a sewage pumping station(s).

A preliminary sanitary sewer design sheet entitled, “*City of Hamilton – AEGD Sanitary Sewer Flow Calculation – Future Dickenson Rd and Centennial Parkway Trunk Sewer*”, dated revision November 21, 2023, was provided by the City for information purposes as to the estimated wastewater design flows used in the design of the Dickenson Road and Upper Centennial Parkway Trunk Sanitary Sewers. A copy of the preliminary design sheet is included in **Appendix B**. Based on the information provided on the

design sheet, approximately 413 ha and a combined residential and employment population of 28,160 persons within the Study Area were included in the design flows tributary to the Dickenson Road Trunk Sewer. An additional approximate 555 ha and a combined residential and employment population of 45,162 persons within the Study Area were included in the design flows tributary to the Upper Centennial Parkway Trunk Sewer. A total of approximately 968 ha and combined residential and employment population of 73,322 persons within the Study Area were included for in the design of the Upper Centennial Parkway Trunk Sanitary Sewer tributary to the downstream sanitary sewer system at Centennial Parkway and King Street. The total wastewater design flow within the Upper Centennial Parkway Trunk Sanitary Sewer at the King Street outlet sewer was estimated to be 3,592 l/s including an infiltration factor of 0.4 l/s/ha for the catchment.

Excluding the wastewater design flows from the Study Area, the estimated wastewater design flow within the Upper Centennial Parkway Trunk Sanitary Sewer at the King Street outlet sewer would be in the order of 2,594 l/s. Based on the “As Constructed” drawings for the Upper Centennial Parkway Trunk Sanitary Sewer from Golf Club Road to Green Mountain Road, an 1800 mm diameter concrete sewer pipe at 0.1% grade has an estimated capacity of 3,635 l/s.

### **4.1.1 Existing Wastewater Treatment**

The Study Area is located within the sewershed tributary to the Woodward Avenue WWTP on Woodard Avenue in the City of Hamilton, which treats wastewater flows from most of the City of Hamilton. The Woodward Avenue WWTP currently treats an average daily flow of 306 MLD and has an average rated capacity of 409 MLD. A Phase 2 expansion to the WWTP is planned that will increase the average rated capacity to 500 MLD. Phase 2 expansion is currently in the design phase with construction expected to be completed in approximately 5-6 years. The Woodward Avenue WWTP discharges its treated effluent into Red Hill Creek, which flows directly into Hamilton Harbor.

## **4.2 Proposed Sanitary Servicing**

As mentioned in Section 1.0, the Study Area has been included in the City’s municipal servicing strategies for urban growth since 2006. **Table 4.1** below summarizes the proposed planned wastewater infrastructure projects required to service the Study Area, as outlined in the *2023/2024 City of Hamilton Development Charges Background Study* and *2006 City of Hamilton Water and Wastewater Master Plan, Class Environmental Assessment Report* documentation. **Figure 4.1** illustrates the locations of the trunk sanitary sewers and corresponding DC Project ID information.

*Table 4.1 – City of Hamilton Wastewater Projects Required to Service the Study Area*

<b>Figure 4.1 Project No.</b>	<b>DC Background Report ID No.</b>	<b>Project Description</b>	<b>Project Status</b>
1	HM20-S-23	1200 to 1500 mm diameter Dickenson Road Trunk Sewer Upper James St. to Regional Road 56	Under Construction – Anticipated Completion Summer 2027
2	SCL11-S-23	1500 mm diameter Lower Centennial Parkway Trunk Sewer King St. to the Woodward Ave. WWTP	0 to 5 Years
2a	WW-33	Battlefield Tunk Sewer Upgrades King Street to South Service Road	No timeline identified
3	SCU12-S-09	Upper Centennial Parkway Trunk Sewer Swayze Road to King Street	Completed
3	SCU15--S-09	Upper Centennial Parkway Trunk Sewer Golf Club Road to Swayze Road	Completed

The future Lower Centennial Parkway Trunk Sewer is proposed to convey wastewater flows from the Upper Centennial Parkway Trunk Sanitary Sewer at King Street, northward to the Woodward Avenue WWTP, and alleviate the capacity restrictions within the existing King Street sewer.

Upgrades to the existing Battlefield Trunk Sewer are also under review by the City to alleviate current capacity constraints within the sanitary sewer system downstream of the King Street sewer. This project is identified in the 2006 *Master Plan*, but no funding budget has been carried forward in the DC Background studies.

#### **4.2.1 Wastewater System Design Requirements**

Wastewater servicing of the Study Area will require construction of a system of local and sub-trunk sanitary sewers to convey flows to the Dickenson Road and Upper Centennial Parkway Trunk Sewers. A hydraulic analysis for the sanitary sewers proposed within the Study Area was undertaken using the City of Hamilton’s standard sanitary sewer design sheet methodology for gravity sewer systems.

The design of the internal sanitary sewer system for the Study Area will meet the intent of the current City of Hamilton, and the MECP, Design Guidelines. Design parameters are summarized in **Table 4.2** below.

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Table 4.2 – Sanitary Sewer System Design Parameters

Design Parameter	Value	Unit
Study Area Population (2051)		
Residential	64,392	
Employment	5,975	
Total equivalent population	<b>70,367</b>	
Average Domestic Flow	360	l/cap/day
Peaking Factor	2 to 5	Babbitt Formula $M=5/P^{0.2}$ (P = population in thousands)
Infiltration Rate	0.4	l/s/ha where weeping tiles of dwellings are designed to drain by gravity
	0.6	l/s/ha where weeping tiles of dwellings are designed to drain by sump pump
Minimum Sewer Size (Industrial)	250 375	mm diameter for residential mm diameter for Industrial or Commercial
Minimum Flow Velocity	0.75	m/s
Maximum Flow Velocity	2.75	m/s
Minimum Sewer Cover Depth	2.75	m
Maximum Manhole Spacing	120	m
Maximum Pipe Flow Design Capacity	75% 60%	For pipe diameter less than or equal to 450 mm diameter. For pipe diameter greater than 450 mm diameter

### 4.2.2 Proposed Sanitary Sewer Layout

Figure 4.2 illustrates a preliminary conceptual sanitary sewer system design for the Study Area based on the Secondary Plan prepared by Bousfields Inc. Development Block areas and population numbers are illustrated on the figure as well as the location of the existing and proposed conceptual sanitary sewer system for the Study Area. Sanitary sewer pipe sizes and grades have been calculated for the internal sub-trunk sewer system based on the City's design criteria and are illustrated in the Sanitary Sewer Design Sheets provided in **Appendix B**. The sanitary sewer layout and sizing is based on the following:

- Sanitary sewers shown on the Conceptual Wastewater Servicing Plan consist of sub-trunk sewers located on the collector road network identified on the Elfrida Secondary Plan. Additional local sanitary sewers on the local road network within the Study Area will be required to service the development lands. The local sanitary sewer network is to be determined at the detailed engineering design stage in support of the subdivision and/or site plan stage of development, including connection to the sanitary sub-trunk sewer network.

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- Sub-trunk sewer sizing is based on the Study Area population estimates outlined in **Table 4.2**. An infiltration allowance of 0.4 l/s/hectare was also used, consistent with the value used in the *City of Hamilton – AEGD Sanitary Sewer Flow Calculation – Future Dickenson Rd and Centennial Parkway Trunk Sewer*.
- All sub-trunk sewers are designed at 0.5% grade. Final sub-trunk sewer design is to be determined at the detailed engineering design stage in support of the subdivision and/or site plan stage of development.
- Minimum sewer cover is approximately 2.75 m.
- The majority of the Study Area can drain by gravity to the Dickenson Road or the Upper Centennial Parkway Sanitary Trunk Sewer.
- Approximately 27.53 ha of lower lying area at the northwest corner of the Study Area, is preliminary designed to drain via a new 375 mm diameter sanitary sewer on Trinity Church Road northward to connect to the existing 750 mm diameter sanitary sewer at the intersection of Rymal Road. The existing 250 mm and 300 mm diameter local sanitary sewers on Trinity Church Road north of the Study Area are undersized to accommodate the anticipated Study Area sanitary design flows based on the Study Area population estimates. Confirmation of the actual development design flows and sizing of the outlet sewers required on Trinity Church Road will be determined at the detailed engineering design stage in support of the subdivision and/or site plan stage of development.
- Areas shown on the Conceptual Wastewater Servicing Plan as “Low-lying Lands to Consider Servicing by Pumping Station to Reduce Downstream Sewer Depths” may be serviced via a deep gravity sewer system of local and sub-trunk sewers tributary to the Upper Centennial Parkway Trunk Sewer. Depths of the sewers are anticipated to range between 2.75 m and 20 m deep. Alternatively, the area may be serviced by a system of shallower local gravity sanitary sewers draining to an area pumping station which in turn will pump the area flows to an adjacent shallower gravity sewer system tributary to the Upper Centennial Parkway Trunk Sewer. Depending on the final development plans within the areas shown on the Conceptual Wastewater Servicing Plan as “Lands to be Serviced by Pumping Station to Reduce Downstream Sewer Depths”, consideration of an area sewage PS is to be determined at the detailed engineering design stage in support of the subdivision and/or site plan stage of development.
- Typical anticipated sub-trunk sewer depth ranges from 3 m to 18 m depth.
- Local sewer depth of cover is not confirmed.
- The proposed sanitary sewer network represents a conceptual layout based on the assumed Study Area population, and available information at the time of preparation of this WWSMP.

### 4.2.3 Existing Trunk Sanitary Sewer Capacity Analysis

The following sections below provide calculations to confirm the available capacity in the Dickenson Road and Upper Centennial Parkway Trunk Sanitary Sewers based on the following Documents included in **Appendix B**.

1. City of Hamilton – AEGD Sanitary Sewer Flow Calculation – Future Dickenson Rd and Centennial Parkway Trunk Sewer, dated revision November 21, 2023
2. Stantec’s Elfrida - WWSMP Local Sanitary Sewer Design Sheets

#### **4.2.3.1 Dickenson Road Trunk Sanitary Sewer**

*Table 4.3 – Dickenson Road Trunk Sewer Available Capacity*

<b>Description</b>	<b>Flow (l/s)</b>	<b>Source Document</b>
Full flow capacity of Trunk Sewer- Nodes C to D – 1500mm diameter sewer at 0.15%	2,738	1
Wastewater flow in Trunk Sewer – Nodes C to D excluding the Study Area Lands	2,154	1
<b>Difference (Available capacity in the trunk excluding the Study Area)</b>	<b>584</b>	
<b>Total Study Area wastewater flow to Trunk Sewer Nodes C to D (Area = 211.91 ha)</b>	<b>210</b>	<b>2</b>

Based on the results in **Table 4.3** above, there is sufficient capacity in the Dickenson Trunk Sanitary Sewer to accommodate the Study Area Lands proposed to drain to the trunk sewer as shown on **Figure 4.2**.

#### **4.2.3.2 Upper Centennial Parkway Trunk Sanitary Sewer**

*Table 4.4 – Upper Centennial Parkway Trunk Sewer Available Capacity*

<b>Description</b>	<b>Flow (l/s)</b>	<b>Source Document</b>
Full flow capacity of Trunk Sewer- Nodes D to Mud Street – 1800mm diameter sewer at 0.10%	3,635	1
Wastewater flow in Trunk Sewer – Nodes D to Mud Street excluding the Study Area Lands	2,433	1
<b>Difference (Available capacity in the trunk excluding the Study Area)</b>	<b>1,202</b>	
<b>Total Study Area wastewater flow to Trunk Sewer Nodes D to Mud Street (Area = 967.79 ha)</b>	<b>957</b>	<b>2</b>

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Based on the results in **Table 4.4** above, there is sufficient capacity in the Upper Centennial Parkway Trunk Sanitary Sewer to accommodate the proposed Study Area growth plus an additional 245 l/s of reserve capacity for the Study Area Lands proposed to drain to the trunk sewer as shown on **Figure 4.2**. The reserve capacity could accommodate an additional development population of approximately 29,400 (residential + employment) over and above the proposed Study Area population of 68,424 (residential + employment) proposed to be directed to the existing trunk sewer.

Assuming no change to density and full buildout of the external lands upstream of the Study Area and tributary to the existing Upper Centennial Parkway Trunk Sanitary as outlined in the City of Hamilton AEGD Sanitary Sewer Flow Calculation, the existing 1800mm diameter sewer has capacity for an equivalent population of 97,832 and area of 967.8 ha contributing from the Study Area.

## **5 Stormwater Management and Drainage Design**

### **5.1 Existing Conditions**

Existing conditions land use, site topography, drainage and soil conditions are described in Sections 1.2.1, 2.1 and 2.2 of this report.

The ECBG retained GeoProcess Research Associates Inc, Palmer Environmental Consulting Group, Landtek Limited and Stantec to prepare a Subwatershed Plan (“SWP”) to support the Elfrida Secondary Plan planning process. The Elfrida SWP includes characterization of the existing natural environmental conditions, which include terrestrial ecology, aquatic ecology, fluvial geomorphology, surface water and hydrogeology of the Study Area. Based on the SWP, preliminary constraints to development including protection and mitigations measures were developed and incorporated into the current Elfrida Secondary Plan including the location and rough sizing of stormwater management facilities.

Refinement of the preliminary constraint mapping including assessment of potential development impacts, a master storm servicing strategy for lands within the Study Area, and the definition of environmental monitoring requirements and responsibilities are outlined in Phase 2 of the Elfrida SWP.

Phase 3 of the SWP includes identifying roles, responsibilities, and funding expectations for implementing the recommendations made as part of the Phase 1 and Phase 2 deliverables. Contingency plans to address enhancement and/or mitigation actions that fail to meet the goals and objectives of the SWP are also defined. Requirements for future planning and engineering submissions for subsequent stages of the development process are to be identified.

### **5.2 Proposed Conditions**

As mentioned in the previous section, preliminary constraints to development, including protection and mitigations measures, were developed and incorporated into the current Elfrida Secondary Plan including the location and rough sizing of stormwater management facilities. A Conceptual Storm Drainage Area Plan illustrated on **Figure 5.1** was developed from the Elfrida Secondary Plan land use and the Conceptual Grading Plans developed for the Study Area. Approximate SWM pond block sizes, location and top of pond elevations are also indicated on **Figure 5.1** as well as the tributary drainage area to each of the proposed SWM facilities.

#### **5.2.1 Storm Drainage System**

The Subject Area is to be serviced with a system of gravity storm sewers designed to accommodate the minor (5-year design storm) storm flows and overland flow routes designed to convey the major (in excess of the 5-year design storm) storm flows up to and including the 100-year design storm. Major system drainage will be conveyed overland from each development block to the future municipal road right-of-way, which will convey drainage overland within the right-of-way to the associated SWM facility. Both the minor and major system flows will be conveyed to outlet to the associated drainage area SWM

facility. **Figure 5.1** illustrates the major and minor storm system drainage flow direction tributary to each of the proposed SWM facilities and follows the proposed grading of the collector road network. Overland flow directions shown mid block will be incorporated into the local road network and/or drainage easements within the final development plans for each land holding.

