12749 Tenth Line – Acorn NE Stouffville Inc., Town of Whitchurch-Stouffville

Functional Servicing and Stormwater Management Report

May 2026

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Table of Contents

Page

1.0 Introduction 1
1.1 Purpose 1
1.2 Study Area 1
1.3 Background Information 2
2.0 Geotechnical and Hydrogeological Conditions 4
2.1 Soils 4
2.2 Groundwater 4
3.0 Topography and Grading 6
3.1 Existing Conditions 6
3.1.1 Topography 6
3.1.2 Floodplain 6
3.2 Proposed Conditions 7
3.2.1 Site Grading 7
3.2.2 Floodplain Modifications 8
4.0 Rights-of-way and Sidewalks 9
5.0 Storm Drainage and Servicing 10
5.1 Existing Conditions 10
5.1.1 Storm Drainage 10
5.1.2 Storm Servicing 11
5.2 Proposed Conditions 11
5.2.1 Storm Drainage 11
5.2.2 Storm Servicing 14
5.2.2.1 Minor System 14
5.2.2.2 Major System 15
6.0 Stormwater Management 16
6.1 Stormwater Management Criteria 16
6.2 Proposed Stormwater Management Plan 17
6.3 Low Impact Development Measures 18
6.3.1 5 mm On-Site Retention 19
6.3.2 Water Budget 19
6.4 End-of-Pipe Stormwater Management Facility 19
6.4.1 Quality Control 20
6.4.2 Erosion Control 20
6.4.3 Quantity Control 21
6.4.4 General SWM Facility Design Characteristics 22
7.0 Sanitary Servicing 25
7.1 Existing Sanitary Sewer System 25

7.2 Proposed External Sanitary Infrastructure 25
7.3 Proposed Sanitary Sewer System 26
8.0 Water Supply and Distribution 28
8.1 Existing Water Distribution 28
8.2 Proposed Water System 28
9.0 Servicing Allocation 30
10.0 Cost Sharing 31
11.0 Utility Considerations 32
11.1 Hydro 32
11.2 Gas 32
11.3 Bell 32
11.4 Rogers 32
12.0 Erosion and Sediment Control During Construction 33
13.0 Summary 34

List of Tables

Table 5.1: Summary of Existing Conditions Drainage Areas
Table 5.2: Summary of Proposed Conditions Drainage Areas
Table 6.1: Stormwater Management Criteria
Table 6.2: Preliminary Allowable Release Rates
Table 6.3: SWM Facility E1 Storage Requirements
Table 6.4: Comparison of Allowable Release Rate Targets and Proposed Flows

List of Figures

Figure 1.1 Site Location Plan
Figure 3.1 Existing Conditions Topography and Drainage
Figure 3.2 Floodplain Mapping
Figure 3.3 Preliminary Grading Plan
Figure 4.1 Sidewalk Location Plan
Figure 5.1 Proposed Storm Drainage Plan
Figure 5.2 Preliminary Servicing Plan
Figure 6.1 Proposed Stormwater Management Facility E1
Figure 7.1 Proposed Sanitary Drainage Plan
Figure 7.2 External Sanitary Servicing Plan
Figure 8.1 Proposed Water Distribution Plan

List of Appendices

Appendix A Draft Plan of Subdivision
Appendix B Relevant Excerpts
Appendix C Hydrology Modelling
Appendix D Right of Way Cross-Section
Appendix E Stormwater Management Calculations
Appendix F SWM Plan Feasibility
Appendix G Sanitary Sewer Design Sheets
Appendix H Utilities Considerations

Submission History

Submission	Date	In Support Of	Distributed To
1st	May 2026	Re-Zoning and Draft Plan Approval	Town of Whitchurch-Stouffville, Region of York, TRCA

1.0 Introduction

SCS Consulting Group Ltd. has been retained by Acorn NE Stouffville Inc. to prepare a Functional Servicing and Stormwater Management Report (FSSR) for the proposed Acorn South development, located at 12749 Tenth Line in the Town of Whitchurch-Stouffville, within the Lincolnville Secondary Plan area.

1.1 Purpose

This FSSR has been prepared in support of a Draft Plan of Subdivision and Zoning By-Law Amendment applications for the proposed development. The Draft Plan of Subdivision is provided in **Appendix A**. The proposed development consists of the following land uses:

- medium-density residential,
- school block,
- SWM pond block, and
- proposed roads.

The purpose of this report is to demonstrate that the development can be graded and serviced in accordance with the Town of Whitchurch-Stouffville, Region of York, Toronto and Region Conservation Authority (TRCA), and the Ministry of Environment, Conservation and Parks (MECP) design criteria.

1.2 Study Area

The Acorn South site (hereafter referred to as the subject lands) is approximately 10.3 ha in size and is bound by York Durham Line to the east, Tenth Line to the west, and future development to the north and south. The existing subject lands are comprised of agricultural and open space areas. The open space area on the east side of the subject lands contains woodlands and a regulatory floodplain associated with Reesor Creek. The subject lands are located within the Duffins Creek watershed in the Town of Whitchurch-Stouffville.

The woodlands extend along the watercourse beyond the northern and southern boundaries of the subject lands. The dripline was determined using air photography and feature staking. A 10 m buffer is provided from the staked dripline to the development limit.

A future residential area adjacent to York Durham Line within the subject property (Future Development Block 7) will be excluded from this Draft Plan Application (refer to Draft Plan of Subdivision in **Appendix A**).

The subject lands are located within the Lincolnville Secondary Plan area, which is approximately 61.86 ha in size and includes the following properties: 2605552 Ontario

Inc. (Newstone), Ambria, and Metrolinx on the west side of Tenth Line, as well as Hume (Apache Freight), 6833 Bethesda Side Road (Piechatzek), 12942 York Durham Line (previously Stateview), 12875 Tenth Line (Acorn North), Northcape, 12749 Tenth Line (Acorn South), 12828 York Durham Line (Reesor), Brundale, and 2434981 Ontario Inc. (Trudel) on the east side of Tenth Line (see **Figure 1.1**).

The contents of this report will be incorporated into the Lincolnville Comprehensive Environmental Constraints and Servicing Strategy (CECSS) report. The CECSS is being prepared to address the requirements outlined in Section 2.4 of Official Plan Amendment No. 155 (OPA 155) which includes the addition of Section 12.6.5 to the Official Plan, requiring preparation of a comprehensive coordinated strategy to address environmental constraints and servicing.

1.3 Background Information

In preparation of the servicing and stormwater management (SWM) strategies, the following design guidelines and standards were used:

- Town of Whitchurch-Stouffville Water and Wastewater Master Plan, March 2024;
- Town of Whitchurch-Stouffville Design Guidelines and Standard Drawings, January 2023;
- Toronto and Region Conservation Authority (TRCA) Erosion and Sediment Control Guideline for Urban Construction, December 2019;
- TRCA Stormwater Management Criteria, April 2012 Version 1.0;
- 2012 Duffins Creek Hydrology Update Final Report, Aquafor Beech Limited, February 2013;
- TRCA Low Impact Development Stormwater Management Planning and Design Guide, 2010 Version 1.0;
- Ministry of Environment (MOE) Stormwater Management Planning and Design Manual, March 2003; and
- 2002 Duffins Creek Hydrology Update, Aquafor Beech Limited, dated May 2002.

The servicing and SWM strategies in this report are based on the following reports:

- Environmental Impact Study (EIS) – 12749 Tenth Line, Dillon Consulting Ltd., April 2026;
- A Geotechnical Investigation for Proposed Residential Development – 12749 Tenth Line, Soil Engineers Ltd., April 2026;
- A Hydrogeological Assessment and Pre- and Post-Development Water Balance Assessment – 12749 Tenth Line, Soil Engineers Ltd., May 2026;
- Ambria Functional Servicing and Stormwater Management Report, Condeland Consulting Engineers, April 2025;

- Newstone Functional Servicing and Stormwater Management Report, Masongsong Associates Limited, January 2025;
- Town of Whitchurch-Stouffville 2024 Water and Wastewater Master Plan, March 2024;
- Environmental Compliance Approval for a Municipal Stormwater Management System ECA Number 132-S701 Issue 1, The Town of Whitchurch-Stouffville August 2023;
- Environmental Compliance Approval for a Municipal Sewage Collection System ECA Number 132-W601 Issue 1, The Town of Whitchurch-Stouffville, August 2023;
- Functional Servicing and Stormwater Management Report, TYLin International Canada Inc., April 2023;
- Functional Servicing and Stormwater Management Report - 12689 Tenth Line, SCS Consulting Group Ltd., November 2022;
- Town of Whitchurch-Stouffville Sub-Trunk #1 Sanitary Sewer and Watermain Extension Preliminary Design Report, Chrisholm Fleming and Associates, March 2017; and
- Courtney Valley – Phase 1 - Stormwater Management Report, GHD, April 2014.

The servicing and SWM strategies are also based on the following approved Engineering Drawings:

- Drawings C-121 and C-122, Construction of New Lincolnville Station Servicing Plans, Stantec Consulting Ltd., September 2020;
- Drawings P1 to P5, Subtrunk #1 Sanitary Sewer Plan and Profile of York Durham from Sta. 0+980 to Sta. 2+320, Chrisholm Fleming and Associates, March 2018;
- Drawings G102A, Courtney Valley Estates - Sanitary Drainage Area Plan, GHD, August 2017;
- Drawings G102B, Courtney Valley Estates - Storm Drainage Area Plan, GHD, August 2017;
- Drawing P10, Bethesda Road Watermain Construction from 5+046.54 to 5+359.71, MacViro Consultants, Inc., October 2007; and
- Drawings P6 to P8, Plan and Profile of Tenth Line Watermain Construction from Sta. 11+000 to Sta. 12+000, MacViro Consultants, Inc., February 2006.

Excerpts from the above listed documents are included in **Appendix B**.

2.0 Geotechnical and Hydrogeological Conditions

2.1 Soils

The soil classifications for the site were identified based on the borehole logs prepared by Soil Engineers Ltd. and land uses visible in recent aerial photography and site reconnaissance. The Geotechnical Investigation (Soil Engineers Ltd., 2026) notes the predominant soil type is Silty Clay, which is a Hydrologic Soil Group C according to the MTO Drainage Management Manual (1997) Design Chart 1.08. This is consistent with the Ontario Soil Survey Complex mapping from OMAFRA which identifies the soils within the study limits as primarily Monoghan Clay Loam. According to the Design Flood Estimation Design Chart H2-6A, Monoghan Clay Loam is considered as Hydrologic Soil Group C. The Soil Conservation Service Curve Numbers (CN) have been determined for the subject lands. Refer to **Appendix B** for excerpts from the Geotechnical Investigation (Soil Engineers Ltd., 2026) and **Appendix C** for the calculations for the CN.

Soil Engineers Ltd. have also completed in-situ infiltration testing which found a range of estimated hydraulic conductivity rates of 1.1×10^{-6} to 7.5×10^{-6} m/s (infiltration rates of 50 – 68 mm/hr per TRCA Table C1). Refer to **Appendix B** for results of the infiltration testing.

2.2 Groundwater

Soil Engineers has monitored groundwater levels across the subject lands, with readings from April 2021 to January 2026 in the monitoring wells. Based on the groundwater levels collected to date, the seasonally high groundwater elevations range from approximately 0.47 m to 7.1 m below existing ground across the subject lands. Refer to **Appendix B** for excerpts from the Hydrogeological Assessment (Soil Engineers Ltd., April 2026) including the groundwater monitoring results.

The Source Water Protection Plan identifies four main regulatory factors under the Clean Water Act (2006) relating to hydrogeology to consider for site development: Significant Groundwater Recharge Ares (SGRAs), Highly Vulnerable Aquifers (HVAs), Wellhead Protection Areas (WHPAs), and Intake Protection Zones (IPZs).

The subject lands have been identified as being located within Wellhead Protection Area B (WHPA-B) with a vulnerability score of 10, as well as WHPA Q1/Q2 – recharge management areas with a moderate stress level. New development is required to implement best management practices, such as Low Impact Development (LID), with the goal of maintaining pre-development recharge.

The subject lands are located approximately 400 m north of Stouffville Municipal Supply Well No. 3. Due to the proximity of the supply well, the site is within an SGRA with a

rating of 4-6, within a HVA zone, and within a WHPA with a rating of B and C. The subject lands are determined to have significant groundwater function and maintaining the post-to-pre development infiltration rates as well as maintaining groundwater quality is necessary.

In addition to the above, due to the presence of Stouffville Municipal Supply Well No. 3 and the shallow depth of the Oak Ridges Moraine Aquifer Complex (ORMAC), much of the subject lands have an aquifer vulnerability scoring of 8 or 10. For Vulnerability scores > 6.1, restrictions on stormwater management measures and land use practices are in place for actions that may result in a significant threat. This can include infiltration of stormwater, deep borehole drilling or deep foundations, construction activities, and retail uses as noted in O. Reg. 287/07 under the Clean Water Act (2006).

3.0 Topography and Grading

3.1 Existing Conditions

3.1.1 Topography

Detailed topographic survey for the subject lands was completed by Genesis Land Surveying. Other surveyors prepared topographic surveys for the various participating members of the Lincolnville Landowner Group within the Lincolnville Secondary Plan Area. All individual surveys were combined to have a better representation of the greater Lincolnville Secondary Plan topography and drainage patterns. The topography of the remaining gaps was supplemented with York Region topographic mapping and TRCA floodplain topographic mapping in the Reesor Creek corridor (September, 2020).

Per the topographic survey shown on **Figure 3.1**, the tableland of the subject lands is comprised of relatively flat agricultural fields with a grade range of less than 0.5% to approximately 9%. The tablelands have steeper slopes on the north and south sides, sloping towards the centre of the parcel. The topographic elevations of the tableland vary from approximately 294.00 m in the northcentral area of the property to approximately 288.00 m near the eastern edge of the tableland, west of Reesor Creek. The tableland is generally sloped east towards Reesor Creek.

The centreline elevations of Tenth Line along the western frontage of the subject lands are sloped down towards the low point in the approximate centre of the property.

Reesor Creek is sloped from north to south. Reesor Creek enters the Lincolnville Secondary Plan via the 12942 York Durham Line property at its northeast corner and flows south through the Reesor, Northcape, and Acorn South properties. The Reesor Creek valley walls are generally steeply sloped at the northern and southern edges of the subject lands with shallower slopes where the central low-lying area joins Reesor creek. The valley wall slopes range of approximately 8-60%.

The topographic survey completed by Genesis Land Surveying dated September 3, 2019 is provided in **Appendix B**.

3.1.2 Floodplain

Engineered floodplain mapping for Reesor Creek was obtained from the TRCA, dated September 2020, and is illustrated on **Figure 3.2** (relevant excerpts are provided in **Appendix B**). As shown on **Figure 3.2**, the regulatory (Regional - Hurricane Hazel) flood elevations range between 286.85 m and 288.49 m within the subject lands. The subject lands are regulated by TRCA under Ontario Regulation (O.Reg.) 41/24 and as such a permit will be required for site development.

A previous version of the TRCA floodplain mapping was reviewed, dated January 11, 2011 for Reesor Creek. It should be noted that a significant discrepancy in floodplain elevation was identified between the two floodplain maps with elevations increasing over 1 m along the frontage of the site in the September 2020 mapping. Increases in floodplain elevation are not uncommon as modelled flows or topographic mapping are updated however increases of over 1 m are uncommon. The floodplain extents will be confirmed as part of the detailed design for affected properties via detailed topographic survey of the valley which may result in decreases to the floodplain. For the purposes of this report the most current floodplain (September 2020) has been used to establish the subject land's constraint limits.

There are two existing crossings of Reesor Creek within the Lincolnville Secondary Plan, one on the Reesor property comprised of an oval corrugated metal culvert, inundated with stone and sediment, and one on the Northcape property comprised of a concrete arch culvert (refer to **Figure 3.1** and **Figure 3.2**). No watercourse crossings are proposed within the subject lands and the existing crossings are not proposed to be enhanced as part of the development.

A 10 m buffer is provided from the existing regulatory floodplain.

3.2 Proposed Conditions

3.2.1 Site Grading

In general, the proposed development will be graded in a manner which will satisfy the following goals:

- Satisfy the Town of Whitchurch-Stouffville lot and road grading criteria including:
  - Minimum Road Grade: 0.5%
  - Maximum Road Grade: 6.0%
  - Minimum Lot Grade: 2%
  - Maximum Lot Grade: 5%
- Provide continuous road grades for overland flow conveyance;
- Minimize the need for retaining walls;
- Minimize the volume of earth to be moved and minimize cut/fill differential;
- Minimize the need for rear lot catchbasins; and
- Achieve the stormwater management objectives required for the proposed development.

A preliminary grading plan is provided on **Figure 3.3**.

The subject lands will generally be sloped east and north towards a proposed SWM facility (SWM Facility E1) adjacent to Reesor Creek (refer to **Section 6.0** for the SWM facility information). The existing ground slope on the subject lands will be reduced to

optimize the construction of medium density units, to provide a continuous flow path to the SWM facility, and to minimize the number of 100 year stormwater capture points required.

The proposed boulevard grade on Future Street B is 5% to provide sufficient right-of-way conveyance capacity.

Per the Town of Whitchurch-Stouffville engineering standards, a minimum 0.6 m separation to the seasonally high groundwater level is required to the underside of building footing elevations. Per the Hydrogeological Assessment (Soil Engineers), groundwater levels across the site were found to be moderately deep, with sufficient separation to underside of anticipated building footings. The exception was near Monitoring Well No. 1 (MW1) in the southwest corner of the site, where the highest recorded groundwater level was 290.1 masl, which is approximately 2.4 m below the proposed road elevation. The townhouses proposed in this area are anticipated to have underside of building footing elevations that are lower than the minimum 0.6 m separation to the groundwater table. Therefore, alternatives such as basement waterproofing or raising foundations will be considered at the detailed design stage.

At the detailed design stage, the preliminary grading shown on **Figure 3.3** will be subject to a more in-depth analysis in an attempt to balance the cut and fill volumes and minimize slopes and walls. Berm and grading requirements based on input from noise and vibration studies will be addressed at the site plan application stage.

3.2.2 Floodplain Modifications

In accordance with O.Reg. 41/24, no development or grading is proposed within the floodplain, or the 10 m setback to the regulatory floodline, as illustrated on **Figure 3.3**.

4.0 Rights-of-way and Sidewalks

A 20.0 m right-of-way (ROW) is proposed for the collector road within the subject lands. The collector roads within the subject lands are based on the Lincolnville Urban Design Guidelines (2023) for collector road right-of-way 23.0 m, and scaled down for the proposed collector road right-of-way width of 20 m. It is designed to accommodate a 2.0 m wide sidewalk on the east and north sides of the ROW and a 3.0 m wide sidewalk on the west and south sides of the ROW. The 20.0 m ROW contains all infrastructure required and has boulevards remaining for snow storage.

The ROW sections for the future development blocks will be determined at the Site Plan application stage. The proposed 20.0 m right-of-way cross-section is provided in **Appendix D**. The proposed sidewalk location plan is provided on **Figure 4.1**.

5.0 Storm Drainage and Servicing

5.1 Existing Conditions

5.1.1 Storm Drainage

The existing surface drainage patterns are shown in **Figure 3.1**.

The Lincolnville Secondary Plan area is part of the West Duffins Creek subwatershed, within the Duffins Creek watershed. As shown on **Figure 3.1,** the Lincolnville area has an existing drainage divide through the Newstone and Ambria properties, splitting drainage west to Stouffville Creek or east to Reesor Creek. The Stouffville Creek Tributary flows northeast to southwest along the western edge of the Newstone Property, adjacent to the GO Railway. Reesor Creek crosses York Durham Line and enters the Lincolnville Secondary Plan in the northeast corner, and generally flows north to south. Reesor Creek flows through the Reesor and Northcape properties before continuing south through the subject lands. The subject lands drain east to Reesor Creek in existing conditions.

Per **Figure 3.1**, the subject lands fall within the existing drainage Catchments 101 and 110. Runoff from Catchments 101, 102, 103, 104, 108, 109, and 110 are conveyed overland to Reesor Creek. Runoff from Catchment 101 generally drains east overland toward Reesor Creek. Runoff from Catchment 102 is conveyed to the eastern Tenth Line ditch which outlets at the approximate centre of the Acorn North property. Runoff from Catchment 103 is conveyed to a low point on the east side of Tenth Line, in the approximate centre of the Acorn South property via the Tenth Line ditches. Runoff from the western Tenth Line ditch and Catchment 104 is conveyed east under Tenth Line via a 750 mm diameter CSP culvert. Runoff from Catchment 108 is conveyed east along the existing Bethesda Side Road ditches which outlet to Reesor Creek west of the intersection with York Durham Line.

Runoff from Catchments 105 and 106 are conveyed west overland to the Stouffville Creek Tributary.

The existing catchment drainage characteristics and outlets are summarized in **Table 5.1**.

Table 5.1: Summary of Existing Conditions Drainage Areas

Drainage Area ID	Description[1]	Outlet	Drainage Area (ha)
101	Agriculture and Open Space	Reesor Creek	25.89
102	Agriculture and Existing Bethesda Side Road	Reesor Creek	2.94
103	Existing Tenth Line	Reesor Creek	2.60
104	Agriculture and Open Space	Reesor Creek	5.54
107	Agriculture	Reesor Creek	0.86
108	Existing Bethesda Side Road	Reesor Creek	0.75
109	Agriculture	Reesor Creek	0.55
110	Agriculture	Reesor Creek	0.79
Reesor Creek Total			39.92
105	Agriculture	Stouffville Creek	6.86
106	Environmental/Floodplain Area	Stouffville Creek	4.48
Stouffville Creek Total			11.34

[1] Land use based on aerial imagery

5.1.2 Storm Servicing

There is no existing storm sewer infrastructure within the subject lands. Tenth Line adjacent to the site has a rural cross section, and conveys stormwater via the existing road side ditches and culverts.

5.2 Proposed Conditions

5.2.1 Storm Drainage

Under proposed conditions, runoff from the subject lands will generally follow the existing drainage conditions and be conveyed towards Reesor Creek as illustrated on **Figure 5.1**.

Within the Lincolnville Secondary Plan area, only Catchments 201 and 208 will drain through the subject lands. The subject lands are located within Catchment 201, which includes drainage from several proposed developments within the Lincolnville Secondary Plan area, including Acorn South (subject lands), Northcape, Acorn North, Brundale, and part of Hume lands. Runoff from Catchment 201 will generally be

conveyed southeast and northeast to a low point on Street A adjacent SWM Facility E1 and ultimately conveyed east to Reesor Creek. Runoff from Catchment 208 will be conveyed south on Tenth Line to a 100 year capture point proposed at the existing low point of the road, near the centre of the subject lands' frontage. Major and minor system runoff from Tenth Line will be captured and conveyed east through the Acorn South storm sewer system and ultimately to Reesor Creek. In an emergency event, runoff from Tenth Line will be conveyed east through the future development block (Block 1) to Reesor Creek. Tenth Line along the frontage of the subject lands will be urbanized as part of the development of the Lincolnville Secondary Plan. The percent impervious of Catchment 208 is based on the future urbanized Tenth Line right-of-way cross section.

Catchment 202 is located within the Hume and Piechatzek properties. Runoff from Catchment 202 will generally be conveyed east to a 100 year capture point on Street A within the Hume property adjacent SWM Facility E2, where it will ultimately be conveyed to Reesor Creek.

Catchments 203 and 204 are located within the 12942 York Durham Line property. Runoff from Catchment 203 will be conveyed south to a 100 year capture point adjacent SWM Facility E3, and ultimately to Reesor Creek. Catchment 204 will drain uncontrolled to Reesor Creek and is anticipated to be comprised of rear yards and open space.

Catchments 207, 209, 210, and 211 are located west of Tenth Line within the Newstone and Ambria properties. Runoff from Catchments 209 and 211 will generally be conveyed southwest to a 100 year capture point, and ultimately to the Stouffville Creek Tributary. Catchments 207 and 210 will drain uncontrolled to the Stouffville Creek Tributary. Runoff from the Metrolinx site will continue to be conveyed to the GO Railway ditch and the Stouffville Creek Tributary.

Runoff from the Trudel property (Catchment 205) will generally be conveyed southeast to an onsite quantity control facility which will outlet to the proposed Courtney Valley Estates storm sewer. The proposed storm sewer will convey flows to a future wet SWM pond providing quantity, quality, and erosion control that will be constructed as part of the Courtney Valley Estates subdivision. It should be noted that there is sufficient depth in the proposed storm sewer on the Acorn South property to convey the Trudel storm flows north if the Courtney Valley Estates SWM pond is delayed.

Runoff from Catchment 206 will be conveyed east to a proposed outlet to Reesor Creek. The approximate future outlet location to Reesor Creek has been identified on **Figure 5.1**.

Runoff from the future development blocks fronting York Durham Line on the Reesor and Acorn South properties is anticipated to drain west to Reesor Creek.

The proposed drainage areas and percent impervious are shown on **Figure 5.1** and summarized in **Table 5.2** below. The impervious coverages have been estimated based on anticipated zoning. Refer to **Appendix C** for the calculations.

Table 5.2: Summary of Proposed Conditions Drainage Areas

Drainage Area ID[1]	Description	Outlet	Drainage Area (ha)	Percent Impervious[2]
201	Acorn South (subject lands), Northcape, Acorn North, Brundale, and part of Hume lands	Reesor Creek	18.77	80
202	Hume and Piechatzek (future development)	Reesor Creek	4.41	85
203	12942 York Durham Line (future development)	Reesor Creek	3.29	72
204	12942 York Durham Line (rear yards to NHS)	Reesor Creek	0.16	0
205	Trudel	Reesor Creek	1.95	77
206	Bethesda Side Road	Reesor Creek	0.75	62
208	Tenth Line	Reesor Creek	3.72	62
Reesor Creek Total			33.05	
207	Newstone (open space)	Stouffville Creek	0.17	7
209	Newstone (future development)	Stouffville Creek	10.13	78
210	Newstone (environmental/ floodplain area)	Stouffville Creek	4.31	0
211	Newstone (park block / SWM block)	Stouffville Creek	2.35	22
Stouffville Creek Total			16.96	

[1] Refer to **Figure 5.2**.
[2] Refer to **Appendix C** for calculations.

As indicated in **Tables 5.1** and **5.2,** in the post-development conditions, there will be a reduction in total overall drainage area to Reesor Creek and there will be an increase in the total overall drainage area to Stouffville Creek. The Stouffville Creek required quantity controls to address the increase in drainage area are summarized in the Newstone Functional Servicing and Stormwater Management Report (January 2025).

5.2.2 Storm Servicing

5.2.2.1 Minor System

The storm sewer system (minor system) will be designed for the 5 year return storm as per the Town of Whitchurch-Stouffville standards and the CLI-ECA. The storm sewers will convey flows to a proposed Stormwater Management (SWM) facility, as outlined further below in **Section 6.0**, discharging ultimately to Reesor Creek (refer to **Figure 5.2**).

The storm sewer system will typically be designed with grades between 0.5% and 2%. Throughout the proposed development, the storm sewer will be constructed at a minimum depth of 1.5 m to provide frost protection and 2.7 m where able for foundation drains. A slope of 0.3% is proposed for a portion of large diameter storm sewer in order to maximize the area where foundation drains are provided. The storm sewer cannot be lowered further due to the elevation of the 100 year floodline within Reesor Creek. Furthermore, road elevations cannot be raised through the subject lands as they are constrained by the Tenth Line centreline elevation and providing a continuous slope towards the Street A low point and site outlet.

In the event that sufficient depth cannot be provided for foundation drain connections to the storm sewer, alternatives such as a foundation drain collector sewers or alternative building product (i.e. slab on grade) will be considered. As noted in the Town of Whitchurch-Stouffville Design Guidelines, sump pumps will not be used in new development areas for foundation drainage. The requirement for alternative foundation drainage will be confirmed at the detailed design stage.

The storm drainage system will be designed in accordance with the Town of Whitchurch-Stouffville and MECP guidelines, including the following:

- Pipes to be sized to accommodate runoff from a 5 year storm event,
- Minimum Pipe Size: 300 mm diameter,
- Maximum Flow Velocity: 4.5 m/s,
- Minimum Flow Velocity: 0.75 m/s,
- Minimum Pipe Depth: 2.7 m to obvert for gravity service connections,
- Minimum Pipe Depth: 1.5 m to obvert.

The preliminary layout for the proposed storm sewer within the subject lands is provided on the Preliminary Servicing Plan, **Figure 5.2**.

Preliminary storm sewer sizing calculations have been prepared, and are included in **Appendix E**.

5.2.2.2 Major System

Major system flows (greater than the 5 year up to the 100 year storm event) will be conveyed within the road rights-of-way to a proposed low point on Street A. Due to right-of-way capacity constraints, a 100 year capture point is proposed on Future Street B at the intersection with Street A. The proposed boulevard grade on Future Street B is 5% to provide sufficient right-of-way conveyance capacity. The proposed right-of-way cross-sections and capacity calculations are provided in **Appendices D** and **E**, respectively, which show that the major system flows can be safely conveyed within the proposed road rights-of-way with a maximum flow depth of 0.30 m.

Tenth Line along the frontage of the subject lands will be urbanized as part of the development of the Lincolnville Secondary Plan. A 100 year capture point is proposed at the existing low point on Tenth Line, near the centre of the subject lands. Major system runoff from Tenth Line will be conveyed south where it will be captured and conveyed through the minor storm sewer system towards the proposed SWM facility (refer to **Section 6.0**). In an emergency event, runoff from Tenth Line will be conveyed east through the future development block (Block 1) to Reesor Creek.

6.0 Stormwater Management

6.1 Stormwater Management Criteria

The following stormwater management criteria have been established based on the greatest requirements of each of the design guidelines and standards listed in **Section 1.3** and discussions with review agencies.

As noted in the Town of Whitchurch-Stouffville Design Guidelines and Standard Drawings (Section D3.01 – General Requirements), storage volume requirements for permanent pool, quality control and extended detention shall be based on criteria established in the CLI-ECA, the MOE Stormwater Management Planning and Design Manual, the TRCA's Stormwater Management Criteria, or site specific requirements as established in an approved Watershed Plan, Master Environmental Servicing Plan, Master Drainage Plan, Town-Wide Storm Drainage & Stormwater Management Master Plan or as otherwise established by the Town, TRCA or other relevant authorities with jurisdiction.

The stormwater management criteria are summarized below in **Table 6.1**:

Table 6.1: Stormwater Management Criteria

Criteria	Control Measure
Quality Control	Provide an "Enhanced" level of protection in accordance with Ministry of Environment (MOE) Stormwater Management Planning and Design Manual (2003) with a minimum 80% Total Suspended Solids (TSS) removal.
Erosion Control	Minimum 5 mm on-site retention (infiltration/bioretention). A minimum 48-hour extended detention of runoff from a 25 mm-4-hour Chicago storm event shall be provided for erosion protection.
Water Budget	Maintain existing groundwater recharge rates and appropriate distribution, ensuring the protection of related hydrologic functions. The site is located within a Wellhead Protection Area (WHPA) Q1/Q2 and is a Significant Groundwater Recharge Area. Therefore, an evaluation of anticipated water balance changes between existing and proposed condition must be conducted, and a plan detailing how changes will be minimized must be provided. Provide a post to pre water budget assessment.

Criteria	Control Measure
Quantity Control	Maximum control to allowable release rates for the 2 through 100 year storm events based on unit flow rates established in the Duffins Creek Hydrology Update report (2002).