## 5.2.2 SWM Criteria

The proposed development of the Study Area is subject to NPCA, HCA and City of Hamilton SWM policies. These SWM criteria include:

- Quantity Control:
  - Control post-development flows to pre-development levels for 2, 5, 25, and 100-year events.
  - Different design storm distributions and durations to be assessed to determine the lowest pre-development and highest post-development peak flows. At minimum 3-hour Chicago, 12-hour AES, 24-hour SCS distributions should be considered.
  - The SWM plan should assess the capacity of the receiving system.
  - Major flow route should be designed for the Regulatory flow (100-year or Regional storm event).
- Quality Control:
  - Normal (70% TSS removal) level of treatment is required.
  - Enhanced level of treatment is required for Type 1 or Critical Fish habitat.
- Erosion Control:
  - Retain 25 mm, 4-hour Chicago design storm for over a 24-hour period.
- Water Balance:
  - All efforts should be made to match pre and post-development infiltration volumes in order to maintain groundwater recharge.
  - Untreated stormwater shall be prevented from being directly infiltrated.
- Erosion and Sediment Control (ESC) Plan:
  - ESC plan should be prepared to demonstrate that the water quality and fish habitat are not impacted by sediment from the property during or following site construction.

## 5.2.3 Stormwater Management Plan

The SWM Plan for the Study Area, will meet the applicable SWM criteria for the Study Area including the following:

**Quantity Control** of the Study Area site will be provided by end-of-pipe SWM facilities, e.g. wet ponds. The proposed wet ponds will be sized to provide peak flow control, quality control, and erosion control.

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The proposed wet ponds will discharge to the existing tributaries to Hannon Creek, Twenty Mile Creek, Sinkhole Creek and Stoney Creek.

**Quality Control** of the Study Area will be provided by the proposed wet ponds, which will be sized to provide either normal or enhanced level of controls, depending on the watercourse classifications.

**Erosion Control** of the Study Area will be provided by the proposed wet ponds, which will be sized to provide extended detention to meet erosion control targets.

## **6 Cost Sharing**

The proposed infrastructure required to service the Study Area benefits multiple landowners. This infrastructure, generally referred to as ‘Community Services’, includes, but is not limited to, trunk storm sewers, trunk sanitary sewers, sanitary pumping stations, watermains, collector roads, SWM ponds, and Natural Heritage Systems (“NHS”). It is our understanding that the ECBG have formed a cost sharing group and have appointed a cost sharing engineer and Trustee to develop a cost sharing agreement (“CSA”) with supporting cost schedules to outline equitable allocation of costs to benefitting landowners for Community Services. **Appendix C – Figure 1.4.1** illustrates the current Participating, Cooperating, and Non-participating landowners within the ECBG. This figure is subject to change should additional landowners choose to join the ECBG and participate in the proposed Secondary Planning process

## **7 Phasing**

The WWSMP has been prepared to provide the City with a proposed plan for the water and wastewater servicing of the Elfrida Secondary Plan. The primary objective of the analysis is the provision of servicing across the entire secondary plan area that aligns with the respective Secondary Plan's planning horizon to 2051. As such, the WWSMP assumes the full buildout of the Study Area.

Development phasing is to consider the logical progression of existing supporting infrastructure (storm sewers, sanitary sewers, watermains and utilities), as well as stormwater management requirements and the road network system that will need to be advanced from the existing facilities to the north and west of the Study Area.

Development of the individual development blocks will follow the requirements of the Secondary Plan planning process for the Study Area and be established through the Draft Plan of Subdivision and Site Plan process, which may occur concurrently or independently of each other.

## **8 Summary**

This WWSMP has been prepared in support of the Elfrida Secondary Plan located in the City of Hamilton (“City”). The Elfrida Secondary Plan is being prepared in support of a request by the ECBG for an expansion of the City’s Urban Boundary to include the Elfrida Secondary Plan Lands (“Study Area”)

The Study Area will be developed with full municipal services including water, sanitary sewers, storm sewers, stormwater management, utilities (electricity, telecommunications and natural gas) and road works. The servicing strategies presented in this WWSMP are consistent with the development guidelines, design and construction drawings, standards and specifications of the City, MECP, NPCA, HCA and utility providers, as required.

### **General**

- The existing land use of the Study Area is comprised predominantly of agricultural fields and residential land uses with some fragmented commercial and industrial uses. The Hamilton South Trunk Hydro Corridor traverses the northern limit of the Study Area from west to east between Trinity Church Road and Regional Road 56 and continues eastward through the Study Area lands south of Regional Road 20 between Regional Road 56 and Hendershot Road.
- Proposed future land uses within the Study are consistent with the historical planning documents for the area as documented in the City’s 2006 GRIDS and Master Plan, which anticipated the Study Area to develop primarily for community use as residential, and supporting uses such as retail, schools, parks and community facilities.

### **Conceptual Grading**

- The Study Area traverses the watersheds of Stoney Creek and Hannon Creek drain northward towards Lake Ontario and are under the jurisdiction of the HCA. The watersheds of Twenty Mile Creek and Sinkhole Creek drain southwesterly and are under the jurisdiction of the NPCA.
- The existing topography is generally flat with shallow watercourses and drainage systems.
- Preliminary proposed grades and elevations are designed to maintain the existing drainage patterns and provide overland flow to proposed stormwater management pond blocks. The preliminary earthworks calculation for the Study Area results in a net deficit of earth material requiring the import of fill.

### **Water Supply and Distribution**

- The water supply and distribution network of the Study Area will require extension of the adjacent existing and planned water distribution system (including external proposed storage volume and pumps) to and throughout the Study Area.
- A conceptual water distribution network has been developed to service the Study Area lands comprised of 400 mm diameter watermains, forming the primary backbone of the system, supplemented by 300 mm diameter watermains to provide internal distribution and system looping. As noted in Section 3, the proposed internal watermain sizing meets the City

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requirements as it relates to meeting the 2051 MDD, required fire flows, and maximum allowable velocity of 3 m/s under the MDD+FF conditions.

- Additional internal looping will be provided by watermains along local roads to be determined during the detailed design process undertaken in support of future Plan of Subdivision and Site Plan applications.

### **Wastewater System**

- The majority of the Study Area can be serviced by a system of sub-trunk gravity sanitary sewers ranging in size between 375 mm to 600 mm diameter and depth between 2.75 m and 20 m.
- The sub-trunk sewer system is designed to outlet to the future Dickenson Road and the existing Upper Centennial Parkway Sanitary Trunk Sewers. The Dickenson Road Sanitary Trunk Sewer is anticipated to be commissioned by Summer 2027.
- The future Lower Centennial Parkway Trunk Sewer is proposed to convey wastewater flows from the Upper Centennial Parkway Trunk Sanitary Sewer at King Street, northward to the Woodward Avenue WWTP, and alleviate the capacity restrictions within the existing King Street sewer.
- There is sufficient capacity in the Dickenson Trunk Sanitary Sewer to accommodate the Study Area Lands proposed to drain to the trunk sewer.
- There is sufficient capacity in the Upper Centennial Parkway Trunk Sanitary Sewer to accommodate the Study Area Lands proposed to drain to the trunk sewer plus an additional 245 l/s of reserve capacity.

### **Stormwater Management and Drainage Design**

- Quantity Control, Quality Control and Erosion Control of the Study Area post development stormwater flows will be provided by end-of-pipe SWM facilities, e.g. wet ponds.
- The proposed wet ponds will be sized to provide peak flow control, quality control, and erosion control.
- The proposed wet ponds will discharge to the existing tributaries to Hannon Creek, Twenty Mile Creek, Sinkhole Creek and Stoney Creek.
- The Subject Area is to be serviced with a system of gravity storm sewers designed to accommodate the minor storm flows, and overland flow routes designed to convey the major storm flows to the associated SWM facilities.

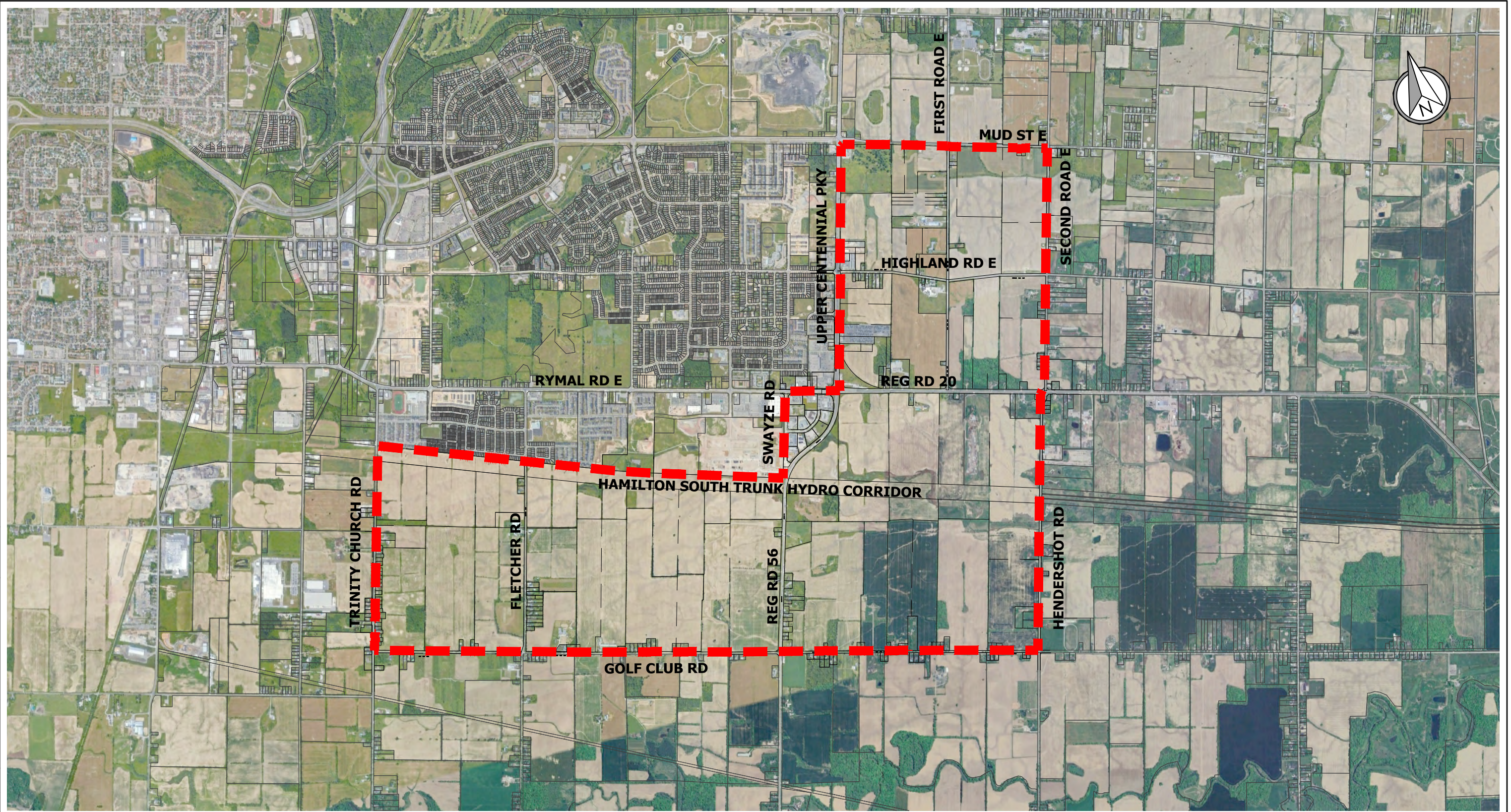
### **Cost Sharing**

- The ECBG have formed a cost sharing group and have appointed a cost sharing engineer and Trustee to develop a cost sharing agreement (“CSA”) with supporting cost schedules to outline equitable allocation of costs to benefitting landowners for Community Services.

# Figures



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LEGEND

 STUDY AREA



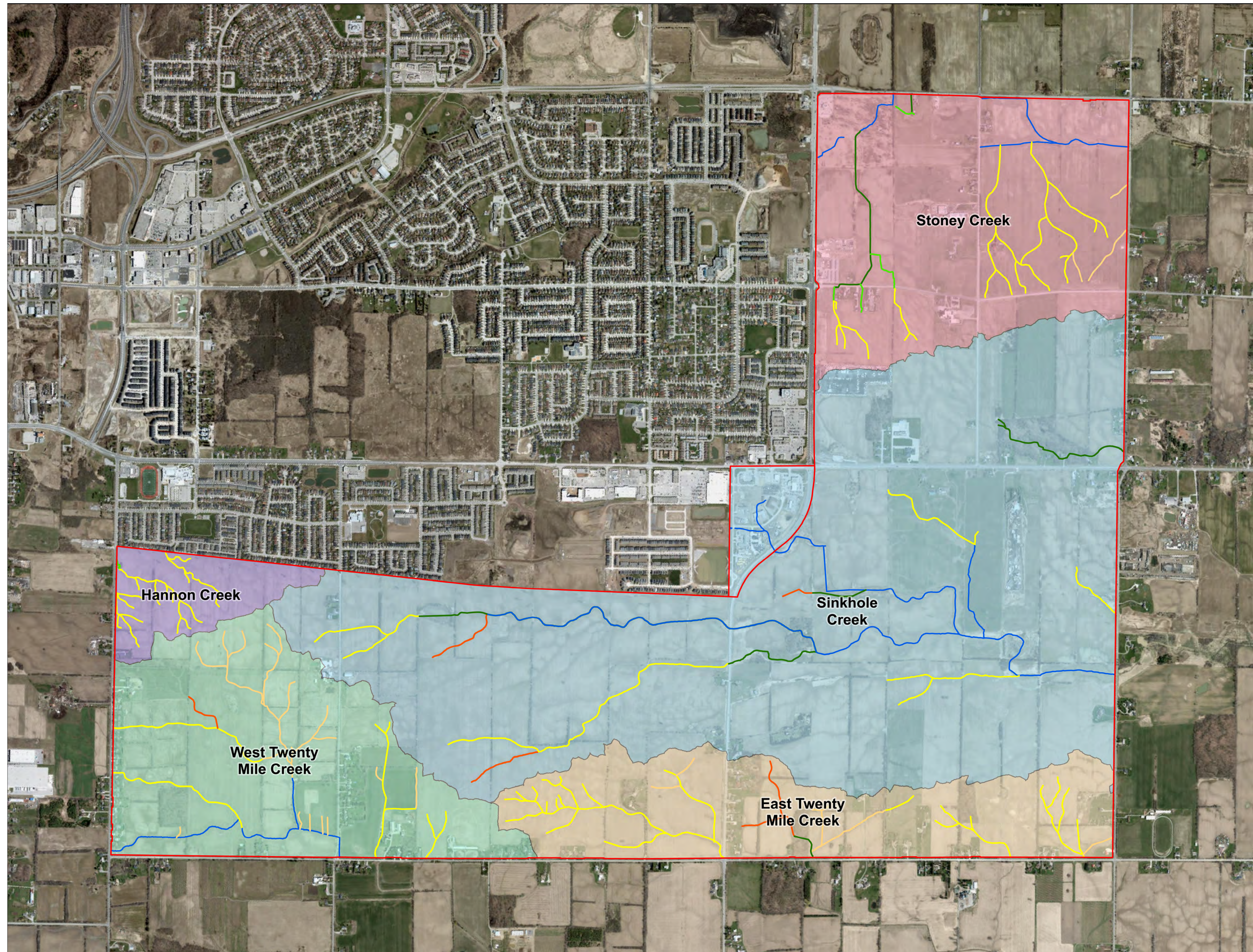
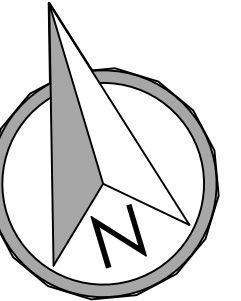
**WATER AND WASTEWATER  
SERVICING MASTER PLAN**

**ELFRIDA SECONDARY PLAN  
CITY OF HAMILTON**

**FIGURE 1.1**

**SITE LOCATION PLAN**

April 2026



**LEGEND**

- Study Area
- Watercourse and Mitigation Class**
- Conservation
- Mitigation
- Maintain
- Protection
- Watercourse; Watercourse-Fish;
- No Management Required
- Watersheds**
- East Twenty Mile Creek
- Hannon Creek
- Redhill Creek
- Sinkhole Creek
- Stoney Creek
- West Twenty Mile Creek



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Legend

NOTE:  
THE INFORMATION CONTAINED WITHIN THIS  
FIGURE IS PRELIMINARY AND WILL BE REFINED  
DURING FURTHER STUDY

**WATER AND WASTEWATER  
MASTER PLAN**

**ELFRIDA  
SECONDARY PLAN  
CITY OF HAMILTON**

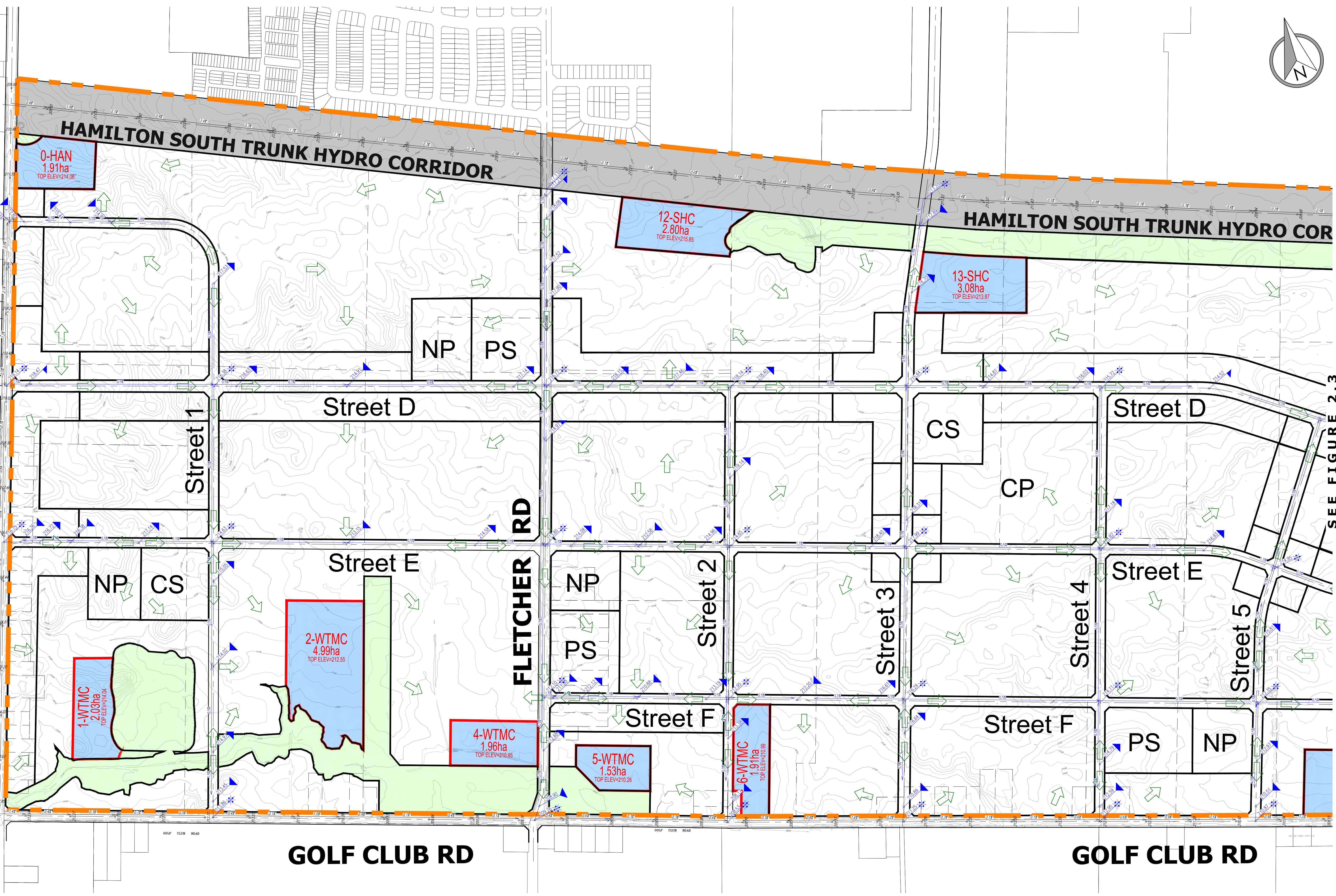
**EXISTING  
WATERSHEDS**

DATE: April 2026  
SCALE: N.T.S.

FIGURE No:  
**FIGURE 2.1**

# UPPER RED HILL VALLEY PARKWAY EXTENSION

TRINITY CHURCH RD



SEE FIGURE 2.3



Legend	
	STUDY AREA
	EXISTING CONTOUR & ELEVATION
	EXISTING SPOT ELEVATION
	SLOPE DIRECTION
	OVERLAND FLOW ROUTE
	HIGH POINT
	LOW POINT
	INTERSECTION
	STORMWATER MANAGEMENT POND BLOCK/FACILITY
	POND ID
	POND BLOCK SIZE (ha)
	TOP OF POND ELEVATION
	NATURAL HERITAGE SYSTEM

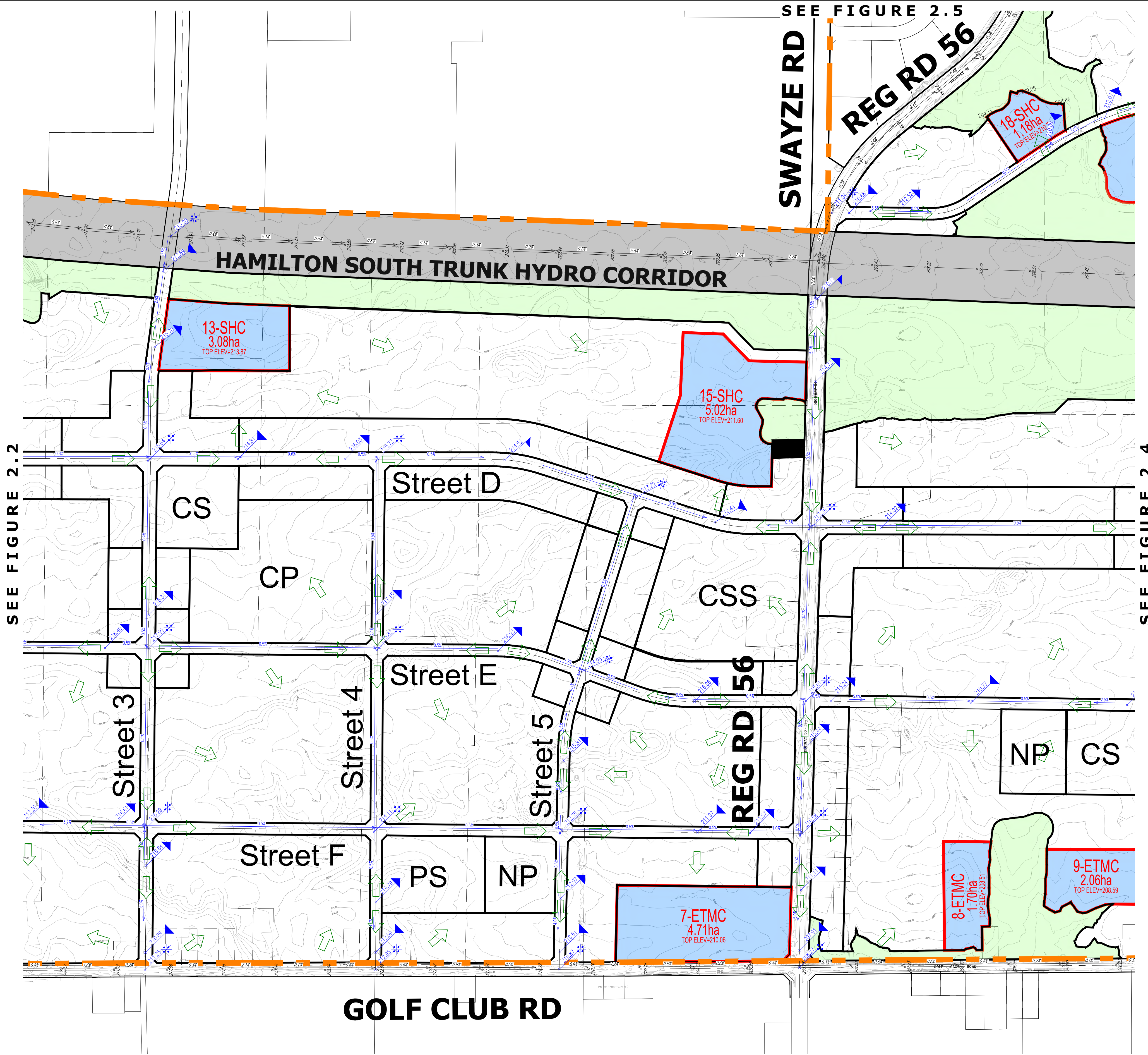
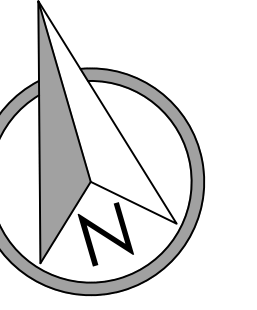
SOURCE:  
• ELFRIDA SECONDARY PLAN: BOUSFIELDS, APRIL 2026  
• TOPO SURVEY: A.T. McLaren Limited, December 2023.

## WATER AND WASTEWATER MASTER PLAN

**ELFRIDA SECONDARY PLAN**  
CITY OF HAMILTON

**CONCEPTUAL GRADING PLAN 1**

DATE: April 2026  
SCALE: 1:4000  
FIGURE No: **FIGURE 2.2**



SEE FIGURE 2.2

SEE FIGURE 2.4

SEE FIGURE 2.5



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**Legend**

- STUDY AREA
- EXISTING CONTOUR & ELEVATION
- 210.65 EXISTING SPOT ELEVATION
- 1.0% SLOPE DIRECTION
- OVERLAND FLOW ROUTE
- 210.80 HIGH POINT
- 210.65 LOW POINT
- 210.80 INTERSECTION
- 17-SHC  
4.78ha  
TOP ELEV=208.50 STORMWATER MANAGEMENT POND BLOCK/FACILITY
- 17-SHC POND ID
- 4.78ha POND BLOCK SIZE (ha)
- TOP ELEV=208.50 TOP OF POND ELEVATION
- NATURAL HERITAGE SYSTEM

- SOURCE:
- ELFRIDA SECONDARY PLAN: BOUSFIELDS, APRIL 2026
  - TOPO SURVEY: A.T. McLaren Limited, December 2023.

**WATER AND WASTEWATER MASTER PLAN**

**ELFRIDA SECONDARY PLAN**  
 CITY OF HAMILTON

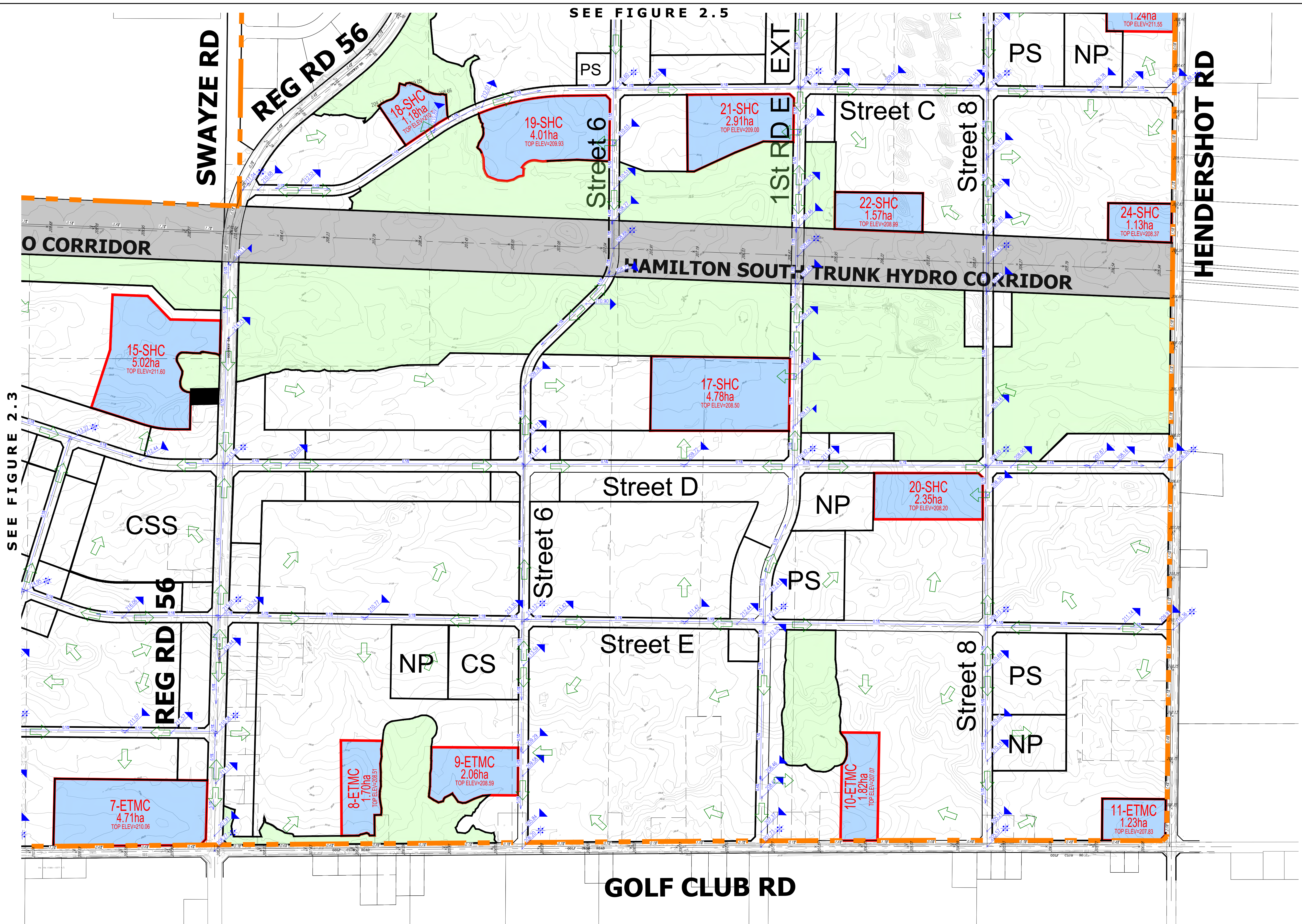
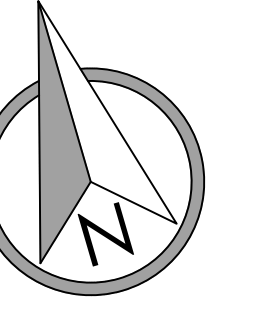
**CONCEPTUAL GRADING PLAN 2**

DATE: April 2026

FIGURE No:

SCALE: 0 40 80 120 160 200  
 1:4000

**FIGURE 2.3**



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**Legend**

- STUDY AREA
- EXISTING CONTOUR & ELEVATION
- 210.65 EXISTING SPOT ELEVATION
- 1.0% SLOPE DIRECTION
- OVERLAND FLOW ROUTE
- ▲ HIGH POINT
- ▼ LOW POINT
- ▲▼ INTERSECTION
- 17-SHC  
4.78ha  
TOP ELEV=208.50 STORMWATER MANAGEMENT POND BLOCK/FACILITY
- POND ID
- POND BLOCK SIZE (ha)
- TOP OF POND ELEVATION
- NATURAL HERITAGE SYSTEM

- SOURCE:
- ELFRIDA SECONDARY PLAN: BOUSFIELDS, APRIL 2026
  - TOPO SURVEY: A.T. McLaren Limited, December 2023.