6.2 Proposed Stormwater Management Plan

In accordance with the Stormwater Management Planning and Design Manual (MOE, 2003), a review of stormwater management best practices was completed using a treatment train approach, which evaluated lot-level, conveyance system and end-of-pipe alternatives.

The following study area characteristics and constraints were taken into consideration:

- The topography has slopes ranging from 0.5% to 10% on the subject lands tableland and 8 to 60% in the valley of Reesor Creek;
- Based on the Geotechnical investigation, soils within the subject lands consist of primarily silty clay;
- An evaluation of boreholes in the vicinity of the proposed LID's, as discussed in **Section 6.3**, have been completed and indicates that the native soils have a hydraulic conductivity ranging from 1.1×10^{-6} to 7.5×10^{-6} m/s ;
- Within the installed site wells, groundwater was observed at depths ranging between 0.47 m to 7.1 m ;
- Due to the presence of Stouffville Municipal Supply Well No. 3 and the shallow depth of the ORMAC, the subject lands have an aquifer vulnerability scoring of 8 or 10;
- The subject lands are within Wellhead Protection Areas (WHPA) Q1/Q2 – recharge management areas;
- Per Town standards, LIDs are not permitted in park blocks or rights-of-ways;
- The proposed subdivision development is approximately 6.9 ha and consists of residential subdivision; and
- The subject lands drain towards Reesor Creek.

The feasibility of at-source, conveyance and end-of-pipe SWM controls were evaluated for use in the proposed development to achieve the design criteria provided in **Section 6.1**. Refer to **Appendix F** for a summary of the feasibility evaluation. Based on the feasibility evaluation, the proposed SWM Plan will include a treatment train approach of on-site LID measures within the site plan blocks, increased topsoil depth, and an end-of-pipe SWM facility. Per Town criteria, pre-treatment devices, such as oil-grit separators, will be proposed within the site plan blocks to remove 80% of suspended solids from runoff prior to discharging to the municipal storm sewer.

A total of four SWM facilities are proposed to control runoff from the Lincolnville Secondary Plan area: SWM Facilities E1-E3 and W1 (refer to **Figure 5.1**). The subject lands will be serviced by SWM Facility E1, which is proposed on the east side of the subject lands and will discharge to Reesor Creek.

Runoff from Catchments 201 and 208 will be conveyed to SWM Facility E1. Runoff from Catchment 201 will generally be conveyed southeast and northeast to a low point on Street A, where the major system will be conveyed to the SWM facility E1 aftbay via an overland flow route. A portion of the major system drainage will be captured by a 100 year capture point located at the Street A / Future Street B intersection, before being conveyed to the SWM Facility E1 forebay inlet. As discussed in **Section 5.2.1**, runoff from Catchment 208 will be conveyed south to a proposed 100 year capture point at the existing low point on Tenth Line, near the middle of the Acorn South frontage, where it will be captured and conveyed east through the minor storm sewer system to the proposed SWM Facility E1 forebay inlet. Both a 5 year and a 100 year storm sewer design sheet have been provided in **Appendix E** to demonstrate how the storm sewers were sized to accommodate the 100 year flows from Catchment 208.

Refer to **Sections 6.3** and **6.4**, below, for additional information on LID measures and the end-of-pipe SWM Facility E1, respectively.

6.3 Low Impact Development Measures

Low Impact Development (LID) measures provide reduction of runoff and promote infiltration at the source. Each type of LID measure has the potential to provide water quality control including TSS removal, erosion control, and/or water budget benefits. These LID measures, combined in a treatment train with end-of pipe SWM measures will work towards achieving the SWM criteria listed in **Section 6.1**.

As described in **Section 2.2**, there are many constraints on the subject lands due to source water protection regulations. Due to the subject lands being located within a WHPA Q1/Q2 and the high vulnerability of the ORMAC, only clean runoff is permitted to infiltrate into the groundwater. As a result, no LIDs are proposed to infiltrate ROW runoff or SWM facility outflows due to salt concerns. Additionally, Town standards do not allow structural LIDs in ROWs or park blocks. Therefore, within the subject lands, LID locations are limited to the site plan blocks. Within the site plan blocks, several potential LID options have been identified, as shown in **Appendix F**.

The potential LID locations are shown on **Figure 5.1** based on separation to the seasonally high groundwater level. At the detailed design stage, the exact LID locations and sizes will be determined. Proposed infiltration trenches will be located such that 1 m of clearance is provided between the bottom of trench and the more restrictive of the approximate top of the ORMAC or the seasonally high groundwater.

6.3.1 5 mm On-Site Retention

The total proposed development area for the subject lands is approximately 6.92 ha with an imperviousness of 76%. To retain the volume generated by 5 mm of rainfall over the proposed impervious area for the subject lands, approximately 265 m^3 of retention volume is required (refer to calculations provided in **Appendix E**). This can be provided via infiltration measures or on-site storage for site specific uses such as irrigation. Several locations have been noted throughout the subject lands which may be feasible to provide an infiltration facility based on the depth to the seasonally high groundwater level, refer to **Figure 5.1**. The retention method will be determined at the detailed design stage.

6.3.2 Water Budget

The assessment and quantification of infiltration across the study site is discussed in Hydrogeological Assessment (Soil Engineers, May 2026). The report also provides preliminary water budget calculations for the subject lands. It provides an assessment of pre and post-development conditions and establishes a post-development target for infiltration for the development site.

Where feasible, measures to minimize impacts on the water budget have been incorporated into the functional development design. As noted in the Hydrogeological Report, the estimated existing infiltration volume on the proposed development is approximately 26,111 m^3. Without mitigation the proposed development infiltration volume is approximately 12,660 m^3.

As recommended in the Hydrogeological Assessment and outlined in **Section 6.3**, LID measures, will be implemented at the detailed design stage, where feasible, to maintain or increase existing infiltration rates in the post-development scenario. It is anticipated that the water balance deficit of approximately 13,451 m^3 will be addressed through proposed mitigation measures on the future development blocks. Refer to **Appendix B** for relevant excerpts.

6.4 End-of-Pipe Stormwater Management Facility

A wet pond SWM facility (SWM Facility E1) is proposed to provide quality, erosion and quantity control. The SWM facility will be located on the subject lands, near the east side of the property adjacent to Reesor Creek, as shown on **Figure 6.1**, and will outlet to Reesor Creek. The SWM facility will be sized for a total drainage area of 22.49 ha assuming an imperviousness of 77%. Refer to **Appendix E** for the impervious calculations.

6.4.1 Quality Control

An "Enhanced" level of quality control is required for the proposed development. The quality control parameters as presented in Table 3.2 of the Stormwater Management Planning and Design Manual, (MOE, March 2003) were used in the design of the facility. The facility will be sized to service a drainage area of 22.49 ha. Based on Table 3.2 and an imperviousness of 77%, a total storage of 236.7 m^3/ha is required for a wet pond (refer to **Appendix E**). Of this total storage, 197 m^3/ha represents the required volume of the permanent pool. Based on a drainage area of 22.49 ha, approximately 4,424 m^3 of permanent pool storage is therefore required to obtain an "Enhanced" level of protection.

The available permanent pool storage is 4,932 m^3 (see **Figure 6.2** and calculations in **Appendix E**). An "Enhanced" protection level for quality control will therefore be achieved through the implementation of the end-of-pipe SWM facility.

As discussed in **Section 6.2**, pre-treatment devices, such as oil-grit separators, will be proposed within the site plan blocks to remove 80% of suspended solids from runoff prior to discharging to the municipal storm sewer.

6.4.2 Erosion Control

The attenuation of the extended detention volume in the pond will provide erosion protection for the downstream watercourse as well as promote sediment removal for water quality. The SWMP Manual (MOE, 2003) states that the extended detention storage is based on the greater of 40 m^3/ha or the storage volume required to retain the runoff from a 25 mm storm for 24 to 48 hours. As outlined in **Section 6.1** above, a detention time of 48 hours is required for the subject lands. A Visual Otthymo 6.2 hydrologic model was used to establish the post-development runoff from the proposed development during a 25 mm, 4-hour Chicago rainfall event. The required extended detention storage based on the runoff volume detained for 48 hours was determined to be approximately 3,907 m^3 (refer to **Appendix E**).

The modelled runoff yielded a larger storage volume than the extended detention volume based on 40 m^3/ha, therefore the erosion control storage volume of 3,907 m^3 will be used in the design of the facility. A copy of the model schematic and the output file are included as **Appendix C** with digital modelling files included via a file sharing link on the **Appendix C** cover page. The calculations for the extended detention component of the proposed stormwater management facility are provided in **Appendix E**. Orifice sizing calculations and details will be provided at detailed design.

6.4.3 Quantity Control

Per Table 3-1 of the TRCA Stormwater Management Criteria, quantity control via unit release rates for the 2-100 year storm events is required for Reesor Creek of the Duffins Creek Watershed. Unit release rates were established for Reesor Creek in Table 5.1 of the Duffins Creek Hydrology Update (Aquafor Beech Ltd., May 2002). Table 5.1 is provided in **Appendix B** for reference. Quantity controls are proposed to be provided via SWM facility E1.

The preliminary allowable release rates from SWM Facility E1 are listed below in **Table 6.2** below.

Table 6.2: Preliminary Allowable Release Rates

Return Period Storm	Unit Release Rate Formula	SWM Facility E1 (Drainage Area = 22.49 ha) Allowable Release Rate
	(m^3/s/ha)	(m^3/s)
2 Year	5.364-0.520 ln(A)	0.084
5 Year	8.535-0.826 ln(A)	0.134
10 Year	10.729-1.036 ln(A)	0.169
25 Year	13.832-1.334 ln(A)	0.218
50 Year	16.132-1.549 ln(A)	0.254
100 Year	18.629-1.787 ln(A)	0.294

The proposed SWM Facility E1 will control future flows from the proposed development to the allowable release rates provided in **Table 6.2** for the 2 to 100 year storm events. Proposed hydrologic modelling was completed using the Visual Otthymo model (Version 6.2) to determine the required SWM facility volume. Refer to the File Safe Cloud Link provided in **Appendix C** to download the VO hydrology model files. The hydrologic modelling parameters and model schematic are provided in **Appendix C**

The 12-hour and 6-hour AES design storm distributions per TRCA and Town of Whitchurch-Stouffville requirements were modelled with a preliminary outlet control structure and approximate facility area for the proposed conditions hydrology model. A summary of the resulting storage requirements for the SWM pond is provided in **Table 6.3**.

Table 6.3: SWM Facility E1 Storage Requirements

Storm Distribution	6-Hour AES		12-Hour AES	
Return Period Storm	**Discharge (m^3/s)**	**Storage (m^3)**	**Discharge (m^3/s)**	**Storage (m^3)**
2 Year	0.062	5,161	0.082	**5,773**
5 Year	0.110	6,908	0.120	**7,416**
10 Year	0.140	8,135	0.155	**8,467**
25 Year	0.211	9,571	0.217	**9,696**
50 Year	0.251	**10,664**	0.251	10,633
100 Year	0.284	**11,793**	0.280	11,644

Note: Bold values indicate the more conservative (higher) proposed storage volumes

The proposed SWM Facility E1 will control proposed flows to allowable release rates for the 2 through 100 year storm events. **Table 6.4** provides a comparison of allowable and proposed flows at the Reesor Creek outlet, downstream of the subject lands. Refer to **Appendix C** for the proposed conditions hydrologic modelling.

Table 6.4: Comparison of Allowable Release Rate Targets and Proposed Flows

Storm Distribution	Reesor Creek Outlet – Flow Rate (m^3/s)	
Return Period Storm	**Target**	**Prop**
2 Year	0.084	0.082
5 Year	0.134	0.120
10 Year	0.169	0.155
25 Year	0.218	0.217
50 Year	0.254	0.251
100 Year	0.294	0.284

As shown in **Table 6.4**, the proposed flows will be less than or equal to the allowable release rates for the 2 through 100 year storm events and thus the quantity control criterion will be achieved.

6.4.4 General SWM Facility Design Characteristics

Preliminary SWM facility grading is provided on **Figure 6.1**. The pond block size was established based on the following general criteria:

- A maximum slope of 4:1 from the pond bottom to 3 m distance below the normal water level will be provided;
- A maximum slope of 7:1 from 3 m distance below the normal water level to 3 m distance above the normal water level will be provided; and,
- A maximum slope of 4:1 will be provided from 3 m distance above the normal water to the pond grading limits.

The design of the facility will include the following elements:

- Maximum 2.5 m deep permanent pool;
- Maximum 1.0 m deep extended detention;
- Maximum flood storage depth of 2.0 m (combined extended detention and flood storage);
- Minimum forebay length to width ratio of 2:1;
- Minimum pond length to width ratio of 3:1;
- Maximum forebay area is 1/3 of total permanent pool;
- Emergency spillway sized for the uncontrolled 100 year storm event should the outlet become blocked;
- Forebay berm to enhance sediment removal;
- Extended detention outlet device designed to ensure the 25 mm water quality event is detained for a minimum of 48 hours;
- 4 m wide maintenance access road provided from the proposed municipal road with a maximum longitudinal slope of 10% and a crossfall of 2% (max). It will be used to facilitate machinery to access the forebay during scheduled maintenance as well as to access the outlet structure for maintenance purposes; and
- Drain-down pipe to be provided leading from the permanent pool to a maintenance hole with de-watering sump, if a gravity outlet is not available.

Per the floodplain mapping obtained by the TRCA, the 100 year floodline adjacent to the proposed SWM facility outfall (286.98 m) will be below the proposed invert of the SWM facility outlet control structure (287.00 m). Therefore, the existing 100 year floodplain will not impact the outlet control structure hydraulics. A preliminary headwall location has been noted at the outlet of the proposed SWM Facility. The location will be confirmed at the detailed design stage.

An emergency spillway will be provided to convey the uncontrolled 100 year storm event peak flow from the SWM block to the proposed outfall. The sizing of the spillway will be provided at the detailed design stage.

As shown on **Figure 6.1**, the proposed SWM pond encroaches slightly into the 10 m top of slope buffer and the 10 m meanderbelt buffer. It should be noted that the proposed grading within the stable top of slope consists of cut and therefore will not negatively impact the established stable top of slope. As discussed in the EIS prepared by Dillon Consulting Ltd., the areas of encroachment will be fully naturalized as part of the SWM

pond's landscape design, maintaining the ecological function of the buffer. Therefore, the proposed encroachments will not negatively impact the natural heritage system (refer to relevant excerpts from the EIS in **Appendix B**).

7.0 Sanitary Servicing

7.1 Existing Sanitary Sewer System

There are no existing sanitary sewers located east of Tenth Line in the vicinity of the subject lands. An existing trunk sanitary sewer (Subtrunk 1) terminates approximately 1.5 km south of the subject lands on York Durham Line. The existing sewer continues south on York Durham Line to Mantle Avenue where it conveys flows west into the existing residential subdivision.

7.2 Proposed External Sanitary Infrastructure

Per the Town of Whitchurch-Stouffville Water & Wastewater Master Plan, the Lincolnville Secondary Plan Area, including the subject lands, will be serviced via an extension of Subtrunk 1 from its current termination in the York Durham Line right-of-way, north of Hoover Park Drive.

An Environmental Assessment (EA) was completed for Subtrunk 1 in 2017 by the Town of Whitchurch-Stouffville to determine the preferred alignment of the extension. The preferred alignment was determined to be on York Durham Line extending to future Forsyth Farm Drive and through the future Courtney Valley Estates development with a connection to be provided at the subject lands property limit.

In the event that the development of Courtney Valley Estates is delayed, an alternative alignment is available to service the subject lands to Subtrunk 1 on York Durham Line. The alignment of the alternative internal sewer within the Lincolnville Secondary Plan area would follow the existing agricultural access road which crosses Reesor Creek on the Northcape property before turning south to connect to the original Subtrunk 1 alignment at Future Forsyth Farm Drive. It should be noted that based on the current grading and servicing design of the Courtney Valley Estates development, it is not feasible to convey Courtney Valley Estates sanitary flows north to the alternative alignment through the Northcape property. Therefore, a second crossing of Reesor Creek would still be required at Future Forsyth Farm Drive to service just the Courtney Valley Estates development. The proposed Subtrunk 1 alignments are illustrated on **Figure 7.1**. The alignment of the Subtrunk 1 extension on York Durham Line is illustrated on **Figure 7.2**.

Detailed design drawings of the Subtrunk 1 extension were prepared by Chisholm Fleming in 2018 from the current termination of the sanitary sewer to approximately 240 m south of the future extension of Forsyth Farm Drive. Final approvals of the drawings from the TRCA, MECP, and Town were not pursued and the sanitary sewer extension was not constructed beyond its current termination. The extension of

Subtrunk 1 along its preferred alignment and through the study area is reflected in the Town's 2024 Water and Wastewater Master Plan (refer to Figure ES 4-1 in **Appendix B**).

7.3 Proposed Sanitary Sewer System

The sanitary sewers within the subject lands will have slopes ranging between 0.3% and 2% (typically) and will be provided at a depth to obvert ranging from 3 m to 8 m deep. Preliminary sanitary servicing is provided on **Figure 7.1**.

The sanitary sewer system will be designed in accordance with the Town of Whitchurch-Stouffville and MECP criteria, including but not limited to:

- Residential Sanitary Generation Rate: 350 L/c/d,
- Population Density: 3.2 people/single and semi-detached,
  2.9 people/townhouse, 2.2 people/apartment
- Peaking Factor: Harmon (Max. 4.0),
- Infiltration Rate: 0.23 L/s/ha,
- Minimum Pipe Size: 200 mm diameter,
- Minimum Residential Pipe Cover: 2.8 m,
- Minimum Acceptable Velocity: 0.6 m/s, and
- Maximum Velocity: 3.0 m/s.

In addition to the criteria above, the proposed sanitary sewers will be designed in accordance with the Inflow and Infiltration Reduction Standard for Sewers Servicing New Development, prepared by York Region including but not limited to: pipe deflection requirements, minimum and maximum depths for direct connections to sanitary sewers, pipe bedding, maintenance hole design and maximum spacing, and sanitary sewer service connection design.

Within the subject lands, there are five proposed sanitary drainage catchments: Catchments 311 - 315, which include two residential site plan blocks, two proposed road blocks, and a school block. Based on the above criteria, the total population from the subject lands is estimated to be approximately 629 people (excludes approximate population of Future Development Block 7 and approximate population from Brundale site). Refer to **Figure 7.1** for the sanitary drainage areas and **Appendix G** for the sanitary population calculations.

The preliminary layout for the proposed trunk sanitary sewers within the subject lands provided on **Figure 5.2**. As shown, the majority of sanitary drainage from the greater Lincolnville Secondary Plan area will be directed southeast through the subject land's sanitary trunk sewers towards Subtrunk 1. Within the subject lands, flows will generally be conveyed east and south to the potential connections to the extension of Subtrunk 1 at the southern limit of the subject lands or at the existing access road crossing of

Reesor Creek on the Northcape property as outlined in **Section 7.2**. The Trudel property, south of the subject lands, has an individual connection proposed to the Courtney Valley Estates sanitary sewer. It should be noted that there is sufficient depth in the proposed sanitary sewer on the Acorn South property to convey the Trudel sanitary flows north if the Courtney Valley Estates sanitary sewer is delayed. Sizing and servicing design of Subtrunk 1 will be confirmed as part of the Lincolnville Comprehensive Environmental Constraints and Servicing Strategy.

The ultimate peak flow to Subtrunk 1, including all external development, from the subject lands is approximately 116.1 L/s. A preliminary sanitary sewer design sheet and population calculations are provided in **Appendix G**.

8.0 Water Supply and Distribution

8.1 Existing Water Distribution

The existing watermain system is illustrated on **Figure 8.1**.

There is an existing 400 mm diameter Regional watermain on the east side of Tenth Line and on the north side of Bethesda Side Road which terminates immediately east of the Stouffville Zone 1 Elevated Tank on the north side of Bethesda Side Road. Existing 300 mm diameter watermain plugs are located on Tenth Line immediately west of the Trudel property and immediately east of the Existing Stouffville Zone 1 Elevated Tank on Bethesda Side Road.

There is no existing watermain on York Durham Line in the immediate vicinity of the subject lands.

The subject lands are located within Pressure District S1 which operates as a pressure boosted zone and is serviced by the Stouffville Zone 1 Booster Pumping Station (located at 12519 Tenth Line) drawing water from the Stouffville Pressure District S2. The Stouffville Pressure District S2 water supply is provided by a combination of Lake Ontario (via the Markham PD6 Reservoir) and five groundwater wells. The Stouffville Zone 1 Elevated Tank provides storage capacity (located at 6842 Bethesda Road).

8.2 Proposed Water System

The preliminary layout for the proposed watermain system is provided on **Figure 8.1.**

The subject lands will generally be serviced by proposed municipal watermains with connections to the existing Regional watermain on Tenth Line. Private local watermains are proposed to service the site plan blocks and connect into the proposed municipal watermains.

Per the Town of Whitchurch-Stouffville 2024 Water and Wastewater Master Plan, the trunk watermains will generally follow the proposed collector road alignment and will be comprised of 300 mm diameter watermains (refer to Figure ES 3-1 and associated Master Plan project list in **Appendix B**).

To service the potential development lands fronting York Durham Line, a watermain loop is proposed in general conformance with the Town of Whitchurch-Stouffville Water and Wastewater Master Plan which passes through the Courtney Valley Estates development to the south, on York Durham Line, and along the alignment of the existing access road on the Northcape property. The timing of construction of this watermain loop is unknown as it is dependent on the development of the Courtney Valley Estates

subdivision. Sizing and design of the external watermain loop will be confirmed as part of the Lincolnville Comprehensive Environmental Constraints and Servicing Strategy.

The watermain system will be designed in accordance with the Town of Whitchurch-Stouffville and MECP criteria including:

- Residential water usage rate: 350 L/c/d,
- Population Density: 3.2 people/single and semi-detached,
  2.9 people/townhouse, 2.2 people/apartment
- Minimum Pipe Size: 150 mm diameter,
- Minimum Pipe Depth: 1.8 m, and
- Maximum Hydrant Spacing: 90 m (medium and high density).

Water system hydraulic analyses will be prepared to confirm watermain sizing and that individual developments meet Town criteria at the detailed design stage.

9.0 Servicing Allocation

Servicing capacity is assigned by York Region to the Town of Whitchurch-Stouffville for allocation to individual developments. As part of the Draft Plan of Subdivision approval, servicing capacity allocation is provided by the Town of Whitchurch-Stouffville Council.

Per the Town of Whitchurch-Stouffville Council Report (January 2026), the Town currently has 9,672 persons equivalent of Regional servicing capacity assignment available for allocation to development applications until York Region's next Capacity Assignment update, scheduled for 2027. This number reflects the remaining unused allocation from the 2023 servicing capacity assignment combined with the allocation provided in 2025.

As of Q4 of 2025, the potential demand for servicing allocation in Whitchurch-Stouffville has been estimated as 11,037 persons, based on current development applications. As the current allocation of 9,672 persons is insufficient, the Town will be working closely with the Region to ensure that the 2027 Regional servicing Capacity Assignment aligns with the Town's needs.

10.0 Cost Sharing

The cost of infrastructure which benefits multiple properties, such as trunk storm sewers, trunk sanitary sewers, watermains, collector roads, and stormwater management facilities, should be shared by the benefiting landowners.

The landowners currently participating in the Lincolnville Landowners Group are preparing a cost sharing agreement to share community land and construction costs, as noted above, related to the development of community use lands within the Lincolnville Secondary Plan Area.

The owner of the subject lands (Acorn NE Stouffville Inc.) is a party in good standing with the landowner group

11.0 Utility Considerations

The utility companies (hydro, natural gas, and telecommunications) have been contacted to circulate the proposed draft plan of subdivision to confirm whether there is sufficient servicing capacity. Correspondence received thus far is included in **Appendix H**.

11.1 Hydro

There are existing overhead hydro lines on Tenth Line, Bethesda Side Road, and York Durham Line. Hydro One has confirmed that additional infrastructure will be required to fully service the Lincolnville Secondary Plan. The Lincolnville Landowner Group is actively coordinating with Hydro One to provide the required services. Town staff are included in the ongoing coordination.

11.2 Gas

There are existing high pressure gas lines on the east side of Tenth Line and on the south side of Bethesda Side Road from the intersection with Tenth Line to approximately 80 m east of the intersection. There are no existing gas lines on York Durham Line along the frontage of the subject lands. Enbridge has confirmed that sufficient capacity is available to service the Lincolnville Secondary Plan area, pending improvements to the Lakeridge and Wagg district stations. System improvements will be confirmed once the gas design is initiated.

11.3 Bell

Bell has existing buried cable on Tenth Line, buried cable and conduit on Bethesda Side Road north of the Hume property, and conduit on York Durham Line south of Webb Road.

11.4 Rogers

Rogers has existing infrastructure along Tenth Line and Bethesda Side Road (west of Tenth Line.

12.0 Erosion and Sediment Control During Construction

During the detailed design stage, erosion and sediment control measures will be designed with a focus on erosion control practices (such as stabilization, track walking, staged earthworks, etc.) as well as sediment controls (such as fencing, mud mats, catchbasin sediment control devices, rock check dams and temporary sediment control ponds). These measures will be designed and constructed as per the “Erosion and Sediment Control Guide for Urban Construction” document (TRCA, 2019). A detailed erosion and sediment control plan will be prepared for review and approval by the Municipality and Conservation Authority prior to any proposed grading being undertaken. This plan will address phasing, inspection and monitoring aspects of erosion and sediment control. All reasonable measures will be taken to ensure sediment loading to the adjacent watercourses and properties are minimized both during and following construction.

13.0 Summary

This Functional Servicing and Stormwater Management Report has been prepared in support of the Draft Plan of Subdivision and Zoning By-law Amendment applications for the proposed residential development in the community of Lincolnville, in the Town of Whitchurch-Stouffville. This report outlines the means by which the proposed development can be graded and serviced in accordance with the Town of Whitchurch-Stouffville, TRCA, York Region, MTO, and the MECP design criteria and policies.

General Information

- The existing lands are currently comprised of agricultural land, open space areas, floodplain, and wooded areas;
- The proposed development is located in the West Duffins Creek subwatershed of the Duffins Creek watershed; and
- The proposed development consists of residential townhouse blocks, an elementary school block, a stormwater management pond, and proposed roads.

Grading

- The proposed development will be graded in accordance with the Town of Whitchurch-Stouffville criteria;
- The proposed development grading has been developed to match to the existing surrounding grades, and provide conveyance of stormwater runoff, including external drainage;
- The site grading will be subject to further grading design at the detailed design stage; and
- Grading in buffers will be avoided where possible, with the exception of areas of local topographic depression or other significant constraints, which include the buffer along the east side of SWM Facility E1.

Rights-of-Way and Sidewalks

- 20.0m rights-of-way are proposed throughout the development.

Storm Drainage and Storm Servicing

- Storm Servicing:
  - Storm runoff will be conveyed by storm sewers designed in accordance with Municipality and MECP criteria;
  - Storm sewers will generally be designed for the 5 year storm event, and will convey 100 year flows from capture points to the SWM Facility; and
  - Adequate 100 year overland flow routes will be provided to convey 100 year flow to capture points.

- External drainage will be accommodated through the proposed development via a municipal storm sewer and overland flow within the ROW.

Stormwater Management

- The SWM Plan includes a treatment train approach of on-site LID measures within the site plan blocks, increased topsoil depth, and an end-of-pipe SWM Facility (E1);
- Quality Control: MOE (2003) Enhanced water quality protection will be provided through the use of a wet pond SWM Facility (E1) and oil-grit separators within the site plan blocks;
- Erosion Control:
  - The runoff volume from a 25 mm rainfall event will be detained over 48 hours by the wet pond SWM facility (E1); and
  - Minimum 5 mm on-site retention will be provided through infiltration or on-site storage for site specific uses such as irrigation.
- Water Budget: Soil Engineers Ltd. has completed a water budget analysis to determine the existing annual infiltration rate and the unmitigated annual infiltration rate in proposed conditions; and
- Quantity Control: Quantity control will be provided via a wet pond SWM Facility (E1) to control proposed runoff rates in the 2 through 100 year storm events to allowable release rates for the 2 through 100 year storm events based on unit flow rates established in the Duffins Creek Hydrology Update report (2002).

Sanitary Servicing

- The sanitary sewer system will be designed in accordance with the Town of Whitchurch-Stouffville criteria;
- Per the Town of Whitchurch-Stouffville Water & Wastewater Master Plan, the subject lands will be serviced via an extension of Subtrunk 1 from its current termination north of Hoover Park Drive;
- Subtrunk 1 is proposed to be extended through the future Courtney Valley Estates development south of the subject lands with a connection to be provided at the Acorn South property limit;
- In the event that the development of Courtney Valley Estates is delayed, an alternative alignment is available to service the subject lands and convey sanitary flows to York Durham Line; and
- The ultimate peak flow including all external development is approximately 116.1 L/s.

Water Supply and Distribution

- Per the Town of Whitchurch-Stouffville Water and Wastewater Master Plan, the trunk watermains will generally follow the proposed collector road alignment and will be comprised of 300 mm diameter watermain; and
- The subject lands will generally be serviced by a proposed municipal watermain with connections to the existing Regional watermain on Tenth Line.

Servicing Allocation

- Insufficient servicing capacity allocation was identified by the Town of Whitchurch-Stouffville Council; and
- The Town will be working closely with the Region to ensure that the 2027 Regional servicing Capacity Assignment aligns with the Town's needs.

Cost-Sharing

- A cost sharing agreement is being prepared by the Lincolnville Landowners Group.

Utility Considerations

- There are no existing utilities within the subject lands;
- Existing hydro, natural gas, and telecommunications infrastructure is present on boundary roads, including Tenth Line and York Durham Line.

Erosion and Sediment Control during Construction

- An erosion and sediment control plan will be prepared at the detailed engineering stage, in accordance with the "Erosion and Sediment Control Guideline for Urban Construction" document (December 2019).

Respectfully Submitted:

SCS Consulting Group Ltd.