**WATER AND WASTEWATER MASTER PLAN**

**ELFRIDA SECONDARY PLAN**  
CITY OF HAMILTON

**CONCEPTUAL GRADING PLAN 3**

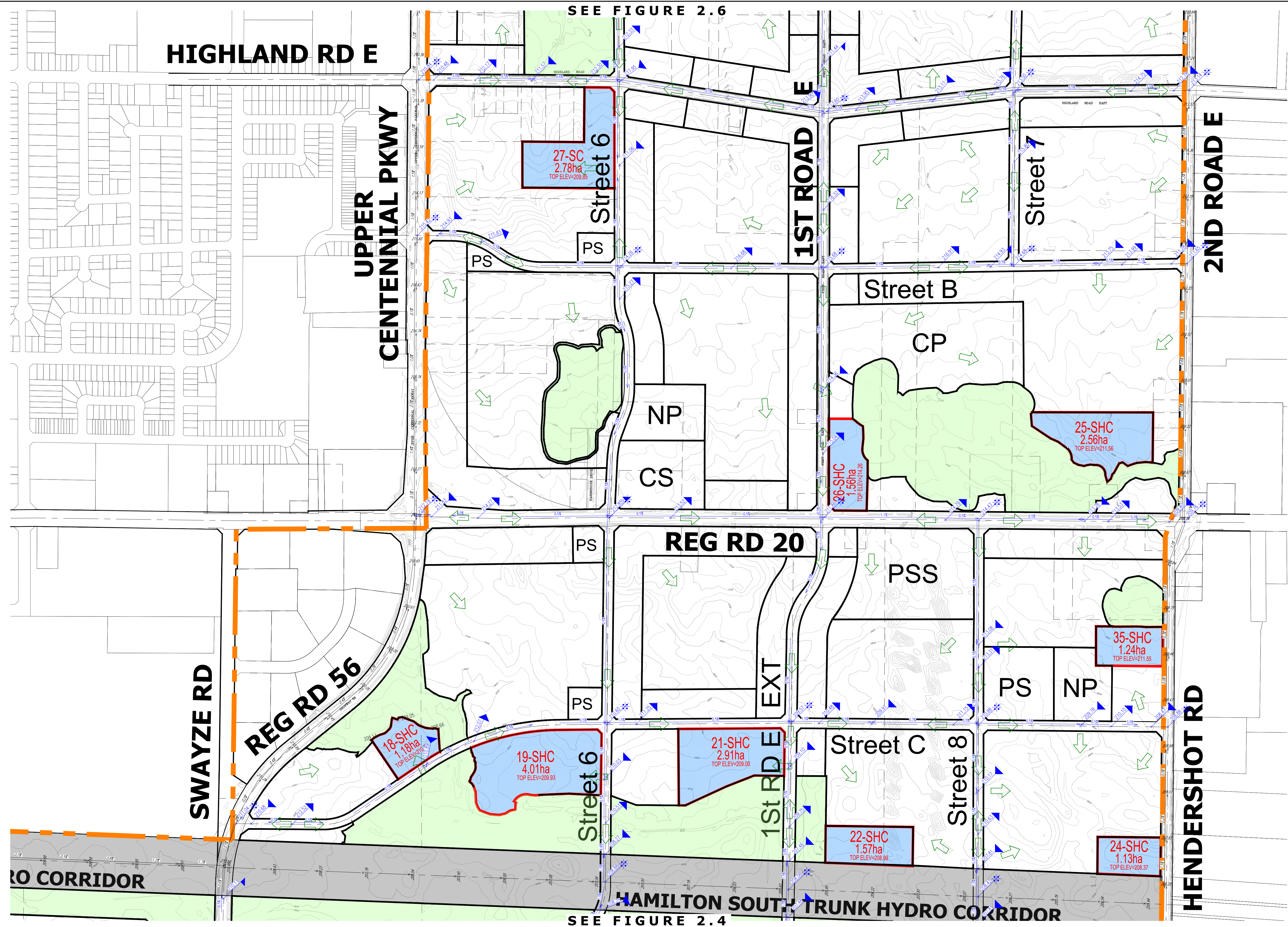
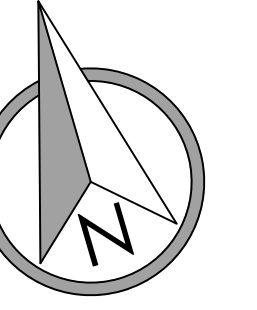
DATE: April 2026

FIGURE No:

SCALE: 0 40 80 120 160 200  
1:4000

**FIGURE 2.4**

File: \\C:\2025-ppt\01\606\Act\160623294\Drawing\sheet\mmp\160623294\_MSP\_Grading.dwg - Revised by clauzon, jernepo - Tue, Apr 14, 2026 - 4:26 PM



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**Legend**

- STUDY AREA
- EXISTING CONTOUR & ELEVATION
- EXISTING SPOT ELEVATION
- 1.0% SLOPE DIRECTION
- OVERLAND FLOW ROUTE
- 211.85 HIGH POINT
- 211.85 LOW POINT
- 211.85 INTERSECTION
- 17-SHC**  
4.78ha  
TOP ELEV=208.50
- STORMWATER MANAGEMENT POND BLOCK/FACILITY
- POND ID
- POND BLOCK SIZE (ha)
- TOP OF POND ELEVATION
- NATURAL HERITAGE SYSTEM

- SOURCE:
- ELFRIDA SECONDARY PLAN: BOUSFIELDS, APRIL 2026
  - TOPO SURVEY: A.T. McLaren Limited, December 2023.

**WATER AND WASTEWATER MASTER PLAN**

**ELFRIDA SECONDARY PLAN**  
CITY OF HAMILTON

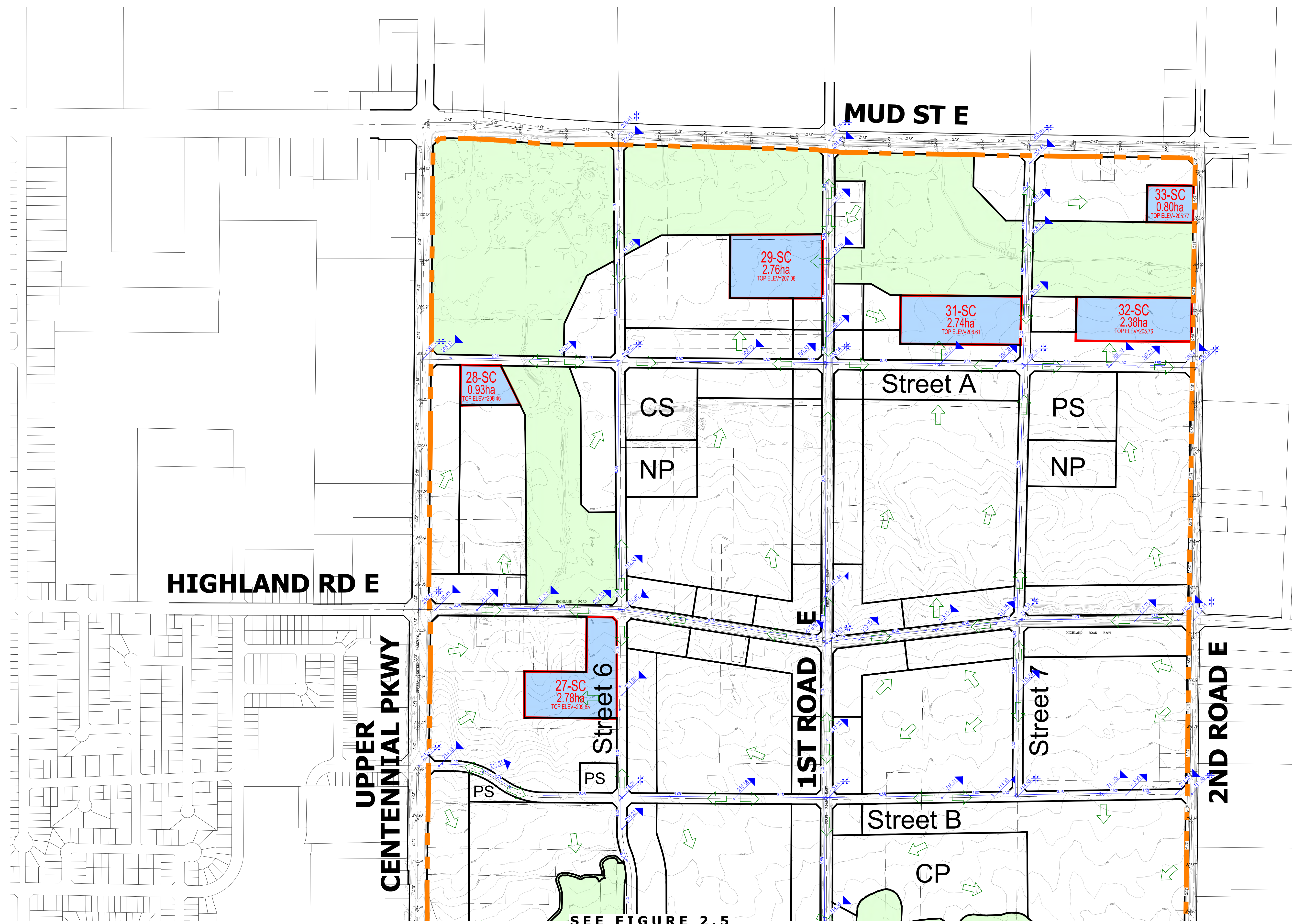
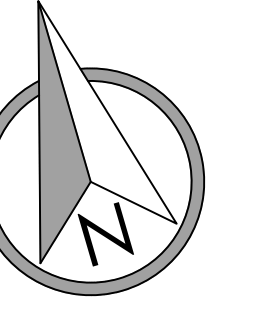
**CONCEPTUAL GRADING PLAN 4**

DATE: April 2026

FIGURE No:

SCALE: 0 40 80 120 160 200  
1:4000

**FIGURE 2.5**



SEE FIGURE 2.5



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**Legend**

- STUDY AREA
- EXISTING CONTOUR & ELEVATION
- EXISTING SPOT ELEVATION
- 1.0% SLOPE DIRECTION
- OVERLAND FLOW ROUTE
- 214.88 HIGH POINT
- 214.86 LOW POINT
- 214.88 INTERSECTION
- 17-SHC 4.78ha TOP ELEV=208.50
- 27-SC 2.78ha TOP ELEV=208.85
- 28-SC 0.93ha TOP ELEV=208.46
- 29-SC 2.76ha TOP ELEV=207.08
- 31-SC 2.74ha TOP ELEV=206.61
- 32-SC 2.38ha TOP ELEV=205.76
- 33-SC 0.80ha TOP ELEV=205.77
- STORMWATER MANAGEMENT POND BLOCK/FACILITY
- POND ID
- POND BLOCK SIZE (ha)
- TOP OF POND ELEVATION
- NATURAL HERITAGE SYSTEM

- SOURCE:
- ELFRIDA SECONDARY PLAN: BOUSFIELDS, APRIL 2026
  - TOPO SURVEY: A.T. McLaren Limited, December 2023.

**WATER AND WASTEWATER MASTER PLAN**

**ELFRIDA SECONDARY PLAN**  
CITY OF HAMILTON

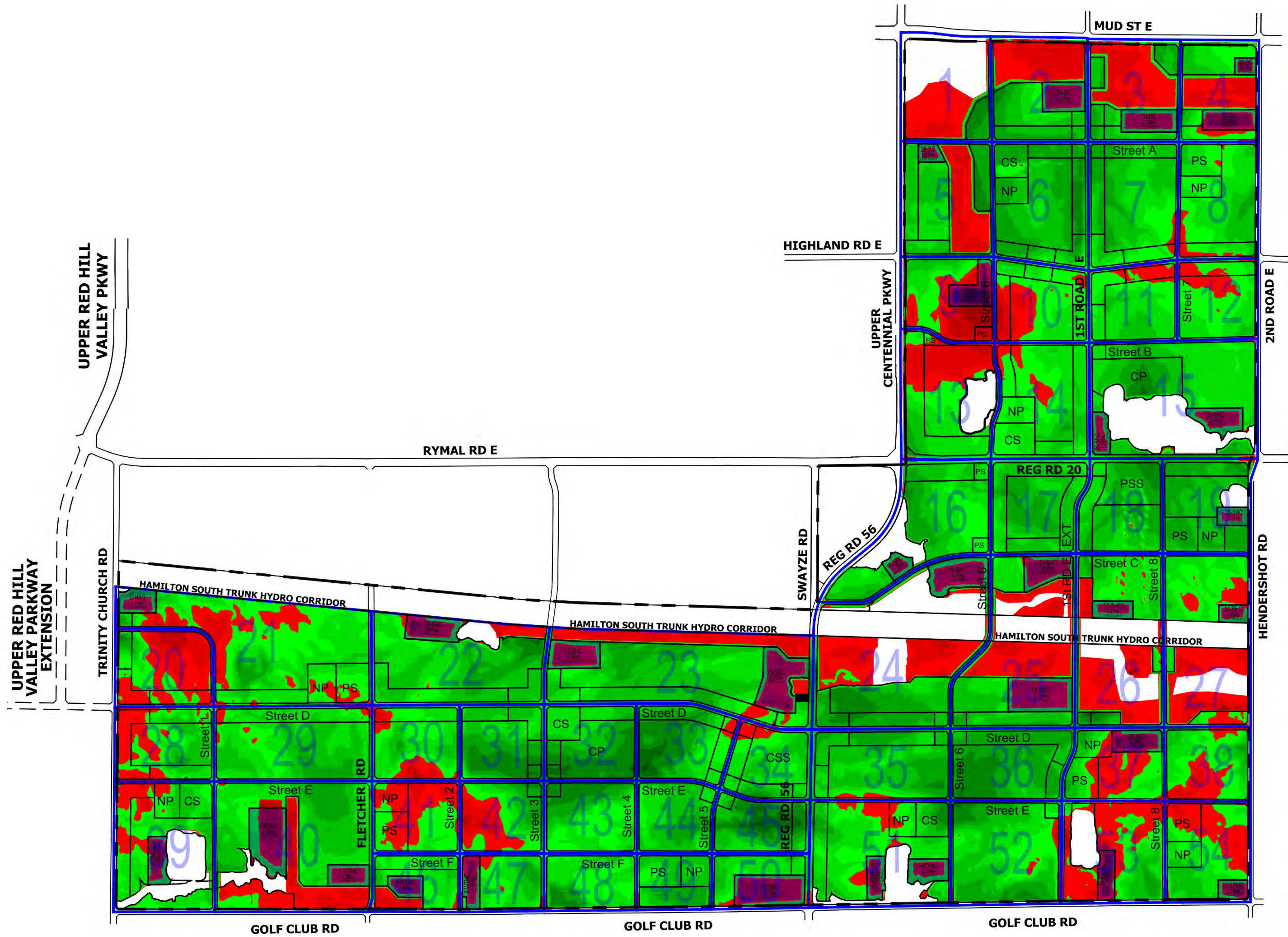
**CONCEPTUAL GRADING PLAN 5**

DATE: April 2026

FIGURE No:

SCALE: 0 40 80 120 160 200  
1:4000

**FIGURE 2.6**



NAME	AREA	CUT	FILL	NET
1	103,064	58,673	116,555	57,882
2	217,134	136,233	272,242	136,008
3	202,142	117,605	211,475	93,870
4	167,255	109,639	110,084	445
5	226,923	76,984	378,184	301,200
6	255,222	92	728,441	728,349
7	243,121	3,738	473,502	469,764
8	200,140	8,054	247,242	239,189
9	162,057	228,987	84,649	-144,338
10	164,742	53,499	94,940	41,441
11	148,251	6,904	167,708	160,804
12	138,390	9,751	93,586	83,836
13	207,690	100,204	163,719	63,514
14	239,232	7,090	266,634	259,545
15	308,414	41,285	564,264	522,979
16	232,548	10,268	428,658	418,390
17	189,251	33	439,742	439,709
18	169,640	138	430,173	430,035
19	168,478	5,846	461,013	455,167
20	160,954	99,488	48,835	-50,653
21	435,942	69,838	384,468	314,630
22	309,909	62,464	571,165	508,701
23	465,915	199,708	686,349	486,641
24	332,324	154,795	527,826	373,032
25	325,904	210,654	321,476	110,822
26	252,433	99,332	261,687	162,355
27	243,651	100,958	127,505	26,546
28	158,766	27,463	151,275	123,812
29	261,509	6,274	459,973	453,700
30	146,242	29,524	143,471	113,947
31	141,611	112	413,457	413,346
32	156,183	0	496,744	496,744
33	158,686	1,584	463,621	462,036
34	131,308	3,369	220,016	216,647
35	217,233	4,468	516,599	512,131
36	186,671	0	641,940	641,940
37	155,166	81,757	117,932	36,174
38	136,733	33,438	111,975	78,537
39	209,282	58,143	208,884	150,741
40	419,412	194,794	537,824	343,030
41	139,430	49,970	37,390	-12,580
42	134,088	47,047	148,992	101,945
43	148,010	0	306,713	306,713
44	121,812	0	276,466	276,466
45	117,855	0	411,262	411,262
46	108,088	42,035	93,886	51,851
47	102,759	29,283	119,213	89,930
48	111,761	2,084	168,999	166,914
49	88,536	797	196,687	195,890
50	112,460	93,055	107,354	14,300
51	274,412	61,366	331,709	270,343
52	246,916	13,229	499,039	485,809
53	194,450	113,262	114,269	1,007
54	179,500	57,122	132,928	75,806
<b>Total</b>	<b>10,829,604</b>	<b>2,922,433</b>	<b>16,090,740</b>	<b>13,168,307</b>

PAPER SIZE:  
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**Legend**

	CUT DEPTHS		FILL DEPTHS		SUB-AREA BOUNDARY
	MORE THAN -6.0m		0.0m TO 1.0m		SUB-AREA ID NAME
	-6.0m TO -5.0m		1.0m TO 2.0m		
	-5.0m TO -4.0m		2.0m TO 3.0m		
	-4.0m TO -3.0m		3.0m TO 4.0m		
	-3.0m TO -2.0m		4.0m TO 5.0m		
	-2.0m TO -1.0m		5.0m TO 6.0m		
	-1.0m TO 0.0m		MORE THAN 6.0m		

SOURCE:  
• ELFRIDA SECONDARY PLAN: BOUSFIELDS, APRIL 2026  
• TOPO SURVEY: A.T. McLaren Limited, December 2023.

NOTES:  
• CUT FILL ANALYSIS ASSUMES AVERAGE 0.30m TOPSOIL STRIPPING DEPTH.  
• CUT FILL ANALYSIS ASSUMES AVERAGE 1.0m PREGRADE DEPTH.

**WATER AND WASTEWATER MASTER PLAN**

**ELFRIDA SECONDARY PLAN**  
CITY OF HAMILTON

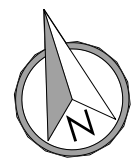
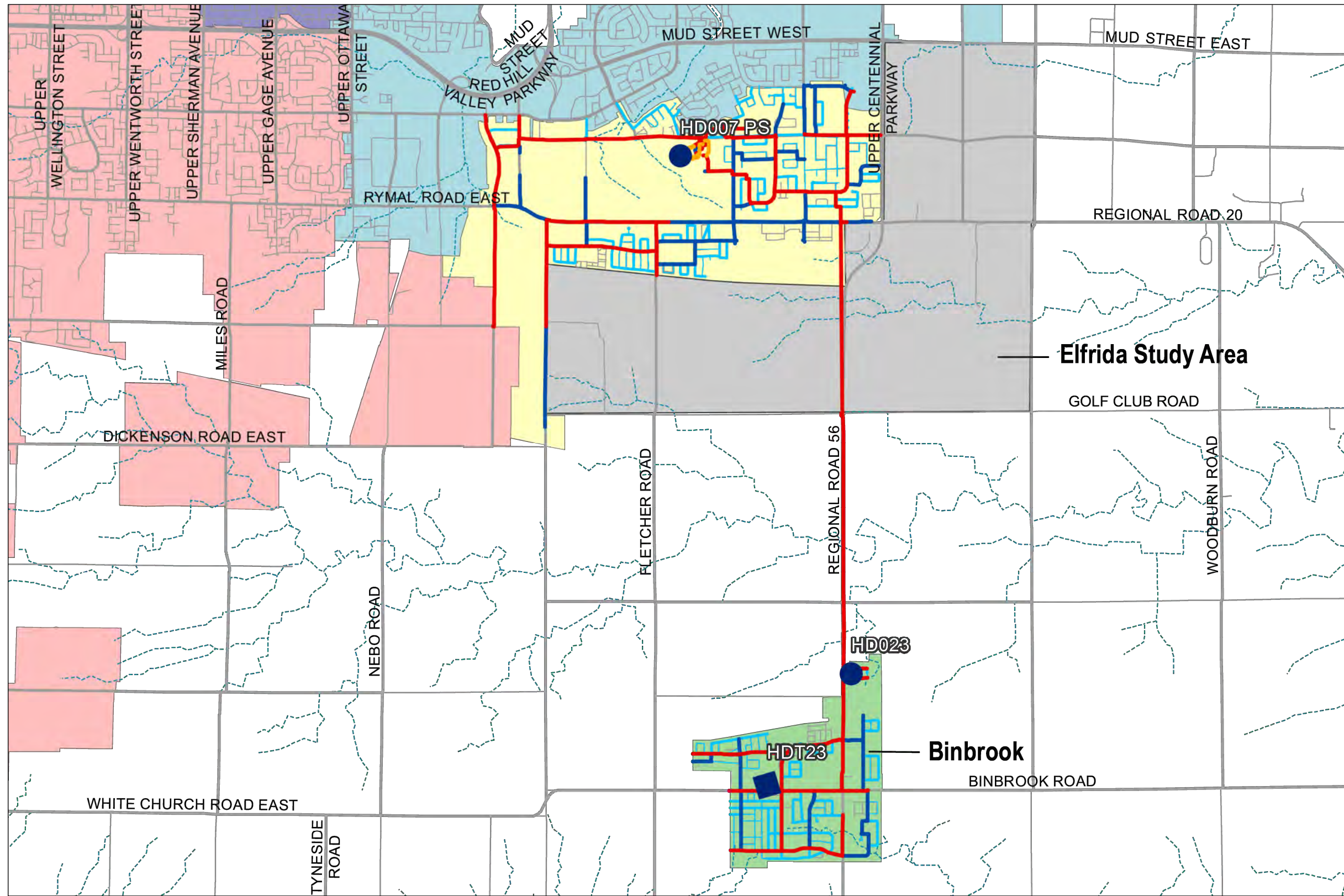
**PRELIMINARY EARTHWORKS ANALYSIS**

DATE: April 2026


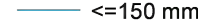


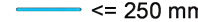


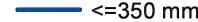




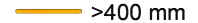

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1:10000

FIGURE No: **FIGURE 2.7**

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**LEGEND**

 Elevated Reservoir	 <=150 mm	 23
 Pumping Station	 <= 250 mm	 25
 Watercourse	 <=350 mm	 5
 Study Area	 400 mm	 6
	 >400 mm	 7

SOURCE:  
 • FIGURE 38 EXISTING WATER DISTRIBUTION SYSTEM, ELFRIDA GROWTH STUDY, CITY OF HAMILTON, JUNE 2017.

**WATER AND WASTEWATER  
 SERVICING MASTER PLAN**

**ELFRIDA SECONDARY PLAN  
 CITY OF HAMILTON**

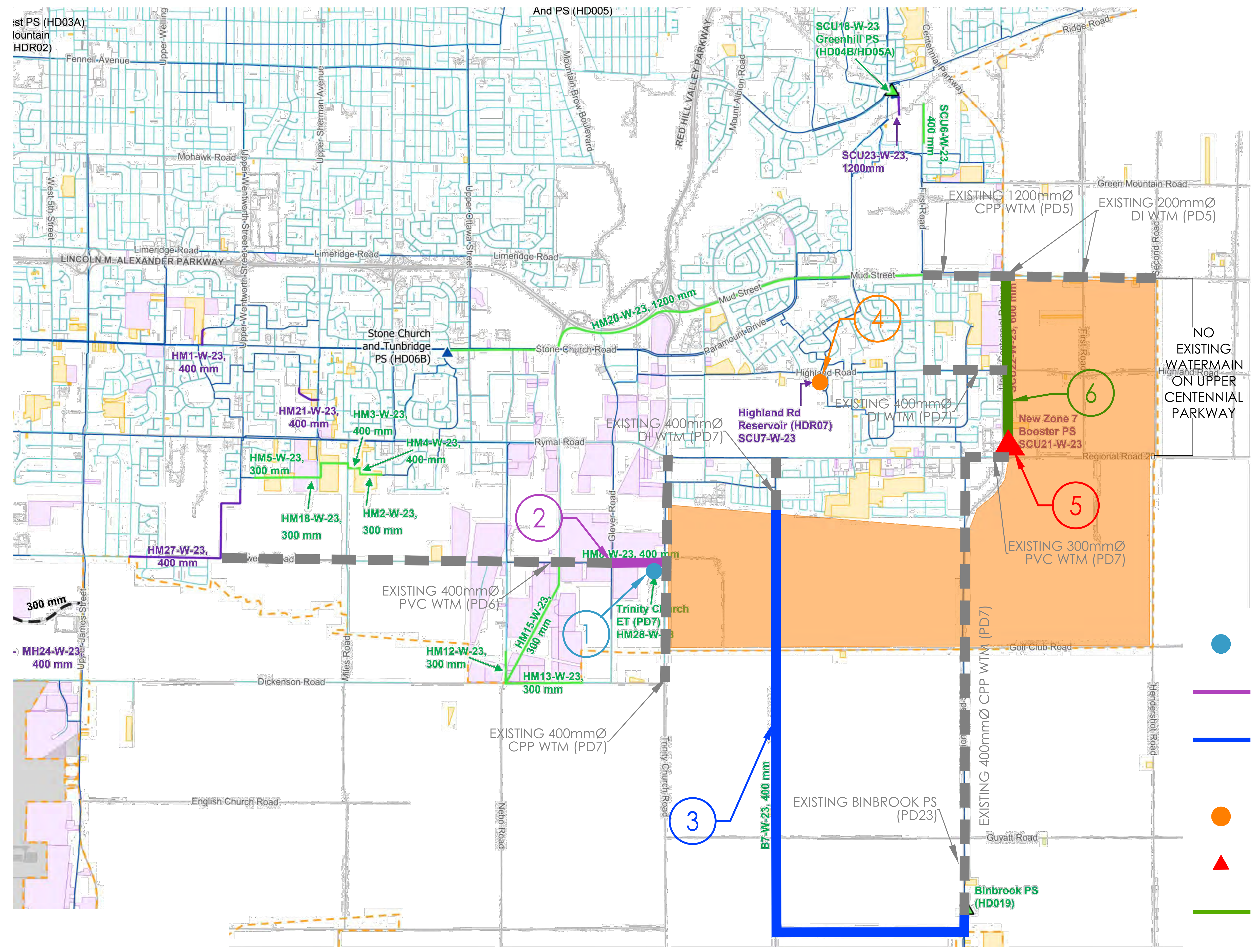
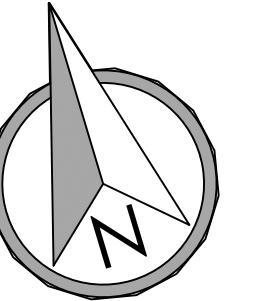
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**FIGURE 3.1**

**EXISTING WATER  
 DISTRIBUTION SYSTEM**

---

April 2026



### WATER INFRASTRUCTURE PROJECTS

- 1 - TRINITY CHURCH ELEVATED TANK (PD7)  
DC PROJECT HM28-W-23
- 2 - 400MMØ WATERMAIN EXTENSION ON TWENTY ROAD  
DC PROJECT HM8-W-23
- 3 - 400MMØ BINBROOK TRUNK FEEDERMAIN  
FLETCHER ROAD AND CEMETERY ROAD  
DC PROJECT B7-W-23
- 4 - HIGHLAND ROAD RESERVOIR (ADDITIONAL STORAGE)  
DC PROJECT SCU7-W-23
- ▲ 5 - NEW PD7 BOOSTER PUMPING STATION  
DC PROJECT SCU21-W-23
- 6 - 600MMØ WATERMAIN ON UPPER CENTENNIAL PARKWAY  
DC PROJECT SCU22-W-23