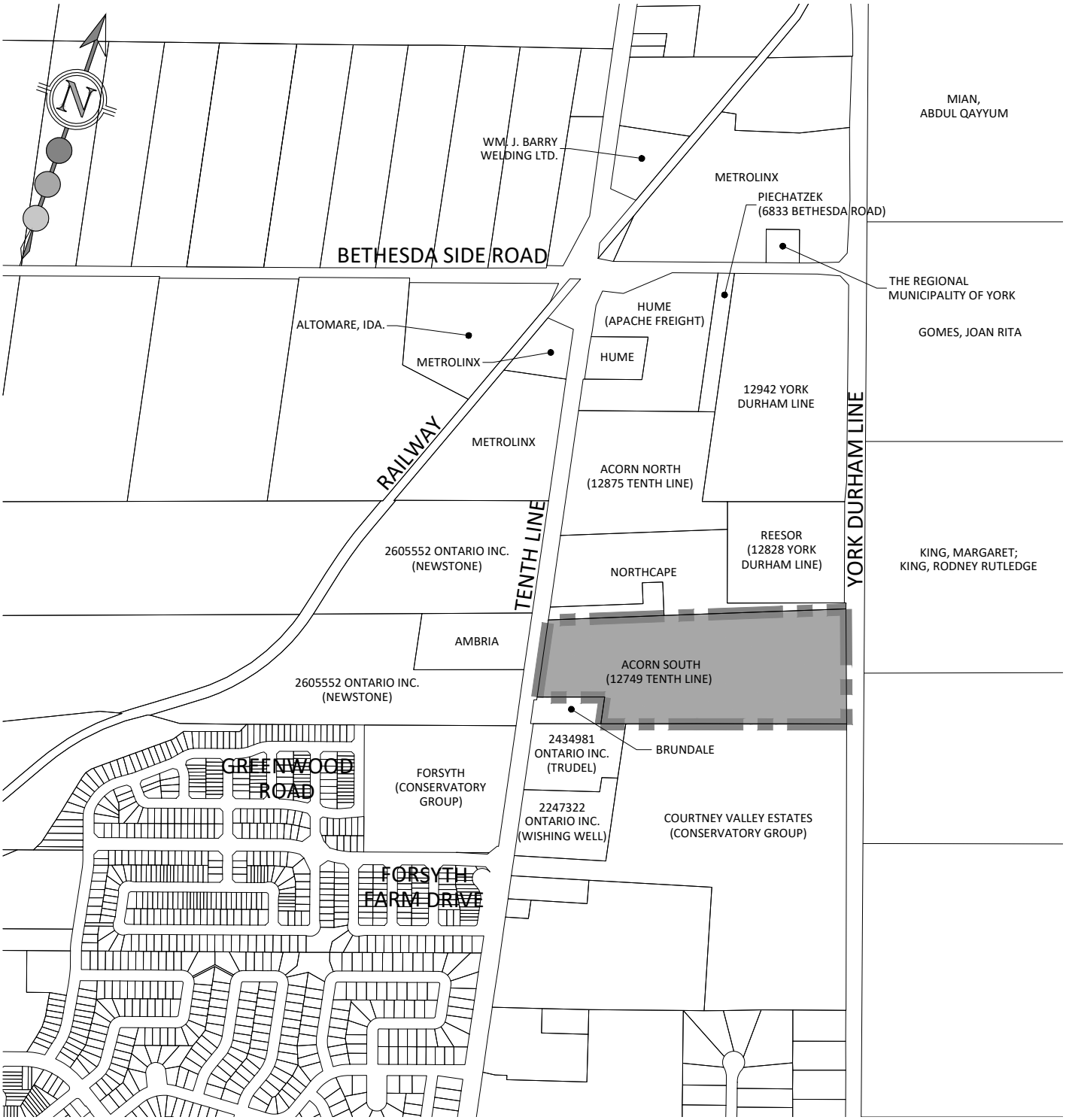
Nick McIntosh, M.A.Sc, P.Eng
nmcintosh@scsconsultinggroup.com

Shae Buchal, EIT
sbuchal@scsconsultinggroup.com

P:\2435 12749 Tenth Line, Stouffville - South\Design\Reports\FSR\2435 - FSSR.docx

Figures

SCS consulting group ltd



SCS consulting group ltd

30 CENTURIAN DRIVE, SUITE 100
MARKHAM, ONTARIO L3R 8B8
TEL: (905) 475-1900
FAX: (905) 475-8335

ACORN SOUTH - TENTH LINE, STOUFFVILLE

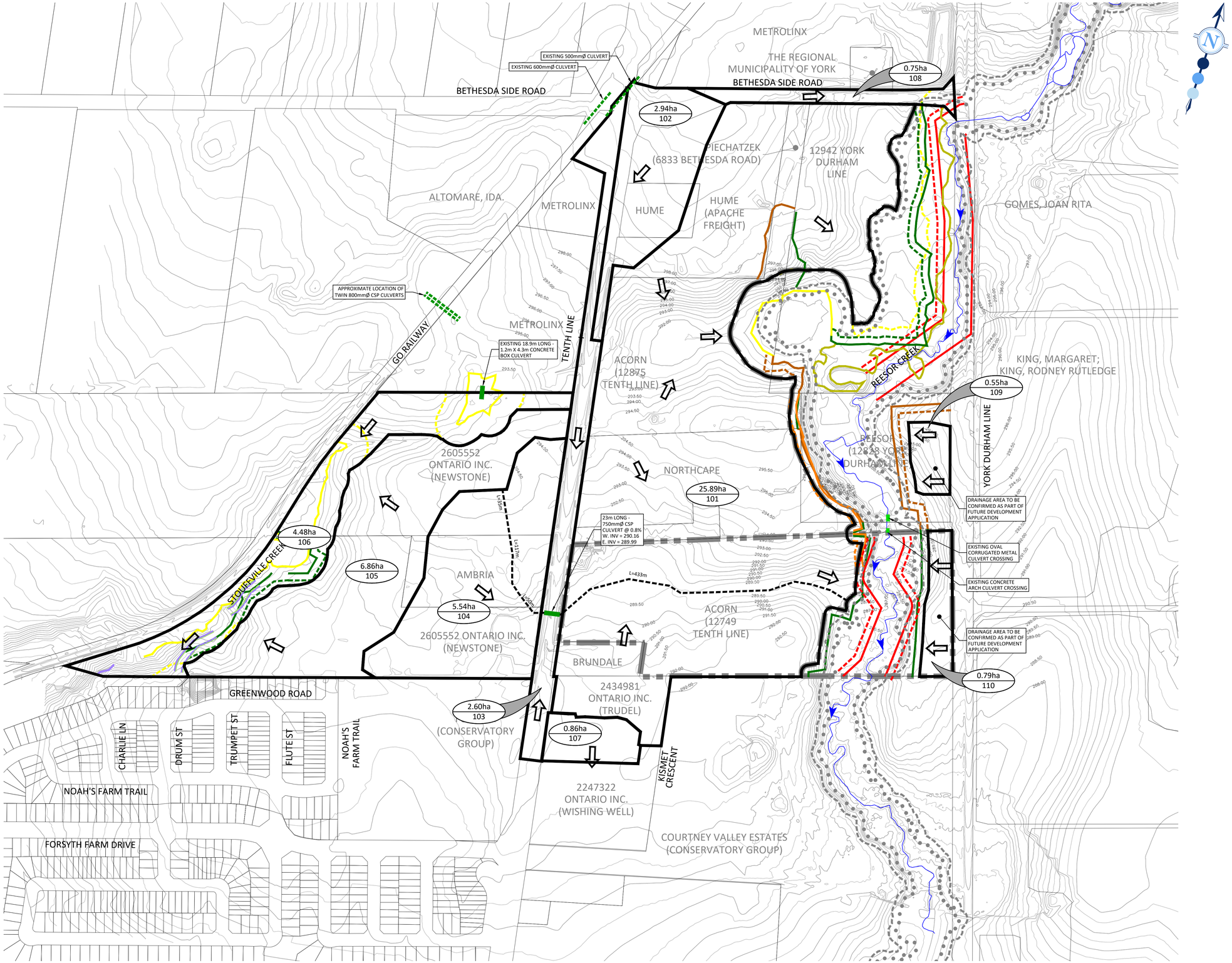
PROPERTY LIMIT

SUBJECT SITE

SITE LOCATION PLAN

DESIGNED BY: S.B.	CHECKED BY: N.D.M.	PROJECT No: 2435	FIGURE No: 1.1
SCALE: N.T.S.	DATE: MAY 2026		

File: P:\2076 Trinison – Tenth Line, Stouffville\Drawings\FSP\Fig\Report Figures\2076P–1.1–LOCT.dwg – Revised by <TMCNEIL> : Tue, Apr 21 2026 – 2:17pm



LEGEND:

- LIMIT OF ACORN NORTH PROPERTY
- LIMIT OF DEVELOPMENT
- 270.25 — EXISTING CONTOUR AND ELEVATION
- STORM DRAINAGE BOUNDARY
- OVERLAND FLOW
- 0.75ha / 108 — DRAINAGE AREA (HECTARES); CATCHMENT ID
- L=433m — TIME TO PEAK FLOW PATH AND LENGTH
- STAKED DRIPLINE
- STAKED DRIPLINE + 10m BUFFER
- STAKED WETLAND
- STAKED WETLAND + 30m BUFFER
- AIR PHOTOGRAPHY DRIPLINE
- AIR PHOTOGRAPHY DRIPLINE + 10m BUFFER
- MEANDERBELT
- MEANDERBELT + 10m BUFFER
- LONG TERM STABLE TOP OF SLOPE
- LONG TERM STABLE TOP OF SLOPE + 10m BUFFER
- WETLAND (PALMER, 2019)
- EXISTING REGULATORY FLOODLINE (TRCA 2020)
- REGULATORY FLOODLINE + 10m BUFFER

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ACORN SOUTH - TENTH LINE, STOUFFVILLE

EXISTING CONDITIONS TOPOGRAPHY AND DRAINAGE

DESIGNED BY:	S.B.	CHECKED BY:	N.D.M.
SCALE:	1:2500	DATE:	MAY 2026
PROJECT No:	2435	FIGURE No:	3.1

File: P:\2076 Trinison – Tenth Line, Stouffville\Drawings\FSP\Fig\Report Figures\2076P-3.1-STRM-EXST.dwg – Revised by <ARIDEOUT> : Mon, Mar 23 2026 – 3:12pm

LEGEND:

- LIMIT OF ACORN SOUTH PROPERTY
- LIMIT OF DEVELOPMENT
- HEC CROSS-SECTION
- 290.42 8075.31 — EXISTING REGULATORY FLOOD ELEVATION; HYDRAULIC SECTION ID; FLOODLINE ELEVATION LEADER
- EXISTING REGULATORY FLOODLINE (TRCA 2020)
- REGULATORY FLOODLINE + 10m BUFFER

*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

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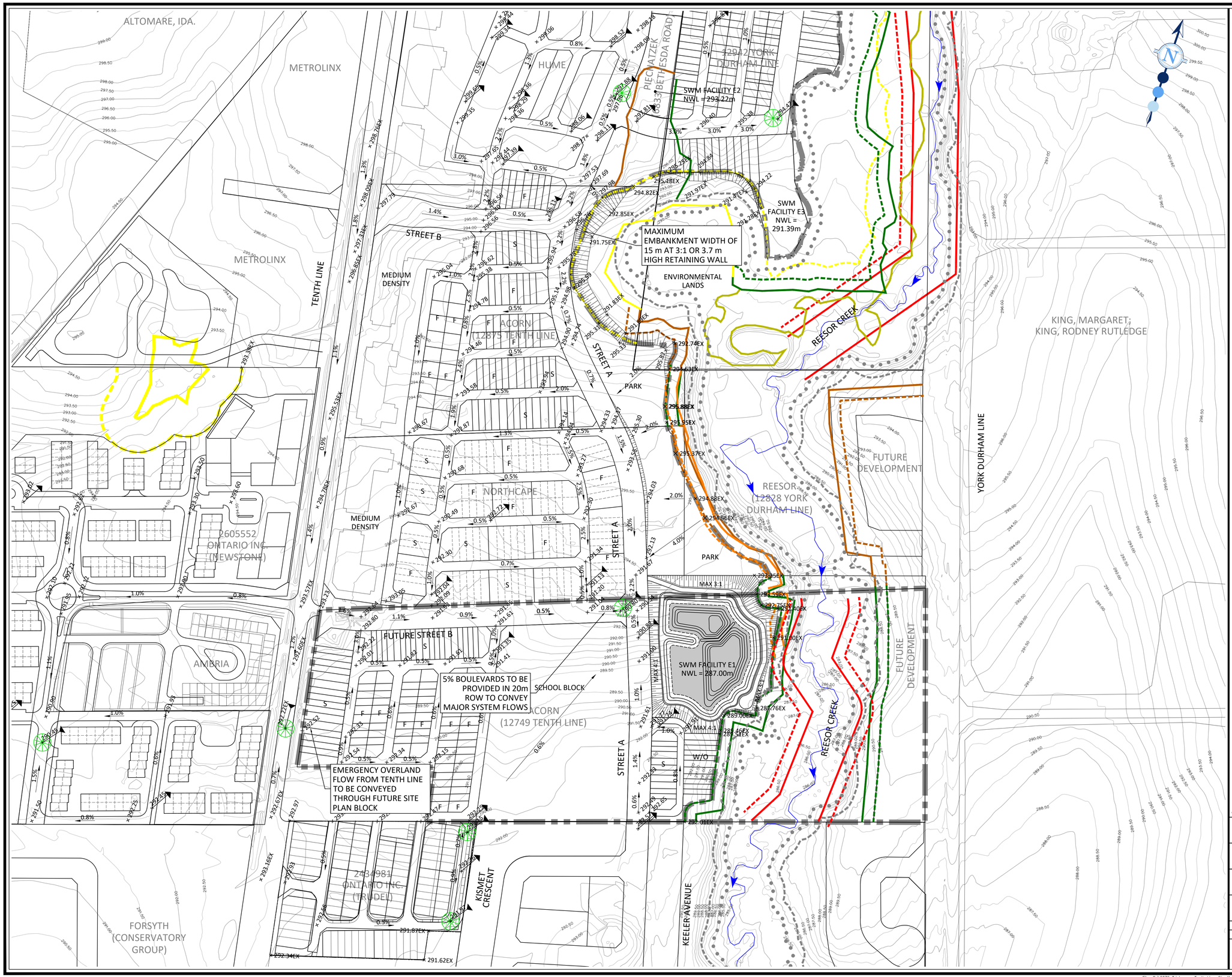
ACORN SOUTH - TENTH LINE, STOUFFVILLE

FLOODPLAIN MAPPING

DESIGNED BY:	S.B.	CHECKED BY:	N.D.M
SCALE:	1:3000	DATE:	MAY 2026
PROJECT No:	2435	FIGURE No:	3.2



LEGEND:

- LIMIT OF ACORN SOUTH PROPERTY
- LIMIT OF DEVELOPMENT
- 270.25 — EXISTING CONTOUR AND ELEVATION
- WATERCOURSE
- × 223.91 — PROPOSED ELEVATION
- × 224.35 EX — EXISTING ELEVATION
- PROPOSED HIGH POINT
- PROPOSED LOW POINT
- 100 YEAR CAPTURE POINT
- MAX 3:1 SLOPE
- F — PROPOSED LOT TYPE (FRONT DRAIN)
- S — PROPOSED LOT TYPE (SPLIT DRAIN)
- B/S — PROPOSED LOT TYPE (BACK SPLIT)
- W/O — PROPOSED LOT TYPE (WALKOUT)
- STAKED DRIPLINE
- STAKED DRIPLINE + 10m BUFFER
- STAKED WETLAND
- STAKED WETLAND + 30m BUFFER
- AIR PHOTOGRAPHY DRIPLINE
- AIR PHOTOGRAPHY DRIPLINE + 10m BUFFER
- MEANDERBELT
- MEANDERBELT + 10m BUFFER
- LONG TERM STABLE TOP OF SLOPE
- LONG TERM STABLE TOP OF SLOPE+ 10m BUFFER
- WETLAND (PALMER, 2019)
- EXISTING REGULATORY FLOODLINE (TRCA 2020)
- REGULATORY FLOODLINE + 10m BUFFER

*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

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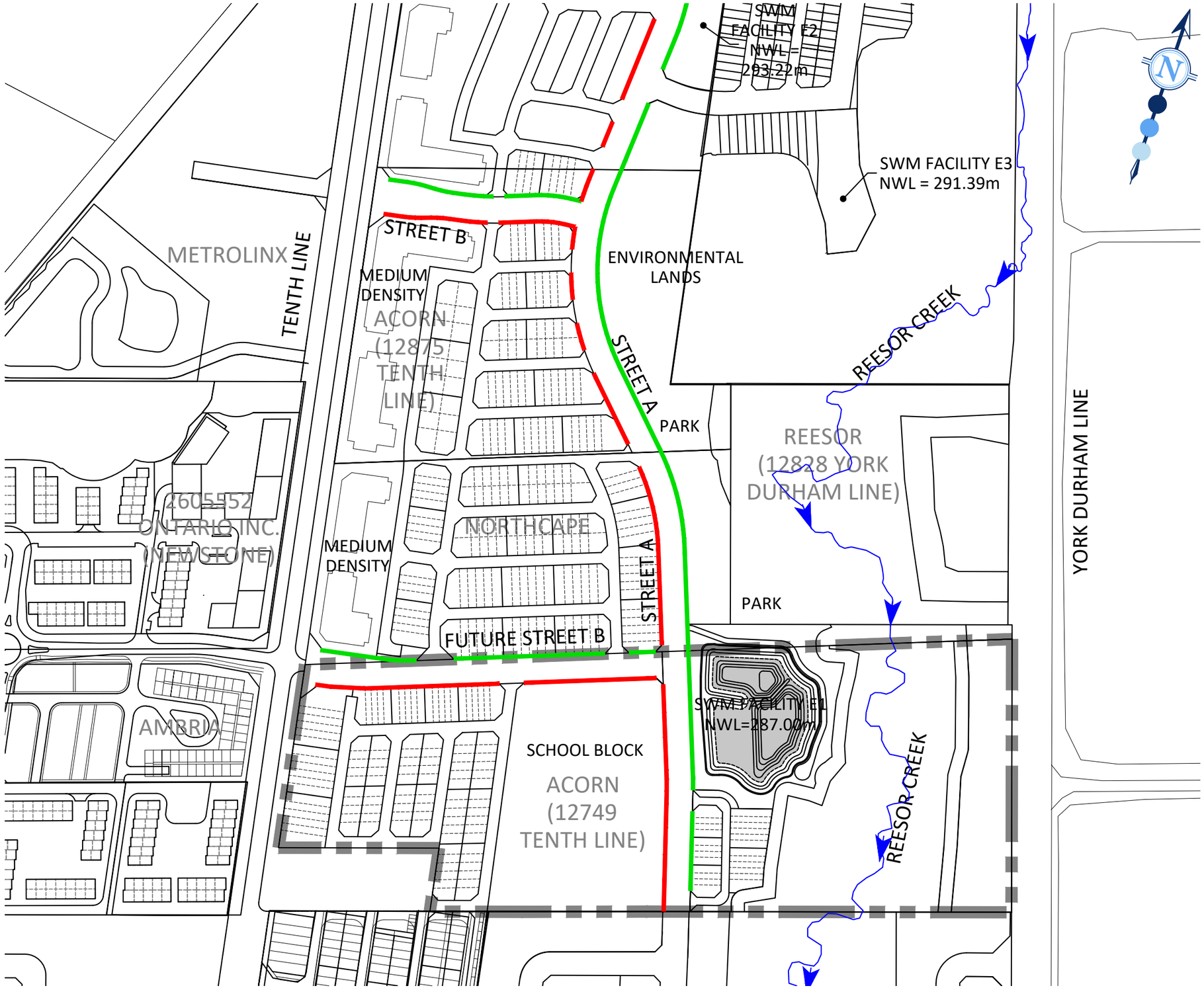
ACORN SOUTH - TENTH LINE, STOUFFVILLE

PRELIMINARY GRADING PLAN

DESIGNED BY:	S.B.	CHECKED BY:	N.D.M.
SCALE:	1:1500	DATE:	MAY 2026
PROJECT No:	2435	FIGURE No:	3.3



LEGEND:

- LIMIT OF ACORN SOUTH PROPERTY
- 3.0m MULTI-USE PATHWAY
- 2.0m SIDEWALK

*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

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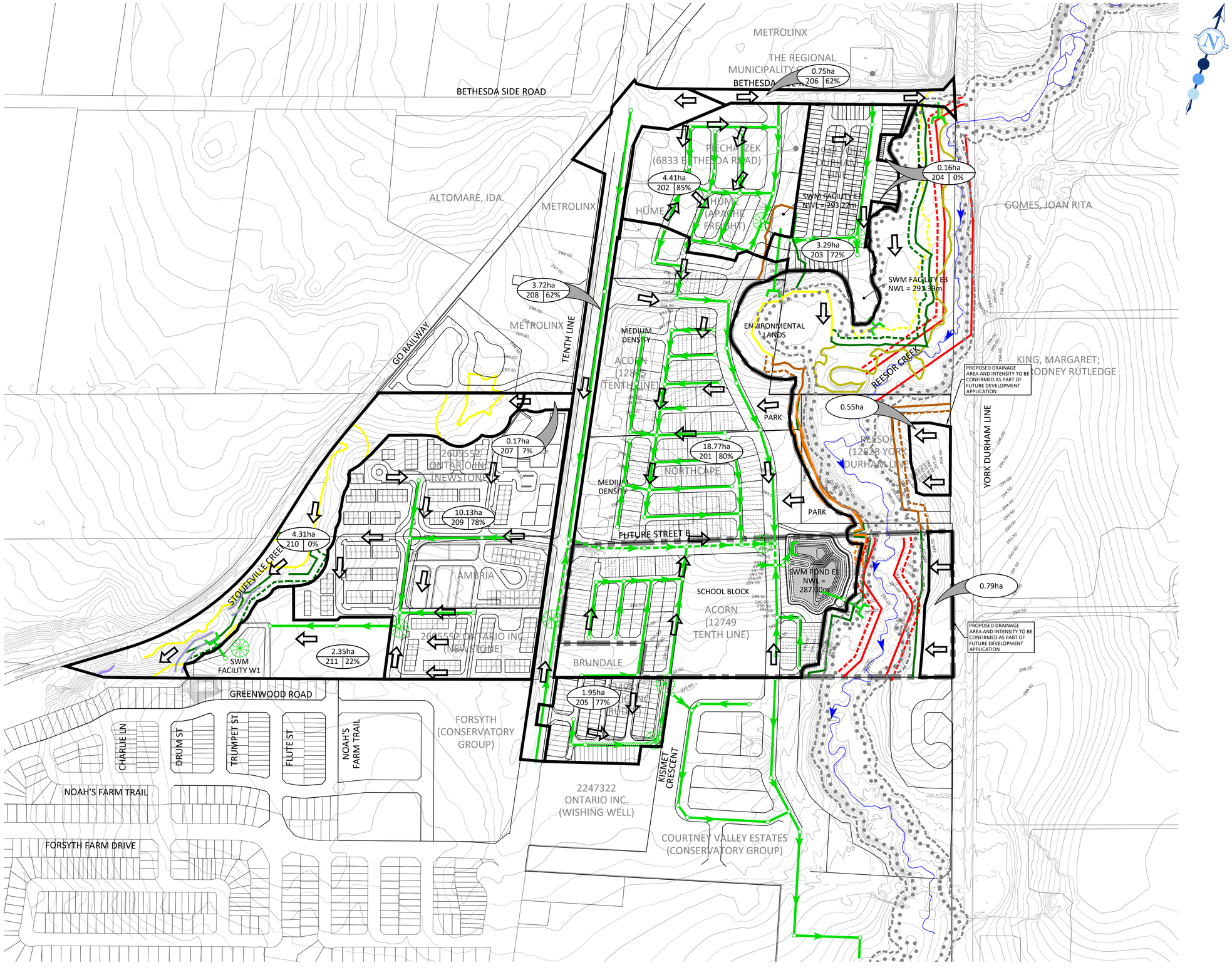
ACORN SOUTH - TENTH LINE, STOUFFVILLE

SIDEWALK LOCATION PLAN

DESIGNED BY:	S.B.	CHECKED BY:	N.D.M
SCALE:	1:3000	DATE:	MAY 2026
PROJECT No:	2435	FIGURE No:	4.1



LEGEND:

- LIMIT OF ACORN SOUTH PROPERTY
- LIMIT OF DEVELOPMENT
- 270.25 — EXISTING CONTOUR AND ELEVATION
- STORM DRAINAGE BOUNDARY
- OVERLAND FLOW
- 18.77ha / 201 / 79% — DRAINAGE AREA (HECTARES); PERCENT IMPERVIOUS; CATCHMENT ID
- 100 YEAR CAPTURE POINT
- STORM SEWER AND MAINTENANCE HOLE
- 100 YEAR STORM SEWER AND MAINTENANCE HOLE
- STAKED DRIPLINE
- STAKED DRIPLINE + 10m BUFFER
- STAKED WETLAND
- STAKED WETLAND + 30m BUFFER
- AIR PHOTOGRAPHY DRIPLINE
- AIR PHOTOGRAPHY DRIPLINE + 10m BUFFER
- MEANDERBELT
- MEANDERBELT + 10m BUFFER
- LONG TERM STABLE TOP OF SLOPE
- LONG TERM STABLE TOP OF SLOPE + 10m BUFFER
- WETLAND (PALMER, 2019)
- EXISTING REGULATORY FLOODLINE (TRCA 2020)
- REGULATORY FLOODLINE + 10m BUFFER
- POTENTIAL LID LOCATIONS

*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DRAFT PLAN STAGE.

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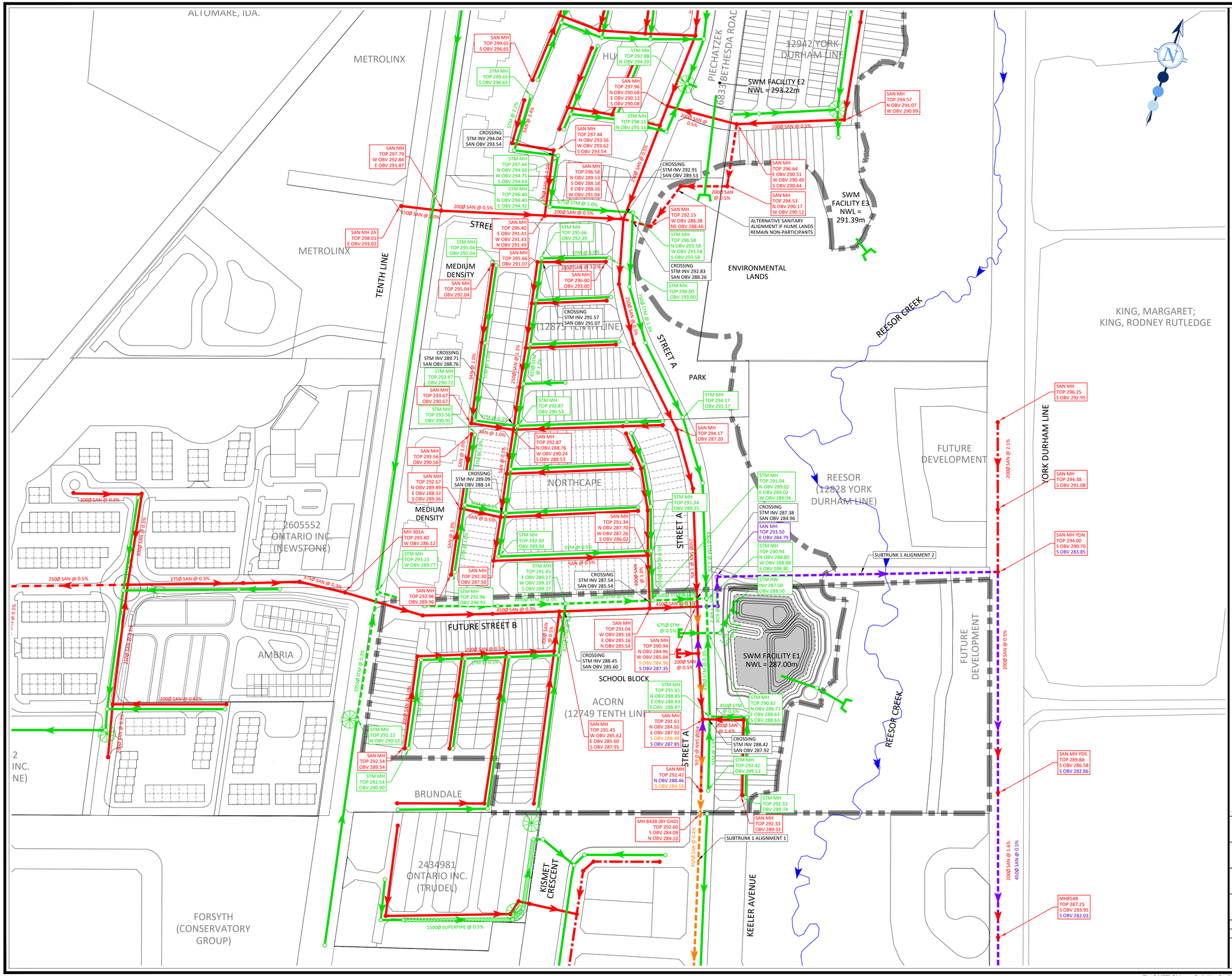
ACORN SOUTH - TENTH LINE, STOUFFVILLE

PROPOSED STORM DRAINAGE PLAN

DESIGNED BY:	S.B.	CHECKED BY:	N.D.M.
SCALE:	1:2500	DATE:	MAY 2026
PROJECT No:	2435	FIGURE No:	5.1

File: P:\2076 Trinison - Tenth Line, Stouffville\Drawings\FSP\Fig\Report Figures\2076P-5.1-STRM.dwg - Revised by <SOZDEMIR> : Fri, Mar 13 2026 - 2:20pm



LEGEND:

- LIMIT OF ACORN NORTH PROPERTY
- LIMIT OF DEVELOPMENT
- STORM SEWER AND MAINTENANCE HOLE
- 100 YEAR STORM SEWER AND MAINTENANCE HOLE
- SANITARY SEWER AND MAINTENANCE HOLE
- INTERIM SANITARY SEWER AND MAINTENANCE HOLE
- EXTERNAL SANITARY SEWER AND MAINTENANCE HOLE
- LOCAL PROPOSED SANITARY SEWER ALTERNATIVE ALIGNMENT
- SUBTRUNK 1 ALTERNATIVE 1
- SUBTRUNK 1 ALTERNATIVE 2
- 100 YEAR CAPTURE POINT
- SAN MH TOP 291.28 W OBV 285.04 S OBV 284.96 S OBV 287.35 — LOCAL PROPOSED SANITARY SEWER OBVERT; SUBTRUNK 1 ALTERNATIVE 1 OBVERT; SUBTRUNK 1 ALTERNATIVE 2 OBVERT