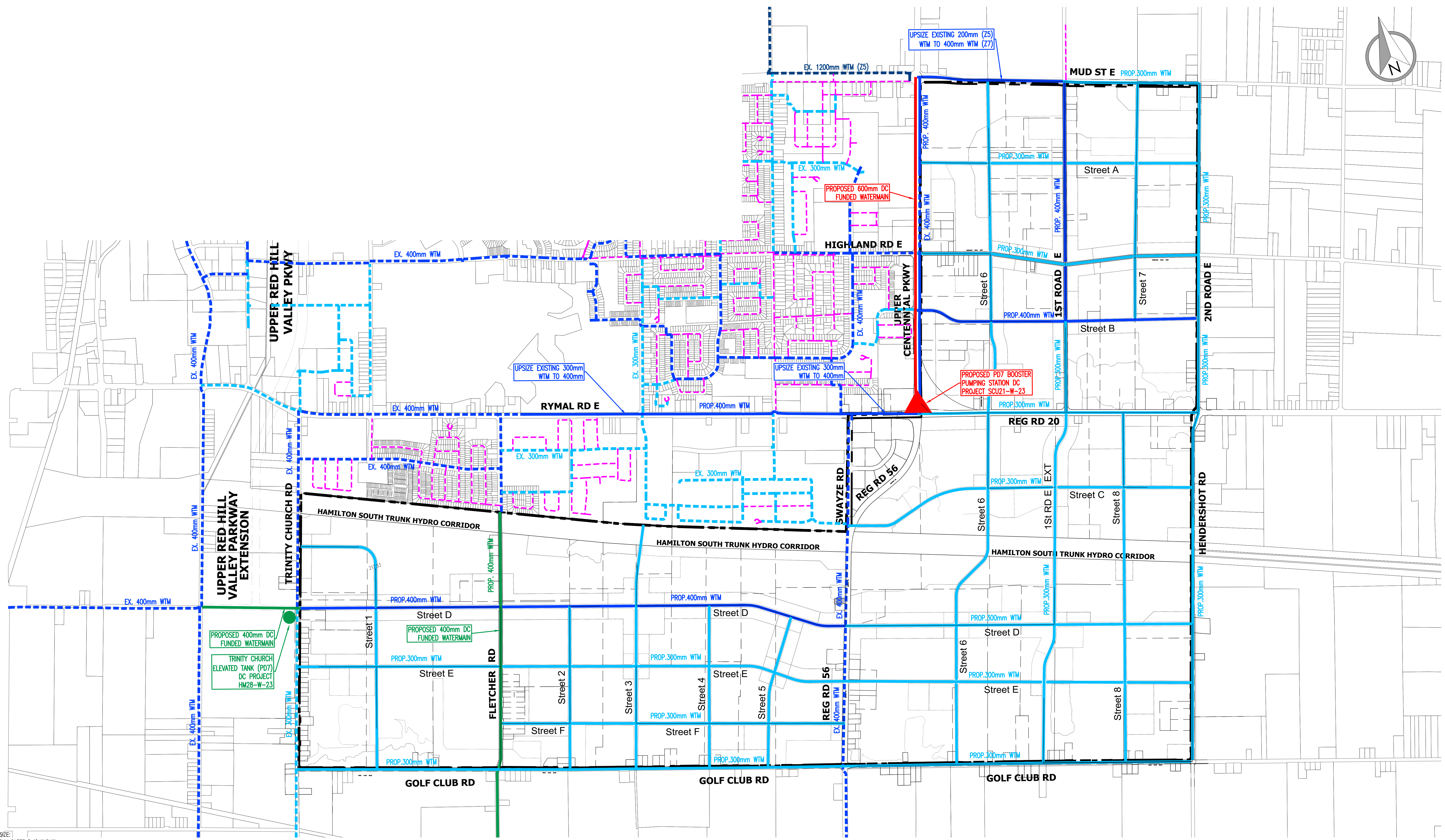
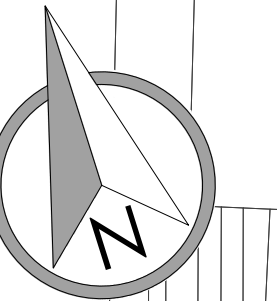


Legend	
	ELFRIDA URBAN BOUNDARY EXPANSION LANDS
	Railways
	Expanded Urban Boundary
	Urban Boundary
	Other Municipalities
	Parking Lot
	Vacant Non-Residential
	Vacant Residential
	Other Residential
	Water Treatment Plant (WTP)
	Elevated Tank (ET)
	Pumping Station (PS)
	Reservoir (RES)
	Water Main Less than 400mm
	Water Main 400mm and Greater
	WTP 0 - 5 Years
	PS 0 - 5 Years
	RES 0 - 5 Years
	WTP 6 Plus Years
	PS 6 Plus Years
	RES 6 Plus Years
	Watermain 0 - 5 Years
	Watermain 6 Plus Years
	Watermain 100% Direct Development

**SOURCE:**

- ELFRIDA SECONDARY PLAN: BOUSFIELDS, FEBRUARY 09, 2026
- PROJECTS 1 THROUGH 6 DEVELOPMENT CHARGES BACKGROUND STUDY: CITY OF HAMILTON, WATSON & ASSOCIATES ECONOMISTS LTD., DECEMBER 21, 2023 (TABLE F-1 WATER CAPITAL PROGRAM)
- FIGURE 1-5 DEVELOPMENT CHARGES BACKGROUND STUDY, CITY OF HAMILTON, GM BluePlan, AUGUST 2023.

WATER AND WASTEWATER MASTER PLAN	
<b>ELFRIDA SECONDARY PLAN</b> CITY OF HAMILTON	<b>WATER SERVICING CONTEXT PLAN</b>
DATE: April 2026	FIGURE No:
SCALE: 1:2000	<b>FIGURE 3.2</b>



PAPER SIZE:  
ARCH FULL BLEED D (24"X36")

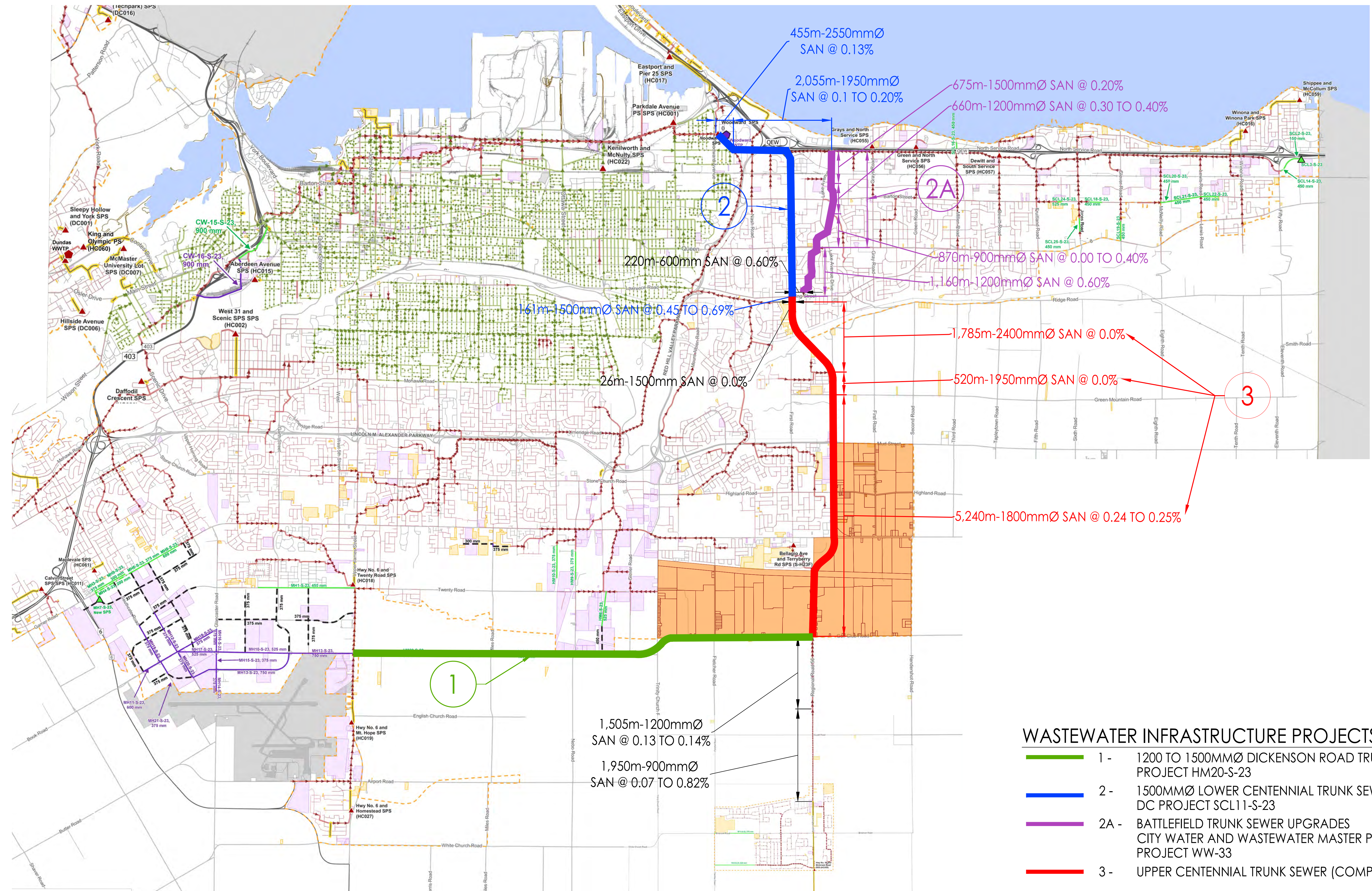
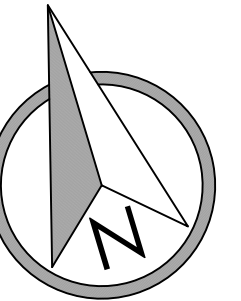


Legend	
	SUBJECT LANDS
	EXISTING 200mm WATERMAIN
	EXISTING 300mm WATERMAIN
	EXISTING 400mm WATERMAIN
	EXISTING >400mm WATERMAIN
	PROPOSE 300mm WATERMAIN
	PROPOSED 400mm WATERMAIN
	PROPOSED 400mm DC FUNDED WATERMAIN
	PROPOSED 600mm DC FUNDED WATERMAIN

- SOURCE:
- ELFRIDA SECONDARY PLAN: BOUSFIELDS, FEBRUARY 09, 2026
  - WATERMAIN NETWORK: CITY OF HAMILTON, OPEN HAMILTON, ACCESSED MARCH 07, 2026

WATER AND WASTEWATER MASTER PLAN	
<b>ELFRIDA SECONDARY PLAN</b> CITY OF HAMILTON	<b>CONCEPTUAL WATER SERVICING PLAN</b>
DATE: April 2026	FIGURE No:
SCALE: 1:10,000	<b>FIGURE 3.3</b>

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**WASTEWATER INFRASTRUCTURE PROJECTS**

- 1 - 1200 TO 1500MMØ DICKENSON ROAD TRUNK SEWER DC PROJECT HM20-S-23
- 2 - 1500MMØ LOWER CENTENNIAL TRUNK SEWER DC PROJECT SCL11-S-23
- 2A - BATTLEFIELD TRUNK SEWER UPGRADES CITY WATER AND WASTEWATER MASTER PLAN (2006) PROJECT WW-33
- 3 - UPPER CENTENNIAL TRUNK SEWER (COMPLETED - \$88M)



**Legend**

<span style="border: 1px solid black; display: inline-block; width: 10px; height: 10px;"></span> Railways	<span style="border: 1px solid black; display: inline-block; width: 10px; height: 10px;"></span> Parking Lot
<span style="border: 1px solid black; display: inline-block; width: 10px; height: 10px;"></span> Expanded Urban Boundary	<span style="border: 1px solid black; display: inline-block; width: 10px; height: 10px;"></span> Vacant Non-Residential
<span style="border: 1px solid black; display: inline-block; width: 10px; height: 10px;"></span> Other Municipalities	<span style="border: 1px solid black; display: inline-block; width: 10px; height: 10px;"></span> Residential

ELFRIDA URBAN BOUNDARY EXPANSION LANDS

**General Features**

- Railways
- Expanded Urban Boundary
- Other Municipalities
- Parking Lot
- Vacant Non-Residential
- Residential

**Existing Infrastructure**

- Wastewater Treatment Plant (WWTP)
- ▲ Sanitary Pumping Station (SPS)
- Force main
- Sanitary Sewer >= 450mm
- Sanitary Sewer < 450mm
- Combined Sewer >= 450mm
- Combined Sewer < 450mm

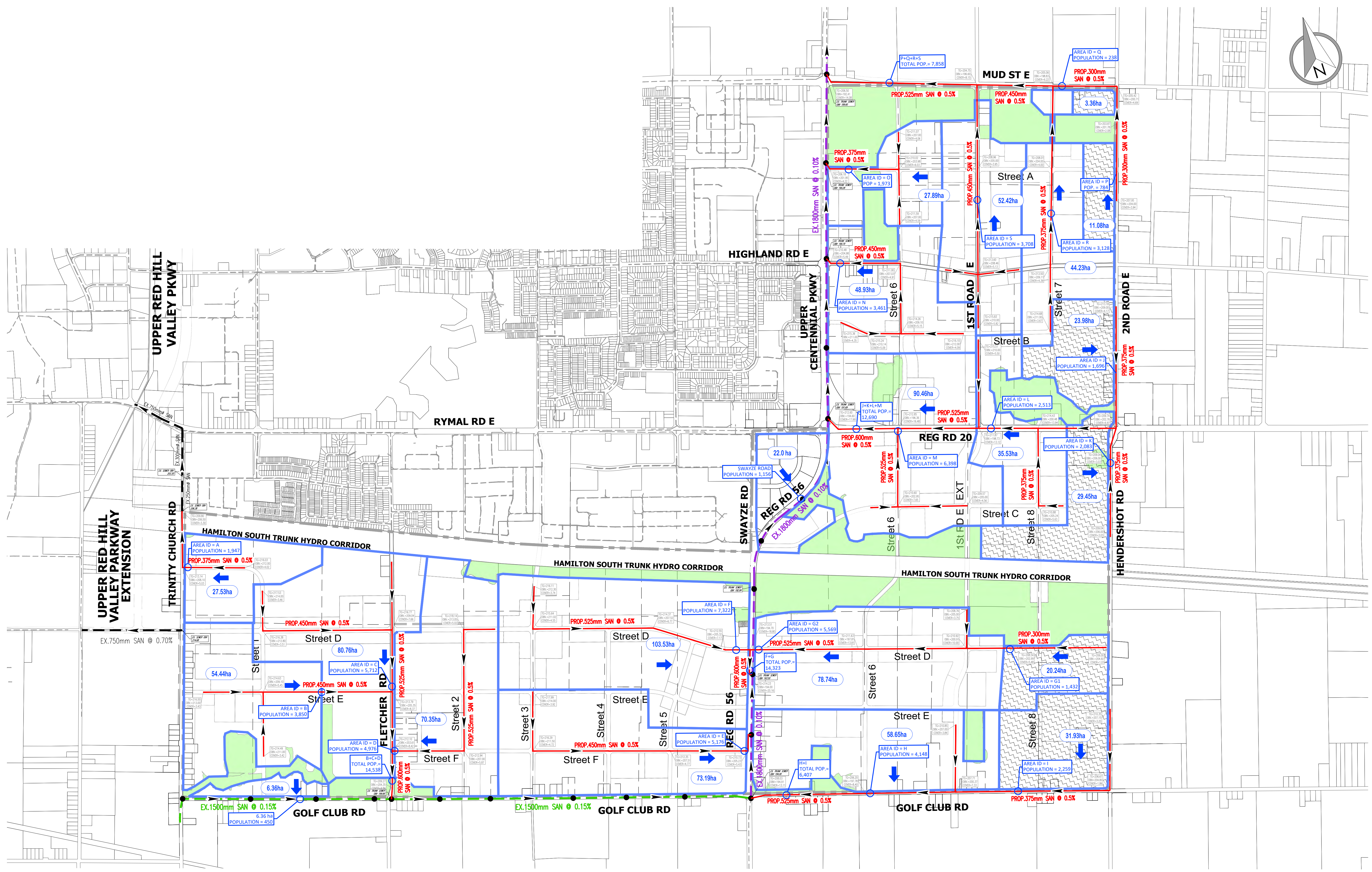
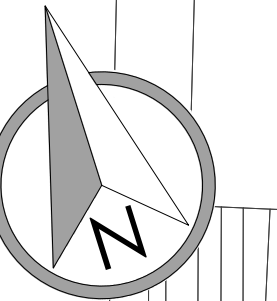
**Future Water Infrastructure**