*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

SCS consulting group ltd
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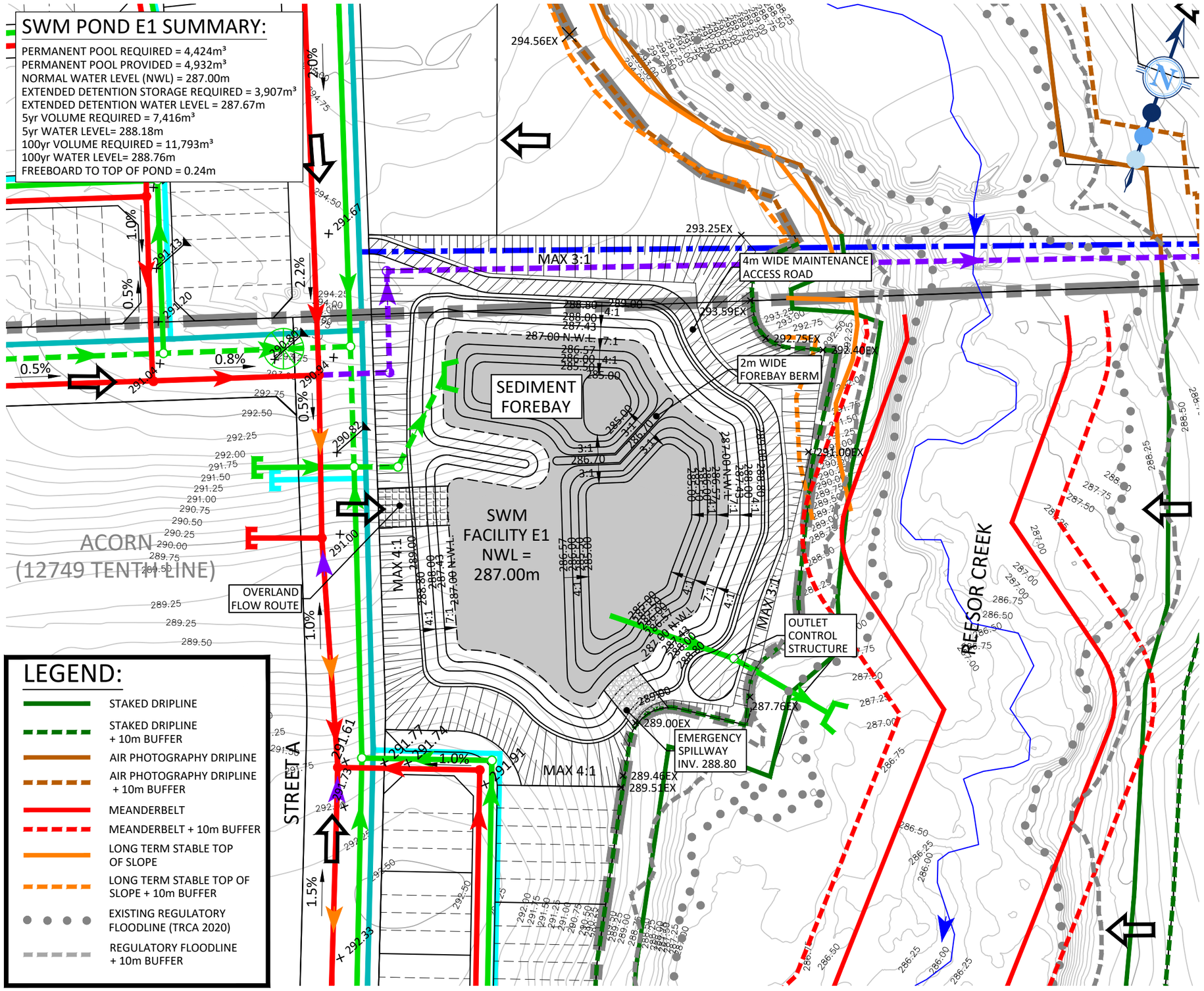
ACORN SOUTH - TENTH LINE, STOUFFVILLE

PRELIMINARY SERVICING PLAN

DESIGNED BY:	S.B.	CHECKED BY:	N.D.M.
SCALE:	1:1500	DATE:	MAY 2026
PROJECT No:	2435	FIGURE No:	5.2

File: P:\2076 Trinison - Tenth Line, Stouffville\Drawings\FSR\Fig\Report Figures\2076P-5.2-SERV.dwg - Revised by <LRIDEOUT> : Mon, Mar 23 2026 - 3:24pm



LEGEND:

- LIMIT OF ACORN SOUTH PROPERTY
- LIMIT OF DEVELOPMENT
- 270.25 — EXISTING CONTOUR AND ELEVATION
- STORM SEWER AND MAINTENANCE HOLE
- 100 YEAR STORM SEWER AND MAINTENANCE HOLE
- SANITARY SEWER AND MAINTENANCE HOLE
- SUBTRUNK 1 ALTERNATIVE 1
- SUBTRUNK 1 ALTERNATIVE 2
- PROPOSED PRIVATE WATERMAIN
- 300Ø PROPOSED MUNICIPAL WATERMAIN
- 200Ø FUTURE MUNICIPAL WATERMAIN (ON EXTERNAL PROPERTIES)
- ×220.00 — PROPOSED ELEVATION
- ×221.27 EX — EXISTING ELEVATION
- OVERLAND FLOW DIRECTION
- OVERLAND FLOW ROUTE
- 4.0m WIDE MAINTENANCE ACCESS ROAD
- EMERGENCY SPILLWAY
- NORMAL WATER LEVEL
- MAX 3:1 SLOPE
- 100 YEAR CAPTURE POINT

*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

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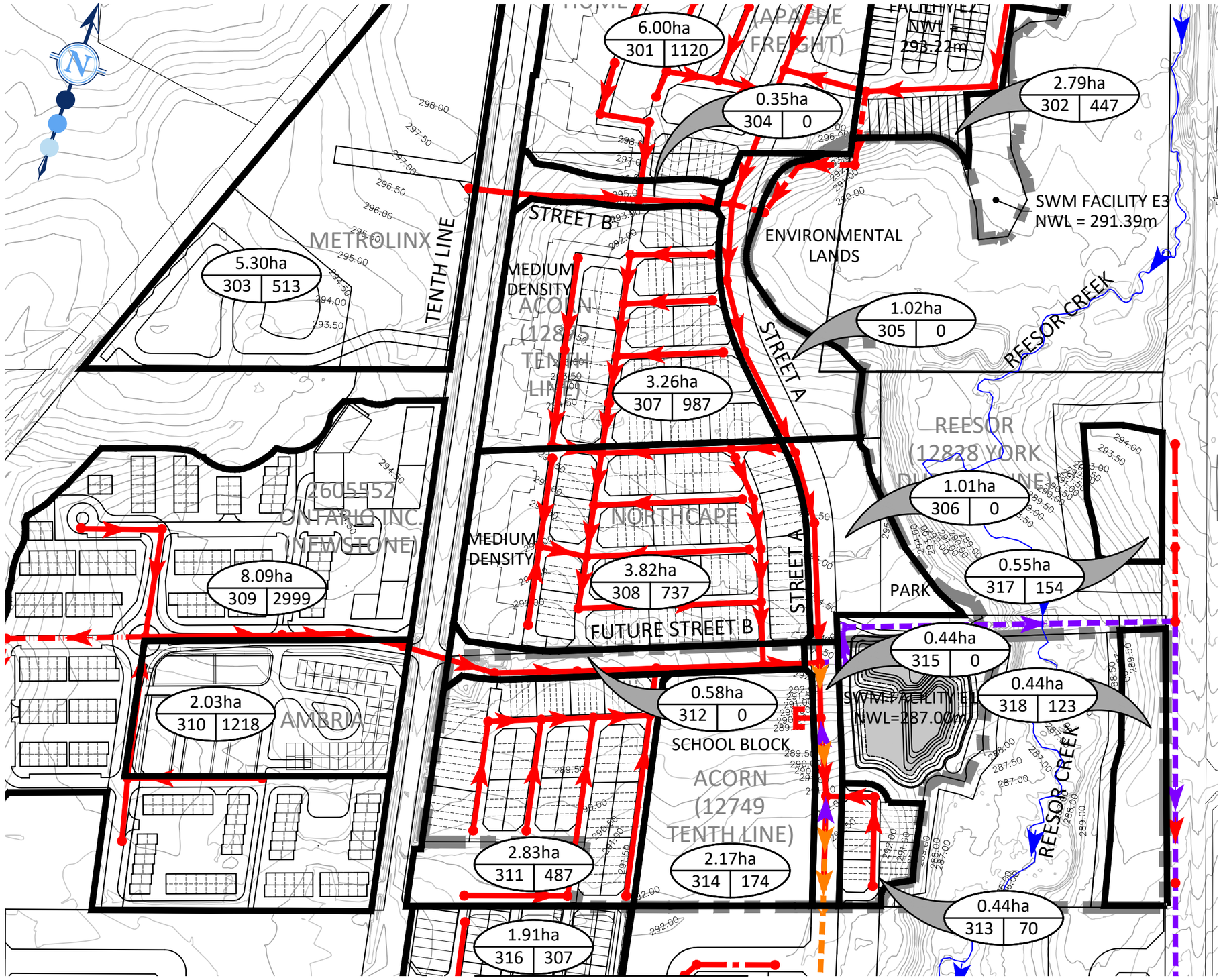
ACORN SOUTH - TENTH LINE, STOUFFVILLE

PROPOSED STORMWATER MANAGEMENT FACILITY E1

DESIGNED BY:	S.B.	CHECKED BY:	N.D.M
SCALE:	1:1000	DATE:	MAY 2026
PROJECT No:	2435	FIGURE No:	6.1



LEGEND:

- LIMIT OF ACORN SOUTH PROPERTY
- LIMIT OF DEVELOPMENT
- 270.25 — EXISTING CONTOUR AND ELEVATION
- SANITARY DRAINAGE BOUNDARY
- 0.35ha / 301 | 154 — DRAINAGE AREA (HECTARES); POPULATION; CATCHMENT ID
- SANITARY SEWER AND MAINTENANCE HOLE
- EXTERNAL SANITARY SEWER AND MAINTENANCE HOLE
- INTERIM SANITARY SEWER AND MAINTENANCE HOLE
- LOCAL PROPOSED SANITARY SEWER ALTERNATIVE ALIGNMENT
- SUBTRUNK 1 ALTERNATIVE 1
- SUBTRUNK 1 ALTERNATIVE 2

*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

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MARKHAM, ONTARIO L3R 8B8
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FAX: (905) 475-8335

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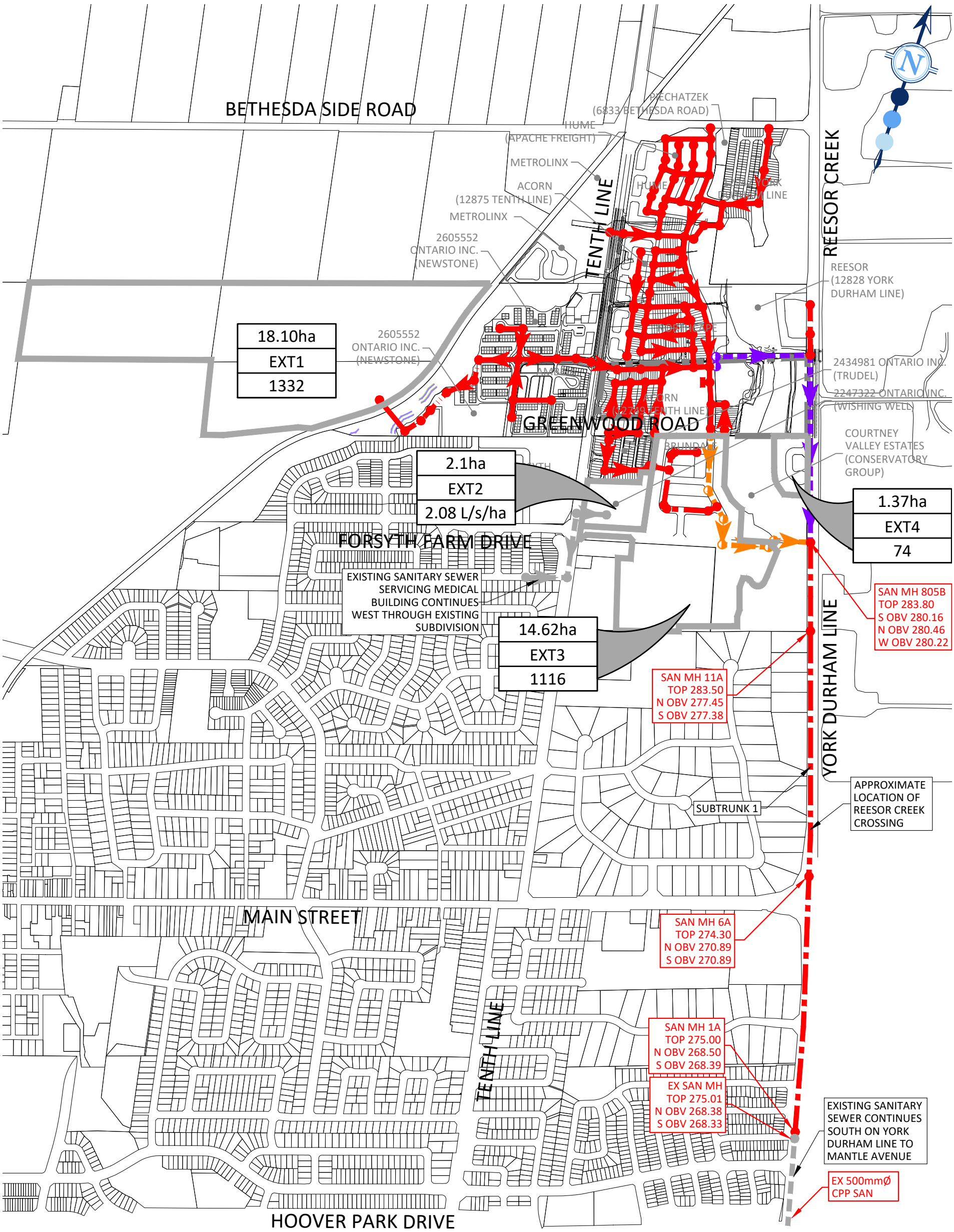
ACORN SOUTH - TENTH LINE, STOUFFVILLE

PROPOSED SANITARY DRAINAGE PLAN

DESIGNED BY:	S.B.	CHECKED BY:	N.D.M
SCALE:	1:3000	DATE:	MAY 2026
PROJECT No:	2435	FIGURE No:	7.1



*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DRAFT PLAN STAGE.

LEGEND:

- LIMIT OF ACORN SOUTH PROPERTY
- EXTERNAL DRAINAGE BOUNDARY
- INTERIM SANITARY SEWER AND MAINTENANCE HOLE
- EXISTING SANITARY SEWER AND MAINTENANCE HOLE
- PROPOSED SANITARY SEWER AND MAINTENANCE HOLE
- EXTERNAL SANITARY SEWER AND MAINTENANCE HOLE
- SUBTRUNK 1 ALIGNMENT 1
- SUBTRUNK 1 ALIGNMENT 2

14.62ha	EXTERNAL SANITARY DRAINAGE AREA (ha)
EXT3	CATCHMENT ID
1116	POPULATION/PROPOSED FLOW RATE (L/s/ha)

FSSR	ACORN SOUTH - TENTH LINE, STOUFFVILLE	EXTERNAL SANITARY SERVICING PLAN	
SCS consulting group ltd 30 CENTURIAN DRIVE, SUITE 100 MARKHAM, ONTARIO L3R 8B8 TEL: (905) 475-1900 FAX: (905) 475-8335	DESIGNED BY: S.B. / CHECKED BY: N.D.M. SCALE: 1:10000 / DATE: MAY 2026	PROJECT No: 2435	FIGURE No: 7.2

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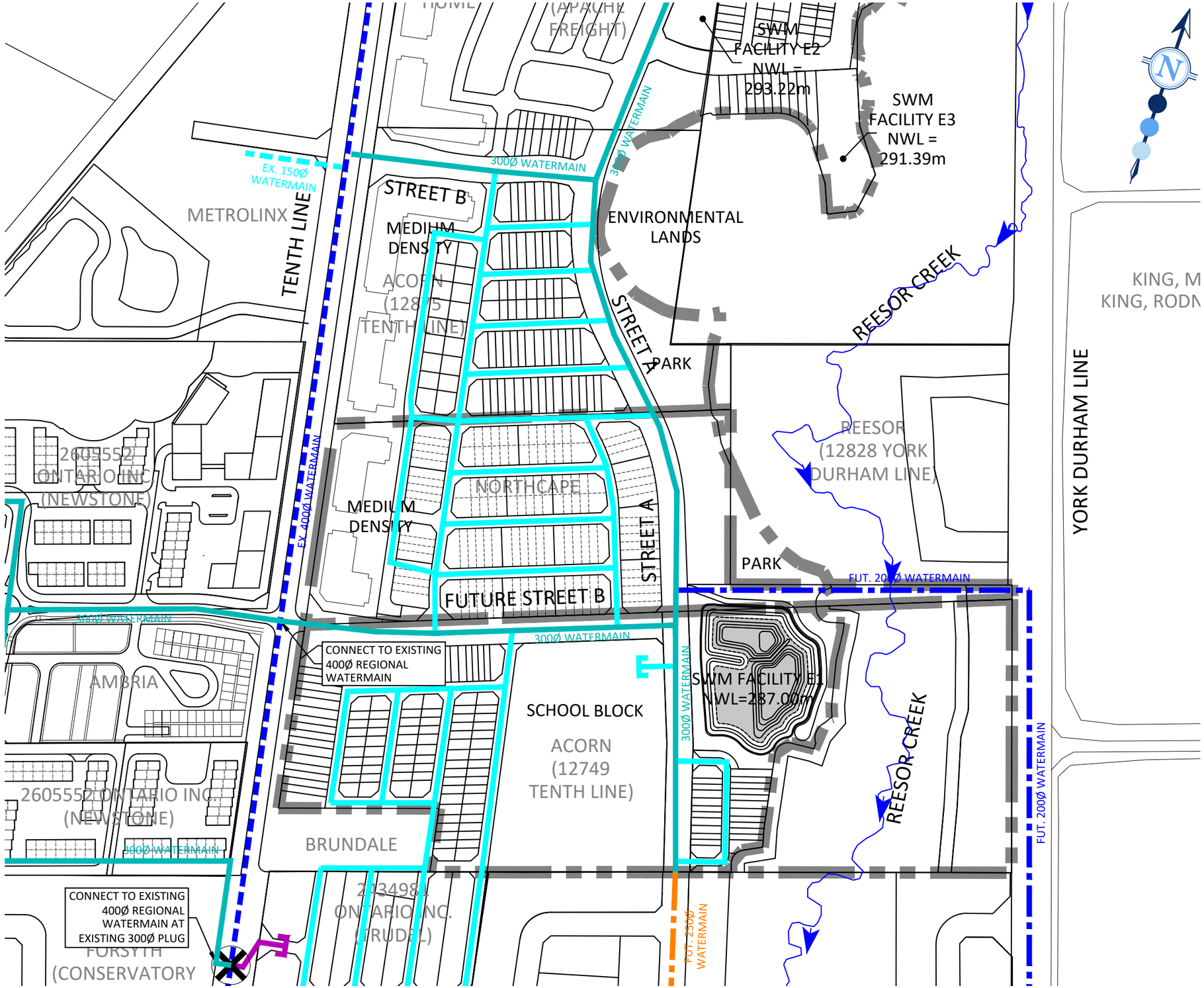

LEGEND:

- LIMIT OF ACORN SOUTH PROPERTY
- LIMIT OF DEVELOPMENT
- PROPOSED PRIVATE WATERMAIN
- 150Ø EXISTING PRIVATE WATERMAIN
- 300Ø PROPOSED MUNICIPAL WATERMAIN
- 400Ø EXISTING REGIONAL WATERMAIN
- 250Ø FUTURE MUNICIPAL WATERMAIN (ON EXTERNAL PROPERTIES)
- 200Ø FUTURE MUNICIPAL WATERMAIN (ON EXTERNAL PROPERTIES)
- PROPOSED PRIVATE WATERMAIN
- EXISTING VALVE CHAMBER

*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

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FAX: (905) 475-8335

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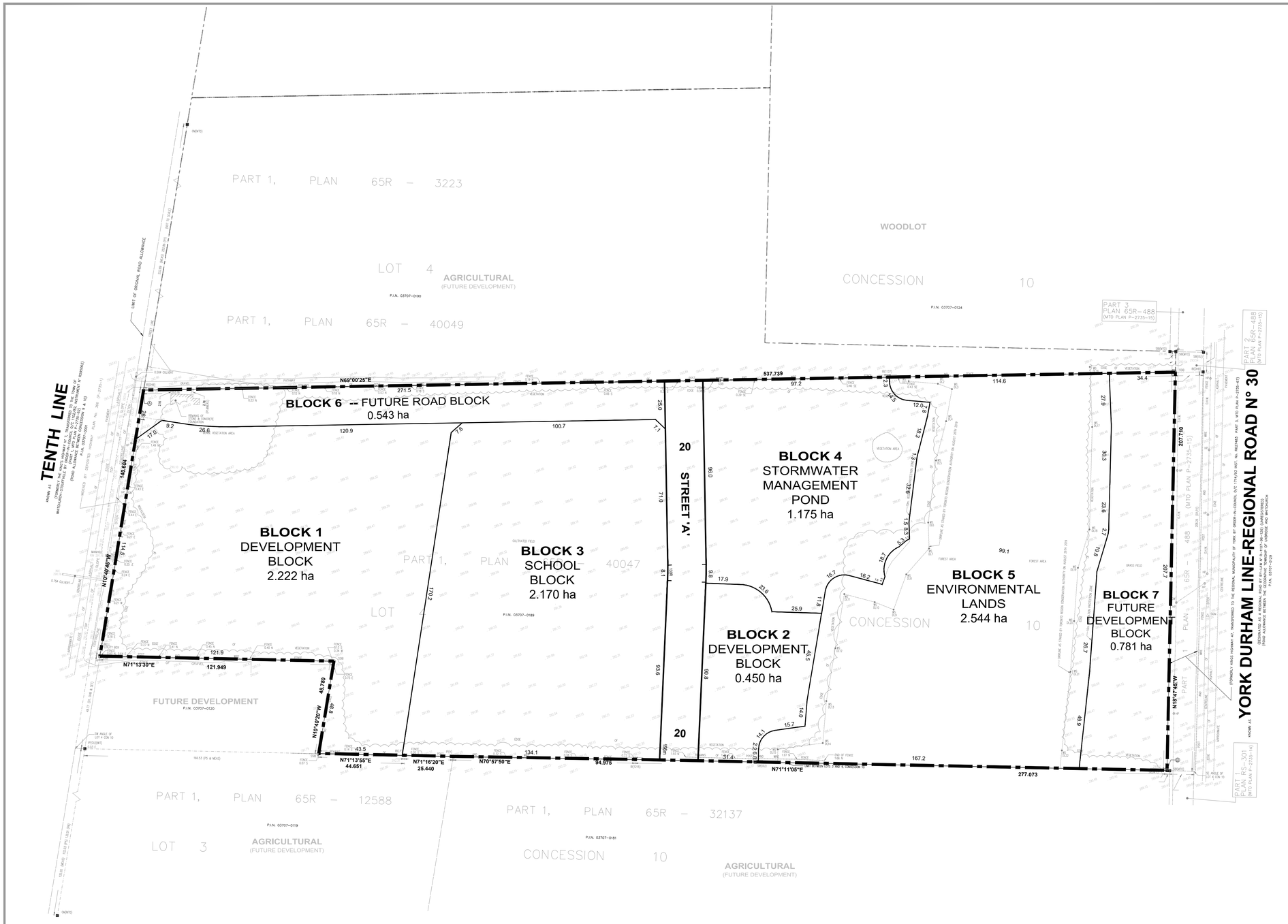
ACORN SOUTH - TENTH LINE, STOUFFVILLE

PROPOSED WATER DISTRIBUTION PLAN

DESIGNED BY:	S.B.	CHECKED BY:	N.D.M
SCALE:	1:3000	DATE:	MAY 2026
PROJECT No:	2435	FIGURE No:	8.1

Appendix A Draft Plan of Subdivision

SCS consulting group ltd



Key Plan — Subject Property — Additional Lands Owned by Applicant

LAND USE - AREA TABLE	18360 - 120dp			January 26, 2026
Development Blocks	Block	1-2	26%	2.672 ha±
School Block	Block	3	21%	2.170
Stormwater Management Pond	Block	4	11%	1.175
Environmental Lands	Block	5	25%	2.544
Future Road Block	Block	6	5%	0.543
Future Development Block	Block	7	8%	0.781
Roads			4%	0.395
Total			**100%**	**10.280 ha±**

ROADS			
20m Public R.O.W.	384	m	0.395
Total	**384**	**m**	**0.395 ha**

Additional information required under Section 51(17) of the Planning Act

A, B, E, F, G, J, L - As Shown on Plan
C. Additional lands owned by the applicant as shown on the key plan.
D. Development Blocks, School Block, Stormwater Management Pond, Environmental Lands, Future Road Block, Future Development Block, Road
H. Piped water to be provided.
I. Clay loam soil.
K. Sanitary & storm sewers to be provided.

Surveyor's Certificate

I certify that: the boundaries of the lands to be subdivided and their relationship to the adjacent lands are correctly shown.

DAN DZALDOV, O.L.S.
SCHAEFFER DZALDOV PURCELL LTD.

Day Month Year

Owner's Authorization

I/we, Acorn NE Stouffville Inc.

being the registered owner(s) of the subject lands hereby authorize BOUSFIELDs INC. to prepare and submit a draft plan of subdivision for approval.

Day Month Year

Legend

Subject Property

Notes

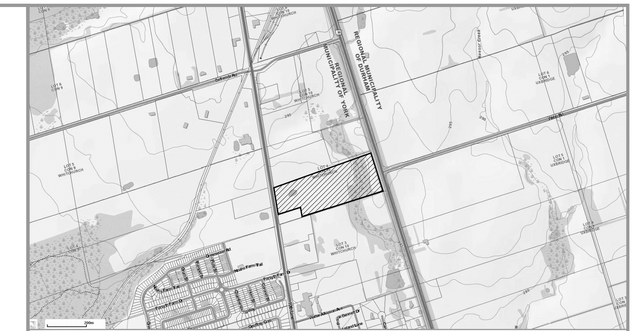
All dimensions are in metres.
All area measurements are computer generated.
All elevations refer to Geodetic Datum.
Geo-reference based on Data from:
Schaeffer Dzaldov Bennett LTD.

DRAFT PLAN OF PROPOSED SUBDIVISION
PART OF LOT 4, CONCESSION 10
(GEOGRAPHIC TOWNSHIP OF WHITCHURCH)
TOWN OF WHITCHURCH-STOUFFVILLE
REGIONAL MUNICIPALITY OF YORK

BOUSFIELDS INC.
3 Church Street, Suite 200, Toronto, Ontario M5E 1M2
P (416) 947-9744 | F (416) 947-0781 | E bousfields@bousfields.ca

1 : 1000 Scale — 0 5 10 25 50 m

January 26, 2025 Date — 18360 - 120dp Drawing Number



Key Plan — Subject Property

ACORN SOUTH - Conceptual Demonstration Plan

ESTIMATED UNIT COUNT	18360 - 134cp	March 23, 2026
4.5m On-Street Towns	8%	12
4.5m Rear Lane Towns	21%	33
6.4m Back-to-Back Towns	48%	76
5.6m Stacked Towns	23%	36
Total	**100%**	**157 units**

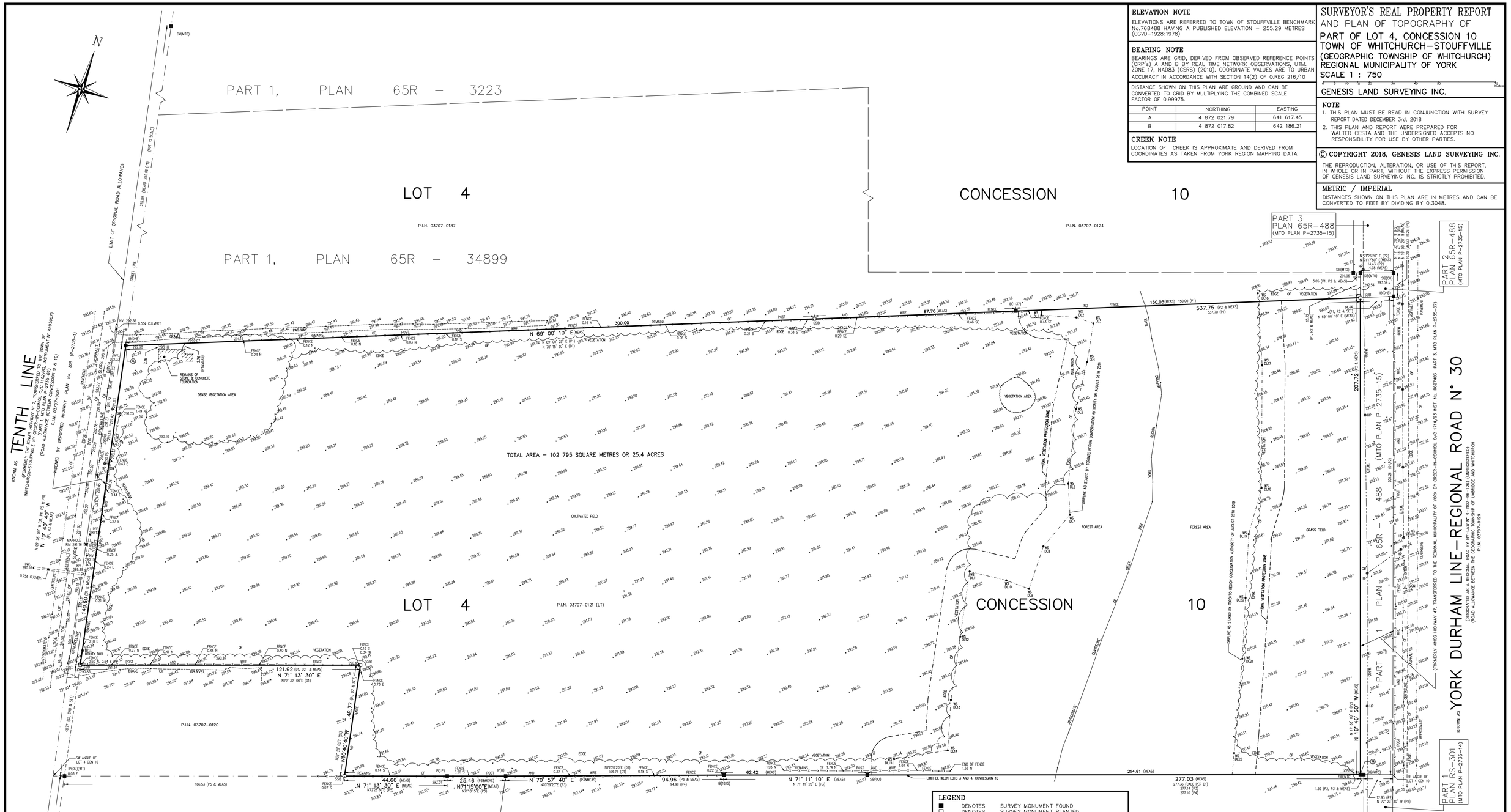
- Back-to-Back Townhouses
- Rear Lane Townhouses
- On-Street Townhouses
- Stacked Townhouses
- School
- Environmental Lands
- Open Space
- Stormwater Management Pond
- Future Development
- PMTSA Boundary (2.19 ha within PMTSA Boundary)

BOUSFIELDS INC.
3 Church Street, Suite 200, Toronto, Ontario M5E 1M2
P (416) 947-9744 | F (416) 947-0781 | E bousfields@bousfields.ca

Z:\AADRAW\2018\18360 BAIF, STOUFFVILLE (10TH LINE)\34CP 18360 MAR23-26 ACORN SOUTH - LOTTED CONCEPT PLAN

Appendix B Relevant Excerpts

SCS consulting group ltd



ELEVATION NOTE

ELEVATIONS ARE REFERRED TO TOWN OF STOUFFVILLE BENCHMARK No.768488 HAVING A PUBLISHED ELEVATION = 255.29 METRES (CGVD–1928:1978)

BEARING NOTE

BEARINGS ARE GRID, DERIVED FROM OBSERVED REFERENCE POINTS (ORP's) A AND B BY REAL TIME NETWORK OBSERVATIONS, UTM, ZONE 17, NAD83 (CSRS) (2010). COORDINATE VALUES ARE TO URBAN ACCURACY IN ACCORDANCE WITH SECTION 14(2) OF O.REG 216/10

DISTANCE SHOWN ON THIS PLAN ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING THE COMBINED SCALE FACTOR OF 0.99975.