- ▲ WWTP 0 - 5 Years
- ▲ WWTP 6 Plus Years
- SPS 0 - 5 Years
- SPS 6 Plus Years
- Sanitary Sewers 0-5 Years
- Sanitary Sewers 6 Plus Years
- Sanitary Sewers - 100% Direct Development Contribution

**SOURCE:**

- ELFRIDA SECONDARY PLAN: BOUSFIELDS, FEBRUARY 09, 2026
- PROJECTS 1 AND 2: DEVELOPMENT CHARGES BACKGROUND STUDY, CITY OF HAMILTON, WATSON & ASSOCIATES ECONOMISTS LTD., DECEMBER 21, 2023 (TABLE F-3 WASTE WATER CAPITAL PROGRAM)
- PROJECT 2A: WATER AND WASTEWATER MASTER PLAN, CLASS ENVIRONMENTAL ASSESSMENT REPORT, CITY OF HAMILTON, KMK CONSULTANTS LIMITED, NOVEMBER 22, 2006
- PROJECT 3: CITY OF HAMILTON 2011 DC BACKGROUND STUDY FOR WATER, WASTEWATER, STORMWATER, AND GO TRANSIT SERVICES, WATSON & ASSOCIATES MAY 20, 2011

WATER AND WASTEWATER MASTER PLAN	
<b>ELFRIDA SECONDARY PLAN</b> CITY OF HAMILTON	<b>WASTEWATER CONTEXT PLAN</b>
DATE: April 2026	FIGURE No:
SCALE: 1:40,000	<b>FIGURE 4.1</b>



PAPER SIZE:  
ARCH FULL BLEED D (24"x36")

Stantec Consulting Ltd.  
300-125 Commerce Valley Drive West  
Markham ON, L3T 7W4  
Tel: 905.944.7777  
www.stantec.com

**Legend**

	SUBJECT LANDS		PROPOSED SANITARY SEWERS		LOW-LYING LANDS TO CONSIDER SERVICING BY PUMPING STATION TO REDUCE DOWNSTREAM SEWER DEPTHS
	EXISTING LOCAL SANITARY SEWER		PROPOSED SANITARY CATCHMENT BOUNDARY		NATURAL HERITAGE SYSTEM
	EXISTING 1500mm TRUNK SANITARY		PROPOSED CATCHMENT AREA		
	EXISTING 1800mm TRUNK SANITARY		DRAINAGE AREA DISCHARGE DIRECTION		

SOURCE:  
• ELFRIDA SECONDARY PLAN: BOUSFIELDS, APRIL 2026  
• SANITARY SEWER NETWORK: CITY OF HAMILTON, OPEN HAMILTON, ACCESSED MARCH 07, 2026

**WATER AND WASTEWATER MASTER PLAN**

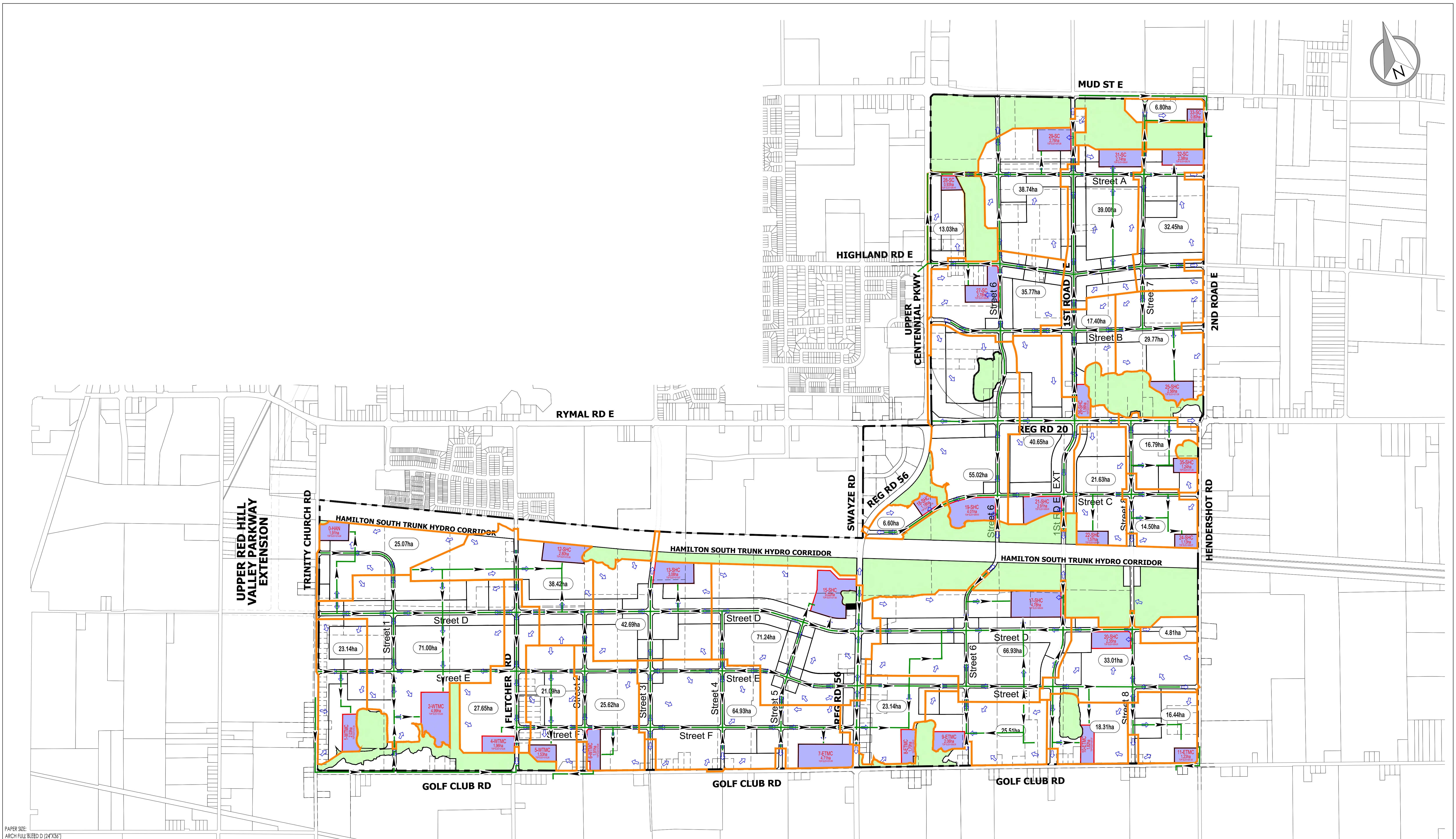
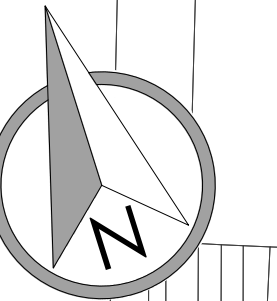
**ELFRIDA SECONDARY PLAN**  
CITY OF HAMILTON

**CONCEPTUAL WASTEWATER SERVICING PLAN**

DATE: April 2026  
SCALE: 1:10,000

FIGURE NO: **FIGURE 4.2**

File: \\c02015-ppfs01\606\active\160623294\Drawing\sheet\_files\_msp\160623294\_MSP\_Sanitary.dwg - Revised by: <Lauren, Jeremy> - Tue, Apr 28, 2026 - 10:25 AM



PAPER SIZE:  
ARCH FULL BLEED D (24"x36")

Stantec Consulting Ltd.  
300-125 Commerce Valley Drive West  
Markham ON, L3T 7W4  
Tel: 905.944.7777  
www.stantec.com

**Legend**

- SUBJECT LANDS
- PROPOSED DRAINAGE BOUNDARY
- PROPOSED DRAINAGE AREA
- PROPOSED STORM SEWER
- ↙ PROPOSED OVERLAND FLOW DIRECTION
- STORMWATER MANAGEMENT POND BLOCK/FACILITY
- POND ID
- POND BLOCK SIZE (ha)
- TOP OF POND ELEVATION
- NATURAL HERITAGE SYSTEM

SOURCE:  
• ELFRIDA SECONDARY PLAN: BOUSFIELDS, APRIL 2026  
• TOPO SURVEY: A.T. McLaren Limited, December 2023.

**WATER AND WASTEWATER MASTER PLAN**

**ELFRIDA SECONDARY PLAN**  
**CITY OF HAMILTON**

**CONCEPTUAL STORM DRAINAGE AREA PLAN**

DATE: April 2026

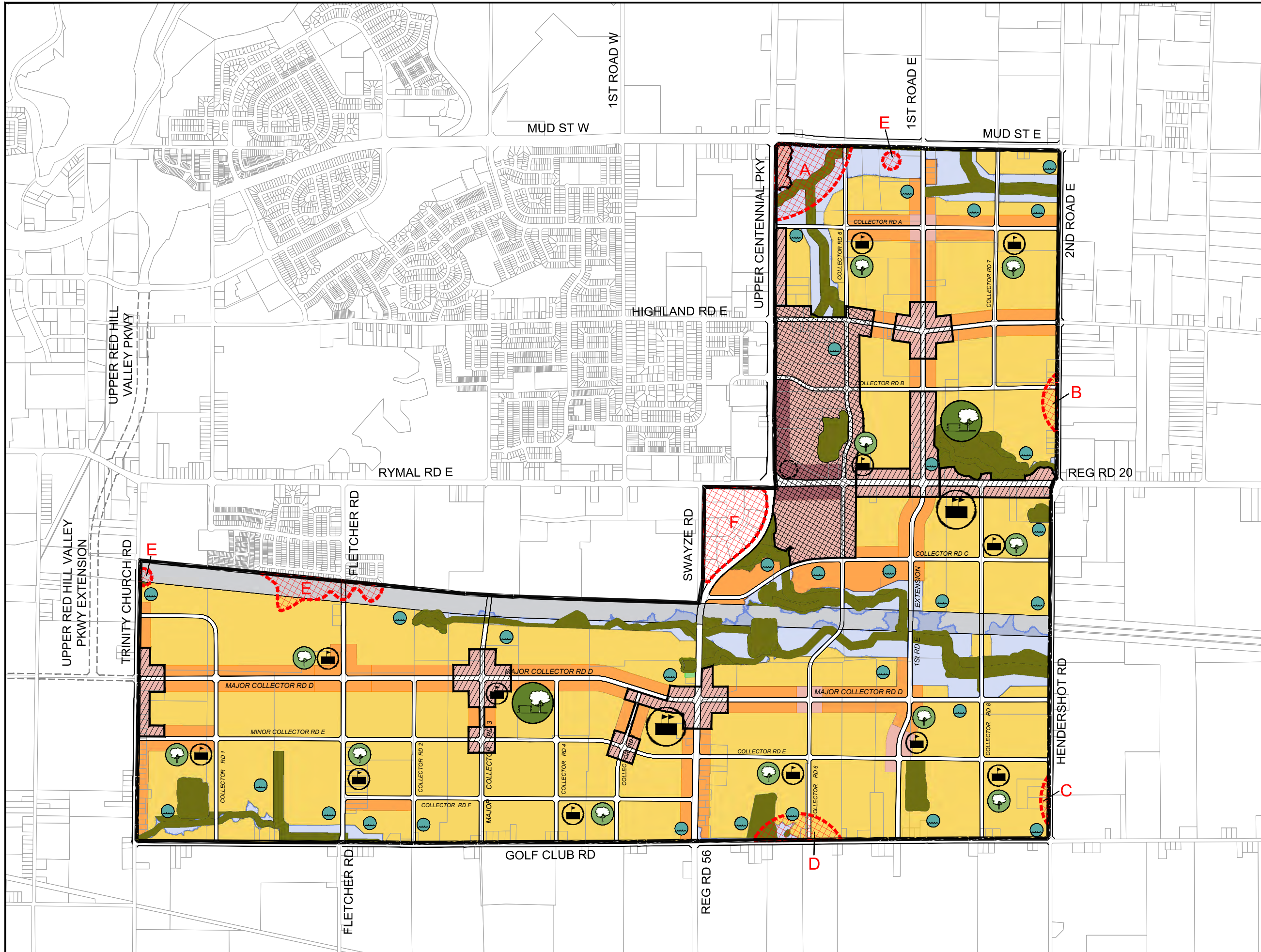
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1:10,000

FIGURE No: **FIGURE 5.1**

File: \\c020215-pdfs01\work\_group\active\16062204\Drawing\sheet\_files\_msp\16062204\_MSP\_Storm.dwg - Revised by: clazou, jeremy - Tue, Apr 14, 2026 - 4:43 PM

# Appendix A Secondary Plan





### Legend

**Residential Designations**

- Low Density Residential
- Medium Density Residential

**Commercial and Mixed Use Designations**

- Mixed Use - Medium Density
- Mixed Use - High Density
- Local Retail Node Overlay
- Community Retail Node Overlay

**Parks and Open Space Designations**

- Community Park
- Neighbourhood Park
- General Open Space

**Natural Heritage System & Floodplain**

- Natural Heritage System (Including Buffers and VPZ)
- Proposed Floodplain (Including Buffers)

**Other Designations**

- Utility
- Elementary School
- Secondary School
- Storm Water Management

**Other Features**

- Area or Site Specific Policy
- Elfrida Gateway Station
- Secondary Plan Boundary

Council Adopted: \_\_\_\_\_  
 Ministerial Approval: \_\_\_\_\_  
 Effective Date: \_\_\_\_\_

**Urban Hamilton Official Plan  
 Elfrida  
 Secondary Plan  
 Land Use Plan  
 Map B.7.8-1**

Date: April 2026

Not To Scale

PLANNING AND ECONOMIC DEVELOPMENT DEPARTMENT

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 THIS IS NOT A PLAN OF SURVEY.