POINT	NORTHING	EASTING
A	4 872 021.79	641 617.45
B	4 872 017.82	642 186.21

CREEK NOTE

LOCATION OF CREEK IS APPROXIMATE AND DERIVED FROM COORDINATES AS TAKEN FROM YORK REGION MAPPING DATA

SURVEYOR'S REAL PROPERTY REPORT
AND PLAN OF TOPOGRAPHY OF

PART OF LOT 4, CONCESSION 10
TOWN OF WHITCHURCH–STOUFFVILLE
(GEOGRAPHIC TOWNSHIP OF WHITCHURCH)
REGIONAL MUNICIPALITY OF YORK
SCALE 1 : 750

0 5 15 25 30 45 60 75 Metres

GENESIS LAND SURVEYING INC.

NOTE

1. THIS PLAN MUST BE READ IN CONJUNCTION WITH SURVEY REPORT DATED DECEMBER 3rd, 2018
2. THIS PLAN AND REPORT WERE PREPARED FOR WALTER CESTA AND THE UNDERSIGNED ACCEPTS NO RESPONSIBILITY FOR USE BY OTHER PARTIES.

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METRIC / IMPERIAL

DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

LEGEND

■	DENOTES	SURVEY MONUMENT FOUND
□	DENOTES	SURVEY MONUMENT PLANTED
IP	DENOTES	IRON PIPE
IB	DENOTES	IRON BAR
SIB	DENOTES	STANDARD IRON BAR
SSIB	DENOTES	SHORT STANDARD IRON BAR
CM	DENOTES	CONCRETE MONUMENT
WIT	DENOTES	WITNESS
OU	DENOTES	ORIGIN UNKNOWN
P1	DENOTES	PLAN 65R–34899
P2	DENOTES	PLAN 65R–488 (MTO PLAN P–2735–15)
P3	DENOTES	PLAN 65R–32137
P4	DENOTES	PLAN 65R–11178
P5	DENOTES	PLAN 65R–12588
P6	DENOTES	PLAN RS–366 (MTO PLAN P–2735–1)
P7	DENOTES	PLAN 65R–3223
D1	DENOTES	INSTRUMENT No. B84312B
D2	DENOTES	INSTRUMENT No. R574499
LP	DENOTES	LLOYD & PURCELL LTD. O.L.S.
H	DENOTES	G.T. HORTON O.L.S.
MTO	DENOTES	MINISTRY OF TRANSPORTATION OF ONTARIO
1215	DENOTES	ERTL & ROWAN INC. O.L.S.
1137	DENOTES	R.G. McKIBBON LTD. O.L.S.
DHB	DENOTES	PLAN OF SURVEY BY D.H. BLACK SURVEYING LTD. O.L.S. DATED (05/18/1965)
PIN	DENOTES	PROPERTY IDENTIFIER NUMBER
N,S,E,W,	DENOTES	NORTH, SOUTH, EAST, WEST
O.H.W.	DENOTES	OVERHEAD WIRES
INV.	DENOTES	INVERT
HP	DENOTES	HYDRO POLE
GW	DENOTES	GUY WIRES
WS	DENOTES	WOOD STAKE

SURVEYOR'S CERTIFICATE

I CERTIFY THAT :

1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT AND THE REGULATIONS MADE UNDER THEM.
2. THE SURVEY WAS COMPLETED ON NOVEMBER 29th, 2018.
3. THIS SURVEY HAS BEEN UPDATED TO SHOW DRIP LINE AS STAKED BY TORONTO REGION CONSERVATION AUTHORITY ON AUGUST 26TH, 2019.

SEPTEMBER 3rd 2019
DATE

MAAZ MALEK
Ontario Land Surveyor

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
2075880

THIS PLAN IS NOT VALID UNLESS IT IS AN EMBOSSED ORIGINAL COPY ISSUED BY THE SURVEYOR
In accordance with Regulation 1026, Section 29(3)

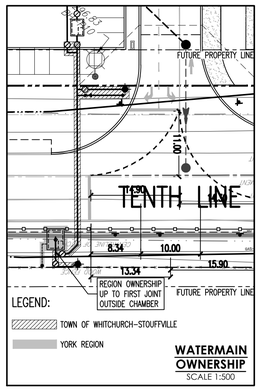
GENESIS
LAND SURVEYING INC.
ONTARIO LAND SURVEYORS
10 FOUR SEASONS PLACE, 10TH FLOOR
TORONTO, M9B 6H7
T 905-499-2956 T 1800-262-9784
WWW.GENESISLANDSURVEY.COM

DRAFTED BY: G.S	CHECKED BY: MM	PROJECT No. GLS–0167–4

Table 5.1
Summary of Unit Flow Relationships

Return Period	Catchment 3 (Reesor Creek)	Catchment 9 (W.Duffins Creek Trib)	Catchment 23 (Urfe Creek)
2-year	Q_2= 5.364-0.520 ln(A)	Q_2= 6.125-0.675 ln(A)	Q_2= 9.933-1.149 ln(A)
5-year	Q_5= 8.535-0.826 ln(A)	Q_5= 8.601-0.890 ln(A)	Q_5= 16.081-1.873 ln(A)
10-year	Q_{10}= 10.729-1.036 ln(A)	Q_{10}= 11.032-1.168 ln(A)	Q_{10}= 20.440-2.397 ln(A)
25-year	Q_{25}= 13.832-1.334 ln(A)	Q_{25}= 14.199-1.530 ln(A)	Q_{25}= 26.633-3.139 ln(A)
50-year	Q_{50}= 16.132-1.549 ln(A)	Q_{50}= 15.580-1.612 ln(A)	Q_{50}= 32.296-3.867 ln(A)
100-year	Q_{100}= 18.629-1.787 ln(A)	Q_{100}= 17.972-1.870 ln(A)	Q_{100}= 37.346-4.471 ln(A)

Note: - Area (A) in hectares
- Unit Flow (Q_n) in Litres/s/ha



WATERMAIN OWNERSHIP
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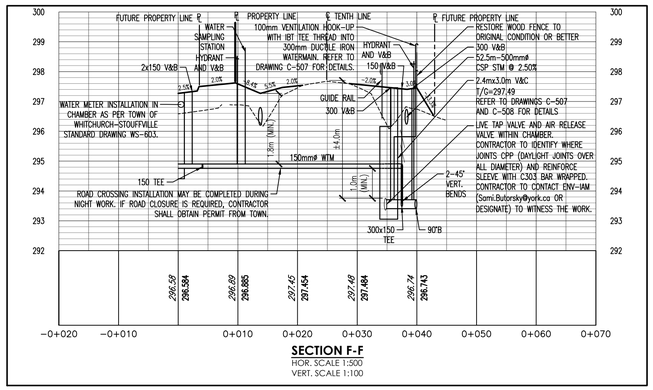
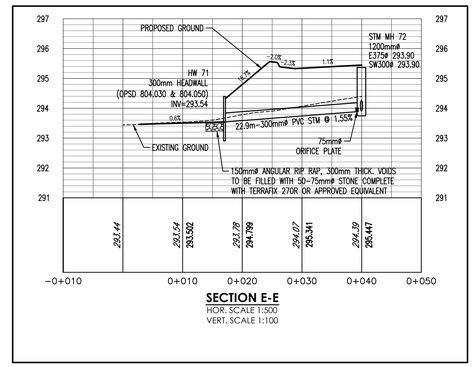


SECTION F-F
HOR. SCALE 1:500
VERT. SCALE 1:100

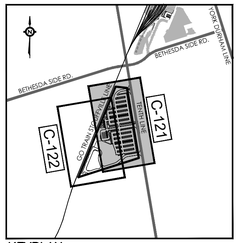


SECTION E-E
HOR. SCALE 1:500
VERT. SCALE 1:100

CHAINAGE NUMBER	ARC TYPE	DIAMETER (mm)	FROM (m)	BAY (m)	FROM (m)	TO (m)	CHAINAGE (m)	LENGTH (mm)	WATER CHAMBER DIMENSIONS (mm)	ATTACHED WORK PRODUCT	DEPTH TO FLOW (mm)
1	WMa	150	0+000	0+000	0+000	0+000	0+000	1.50	2400	1.00	300
	WMb	150	0+000	0+000	0+000	0+000	0+000				
2	Sa	525	0+000	0+000	0+000	0+000	0+000	0.07	2600	1.70	500
	Sb	525	0+000	0+000	0+000	0+000	0+000				
3	Sa	525	0+000	0+000	0+000	0+000	0+000	0.00	2600	0.82	500
	Sb	525	0+000	0+000	0+000	0+000	0+000				
4	Sa	750	0+000	0+000	0+000	0+000	0+000	0.00	2600	1.07	500
	WMa	150	0+000	0+000	0+000	0+000	0+000				
5	Sa	750	0+000	0+000	0+000	0+000	0+000	1.00	2600	0.75	500
	WMa	150	0+000	0+000	0+000	0+000	0+000				
6	Sa	750	0+000	0+000	0+000	0+000	0+000	0.00	2600	0.67	500
	WMa	150	0+000	0+000	0+000	0+000	0+000				
7	Sa	450	0+000	0+000	0+000	0+000	0+000	0.00	2600	0.94	500
	Sb	450	0+000	0+000	0+000	0+000	0+000				
8	Sa	450	0+000	0+000	0+000	0+000	0+000	0.07	2600	1.18	500
	Sb	750	0+000	0+000	0+000	0+000	0+000				
9	Sa	750	0+000	0+000	0+000	0+000	0+000	0.00	2600	0.88	500
	Sb	750	0+000	0+000	0+000	0+000	0+000				
10	Sa	450	0+000	0+000	0+000	0+000	0+000	0.00	2600	1.29	500
	Sb	450	0+000	0+000	0+000	0+000	0+000				
11	Sa	450	0+000	0+000	0+000	0+000	0+000	0.00	2600	0.96	500
	Sb	450	0+000	0+000	0+000	0+000	0+000				
12	Sa	450	0+000	0+000	0+000	0+000	0+000	0.00	2600	0.90	500
	Sb	450	0+000	0+000	0+000	0+000	0+000				
13	Sa	450	0+000	0+000	0+000	0+000	0+000	0.00	2600	1.29	500
	Sb	450	0+000	0+000	0+000	0+000	0+000				
14	WMa	150	0+000	0+000	0+000	0+000	0+000	1.00	2600	0.82	500
	Sa	450	0+000	0+000	0+000	0+000	0+000				
15	Sa	450	0+000	0+000	0+000	0+000	0+000	1.06	2600	0.88	500
	WMa	150	0+000	0+000	0+000	0+000	0+000				
16	Sa	450	0+000	0+000	0+000	0+000	0+000	0.00	2600	2.54	500
	WMa	150	0+000	0+000	0+000	0+000	0+000				

METRIC

ALL DIMENSIONS SHOWN ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE NOTED.



KEYPLAN
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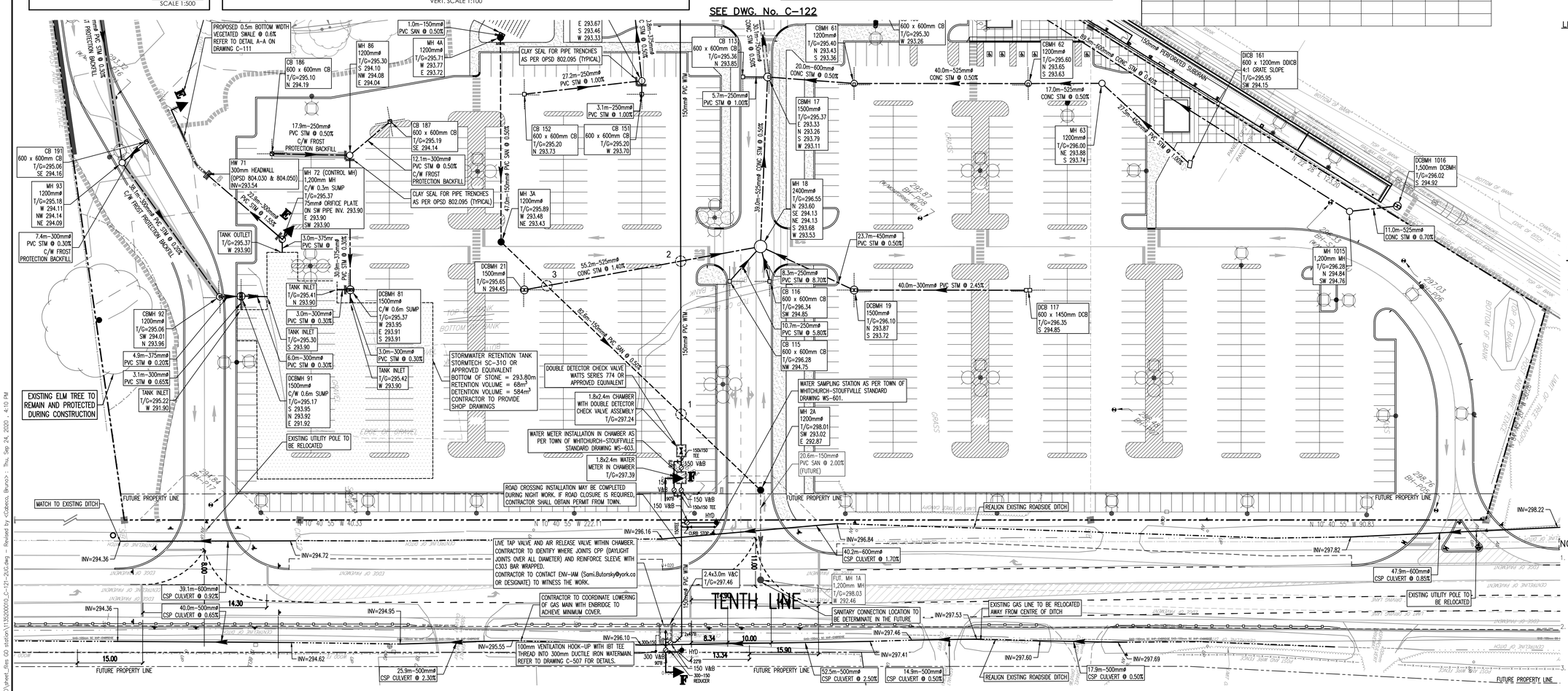


LEGEND

- SANITARY MANHOLE
- STORM MANHOLE
- CATCH BASIN MANHOLE C/W 0.3m SUMP
- HEADWALL
- CATCH BASIN / DOUBLE CATCH BASIN
- CB SHIELD (OR APPROVED EQUIV.)
- V&B — VALVE AND VALVE BOX
- HYD — HYDRANT
- BOLLARD
- LIGHT STANDARD
- 1 — PIPE CROSSING ID
- CLAY SEAL FOR PIPE TRENCHES AS PER OPSD 802.095
- PROPERTY BOUNDARY
- LIMIT OF CONSTRUCTION
- WATERMAIN
- STORM SEWER
- SANITARY SEWER
- 100mmø PERFORATED SUBDRAIN (UNLESS OTHERWISE NOTED). REFER TO DRAWING C-504 FOR DETAILS. DRAWINGS A6001 AND A6002 FOR SECTIONS WITHIN PLATFORM.
- STORM SEWER WITH FROST PROTECTION BACKFILL AS PER DETAIL ON DRAWING C-503
- EXISTING BOREHOLE/MONITORING WELL

NOTES:

1. THE LOCATION OF ALL ABOVEGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE LOCATION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.
2. THE TOWN WILL REQUIRE THAT THE CONTRACTOR PERFORMING THE WORKS APPLY TO THE TOWN FOR A ROAD OCCUPANCY PERMIT AND POST ANY SECURITIES CUSTOMARILY REQUIRED UNDER THE ROAD OCCUPANCY PERMIT.
3. FOR NOTES AND PROJECT REQUIREMENTS, REFER TO GENERAL NOTES ON DRAWING C-001. FOR DETAILS, REFER TO DRAWING C-501 TO C-505.

METROLINX PROJECT NO. 166313

REFERENCE DRAWINGS		ISSUE			REVISIONS		
		1	20.09.25	ISSUED FOR CONSTRUCTION			
DWG NO.	TITLE	NO.	DATE	ISSUED FOR	REV.	DATE	

DRAWN BY: BC 19/01/18	DESIGNED BY: BC 19/01/18
CHECKED BY: SA/JK 19/06/03	APPROVED BY: SA/JK 19/06/03
SCALE: 1:500	FULL SIZE ONLY

0 5 1:500 25m

LICENSED PROFESSIONAL ENGINEER S.AKBARI 100147693 SEPT. 25, 2020 PROVINCE OF ONTARIO

Stantec Consulting Ltd.
300-675 Cochrane Drive West Tower
Markham ON Canada
L3R 0B8
Tel 905.944.7777
Fax. 905.474.9889
www.stantec.com

METROLINX

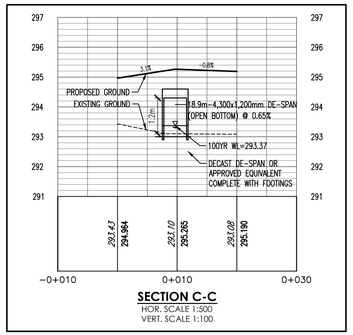
CONSTRUCTION OF NEW LINCOLNVILLE STATION

PROPOSED SITE

SERVICING PLAN – 1 OF 2

CONTRACT NO.	DWG. NO.	REV.	SHEET
PT-2019-NAFA-788	C-121	0	

File: \\Cd1215-f01\01606\Active\135200010 - GO Lincolnville\drawing\C3D\sheet_files GO station\135200010_C-121-2LC.dwg - Revised by sCabecos, Bruno> - Thu, Sep 24, 2020 - 4:10 PM



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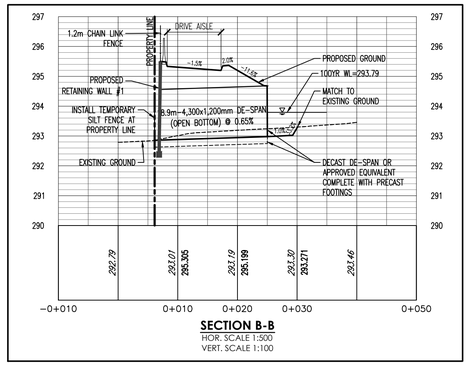
VERT. SCALE 1:100



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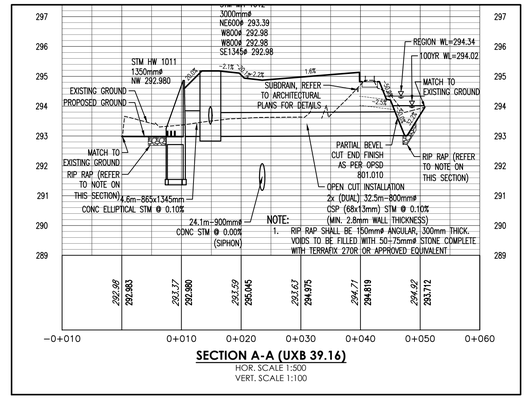

SECTION A-A (UXB 39.16)
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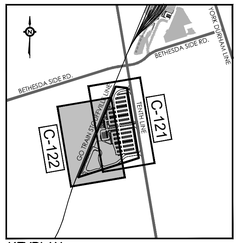
METRIC

ALL DIMENSIONS SHOWN ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE NOTED.



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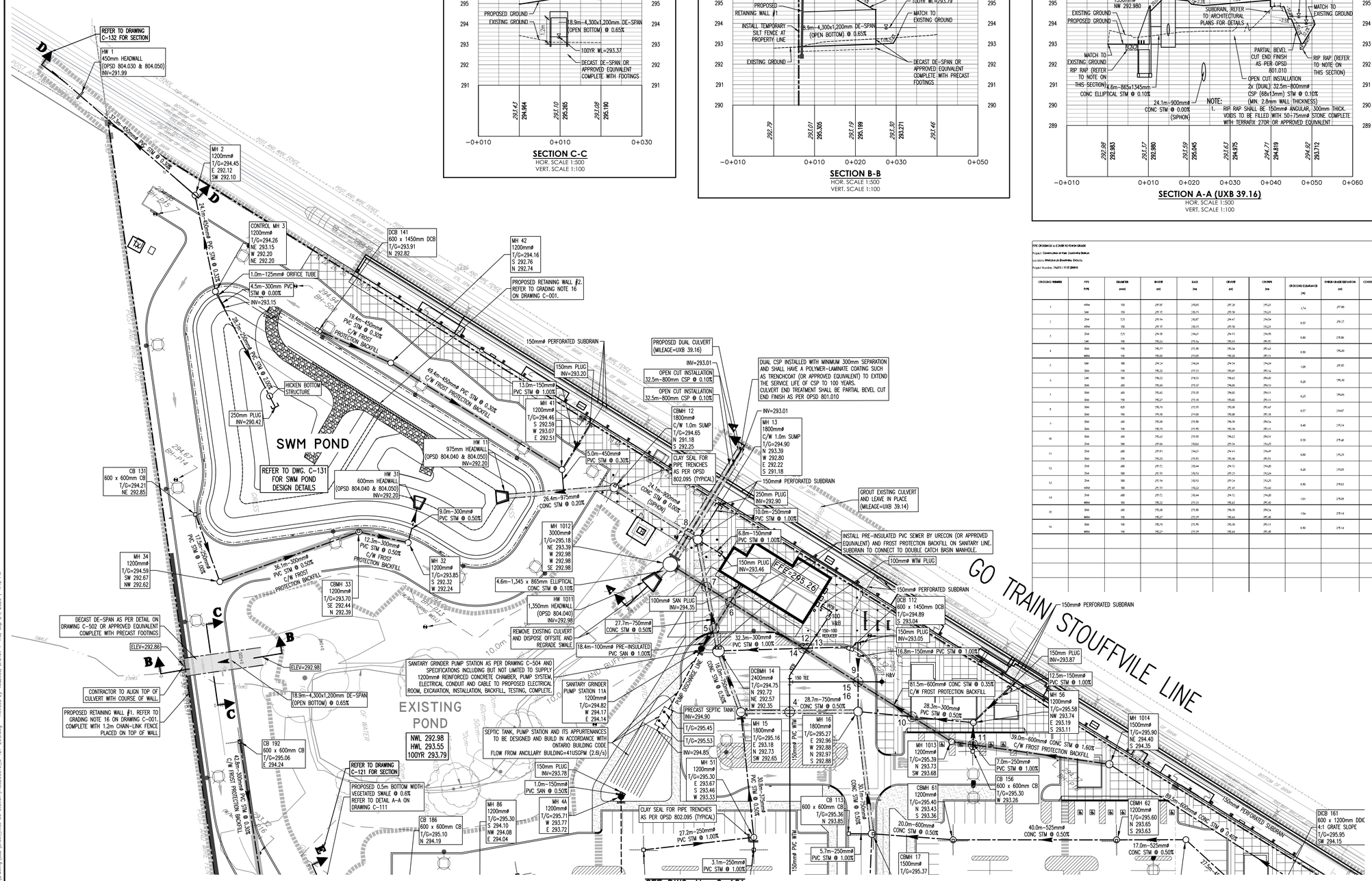

PIPE CROSSINGS & CLOSE TO FINISH GRADE

Project: Construction of New Lincolnville Station

Location: Whitchurch-Stouffville, Ontario

Project Number: 166313 / ICIS# 200010

CROSSING NUMBER	PIPE	PIPE (mm)	DIAMETER (mm)	INVERT (m)	BASE (m)	OBVERT (m)	CROWN (m)	CROSSING CLEARANCE (m)	FINISH GRADE ELEVATION (m)	COVER TO FINISH GRADE (m)	DEPTH OF EXCAVATION (m)
1	WS6W	900	297.07	293.05	297.20	295.21	1.74	297.80	3.40	3.96
	SW	900	297.07	293.15	297.30	295.21					
2	SW	525	297.14	293.47	297.47	294.54	0.57	297.37	3.73	3.11
	WS6W	900	297.07	293.15	297.30	295.21					
3	SW	525	294.38	294.01	294.91	294.98	0.80	295.80	0.90	2.44
	SW	900	295.26	293.36	295.51	293.51					
4	SW	900	295.77	293.28	295.94	293.63	0.90	296.80	1.07	2.45
	WS6W	900	295.65	293.05	295.80	293.71					
5	SW	900	294.34	294.04	294.74	294.84	1.08	295.87	0.71	2.42
	SW	900	295.12	293.23	295.69	293.16					
6	SW	900	294.22	294.13	294.62	294.83	0.20	295.90	0.67	1.93
	SW	600	295.65	293.37	294.06	294.13					
7	SW	600	295.63	293.35	296.02	294.11	0.25	296.85	0.96	2.59
	SW	900	295.27	293.18	295.82	293.11					
8	SW	825	295.79	293.25	295.48	293.47	0.57	294.87	1.39	2.71
	SW	900	295.38	293.08	295.88	293.03					
9	SW	600	295.88	293.50	296.18	294.26	0.40	295.94	0.98	2.17
	SW	900	295.75	293.95	295.90	293.11					
10	SW	600	295.63	293.55	296.23	294.31	0.30	295.60	1.37	2.37
	2W	300	295.84	293.62	295.74	293.25					
11	2W	600	295.91	294.01	294.41	294.49	0.80	295.21	0.96	1.52
	SW	900	295.25	293.95	295.90	293.51					
12	2W	600	295.72	293.44	294.12	294.20	0.20	295.85	0.97	2.13
	2W	300	295.90	293.92	295.20	293.24					
13	2W	300	295.94	293.93	295.14	293.25	0.50	295.03	1.19	2.19
	WS6W	900	295.70	293.62	295.47	293.62					
14	2W	600	295.72	293.44	294.12	294.20	1.01	295.85	0.85	2.72
	WS6W	900	295.52	293.55	295.40	293.40					
15	SW	600	295.68	293.50	296.18	294.26	1.06	295.94	0.88	2.86
	WS6W	900	295.25	293.19	295.44	293.48					
16	SW	900	295.76	293.95	295.90	293.11	0.90	295.94	2.04	2.86
	WS6W	900	295.25	293.19	295.44	293.48					

DWG NO.	TITLE	NO.	DATE	ISSUED FOR	REV.	DATE
		1	20.09.25	ISSUED FOR CONSTRUCTION		

REFERENCE DRAWINGS

DRAWN BY: BC 19/01/18	DESIGNED BY: BC 19/01/18
CHECKED BY: SA/JK 19/06/03	APPROVED BY: SA/JK 19/06/03
SCALE: 1:500	FULL SIZE ONLY

0 5 1:500 25m

LICENSED PROFESSIONAL ENGINEER S.AKBARI 100147693 SEPT. 25, 2020 PROVINCE OF ONTARIO

Stantec Consulting Ltd.
300–675 Cochrane Drive West Tower
Markham ON Canada
L3R 0B8
Tel 905.944.7777
Fax. 905.474.9889
www.stantec.com

METROLINX

LEGEND

- SANITARY MANHOLE
- STORM MANHOLE
- CATCH BASIN MANHOLE C/W 0.3m SUMP
- HEADWALL
- CATCH BASIN / DOUBLE CATCH BASIN
- CB SHIELD (OR APPROVED EQUIV.)
- V&B — VALVE AND VALVE BOX
- HYD — HYDRANT
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- 1 — PIPE CROSSING ID
- CLAY SEAL FOR PIPE TRENCHES AS PER OPSD 802.095
- PROPERTY BOUNDARY
- LIMIT OF CONSTRUCTION
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- 100mmø PERFORATED SUBDRAIN (UNLESS OTHERWISE NOTED). REFER TO DRAWING C–504 FOR DETAILS. DRAWINGS A6001 AND A6002 FOR SECTIONS WITHIN PLATFORM.
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METROLINX PROJECT NO. 166313

CONSTRUCTION OF NEW LINCOLNVILLE STATION

PROPOSED SITE

SERVICING PLAN – 2 OF 2

CONTRACT NO.	DWG. NO.	REV.	SHEET
PT–2019–NAFA–788	C–122	0	

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EPW-014-24
Attachment 1

Town of Whitchurch-Stouffville
2024 Water and Wastewater Master Plan

Master Plan Report
Executive Summary

Post-Filing (March 2024)

Prepared by: GM BluePlan Engineering
Contact Person: Chris Campbell – Vice President
E: chris.campbell@gmblueplan.ca
Royal Centre, 3300 Highway No. 7
Suite 402, Vaughan, Ontario, L4K 4M3
P: 416 703 0667

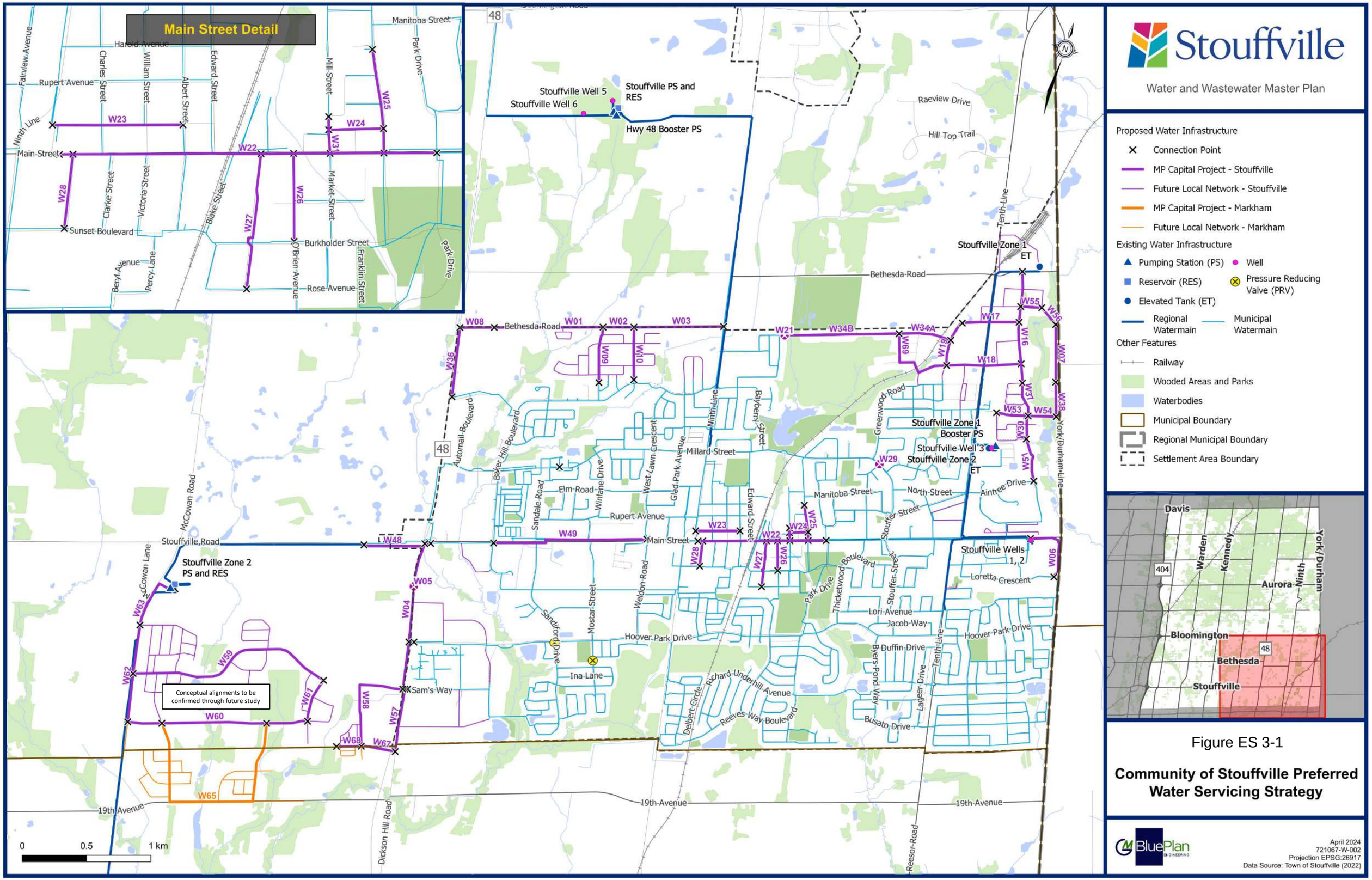


Figure ES 3-1

Community of Stouffville Preferred Water Servicing Strategy

Table 4-10: Water Capital Program

Master Plan ID	Project Name	Project Description	Year in Service	Municipality	Class EA	Size/Capacity	Length (m)	Class Estimate Type	Project Complexity	Area Condition	Base Construction Cost ($2023)	Crossings ($2023)	Additional Costs ($2023)	Soft Costs (Engineering + In-House) ($2023)	Property Costs ($2023)	Project Contingency ($2023)	Non-Refundable HST ($2023)	Total Estimated Cost ($2023)
W01	Bethesda Side Road #1	New 300 mm diameter watermain along Bethesda Side Road from W09 to W08. Two creek crossings.	2031-2036	Stouffville	A+	300 mm	845	Class 4	High	Suburban	1,009,681	104,544	357,000	368,000	29,000	467,000	39,000	**$ 2,374,000**
W02	Bethesda Side Road #2	New 300 mm diameter watermain along Bethesda Side Road from W10 to W09	2023-2026	Stouffville	A+	300 mm	240	Class 4	Med	Rural	243,483	-	65,000	74,000	5,000	58,000	7,000	**$ 452,000**
W03	Bethesda Side Road 3	New 300 mm diameter watermain along Bethesda Side Road from Ninth Line to W10	2026-2031	Stouffville	A+	300 mm	695	Class 4	Med	Suburban	807,643	-	214,000	245,000	15,000	192,000	25,000	**$ 1,499,000**
W04	Hwy 48 #1	New 300mm diameter watemain along Hwy 48 from Main Street to Hoover Park Drive. One creek crossing	2023-2026	Stouffville	A+	300 mm	862	Class 4	High	Suburban	1,013,515	500,000	484,000	500,000	40,000	634,000	53,000	**$ 3,225,000**
W05	PRV Highway 48	PRV on Highway 48 south of Stoufville Road/Main Street	2023-2026	Stouffville	A+	-	-	-	-	-	-	-	-	-	-	-	-	**$ 1,000,000**
W06	York Durham Line #1	New 300 mm diameter watermain along Main Street and York Durham Line, from Stouffville Well 1&2 to Loretta Crescent.	2031-2036	Stouffville	A+	300 mm	483	Class 4	High	Suburban	566,023	-	181,000	187,000	15,000	237,000	20,000	**$ 1,206,000**
W07	York Durham Line #2	New 200 mm diameter watermain along York Durham Line, between Bethesda Side Road and proposed Post Gate Road	2031-2036	Stouffville	A+	200 mm	446	Class 4	High	Rural	335,734	-	107,000	111,000	9,000	141,000	12,000	**$ 716,000**
W08	Bethesda Side Road #4	New 300 mm diameter watermain along Bethesda Side Road from W01 to Hwy 48	2046-2051	Stouffville	A+	300 mm	267	Class 4	Med	Rural	269,127	-	71,000	82,000	5,000	64,000	8,000	**$ 499,000**
W09	Future Road #2	New 300 mm diameter watermain along future road connecting Baker Hill Boulevard to Bathesda Side Road and Main Street	2026-2031	Stouffville	A+	300 mm	440	Class 4	Med	Rural	433,436	-	115,000	132,000	8,000	103,000	13,000	**$ 804,000**
W10	Future Road #3	New 300 mm diameter watermain along future road connecting Baker Hill Boulevard to Bethesda Side Road	2026-2031	Stouffville	A+	300 mm	410	Class 4	Low	Rural	404,943	-	85,000	115,000	5,000	61,000	11,000	**$ 682,000**
W16	Future Road #9	New 300 mm diameter watermain along future road in northeast corner of Stouffville, connecting W37 to Bethesda Side Road	2026-2031	Stouffville	A+	300 mm	870	Class 4	High	Rural	841,834	-	269,000	278,000	22,000	353,000	30,000	**$ 1,794,000**
W17	Future Road #10	New 300 mm diameter watermain along future road in northeast corner of Stouffville, connecting W19 to W16	2026-2031	Stouffville	A+	300 mm	455	Class 4	High	Rural	463,223	52,111	165,000	170,000	14,000	216,000	18,000	**$ 1,098,000**
W18	Future Road #11	New 300 mm diameter watermain along future road in northeast corner of Stouffville, connecting W19 to W16	2026-2031	Stouffville	A+	300 mm	580	Class 4	High	Rural	581,943	52,111	203,000	209,000	17,000	266,000	22,000	**$ 1,351,000**
W19	Future Road #12	New 300 mm diameter watermain along future road in northeast corner of Stouffville, connecting W17 and W18	2026-2031	Stouffville	A+	300 mm	350	Class 4	High	Rural	347,957	-	111,000	115,000	9,000	146,000	12,000	**$ 741,000**
W21	PRV Future Road	PRV west of W34	2041-2046	Stouffville	A+	-	-	Class 4	-	-	-	-		-	-	-		**$ 900,000**
W22	Main Street	300 mm watermain upgrade along Main Street from Ninth Line to Park Drive. One railway and one creek crossing.	2023-2026	Stouffville	A+	300 mm	1000	Class 4	High	Urban	1,186,336	1,000,000		722,000	58,000	916,000	77,000	**$ 4,658,000**
W23	Second Street	200 mm watermain upgrade along Second Street from Ninth Line to Albert Street.	2023-2026	Stouffville	A+	200 mm	345	Class 4	Low	Urban	323,353	104,221	90,000	122,000	5,000	64,000	12,000	**$ 720,000**
W24	Commercial Street	150 mm watermain upgrade along Commercial Street from Church Street North to Mill Street	2023-2026	Stouffville	A+	150 mm	145	Class 4	High	Urban	116,571	-	37,000	39,000	3,000	49,000	4,000	**$ 249,000**
W25	Church Street North	200 mm watermain upgrade along Church Street North from Main Street to Warriner Street	2023-2026	Stouffville	A+	200 mm	276	Class 4	High	Urban	250,771	-	80,000	83,000	7,000	105,000	9,000	**$ 534,000**
W26	O'Brien Avenue	150 mm watermain upgrade along O'Brien Avenue from Main Street to Burkholder Street	2023-2026	Stouffville	A+	150 mm	231	Class 4	High	Urban	187,549	52,111	77,000	79,000	6,000	100,000	8,000	**$ 510,000**
W27	Lloyd Street	150 mm watermain upgrade along Lloyd Street from Main Street to Rose Avenue	2023-2026	Stouffville	A+	150 mm	375	Class 4	Med	Urban	298,827	52,111	93,000	107,000	7,000	84,000	11,000	**$ 652,000**
W28	Orchard Park Boulevard	200 mm watermain upgrade along Orchard Park Boulevard from Main Street to Sunset Boulevard	2023-2026	Stouffville	A+	200 mm	197	Class 4	High	Urban	180,610	-	58,000	60,000	5,000	76,000	6,000	**$ 385,000**

Table 4-10: Water Capital Program

Master Plan ID	Project Name	Project Description	Year in Service	Municipality	Class EA	Size/Capacity	Length (m)	Class Estimate Type	Project Complexity	Area Condition	Base Construction Cost ($2023)	Crossings ($2023)	Additional Costs ($2023)	Soft Costs (Engineering + In-House) ($2023)	Property Costs ($2023)	Project Contingency ($2023)	Non-Refundable HST ($2023)	Total Estimated Cost ($2023)
W29	PRV Millard Street	New PRV on Millard Street and Willoway	2023-2026	Stouffville	A+	-	-	-	-	-	-	-	-	-	-	-	-	**$ 1,000,000**
W30	Future Road #14	New 200 mm diameter watermain along a future road from Forsyth Farm Drive to Auctioneers Crescent	2026-2031	Stouffville	A+	200 mm	180	Class 4	Med	Rural	138,868	-	37,000	42,000	3,000	33,000	4,000	**$ 258,000**
W31	Mill Street	200 mm watermain upgrade along Mill Street from Main Street to George Street	2023-2026	Stouffville	A+	200 mm	98	Class 4	High	Urban	92,686	-	30,000	31,000	2,000	39,000	3,000	**$ 197,000**
W33	HWY 48 #3	New 250 mm diameter watermain along HWY 48 from Spruceview Place to existing dead end.	2023-2026	Ballantrae	A+	250 mm	1173	Class 4	High	Rural	1,000,800	-	320,000	330,000	26,000	419,000	35,000	**$ 2,132,000**
W34A	Future Road #15	New 300 mm diameter watermain along future road in northeast corner of Stouffville, connecting W19 to W20. One railway crossing	2026-2031	Stouffville	A+	300 mm	408	Class 4	High	Rural	418,584	500,000	294,000	303,000	24,000	385,000	32,000	**$ 1,958,000**
W34B	Future Road #15	New 300 mm diameter watermain along future road in northeast corner of Stouffville, connecting W19 to W20. One creek crossing.	2041-2046	Stouffville	A+	300 mm	889	Class 4	High	Rural	875,420	500,000	440,000	454,000	36,000	577,000	48,000	**$ 2,932,000**
W36	HWY 48 #2	New 300 mm diameter watermain along Hwy 48	2046-2051	Stouffville	A+	300 mm	540	Class 4	Med	Rural	543,953	52,272	158,000	181,000	11,000	142,000	18,000	**$ 1,106,000**
W37	Future Road #16	New 300 mm diameter watermain along future road in northeast corner of Stouffville, connecting W30 to W16	2026-2031	Stouffville	A+	300 mm	268	Class 4	High	Rural	270,077	-	86,000	89,000	7,000	113,000	10,000	**$ 576,000**
W38	York Durham Line #3	New 200 mm diameter watermain along York Durham Line, between Bethesda Side Road and Main Street	2026-2031	Stouffville	A+	200 mm	268	Class 4	High	Rural	203,997	-	65,000	67,000	5,000	85,000	7,000	**$ 434,000**
W39	Gormely Fire Protection	New 300 mm diameter fire protection watermain on Stouffville Road from Union Street west	2023-2026	Gormley	A+	300 mm	347	Class 4	Low	Suburban	411,022	-	86,000	117,000	5,000	62,000	11,000	**$ 692,000**
W40	Gormely Fire Protection	New 300 mm diameter fire protection watermain on Union Street from Stouffville Street south	2023-2026	Gormley	A+	300 mm	453	Class 4	Low	Suburban	531,831	-	112,000	151,000	6,000	80,000	15,000	**$ 896,000**
W42	Master Plan	Water Master Plan (occurs every 5 years at $300k each)	2026-2051	Stouffville	-													**$ 1,500,000**
W43	Future Studies	Vandorf Future Service Area Study	2026-2031	Vandorf	-													**$ 250,000**
W44	Future Studies	Gormley Future Service Area Study	2026-2031	Gormley	-													**$ 250,000**
W45	Future Studies	Whitebelt Lands Future Service Area Study	2026-2031	Whitebelt	-													**$ 250,000**
W48	Stouffville Road	600mm Watermain twinning on Stouffville Road from the Z2 BPS to Hwy48 (Town owned section)	2036-2041	Stouffville	A+	600 mm	530	Class 4	High	Rural	1,301,798	1,490,460	894,000	922,000	74,000	1,170,000	98,000	**$ 5,949,000**
W49	Main Street	The existing aged 250mm watermain along Main Street from Hwy 48 to Weldon Road to be upgraded to 300mm	2041-2046	Stouffville	A+	300 mm	1230	Class 4	High	Urban	1,448,471	104,221	497,000	513,000	41,000	651,000	54,000	**$ 3,309,000**
W50	Millard Street and Bearings Avenue	connect the existing 150mm watermain on Bearings Avenue to the existing 300mm watermain on Millard Street to improve resiliency	2041-2046	Stouffville	A+	300 mm	10	Class 4	Low	Urban	26,937	-	6,000	8,000	-	4,000	1,000	**$ 46,000**
W51	Cam Fella Boulevard	Upgrade to the existing 150mm watermain along Cam Fella Boulevard cul-de-sac to 200mm, , and a new 200mm watermain on easement connecting	2026-2031	Stouffville	A+	200 mm	350	Class 4	Low	Suburban	322,143	42,383	77,000	104,000	300,000	84,000	16,000	**$ 944,000**
W52	Ninth Line	New 300mm Watermain twinning on Ninth Line from Musselman Lake to Windsor Drive	2023-2026	Musselman's Lake	A+	300 mm	660	Class 4	High	Suburban	783,293	52,111	267,000	276,000	22,000	350,000	29,000	**$ 1,780,000**
W53	Forsyth Farm Road	New 300mm Watermain on Forsyth Farm Road connecting W37 and Existing watermain on Forsyth Farm Road	2026-2031	Stouffville	A+	300 mm	250	Class 4	Med	Rural	252,981	-	67,000	77,000	5,000	60,000	8,000	**$ 469,000**
W54	Forsyth Farm Road	New 200mm Watermain on Forsyth Farm Road connecting W37 and future watermain on York Durham Line	2026-2031	Stouffville	A+	200 mm	220	Class 4	High	Rural	174,123	500,000	216,000	223,000	18,000	283,000	24,000	**$ 1,437,000**

Table 4-10: Water Capital Program

Master Plan ID	Project Name	Project Description	Year in Service	Municipality	Class EA	Size/Capacity	Length (m)	Class Estimate Type	Project Complexity	Area Condition	Base Construction Cost ($2023)	Crossings ($2023)	Additional Costs ($2023)	Soft Costs (Engineering + In-House) ($2023)	Property Costs ($2023)	Project Contingency ($2023)	Non-Refundable HST ($2023)	Total Estimated Cost ($2023)
W55	Future Road #17	New 250 mm diameter watermain along future road in northeast corner of Stouffville, connecting W16 to W56	2026-2031	Stouffville	A+	250 mm	170	Class 4	High	Rural	150,359	-	48,000	50,000	4,000	63,000	5,000	**$ 320,000**
W56	Future Road #17	New 200 mm diameter watermain along future road in northeast corner of Stouffville, connecting W56 to W07	2031-2036	Stouffville	A+	200 mm	170	Class 4	High	Rural	137,119	500,000	204,000	210,000	17,000	267,000	22,000	**$ 1,357,000**
W57	Hwy 48	New 300mm diameter watemain along Hwy 48 from Hoover Park Dr to new road within MZO 1 lands (Street A)	2023-2026	Stouffville	A+	300 mm	900	Class 4	High	Suburban	1,041,284	-	333,000	344,000	28,000	436,000	37,000	**$ 2,218,000**
W58	MZO1 Loop	New 250mm diameter watemain within MZO 1 Lands to new Street A	2023-2026	Stouffville	A+	250 mm	820	Class 4	High	Rural	707,708	42,383	240,000	248,000	20,000	314,000	26,000	**$ 1,598,000**
W59	Future Road #18	New 300mm diameter watermain within MZO 2 lands connecting W61 and W62	2031-2036	Stouffville	A+	300 mm	1650	Class 4	High	Rural	1,598,189	500,000	671,000	693,000	55,000	879,000	74,000	**$ 4,470,000**
W60	Future Road #19	New 300mm diameter watermain within MZO 2 lands connecting W61 and south end of W62	2031-2036	Stouffville	A+	300 mm	1400	Class 4	High	Rural	1,376,289	552,272	617,000	637,000	51,000	808,000	68,000	**$ 4,109,000**
W61	Future Road #20	New 300mm watermain within in MZO2 development connecting W59 and W60	2031-2036	Stouffville	A+	300 mm	350	Class 4	Med	Rural	347,957	-	92,000	106,000	7,000	83,000	11,000	**$ 646,000**
W62	McCowan Road	New 300mm watermain on McCowan Road connecting W59 and W60	2031-2036	Stouffville	A+	300 mm	760	Class 4	High	Suburban	881,724	-	282,000	291,000	23,000	370,000	31,000	**$ 1,879,000**
W63	McCowan Road	New 300mm watermain on McCowan Road from new pumping station to MZO2 development	2031-2036	Stouffville	A+	300 mm	505	Class 4	High	Suburban	591,097	-	189,000	195,000	16,000	248,000	21,000	**$ 1,259,000**
W66	Ninth Line	New 200mm Watermain twinning on Ninth Line from Cedarvale Boulevard to Legendary Trail	2031-2036	trae - Musselman'	A+	200 mm	1300	Class 4	High	Suburban	1,160,202	-	371,000	383,000	31,000	486,000	41,000	**$ 2,471,000**
W67	MZO1 Loop	New 200mm diameter watemain within MZO 1 Lands along new Street A from W58 to W57.	2023-2026	Stouffville	A+	200 mm	270	Class 4	High	Rural	211,128	500,000	228,000	235,000	19,000	298,000	25,000	**$ 1,516,000**
W68	MZO1 Servicing	New 250mm diameter watemain within MZO 1 Lands along new Street A from W58 to the West	2023-2026	Stouffville	A+	250 mm	200	Class 4	Low	Rural	175,796	-	37,000	50,000	2,000	27,000	5,000	**$ 297,000**
W69	Future Railway Crossing	New 300mm watermain connecting W18 and W34 crossing the Go Transit Railway	2026-2031	Stouffville	A+	300 mm	650	Class 4	High	Rural	648,427	500,000	367,000	379,000	30,000	481,000	40,000	**$ 2,447,000**
W70	Water Meter AMI	7 antennas/towers for water meter AMI	2026-2051	Stouffville	-													**$ 475,219**
Total Program 2051																		**$79,476,219**

Stouffville

Water and Wastewater Master Plan

Proposed Wastewater System

- Decommissioned Sanitary Pumping Station (SPS)
- Connection Point
- MP Capital Project - Stouffville
- Future Local Collection
- MP Capital Project - Outside of Stouffville

Existing Wastewater System

- Regional Sanitary Pumping Station (SPS)
- Private Sanitary Pumping Station (SPS)
- Forcemain
- Gravity Main (Regional)
- Siphon
- Gravity Main (Municipal)

Other Features

- Railway
- Wooded Area and Parks
- Waterbodies
- Settlement Area Boundary
- Municipal Boundary
- Regional Municipal Boundary

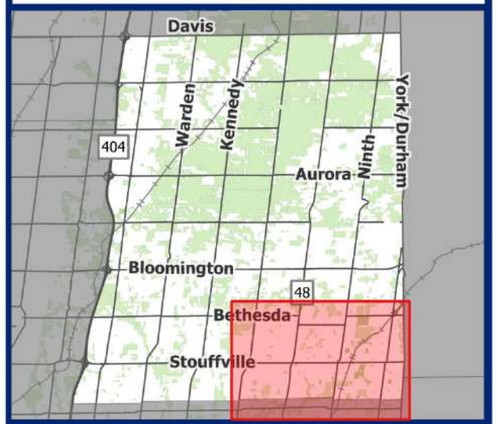
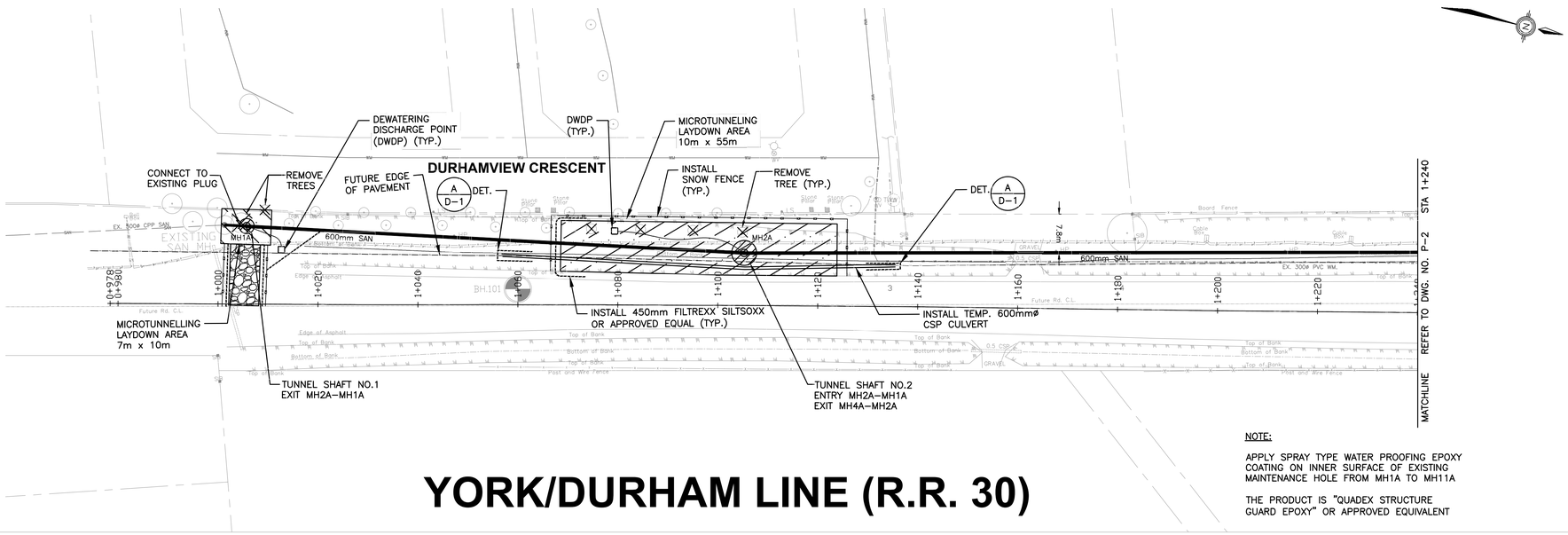


Figure ES 4-1

Community of Stouffville Preferred Wastewater Servicing Strategy

BluePlan ENGINEERING

November 2023
721067-WW-002
Projection EPSG:26917
Data Source: Town of Stouffville (2022)

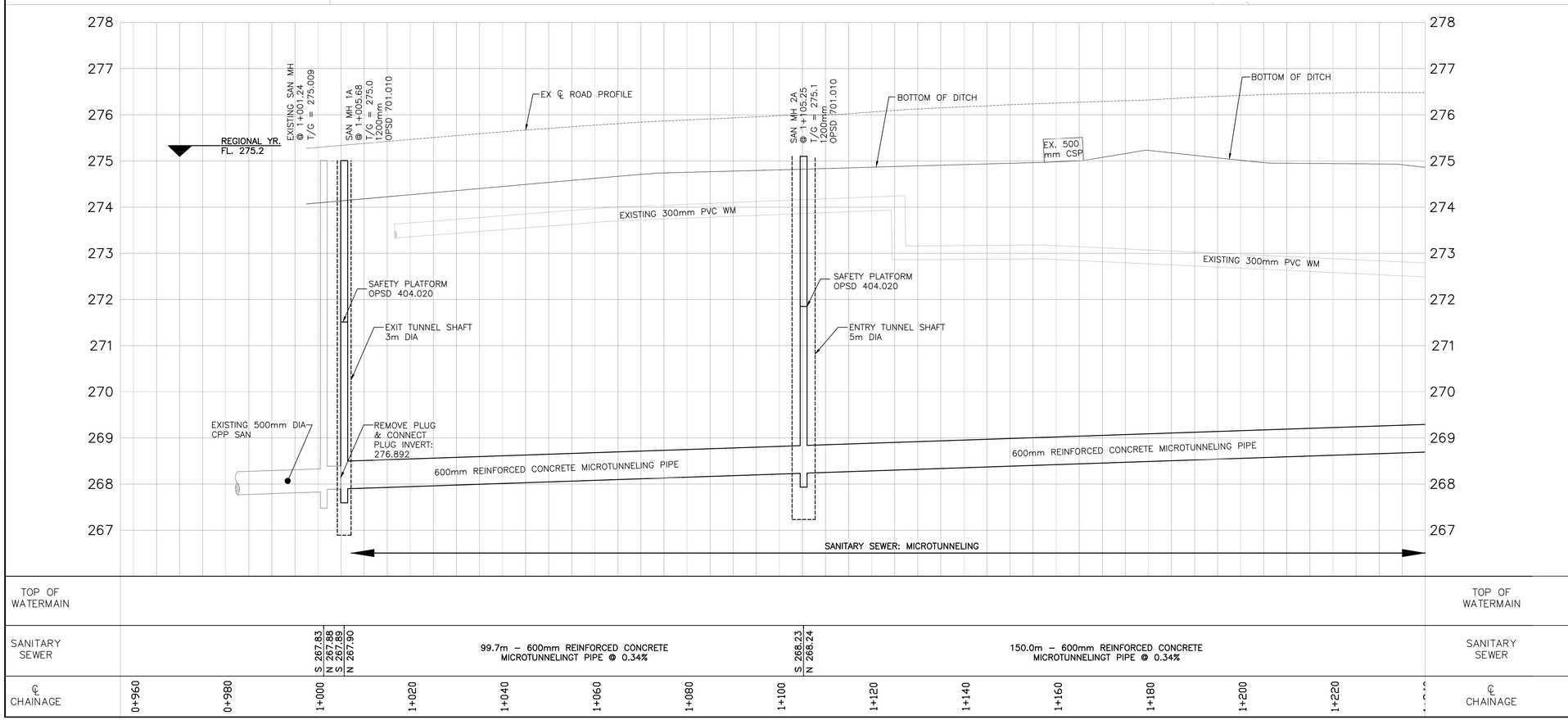


NOTE:

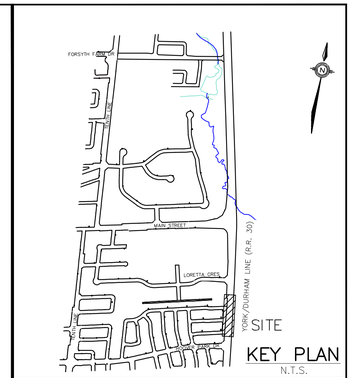
APPLY SPRAY TYPE WATER PROOFING EPOXY COATING ON INNER SURFACE OF EXISTING MAINTENANCE HOLE FROM MH1A TO MH11A

THE PRODUCT IS "QUADEX STRUCTURE GUARD EPOXY" OR APPROVED EQUIVALENT

YORK/DURHAM LINE (R.R. 30)



TOP OF WATERMAIN																	TOP OF WATERMAIN
SANITARY SEWER			S 267.83 N 267.88 S 267.89 N 267.90	99.7m – 600mm REINFORCED CONCRETE MICROTUNNELINGT PIPE @ 0.34%				S 268.23 N 268.24	150.0m – 600mm REINFORCED CONCRETE MICROTUNNELINGT PIPE @ 0.34%							SANITARY SEWER
℄ CHAINAGE	0+960	0+980	1+000	1+020	1+040	1+060	1+080	1+100	1+120	1+140	1+160	1+180	1+200	1+220			℄ CHAINAGE



KEY PLAN
N.T.S.

LEGEND

FUTURE EDGE OF PAVEMENT

NO.	REVISION	DATE	BY	APPR'D
1.	95% SUBMISSION	MAR.2018	D.T.	N.M.

Chisholm, Fleming and Associates
consulting engineers

BENCH MARK

REGISTERED PROFESSIONAL ENGINEER N. G. MORRISON PROVINCE OF ONTARIO

APPROVED

DIRECTOR, ENGINEERING DEPARTMENT
DEVELOPMENT SERVICES COMMISSION

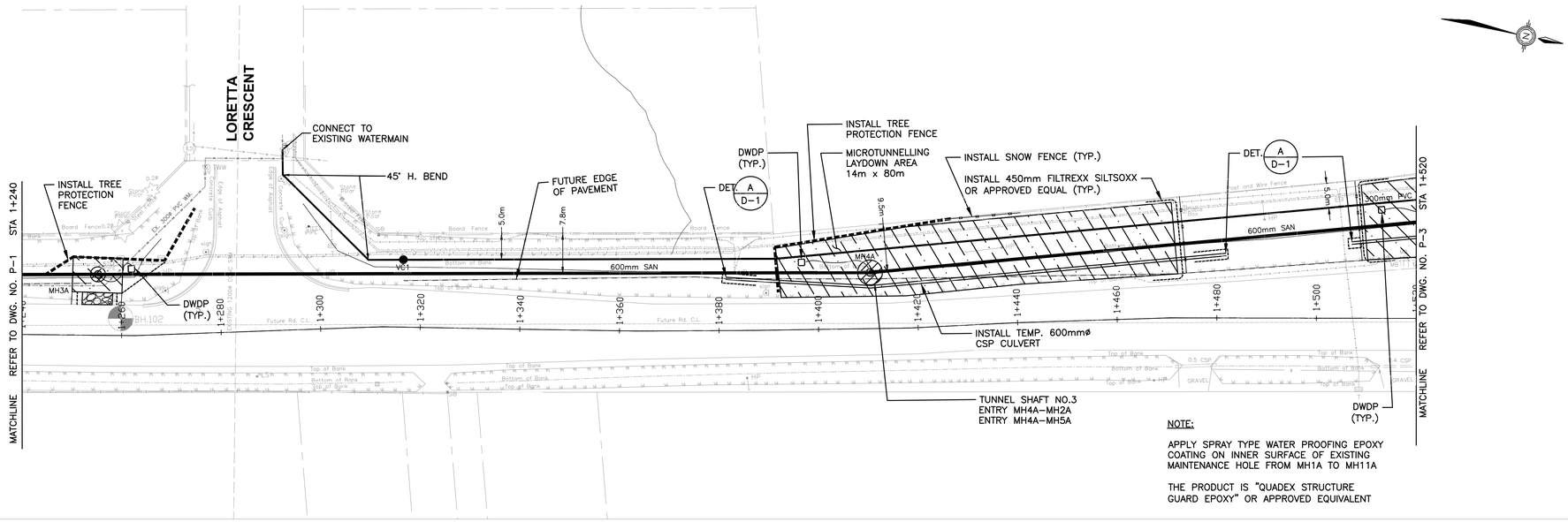
DATE

TOWN OF WHITCHURCH–STOUFFVILLE

YORK/DURHAM LINE (R.R. 30)
SUB–TRUNK #1 SANITARY SEWER
PLAN AND PROFILE
STA 0+980 TO STA 1+240

SURVEYED BY: P&P	CHECKED BY: XX	CONTRACT NO. XXX–T–XX
DRAWN BY: XX	APPROVED BY: XX	
DESIGNED BY: XX	DATE: FEB./2017	DRAWING NO. P–1
SCALE: H: 1:500 V: 1:50		SHEET NO. 3 OF 15

APPROVED AS TO FORM IN RELIANCE UPON THE PROFESSIONAL SKILL AND ABILITY OF CHISHOLM FLEMING AND ASSOCIATES, CONSULTING ENGINEERS, AS TO DESIGN AND SPECIFICATION.