## Appendix B Sanitary Sewer Design Sheets







## ELFRIDA - WWSMP

### Local Sanitary Sewer Design Sheet

Cumulative Study Area Tributary to Upper Centennial Trunk Sewer    967.5    ha  
 Cumulative Study Area Equivalent Population to Upper Centennial Trunk Sewer    68,424    people  
 Cumulative Study Area Flow to Upper Centennial Trunk Sewer    957    l/s

Project Number:	1606 23294	Mannings 'n' :	0.013	Max. Capacity (%):	60%	Babbitt Peaking Factor:		Q = Design Flow (L/s)	
Date:	April 2026	Min. Velocity (m/s):	0.75	Infiltration Flow (L/s):	0.40	$M = 5/P^{0.2}$		q = Avg. Domestic Flow (L/c/d)	
Stantec Ltd.:	Stantec Ltd.	Max. Velocity (m/s):	2.75	Max. Peaking Factor:	5.0			P = Population/1000	
City File Number:	N/A	Min. Pipe Slope (%):	0.50	Min. Peaking Factor:	2.0	Design Flow:		I = Infiltration Flow	
Prepared By:	Lindsay Chen	Avg. Domestic Flow, q (L/c/d):	360			$Q = (MqP/86.4) + IA$		A = Gross Drainage Area (ha)	

Manhole			Contributing Area					Comm./Ind./Inst.		Population		Design Calculations					Capacity Calculations				
Location	U/S MH	D/S MH	Drainage Area	Accum. Area	Units	Density (Area)	Density (Unit)	Static Area	Peak Flow	Pop.	Accum. Pop.	Peaking Factor	Infil. Flow	Static Flow	Design Flow	Total Flow	Size	Slope	Full Capacity	Full Velocity	QA/QC
			(ha)	(ha)	"R"	(p/ha)	(p/unit)	(ha)	(L/ha/s)	(p)	(p)		(L/s)	(L/s)	(L/s)	(L/s)	(mm)	(%)	(L/s)	(m/s)	(%)
Street 1	A1	T-A21	27.53	27.53		70.7				1,947	1,947	4.4	11.01	0.00	35.50	46.51	375	0.50	123.98	1.12	38%
Golf Club Road	1	GC-T	6.36	6.36		70.7				450	450	5.0	2.54	0.00	9.38	11.92	300	0.50	68.38	0.97	17%
Street E	B1	C1	54.44	54.44		70.7				3,850	3,850	3.8	21.78	0.00	61.25	83.03	450	0.50	201.60	1.27	41%
	C1	D2	80.76	135.20		70.7				5,712	9,562	3.2	54.08	0.00	126.82	180.90	525	0.50	304.10	1.40	59%
	D1	D2	70.35	70.35		70.7				4,976	4,976	3.6	28.14	0.00	75.21	103.35	525	0.50	304.10	1.40	34%
Fletcher Road	D2	GC-39A	0.00	205.55		70.7				-	14,538	2.9	82.22	0.00	177.32	259.54	600	0.50	434.17	1.54	60%
Street F	E1	UCP-02	73.19	73.19		70.7				5,176	5,176	3.6	29.28	0.00	77.62	106.89	450	0.50	201.60	1.27	53%
Street D (West)	F1	G	103.53	103.53		70.7				7,322	7,322	3.4	41.41	0.00	102.44	143.85	525	0.50	304.10	1.40	47%
	G1	G2	20.24	20.24		70.7				1,432	1,432	4.7	8.10	0.00	27.77	35.86	300	0.50	68.38	0.97	52%
	G2	G	78.74	98.98		70.7				5,569	7,001	3.4	39.59	0.00	98.83	138.42	525	0.50	304.10	1.40	46%
Street D (East)	G	UCP-03	0.00	202.51		70.7				-	14,323	2.9	81.00	0.00	175.22	256.22	600	0.50	434.17	1.54	59%
	I1	H1	31.93	31.93		70.7				2,259	2,259	4.2	12.8	0.00	40.0	52.8	375	0.50	124.0	1.1	43%
Golf Club Road	H1	UCP-01	58.65	90.58		70.7				4,148	6,407	3.4	36.2	0.00	92.1	128.3	525	0.50	304.1	1.4	42%
Swayze Road	2	UCP-06	22.00	22.00		70.7				1,556	1,556	4.6	8.8	0.00	29.7	38.5	300	0.50	68.4	1.0	56%
	J1	L1	23.98	23.98		70.7				1,696	1,696	4.5	9.6	0.00	31.8	41.4	375	0.50	124.0	1.1	33%
Hendershot Road	K1	L1	29.45	29.45		70.7				2,083	2,083	4.3	11.8	0.00	37.5	49.3	375	0.50	124.0	1.1	40%
	L1	M2	35.53	88.96		70.7				2,513	6,292	3.5	35.6	0.00	90.7	126.3	525	0.50	304.1	1.4	42%
	M1	M2	90.46	90.46		70.7				6,398	6,398	3.4	36.2	0.00	92.0	128.1	525	0.50	304.1	1.4	42%
Regional Road 20	M2	UCP-07	0.00	179.42		0.0				-	12,690	3.0	71.8	0.00	159.0	230.8	600	0.50	434.2	1.5	53%
Highland Road	N1	UCP-09	48.93	48.93		70.7				3,461	3,461	3.9	19.6	0.00	56.2	75.8	450	0.50	201.6	1.3	38%
Street A	O1	UCP-10	27.89	27.89		70.7				1,973	1,973	4.4	11.2	0.00	35.9	47.0	375	0.50	124.0	1.1	38%
2nd Road East	P1	Q1	11.08	11.08		70.7				784	784	5.0	4.4	0.00	16.3	20.8	300	0.50	68.4	1.0	30%
	Q1	R2	3.36	14.44		70.7				238	1,022	5.0	5.78	0.00	21.20	26.98	300	0.50	68.38	0.97	39%
Street 7	R1	R2	44.23	44.23		70.7				3,128	3,128	4.0	17.69	0.00	51.88	69.57	375	0.50	123.98	1.12	56%
	R2	S2	0.00	58.67		70.7				-	4,150	3.8	23.47	0.00	65.04	88.51	450	0.50	201.60	1.27	44%
1st Road East	S1	S2	52.42	52.42		70.7				3,708	3,708	3.8	20.97	0.00	59.44	80.41	450	0.50	201.60	1.27	40%
Mud Street	S2	UCP-11	0.00	111.09		0.0				-	7,858	3.3	44.44	0.00	108.39	152.83	525	0.50	304.10	1.40	50%



## ELFRIDA - WWSMP

### Local Sanitary Sewer Design Sheet

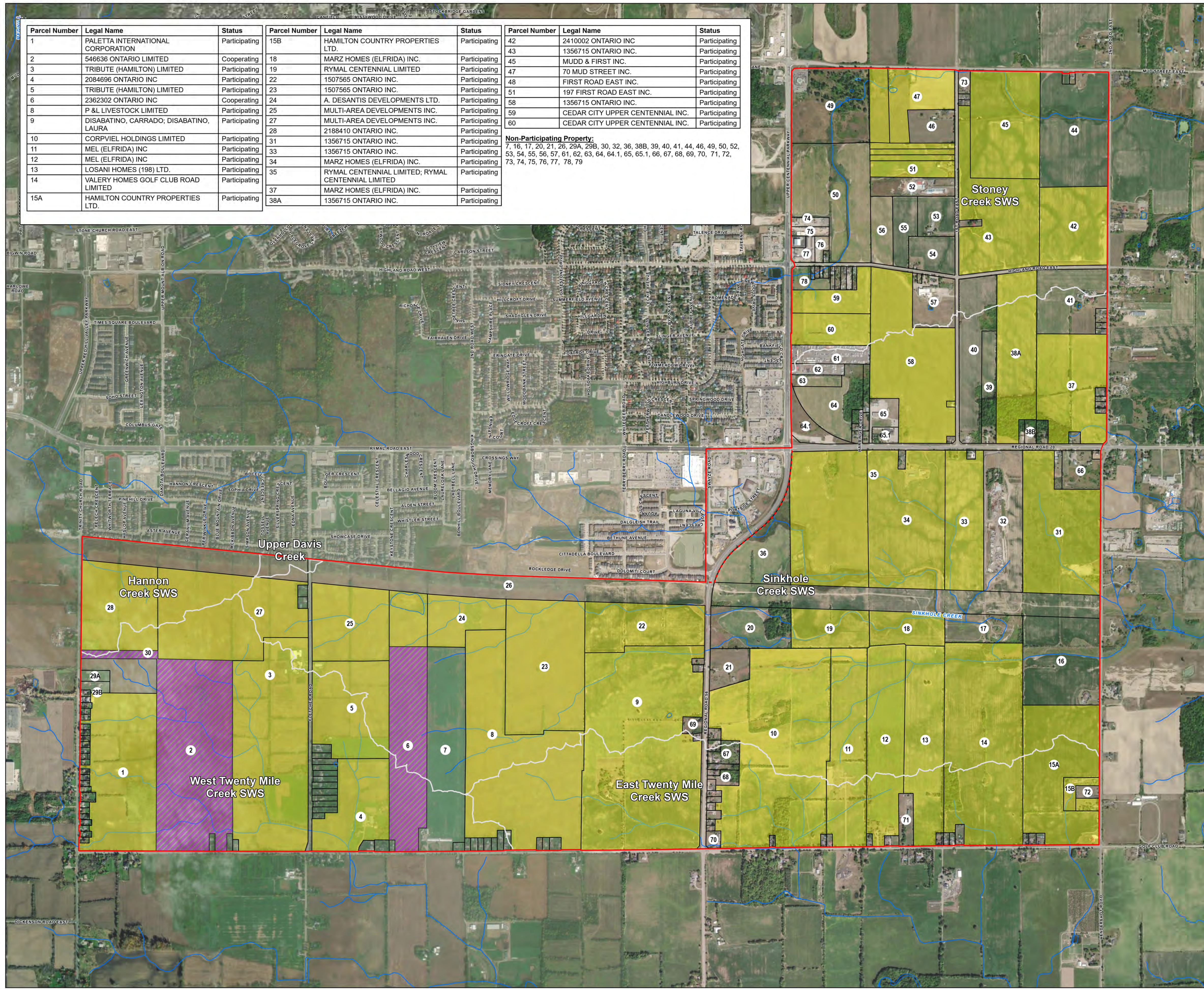
Cumulative Study Area Tributary to Upper Centennial Trunk Sewer    967.5    ha  
 Cumulative Study Area Equivalent Population to Upper Centennial Trunk Sewer    68,424    people  
 Cumulative Study Area Flow to Upper Centennial Trunk Sewer    957    l/s

Project Number:	1606 23294	Mannings 'n' :	0.013	Max. Capacity (%):	60%	Babbitt Peaking Factor:		Q = Design Flow (L/s)	
Date:	April 2026	Min. Velocity (m/s):	0.75	Infiltration Flow (L/s):	0.40	$M = 5/P^{0.2}$		q = Avg. Domestic Flow (L/c/d)	
Stantec Ltd.:	Stantec Ltd.	Max. Velocity (m/s):	2.75	Max. Peaking Factor:	5.0			P = Population/1000	
City File Number:	N/A	Min. Pipe Slope (%):	0.50	Min. Peaking Factor:	2.0	Design Flow:		I = Infiltration Flow	
Prepared By:	Lindsay Chen	Avg. Domestic Flow, q (L/c/d):	360			$Q = (MqP/86.4) + IA$		A = Gross Drainage Area (ha)	

Manhole			Contributing Area					Comm./Ind./Inst.		Population		Design Calculations					Capacity Calculations				
Location	U/S MH	D/S MH	Drainage Area	Accum. Area	Units	Density (Area)	Density (Unit)	Static Area	Peak Flow	Pop.	Accum. Pop.	Peaking Factor	Infil. Flow	Static Flow	Design Flow	Total Flow	Size	Slope	Full Capacity	Full Velocity	QA/QC
			(ha)	(ha)	"R"	(p/ha)	(p/unit)	(ha)	(L/ha/s)	(p)	(p)		(L/s)	(L/s)	(L/s)	(L/s)	(mm)	(%)	(L/s)	(m/s)	(%)
Ext. U/S of Trinity Church	EXT-8	GC-T	2903.00	2903.00		41.0				119,042	119,042	2.0	1161.20	0.00	992.02	2153.22	1500	0.15	2737.76	1.55	79%
	GC-T	GC-39A	0.00	2909.36		0.0				-	119,492	2.0	1163.74	0.00	995.77	2159.51	1500	0.15	2737.76	1.55	79%
Dickenson Trunk to UCP	GC-39A	UCP-01	0.00	3114.91		0.0				-	134,030	2.0	1245.96	0.00	1116.92	2362.88	1500	0.15	2737.76	1.55	86%
Ext. U/S Binbrook	EXT-11	UCP-01	429.00	429.00		39.5				16,960	16,960	2.8	171.60	0.00	200.59	372.19	750	0.20	497.87	1.13	75%
Regional Road 56	UCP-01	UCP-02	0.00	3634.49		0.0				-	157,397	2.0	1453.80	0.00	1311.64	2765.44	1800	0.10	3634.96	1.43	76%
	UCP-02	UCP-03	0.00	3707.68		0.0				-	162,573	2.0	1483.07	0.00	1354.78	2837.85	1800	0.10	3634.96	1.43	78%
	UCP-03	UCP-04	0.00	3910.19		0.0				-	176,896	2.0	1564.08	0.00	1474.13	3038.21	1800	0.10	3634.96	1.43	84%
	UCP-04	UCP-05	0.00	3910.19		0.0				-	176,896	2.0	1564.08	0.00	1474.13	3038.21	1800	0.10	3634.96	1.43	84%
	UCP-05	UCP-06	0.00	3910.19		0.0				-	176,896	2.0	1564.08	0.00	1474.13	3038.21	1800	0.10	3634.96	1.43	84%
	UCP-06	UCP-07	0.00	3932.19		0.0				-	178,452	2.0	1572.88	0.00	1487.10	3059.98	1800	0.10	3634.96	1.43	84%
	UCP-07	UCP-08	0.00	4111.61		0.0				-	191,142	2.0	1644.64	0.00	1592.85	3237.49	1800	0.10	3634.96	1.43	89%
	UCP-08	UCP-09	0.00	4111.61		0.0				0	191142	2.0	1644.64	0.00	1592.85	3237.49	1800	0.10	3634.96	1.43	89%
Highland Road	UCP-09	UCP-10	0.00	4160.54		0.0				0	194603	2.0	1664.22	0.00	1621.69	3285.91	1800	0.10	3634.96	1.43	90%
	UCP-10	UCP-11	0.00	4188.43		0.0				0	196576	2.0	1675.37	0.00	1638.13	3313.51	1800	0.10	3634.96	1.43	91%
Mud Street	UCP-11	UCP-12	0.00	4299.52		0.0				0	204434	2.0	1719.81	0.00	1703.62	3423.42	1800	0.10	3634.96	1.43	94%

## Appendix C Land Ownership Mapping





**LEGEND**

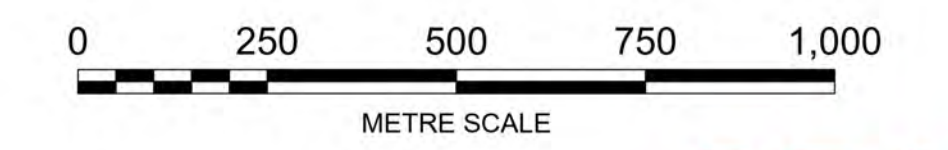
- Study Area
- Additional Lands (Unsurveyed)
- Subwatershed Boundary

**Subject Properties**

- Cooperating Owner
- Participating Property
- Non Participating Property
- Watercourse<sup>1</sup>

1 - Geospatial Ontario (GEO)

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



**DRAFT**

North American Datum 1983  
 Universal Transverse Mercator Projection Zone 17  
 Scale: 1:10,000  
 Page Size: ANSI D (22 x 34 inches)

Drawn: SM  
 Checked: DJ  
 Date: Nov 5, 2025



Source Notes:  
 Imagery (2022) provided by Bramalea region map service. Contains information licensed under the Open Government Licence - Ontario.

CLIENT  
 Elfrida Community Builders Group Inc.

PROJECT  
 Elfrida Phase 1 Subwatershed Study



TITLE  
**Land Ownership Mapping**

REF. NO.  
 2306301-2-1

**Figure 1.4.1**

**With every community, we redefine what's possible.**

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