NOTE:

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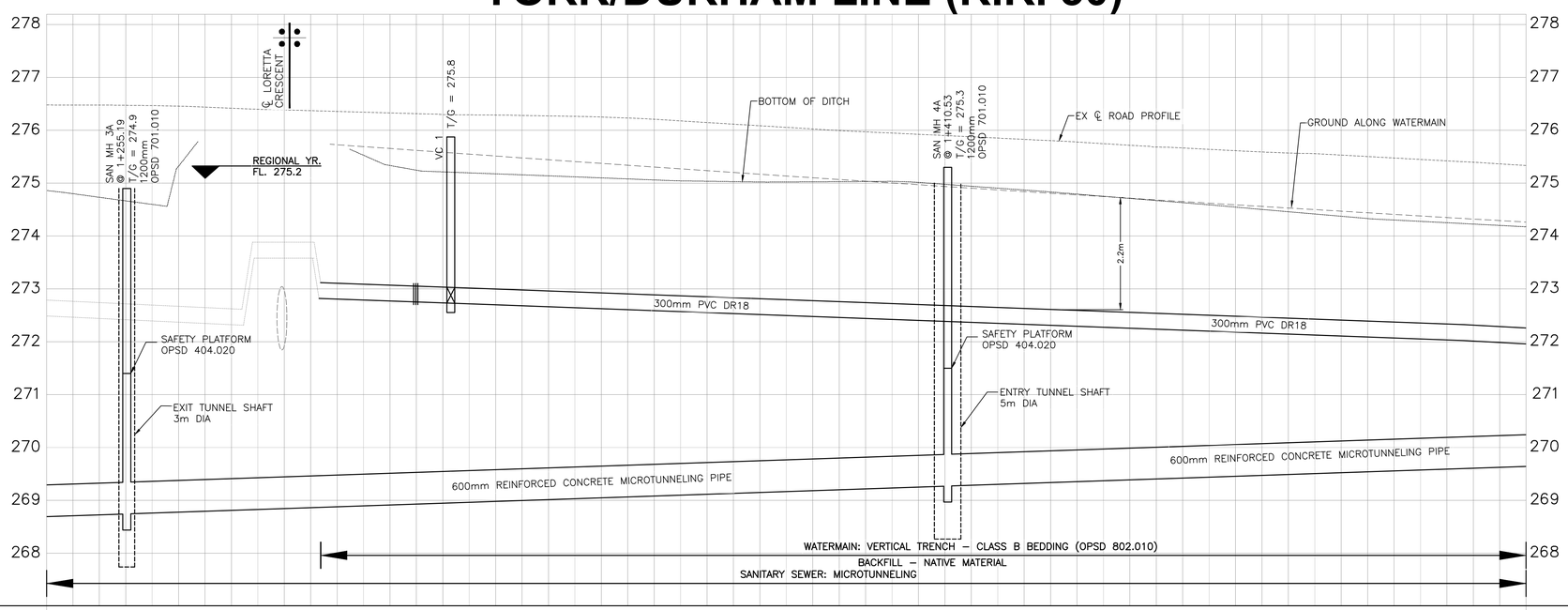
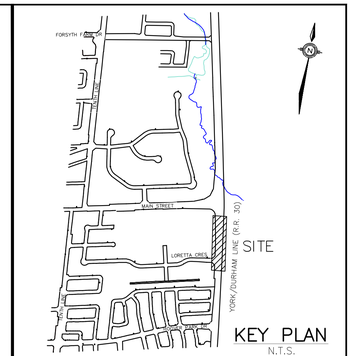
YORK/DURHAM LINE (R.R. 30)



TOP OF WATERMAIN	TOP OF WATERMAIN
SANITARY SEWER	S 268.74 N 268.75 — 155.0m – 600mm REINFORCED CONCRETE MICROTUNNELINGT PIPE @ 0.34% — S 269.27 N 269.27 — 122.7m – 600mm REINFORCED CONCRETE MICROTUNNELINGT PIPE @ 0.34% — SANITARY SEWER
℄ CHAINAGE	1+240 1+260 1+280 1+300 1+320 1+340 1+360 1+380 1+400 1+420 1+440 1+460 1+480 1+500 1+520 — ℄ CHAINAGE



LEGEND

FUTURE EDGE OF PAVEMENT

NO.	REVISION	DATE	BY	APPR'D
1.	95% SUBMISSION	MAR.2018	D.T.	N.M.

Chisholm, Fleming and Associates
consulting engineers

BENCH MARK

REGISTERED PROFESSIONAL ENGINEER N. G. MORRISON PROVINCE OF ONTARIO

APPROVED

DIRECTOR, ENGINEERING DEPARTMENT
DEVELOPMENT SERVICES COMMISSION

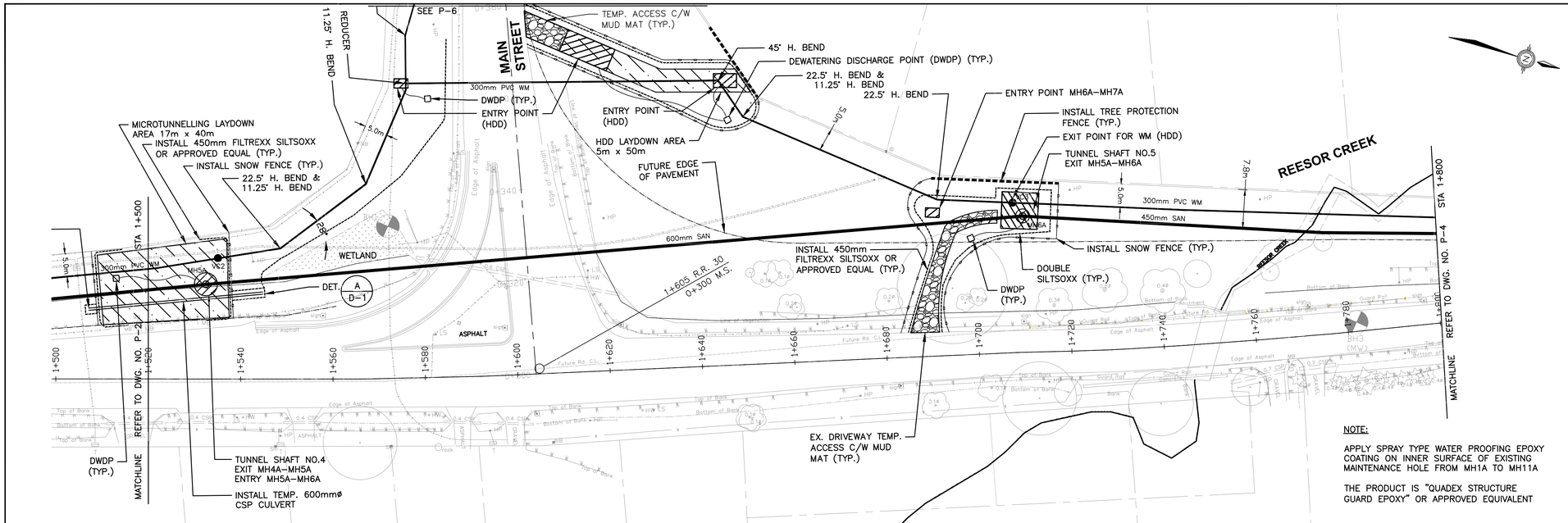
DATE

TOWN OF WHITCHURCH–STOUFFVILLE

YORK/DURHAM LINE (R.R. 30)
SUB–TRUNK #1 SANITARY SEWER
PLAN AND PROFILE
STA 1+240 TO STA 1+520

SURVEYED BY: P&P	CHECKED BY: XX	CONTRACT NO. XXX–T–XX
DRAWN BY: XX	APPROVED BY: XX	
DESIGNED BY: XX	DATE: FEB./2017	DRAWING NO. P–2
SCALE: H: 1:500 V: 1:50		SHEET NO. 4 OF 15

APPROVED AS TO FORM IN RELIANCE UPON THE PROFESSIONAL SKILL AND ABILITY OF CHISHOLM FLEMING AND ASSOCIATES, CONSULTING ENGINEERS, AS TO DESIGN AND SPECIFICATION.



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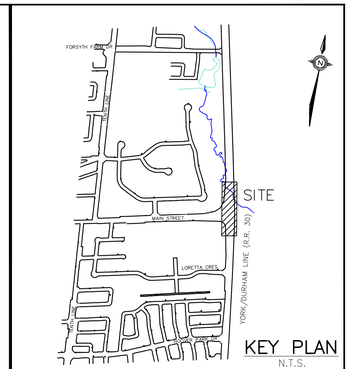
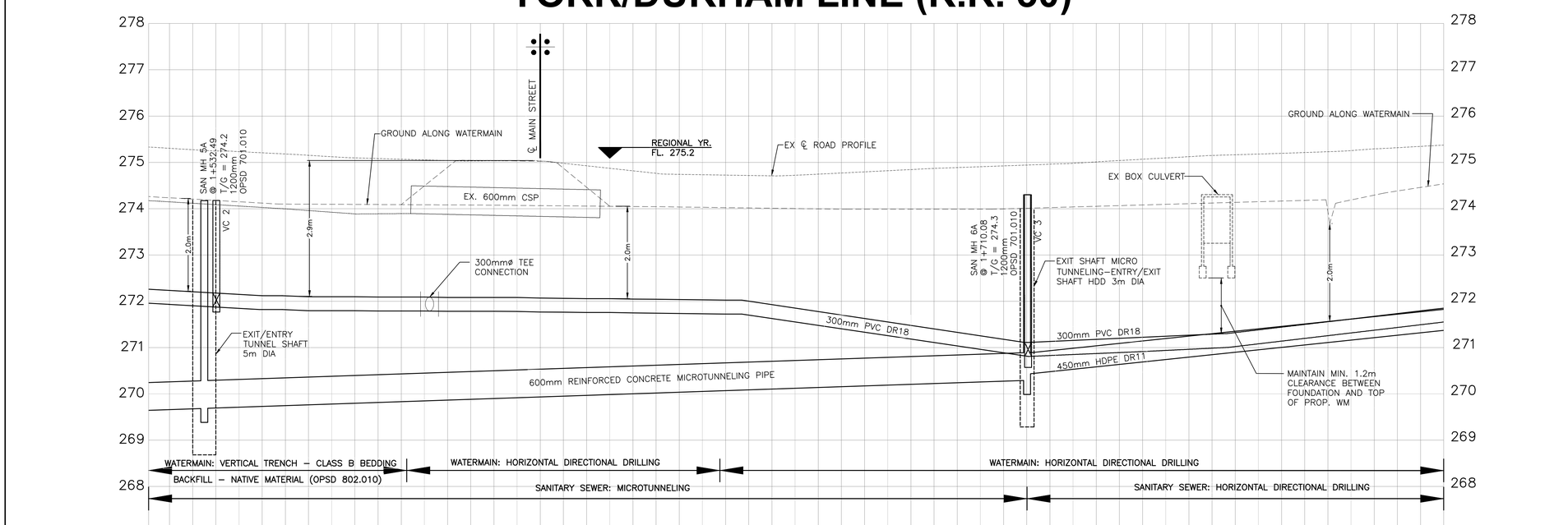


KEY PLAN
N.T.S.

LEGEND

FUTURE EDGE OF PAVEMENT

YORK/DURHAM LINE (R.R. 30)



TOP OF WATERMAIN																					TOP OF WATERMAIN
SANITARY SEWER		S 269.68 N 269.69					177.3m – 600mm REINFORCED CONCRETE MICROTUNNELING PIPE @ 0.34%							S 270.29 N 270.44			111.9m – 450mm (22in OD) HDPE DR11 @ 1.05%				SANITARY SEWER
℄ CHAINAGE			1+540	1+560	1+580	1+600	1+620	1+640	1+660	1+680	1+700		1+720	1+740	1+760	1+780					℄ CHAINAGE

NO.	REVISION	DATE	BY	APPR'D
1.	95% SUBMISSION	MAR.2018	D.T.	N.M.

Chisholm, Fleming and Associates
consulting engineers

BENCH MARK

REGISTERED PROFESSIONAL ENGINEER N. G. MORRISON PROVINCE OF ONTARIO

APPROVED

DIRECTOR, ENGINEERING DEPARTMENT
DEVELOPMENT SERVICES COMMISSION

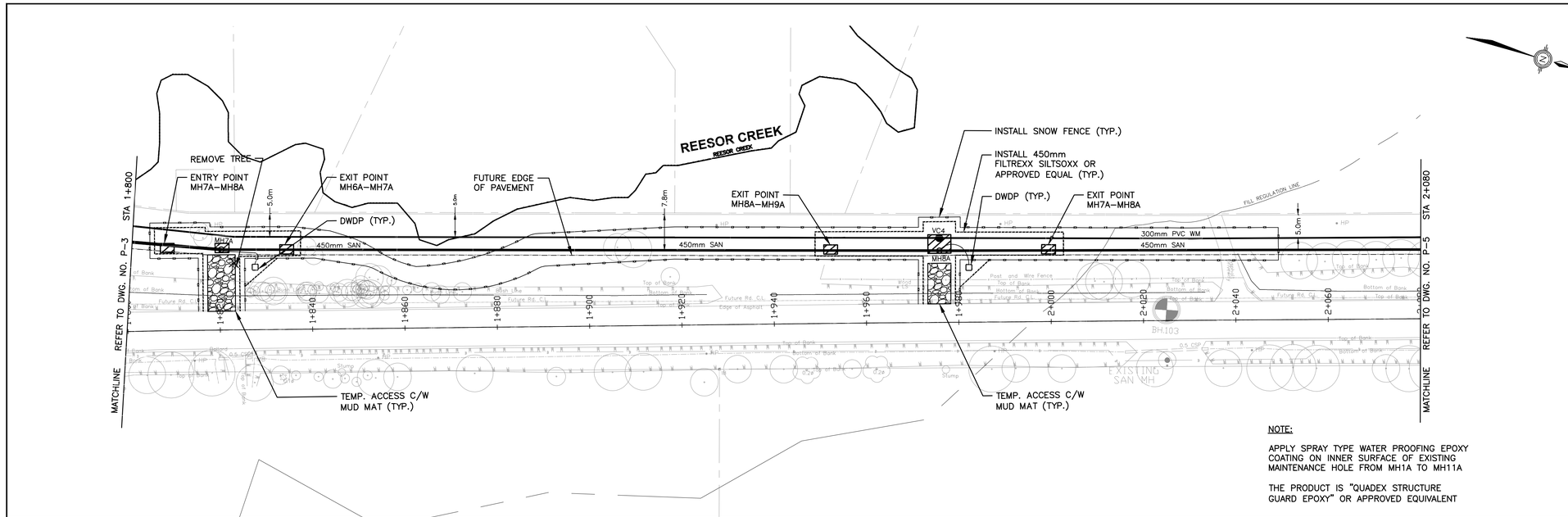
DATE

TOWN OF WHITCHURCH–STOUFFVILLE

YORK/DURHAM LINE (R.R. 30)
SUB–TRUNK #1 SANITARY SEWER
PLAN AND PROFILE
STA 1+520 TO STA 1+800

SURVEYED BY: P&P	CHECKED BY: XX	CONTRACT NO. XXX–T–XX
DRAWN BY: XX	APPROVED BY: XX	
DESIGNED BY: XX	DATE: FEB./2017	DRAWING NO. P–3
SCALE: H: 1:500 V: 1:50		SHEET NO. 5 OF 15

APPROVED AS TO FORM IN RELIANCE UPON THE PROFESSIONAL SKILL AND ABILITY OF CHISHOLM FLEMING AND ASSOCIATES, CONSULTING ENGINEERS, AS TO DESIGN AND SPECIFICATION.

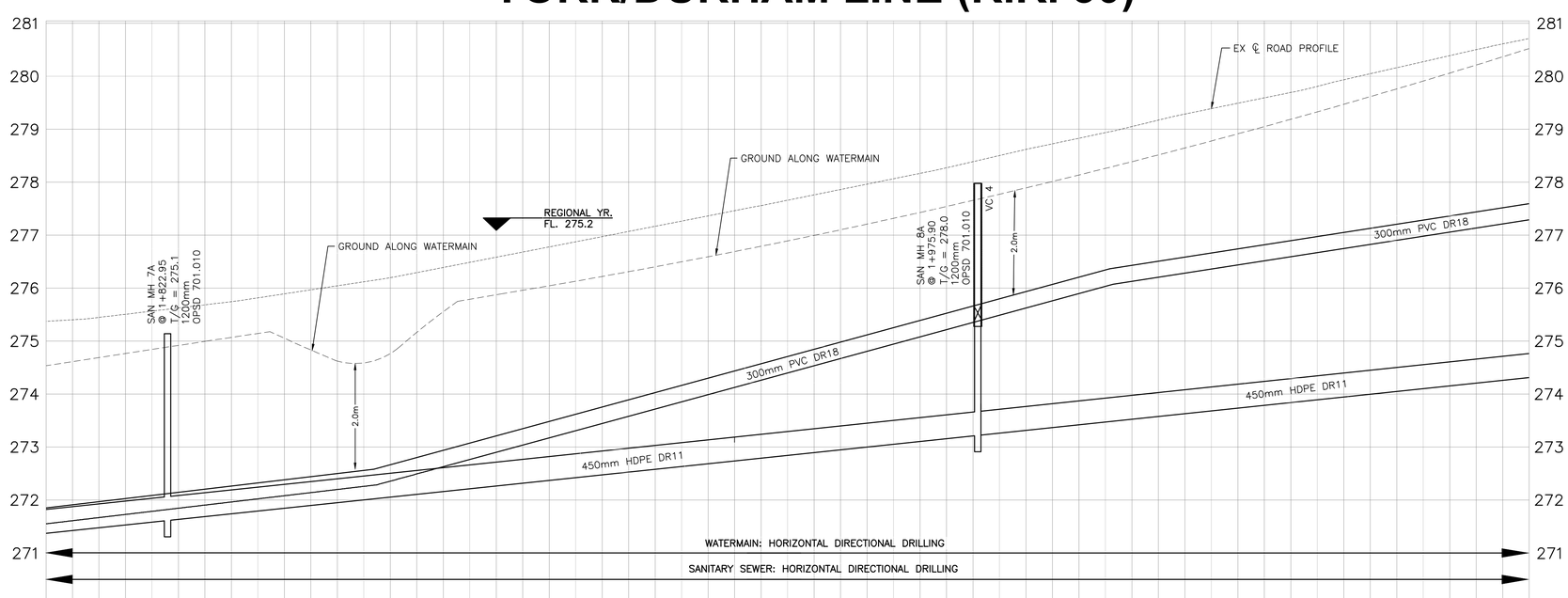


NOTE:

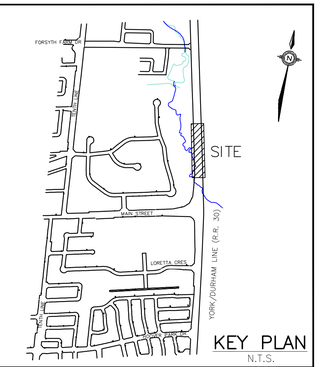
APPLY SPRAY TYPE WATER PROOFING EPOXY COATING ON INNER SURFACE OF EXISTING MAINTENANCE HOLE FROM MH1A TO MH11A

THE PRODUCT IS "QUADEX STRUCTURE GUARD EPOXY" OR APPROVED EQUIVALENT

YORK/DURHAM LINE (R.R. 30)



TOP OF WATERMAIN																	TOP OF WATERMAIN
SANITARY SEWER		S 271.61 N 271.62	153.0m – 450mm (22in OD) HDPE DR11 @ 1.05%							S 273.21 N 273.23	147.0m – 450mm (22in OD) HDPE DR11 @ 1.05%						SANITARY SEWER
℄ CHAINAGE	1+800	1+820	1+840	1+860	1+880	1+900	1+920	1+940	1+960	1+980	2+000	2+020	2+040	2+060	2+080		℄ CHAINAGE



KEY PLAN
N.T.S.

LEGEND

FUTURE EDGE OF PAVEMENT

NO.	REVISION	DATE	BY	APPR'D
1.	95% SUBMISSION	MAR.2018	D.T.	N.M.

Chisholm, Fleming and Associates
consulting engineers

BENCH MARK

REGISTERED PROFESSIONAL ENGINEER N. G. MORRISON PROVINCE OF ONTARIO

APPROVED

DIRECTOR, ENGINEERING DEPARTMENT
DEVELOPMENT SERVICES COMMISSION

DATE

TOWN OF WHITCHURCH–STOUFFVILLE

YORK/DURHAM LINE (R.R. 30)
SUB–TRUNK #1 SANITARY SEWER
PLAN AND PROFILE
STA 1+800 TO STA 2+080

SURVEYED BY: P&P	CHECKED BY: XX	CONTRACT NO. XXX–T–XX
DRAWN BY: XX	APPROVED BY: XX	
DESIGNED BY: XX	DATE: FEB./2017	DRAWING NO. P–4
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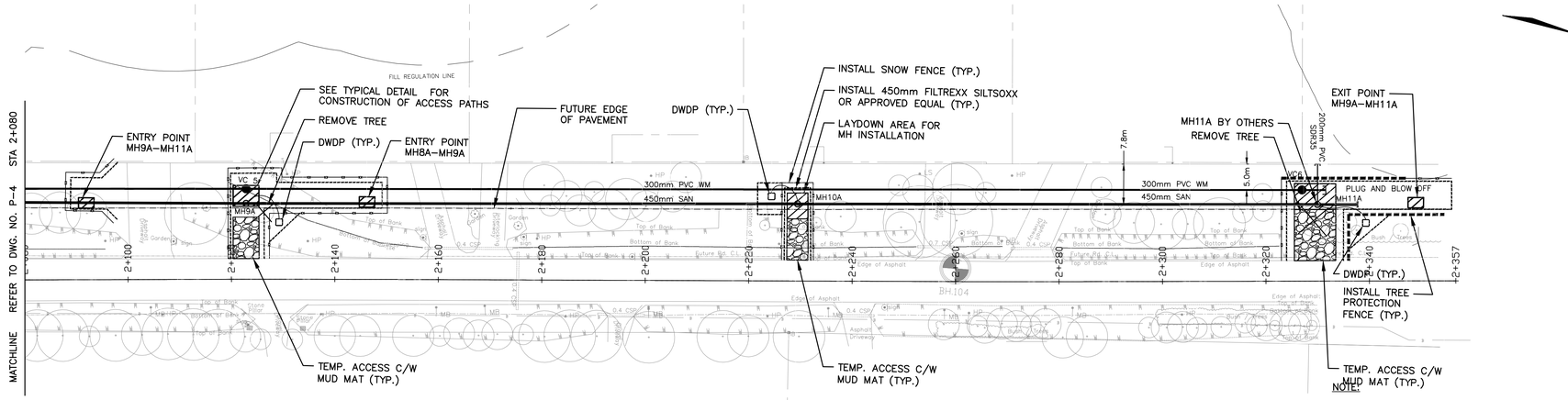

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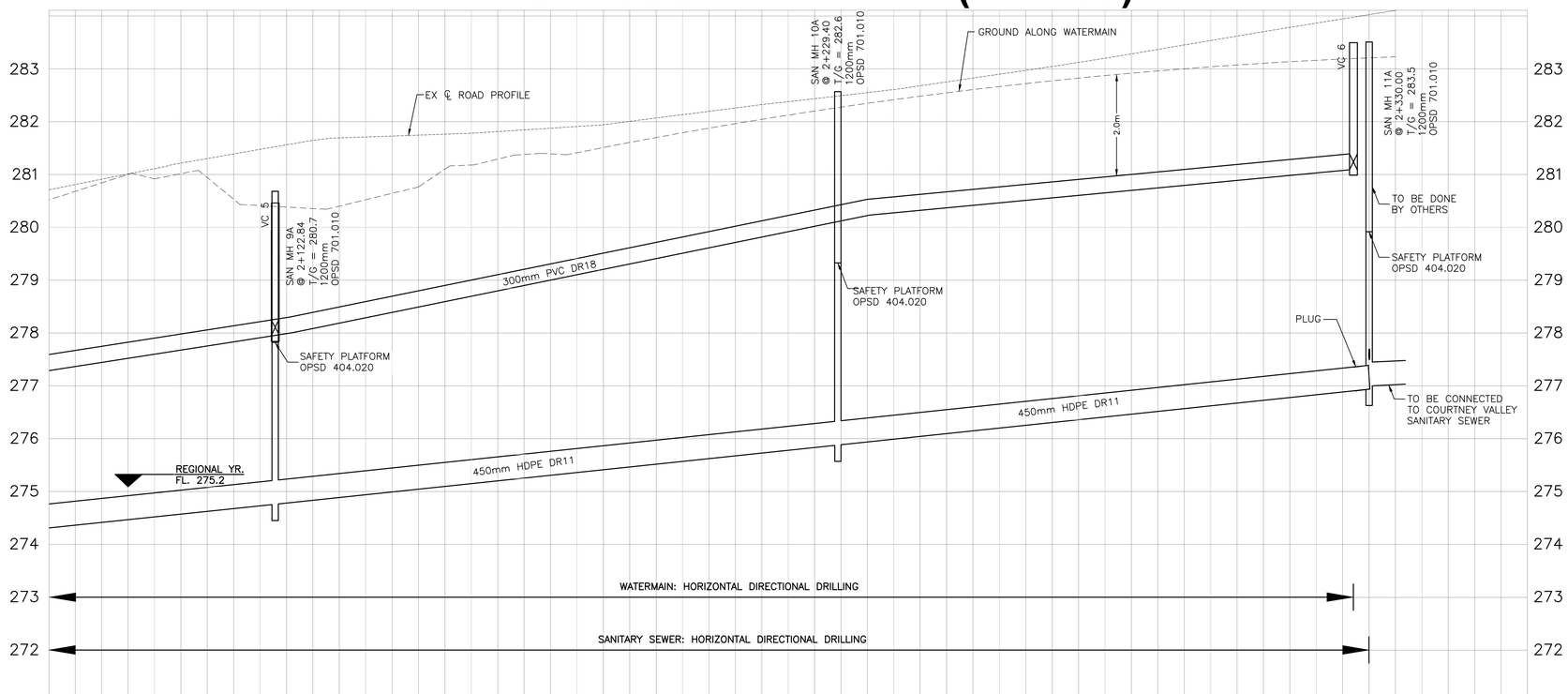
THE PRODUCT IS "QUADEX STRUCTURE GUARD EPOXY" OR APPROVED EQUIVALENT

YORK/DURHAM LINE (R.R. 30)



| | | |

TOWN OF
WHITCHURCH–STOUFFVILLE

Preliminary Design Report, *Amended- March 2017*

SUB-TRUNK #1 SANITARY SEWER AND WATERMAIN EXTENSION

FROM 284m SOUTH OF LORETTA CRESCENT TO THE NORTHERN LIMIT OF THE WESTFIELD ESTATES SUBDIVISION

Town of Whitchurch-Stouffville
Proposal WS-RFP-12-42
Consultant Design Services – Preliminary & Detailed Design

Chisholm, Fleming and Associates
consulting engineers

TABLE OF CONTENTS

TABLE OF CONTENTS **1**

1.0 INTRODUCTION **2**

2.0 EXISTING CONDITIONS AND DESIGN CONSIDERATIONS **3**

2.1 General 4
2.2 Base Mapping and Field Survey 4
2.3 Utilities and Services 4
2.4 Soil Conditions 5
2.4.1 Geotechnical Study 5
2.4.2 Hydrogeological Study 5
2.4.3 ESR/EMP 6

3.0 ALIGNMENT OPTIONS **6**

3.1 Design Criteria 4
3.2 Alignment Alternative 4

4.0 CONSTRUCTION / CONSTRUCTABILITY **8**

4.1 General 8
4.2 Construction Methodology 8
4.2.1 Open Cut Construction 8
4.2.2 Trench Technology 8

5.0 ESTIMATED COSTS **9**

6.0 SCHEDULE **9**

7.0 APPROVALS **9**

8.0 CONCLUSIONS **9**

APPENDICES

Appendix A – Figures
- I) Schedule "F3" and "K"
- II) Figure 2a and 2b Alignment Alternatives
- III) Figure 3 Alternative Alignment Cross Section
- IV) Drawing G1-G6 Plans and Profiles of Preferred Alignment Alternative 1

Appendix B – Cost Estimate Breakdown
- I) Table 2 – Sanitary Sub-trunk
- II) Table 3 – 300 mm diameter watermain

Appendix C – Getotechnical Report, by Soil Engineering, Oct. 2016

Appendix D – Hydrogeological Report
- I) Graphical Interpretations of the 2013 Hydrogeological report
- II) Hydrogeological Assessment by Soil Engineering, 2017

Appendix E – Environmental Management Plan by LGL, Feb. 2017

Appendix F – Spearate Package – Background Documents request by TRCA

1.0 INTRODUCTION

This preliminary design report (PDR) is an amendment to that which was prepared on June 12, 2015, for the sub trunk sanitary sewer. The following is an overview of the project rationale.

The Town of Whitchurch-Stouffville, Regional Municipality of York, is experiencing significant population and employment growth and as a result, there is a need for additional serviced lands. Growth development is guided by the Town's Secondary Plan for the Community of Stouffville which defines land use and phasing strategies. The Project Area is identified in the Secondary Plan as Phase 2 which is bounded by Tenth Line, York/Durham Line (Regional Road 30 (R.R. 30)), CP Railway Tracks north of Bethesda Road and Loretta Crescent, and is dependent on the availability of municipal services. The development strategy is to maximize the use of the existing infrastructure and to extend them in logical and environmentally safe undertakings.

The project is proceeding as a Schedule 'B' Municipal Class Environmental Assessment Project File, *Sub-Trunk Sanitary Sewer Town of Whitchurch-Stouffville*, which was completed and filed in May of 2014 by Chisholm, Fleming and Associates. The Environmental Assessment process outlined the solutions needed to provide municipal water supply and sewerage disposal capacities for the areas east of Tenth Line to the Regional Road 30, north of and including Loretta Crescent and just north Bethesda Rd, within the Town of Stouffville. The implementation phase of the project under this assignment is to extend the Sub-Trunk #1 Sanitary Sewer northerly from its terminal point, about 284 m south of Loretta Crescent, to 1500m further north. It also includes the extension of the existing 300 mm water main to the same north only limit as the sanitary.

The sewer will provide an outlet for the planned areas and existing residencies which are on septic systems. The proposal also includes the extension of the water system to service properties fronting on R.R. 30. The Study Area is divided into two (2) zones; Zone A and Zone B, as shown in Figure 1. The study limits of Zone A are from the existing sewer termination maintenance hole (about 284 m south of Loretta Crescent, on York-Durham Line) to the north property line of Cam Fella Blvd. The Limits of Zone B are from the north property line of Cam Fella Blvd to Bethesda Road. Alternative 1A (along York-Durham Line) within Zone A and Alternative 2C (through the interior lands) within Zone B were selected as the recommended alternatives.

Chisholm, Fleming and Associates are retained by the Town to provide preliminary and detail design of the sub-trunk sanitary sewer and watermain within Zone A. The Design for the Sub-Trunk within Zone B will be carried out through the development process. This amendment to the Preliminary-Design Report (PDR) provides the guidelines under which the detail design is to be completed.

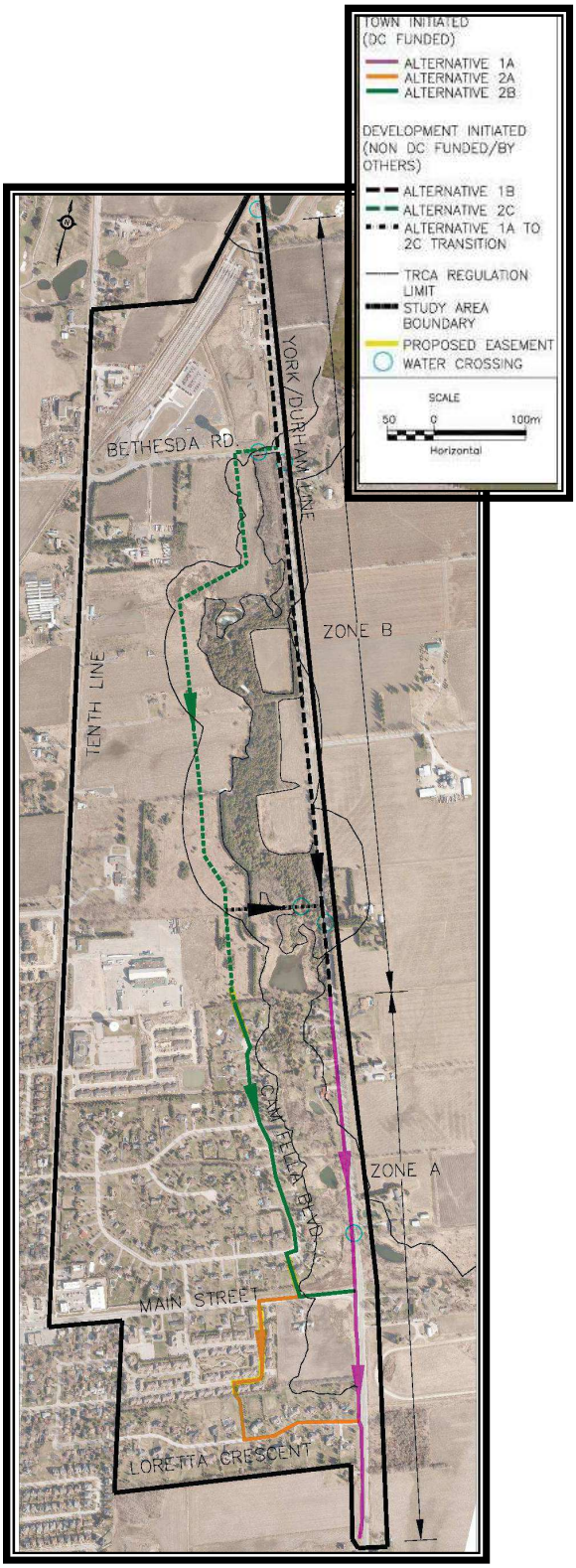


Figure 1: Sub-Trunk Zone Map

2.0 EXISTING CONDITIONS AND DESIGN CONSIDERATIONS

2.1 General

The project site consists of vacant lands, agricultural lands, and existing subdivisions. There is a proposed subdivision (i.e. Courtney Valley Estates Inc. property) to the north of the project limit. York-Durham Line and Tenth Line is paved, as a basic two lane road with narrow to wide gravel shoulders. The area immediately north and south of Main Street is primarily residential and the area north of the existing country side sub-division, is mainly farm and wooded lots. The Reesor Creek watercourse meanders through the rear yards of the properties fronting onto R.R. 30 and just north of Main Street. The ground is rolling terrain, which generally slopes to the southeast and the approximate elevation difference between the low and high point is 33 m.

The significant environmental features include the Greenland System and Oak Ridges Moraine boundary and are identified in Schedule “F-3” of the *Town of Whitchurch-Stouffville Official Plan.* The Greenland System includes key Natural Heritage Sensitive Features, such as; woodlands, streams, wetlands, and associated protected vegetation zones. The Study Area lies in the Oak Ridges Moraine Wellhead Protection Zone, as shown in Schedule “K” of the *Town of Whitchurch-Stouffville Official Plan*, and the policy states that development must conform to the Oak Ridges Moraine Conservation Plan. Both Schedule “F-3” and “K” are enclosed in Appendix A.

2.2 Base Mapping and Field Survey

Topographic base mappings were obtained from the Town of Witchurch-Stouffville for the project limits, and have been augmented by the field survey, undertaken by Pearson & Pearson Ltd. The base map drawing for the project has been complied from these referenced sources.

2.3 Utilities and Services

The utilities and services that are to be assessed for the alignment evaluations are:

- Existing storm and sanitary sewers
- Existing watermain and individual wells
- Rogers aerial and buried cables
- Hydro One buried and overhead cables
- Bell underground cables, conduits and pedestals

Request letters were sent to the utility companies advising of the project and to confirm locations of their plants and any future plans. In addition, a SUE Level B investigation has been undertaken. The base drawings have been updated to include the information and the necessary submissions, for approval or clearance, will be done during the detail design stage.

2.4 Soil Conditions

2.4.1 Geotechnical Studies

Two geotechnical investigations were completed during the EA phase to assess the soil stratigraphy along the proposed sub-trunk sanitary and water main. The study is submitted under Appendix E. As requested by the TRCA further detailed geotechnical and hydro geological studies were completed between October 2016 and February 2017. The current geotechnical report, 'Soil Engineering Ltd., Oct. 2016, A Soil Investigation for Proposed Sanitary Trunk Sewer and Watermain York Durham Line Hoover Park Drive to Webb Rd., Appendix C. The environmental investigation included a chemical analysis of the soil to determine its suitability for disposal at a landfill site or specialized treatment facility.

The investigation determined that beneath the existing pavement structure (a layer of topsoil fill, topsoil, earth fill and/or organic fine sand and wood debris extending to depths ranging from 0.3± to 2.9± m from the prevailing ground surface) is underlain by a complex stratigraphy consisting of a very soft to hard, generally very stiff silty clay till; very loose to very dense, generally dense sandy silt till; loose to very dense, generally dense silty sand till; loose to very dense, generally dense silt; dense to very dense, generally very dense sandy silt; loose to very dense, generally dense silty fine sand and very loose to compact fine to medium sand. The weathered zone of the in-situ native soils generally extends to depths ranging from 0.7± to 4.0± m from the prevailing ground surface. The deep weathered soils were encountered 0.8± to 1.9± m below the topsoil fill, earth fills and wood debris.

2.4.2 Hydro-geological Study

The relevant hydro-geological investigations that have been completed for projects are:

- Soil Engineers Ltd., May 2013, 'Limited Hydrogeological Study Report', prepared by exp Services Inc. (Consolidated Documents Appendix E)
- Soil Engineers Ltd., October 10 2014, 'Graphical Interpretation of the 2013 Hydrogeological Report', prepared by exp Services Inc. (Appendix C)
- Soil Engineers Ltd., February 2017, 'Hydrogeological Assessment for Proposed Sanitary Trunk Sewer (Zone 'A'), York-Durham Line, North of Hoover Park Drive, South of Reesor Creek' (Appendix C)

The studies describe the groundwater regime, varying to as high as .8m and to as low as 6± m below the prevailing ground surface, depending on the time of the year. The recent hydrogeological study indicates that ground water table is high and there are areas under artesian conditions. Perched groundwater derived from infiltrated precipitation occurs at shallow depths during wet seasons and often dissipates during the dry seasons.

The recent study examines the need for dewatering depending on the method of construction. Generally, for deep trench excavation some form of dewatering other than pumping and baling would be required to keep the base from becoming unstable. Trenchless methods are feasible which would require? some dewatering in excess of 50000 litres per day ? but less than 400000 litres in which case a Permit to Take Water (PTTW) would be required.

2.4.3 ESR/EMP

The environmental study report prepared by LGL identifies the species of trees, aquatic and terrestial habitats that can be found in the proposed areas of ocnstruction. It confirmed that no species at risk are identified in the proposed areas of construction activties. Construction will require the removal of some shrubs and trees. It concluded that as no instream work is proposed the potential for harmful destruction to fish is minimal with the use of trenchless technology for the installations (EMP).
The report documents the Environment Management Plan which must be followed during construction to mitigate impacts on the natural features. The EMP will include require, a contingency plan for dealing with emergency spills and the implementation of a monitoring strategy.
The reports are LGL Limited, August 2013, Natural Heritage Report (Appended as H in the Project File) Appendix E, this Report, LGL Limited, January 2017, Stouffville Sanitary Trunk # 1Sanitary Sewer and Watermain Environmental Management Plan, Appendix D.

3.0 ALIGNMENT OPTIONS

3.1 Design Criteria

The sub-trunk sanitary sewer will be designed as a gravity system to accommodate flows, from existing developments and future subdivisions. The 300 mm watermain will be extended from Loretta Ave northward to complete the looping system. The design should adhere to the Town's Standards and those of the Region where applicable. In addition, the design should comply with the requirements of the other reviewing agencies.

3.2 Alignment Alternatives

The final alignments of the services were developed based on the evaluation of the three feasible alternatives as shown on Fig 2a and 2b (Appendix A) and as discussed below:

- Alternative 1 is located in the west boulevard, approximately 7.8 m from the property line.
- Alternative 2 is also in the west boulevard, approximately 1.5 m from the centerline of the future road allowance.
- Alternative 3 is based on the Town's standard offset of 1.5 m from the centerline of the existing road.

Alternative 3, was eliminated due to the major impact it would have on the traffic along R.R. 30 which is a major arterial road and any construction within the existing pavement would require road closures and detours.
Alternatives 2, eliminates the need for the road closure but would see more disturbance to the vegetation, north of Main Street. South of Main Street there would be conflicts with the existing utilities.

Alternative 1 parallels the corridor that was established for the High Voltage overhead line, north of Main Street. Two crossings of the Reesor Creek would be required and there would be localized disturbances to trees and shrubs. South of Main Street, from the south streetline to the end of the widened day lighting the corridor is occupied by several utilities, such as Bell, Hydro, buried and overheard. Vegetation is generally mowed grass and shrubs.

Over the course of the last year a number of meetings were held with the Region to establish the alignment for the watermain and sewer within the R.O.W. The Region restated their position that the service alignments must conform to their standards, i.e., 7.8m and 5m respectively for the sanitary sewer and watermain from the west streetline. The only exception would be a 9.3 m offset from the west streetline and within the tapered section of the right of way, just south of Main Street. The exemption was made to provide clearance during construction from the overhead hydro and the fact it would not fall in the limits of any future roadway pavement. Alternative 1 is therefore the preferred.

The final alignments of the sewer and watermain, as shown on the Design Drawings G1 to G6, were established based on the requirements given by the Region. The drawings showing the alternative alignments and typical cross-section are under Appendix A. Table 1, below, summarizes the opportunities and constraints for each alternative.

Table 1: Comparison of the Alternative Alignments

Sub-Trunk Alignment Alternatives	Constructability	Traffic Management	Qualitative Cost Basis	CFA Recommendation Order
Alternative '1' **Within the Blvd. approx. 7.8m east from the West P/L**	• Require boulevard restoration. No impact to existing road pavement. • Close proximity to proposed watermain, and existing utilities (Bell, Rogers) • Minor impact on driveways • Minimum impact on traffic during construction • Conforms to Region standards	• No road closure required • Impact access houses during construction	Base cost	1
Alternative '2' **Within the Blvd approx. 16.5m east from the west P/L (north of Main Street) Within the pavement west of the road centerline (south of Main Street)**	• Require boulevard restoration. Impact to existing road pavement south of Main Street • Close proximity to existing light standards. • Minor environmental impact • Minimum impact on traffic during construction • Does not conform to Region standards	• Lane closure required south of Main Street • Construction staging and equipment movements restricted • Impact access to houses during construction	Slightly more expensive than base cost	2
Alternative '3' **Within the pavement 1.5m west of the existing road centerline**	• Require removal and restoration of pavement • Full lane closure, and extensive traffic control measures required • Limited work zone • Does not conform to Region standards	• Requires lane closure • Construction staging and equipment movements restricted • Impact access houses during construction	Most expensive compare to base cost	3

4.0 CONSTRUCTION / CONSTRUCTABILITY

4.1 General

The sub-trunk sanitary sewer construction and watermain will face many challenges such as:

- High ground water table
- Crossing of the Reesor Creek
- Maintaining of traffic at all times during construction
- Construction staging
- Potential conflicts with utilities and existing infrastructure

Soil conditions vary from stable to unstable ground with some areas under artesian conditions. Depending on the method of construction dewatering of the ground water could be extensive.

4.2 Construction Methodology

The method of construction has to be done in accordance to current Region's stated policies regarding trenching within their rights of ways. The Region Policy state that no open cut trench will be permitted below their pavement structure, neither under existing nor future configurations. Where it is waived, the excavation shall be backfilled with lean concrete mix. Their acceptable practice for sewers and watermains installations within the rights of ways is generally trenchless technology with the exception for shallow watermains that will be outside the pavement structure.

4.2.1 Open Cut Construction

Based on the Region's policy deep open cut excavations are generally not accepted. Based on this policy, open trench excavation is eliminated for the sanitary trunk sewer. Where localized open cuts are required for maintenance holes some dewatering would be required but the volume of water to be taken is expected not to exceed allowable the pumping rate of 400,000 litres per day, as permitted under the Act. The south section of the proposed watermain will be constructed via the open cut method and will not require dewatering beyond the allowable limit of 50,000 litres per day.

4.2.2 Trenchless Technology

Due to the potential for high ground water, the Region's current policy regarding open cut installation and the creek crossings, trenchless methods of construction will best satisfy these constraints. On review of the available trenchless methods and with respect to site conditions and cost considerations, horizontal directional drilling (HDD) and micro tunnelling (MT) have been selected. On this basis, the project is broken into two zones, namely, north of Main Street and south of Main Street.

The northerly section will have a slope of 1% and greater which makes it adaptable to HDD installation in combination with pipe material of High Density Polyethylene (HDPE). In the southern zone, the sewers will be in the depth range of 5 m to 7.5 m and at grades equal to or less than 0.4% for which a micro tunnel operation is best suited. The carrier and casing pipe for the MT installation will be concrete jacking pipe of 600 mm diameter. To reduce the number of entry and exit points along the corridor the Town have agreed to increase their standard maximum spacing for maintenance holes from 110 m to 150m.

The proposed trenchless method of constructions, although at a premium cost over an open cut, provides the following advantages:

- Minimize the construction foot print through the environment area
- No need for R.R. 30 closure
- Reduces the amount of dewatering that would normally be required
- Eliminate in waterwork at the creek
- Can be contained within the existing corridor which was disturbed during construction of the high voltage overhead plant.

It is noted that HDD has the potential for frac-outs at the creek crossing and therefore the necessary precautionary measures would be in place to deal any such emergency.

5.0 ESTIMATED COSTS

The estimated construction cost for the sanitary sewer construction by micro tunnelling and HDD is $4,500,000 and for the watermain, partially by open cut and HDD, is $1,880,000 excluding the HST. The estimates are broken down in Tables 2 and 3, Appendix B.

6.0 SCHEDULE

The schedule is to start complete the design by the end of June 2017 and construction is anticipated to be October 2017 and completion by July 2018, subject Council and agency approvals.

7.0 APPROVALS

Approvals and/or clearance letters will be required from agencies and/or authorities limited to the following:

- Toronto and Region Conservation Authority
- Department of Fisheries and Oceans (DFO) clearance

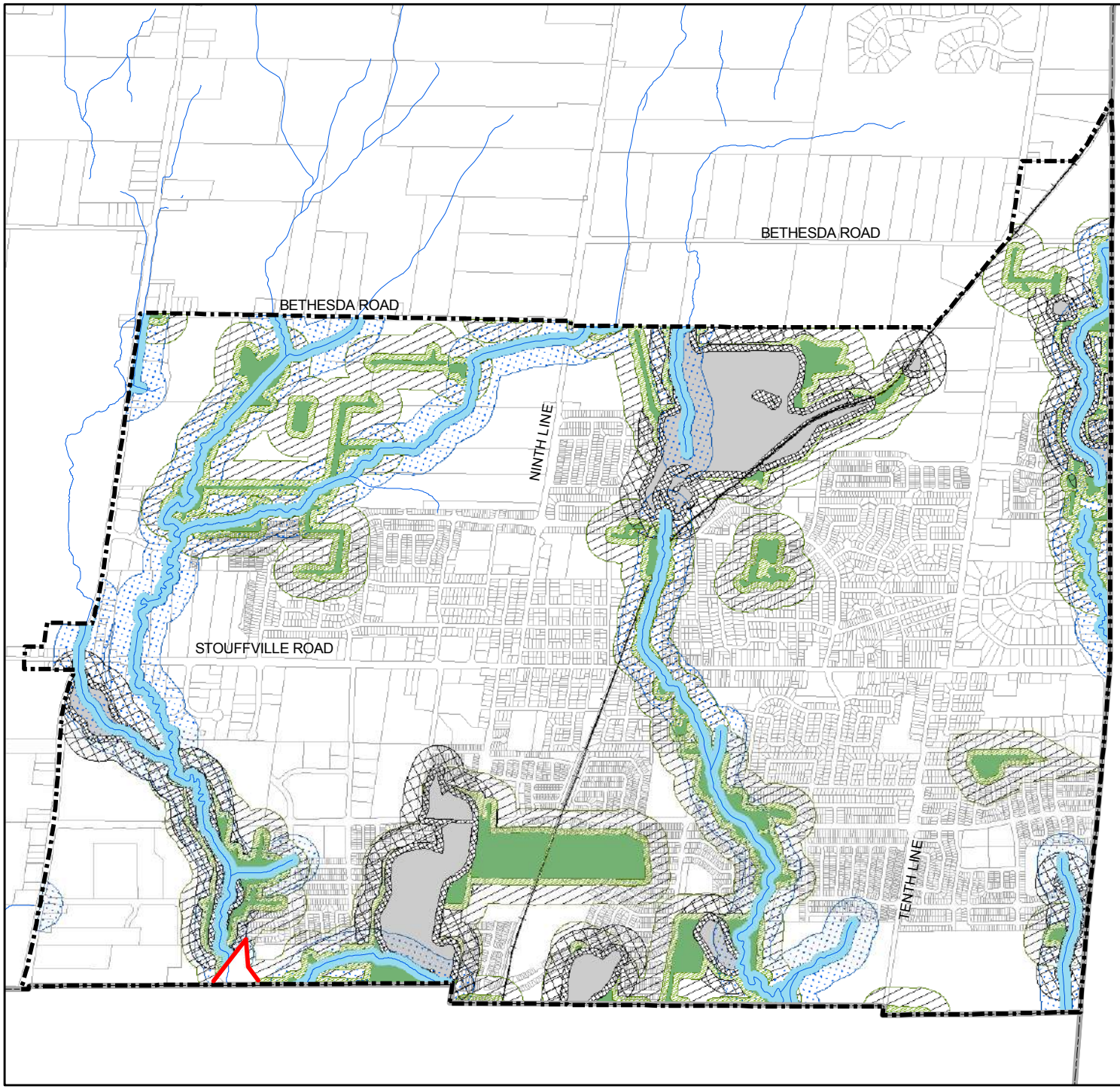
8.0 CONCLUSIONS

Alternative 1 as modified to conform with the Region's requirements, i.e., watermain 5m and sanitary sewer 7.8m respectively from the west property are the preferred alignments. Mitigation measures as provided in the EMP prepared by LGL including restoration will be implemented during the construction phase to protect the ecological and aquatic systems. High ground water table will be experienced during the spring and fall seasons notwithstanding that HDD and MT methods of construction can cope with the condition. Scheduling of the north section of the project could be planned for late spring and summer when the ground water will be at the lowest level. It is concluded that the infrastructures can be constructed with minimal impact on the environment and ground water regime based on the proposed design and supporting studies.

Prepared by:	Reviewed by:
Arash Kiayee, E.I.T.	Neville Morrison, P.Eng.

Appendix A

FIGURES



Legend

- SECONDARY PLAN AREA BOUNDARY
- LAKES & WATERCOURSES
- WETLANDS
- WETLANDS 30m MINIMUM VEGETATION PROTECTION ZONE
- WETLANDS 120m AREA OF INFLUENCE
- WOODLANDS
- WOODLANDS 30m MINIMUM VEGETATION PROTECTION ZONE
- WOODLANDS 120m AREA OF INFLUENCE
- STREAMS
- STREAMS 30m MINIMUM VEGETATION PROTECTION ZONE
- STREAMS 120m AREA OF INFLUENCE
- OAK RIDGES MORAINE BOUNDARY

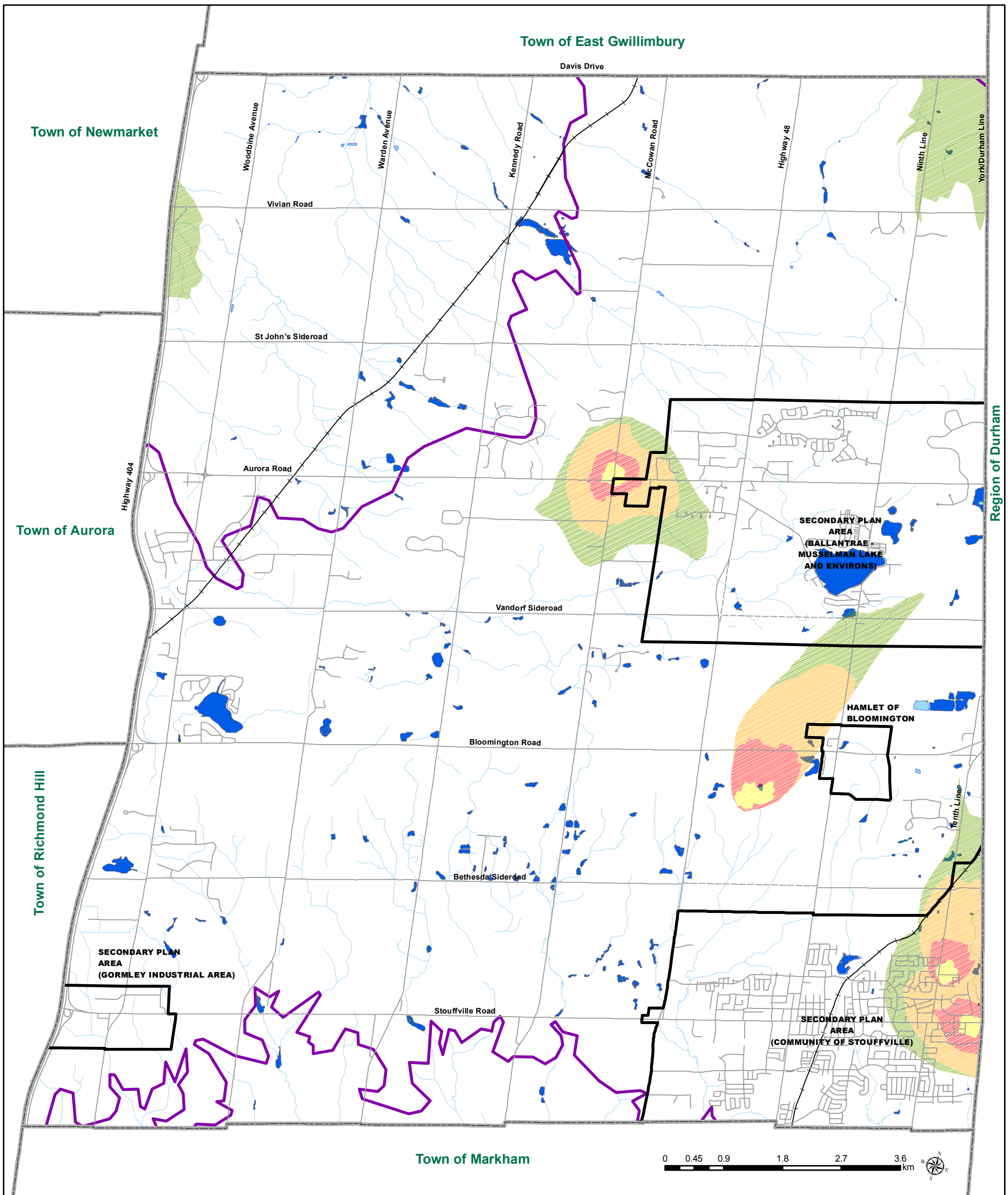
TOWN OF
WHITCHURCH - STOUFFVILLE
OFFICIAL PLAN

Schedule "F-3"

Greenland System

0 0.15 0.3 0.6 0.9 1.2 km

JULY 31, 2007



LEGEND

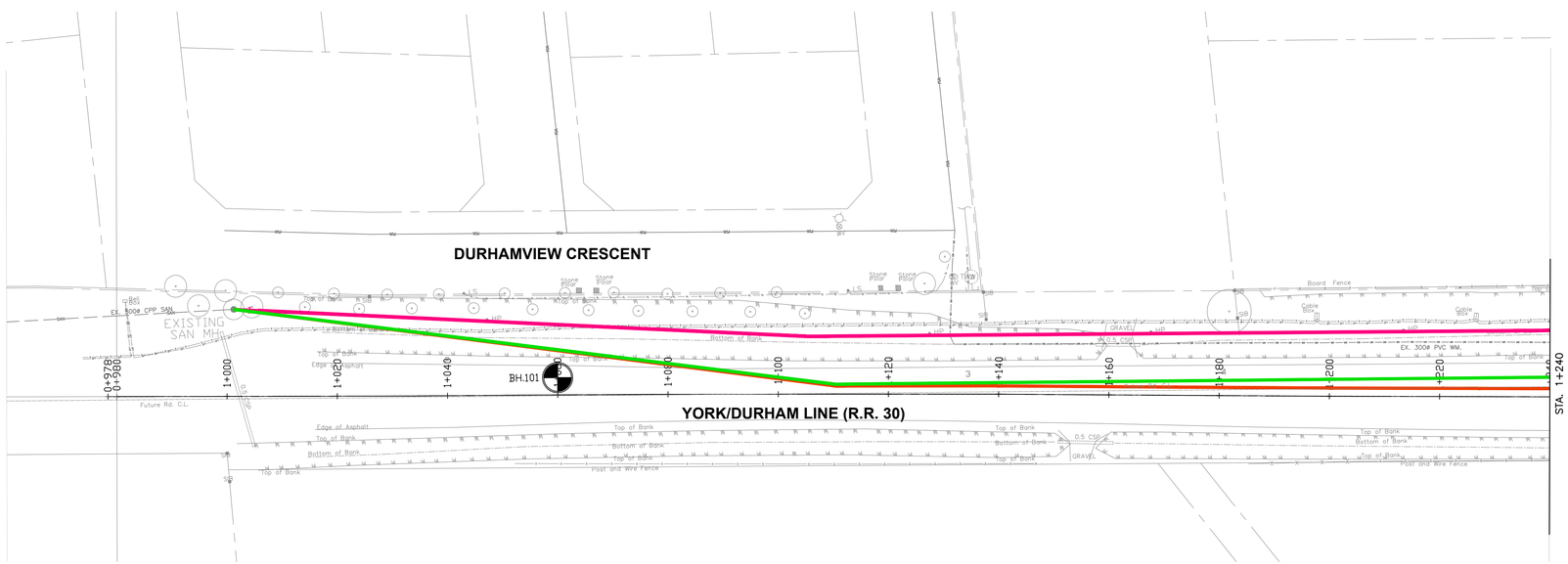
- TOWN BOUNDARY
- EXISTING CENTRELINES
- UNOPENED ROAD ALLOWANCE
- RAILWAYS
- LAKES
- RIVERS
- COMMUNITY AREAS
- OAK RIDGES MORAINE
- KETTLE LAKES
- 150 DAY WELLHEAD PROTECTION ZONE
- 2 YEAR WELLHEAD PROTECTION ZONE
- 10 YEAR WELLHEAD PROTECTION ZONE
- 25 YEAR WELLHEAD PROTECTION ZONE

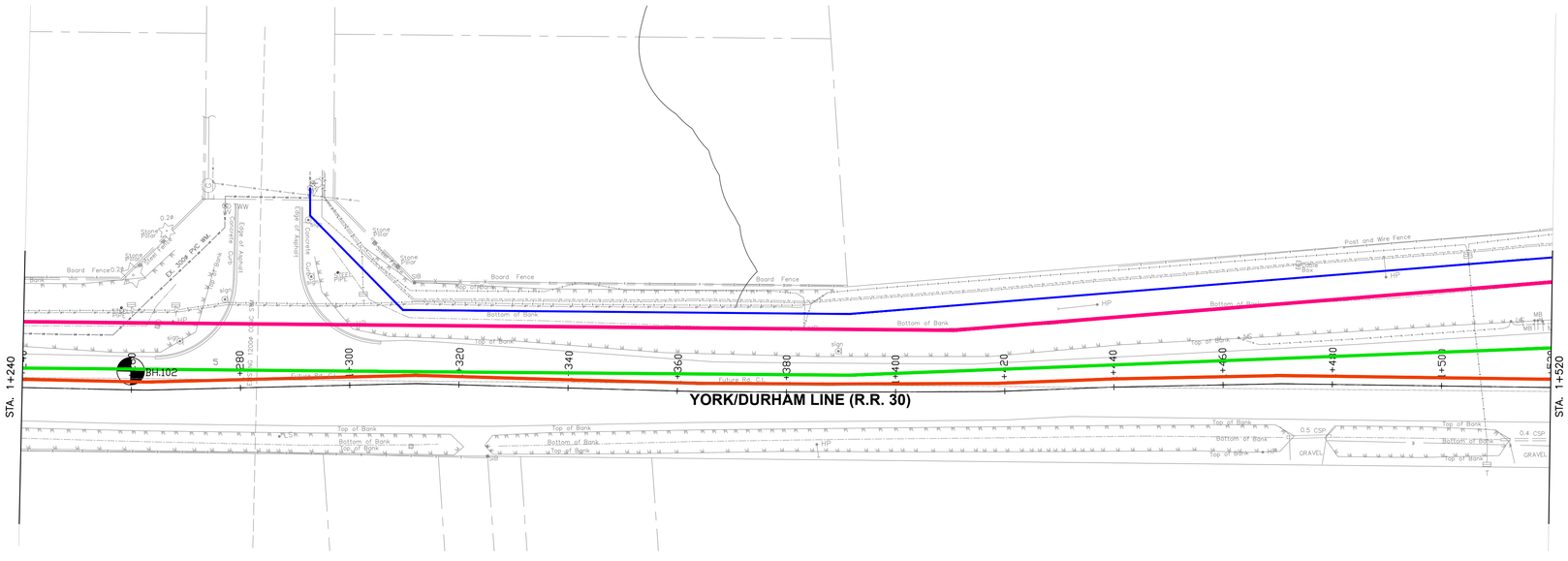
TOWN OF
WHITCHURCH - STOUFFVILLE
OFFICIAL PLAN

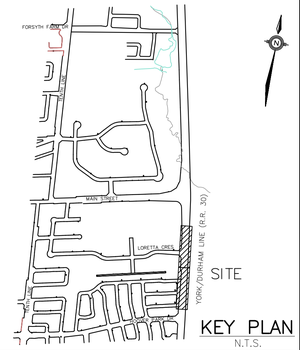
Schedule "K"

Oak Ridges Moraine Plan Area
Wellhead Protection Zones

JULY 31, 2007







LEGEND

- PROPOSED WATERMAIN ALIGNMENT
- PROPOSED SANITARY SEWER ALIGNMENT #1
- PROPOSED SANITARY SEWER ALIGNMENT #2
- PROPOSED SANITARY SEWER ALIGNMENT #3

NO.	REVISION	DATE	BY	APPR'D

Chisholm, Fleming and Associates
consulting engineers

BENCH MARK

BENCH MARK IN CONCRETE HEAD WALL AT SEDIMENT POND, 0.80 km EAST OF TENTH LINE ROAD, 0.20 km WEST OF YORK–DURHAM LINE ROAD AND 33.0 m SOUTH OF MANTLE AVE. TABLET SET FLUSH IN SOUTH FACE OF HEADWALL, 0.07 m BELOW TOP OF WALL AND 0.09 m SOUTHEAST FROM THE NORTHWEST CORNER. MANTLE AVE IS 1.2 km SOUTH OF MAIN STREET IN TOWN OF STOUFFVILLE.

APPROVED

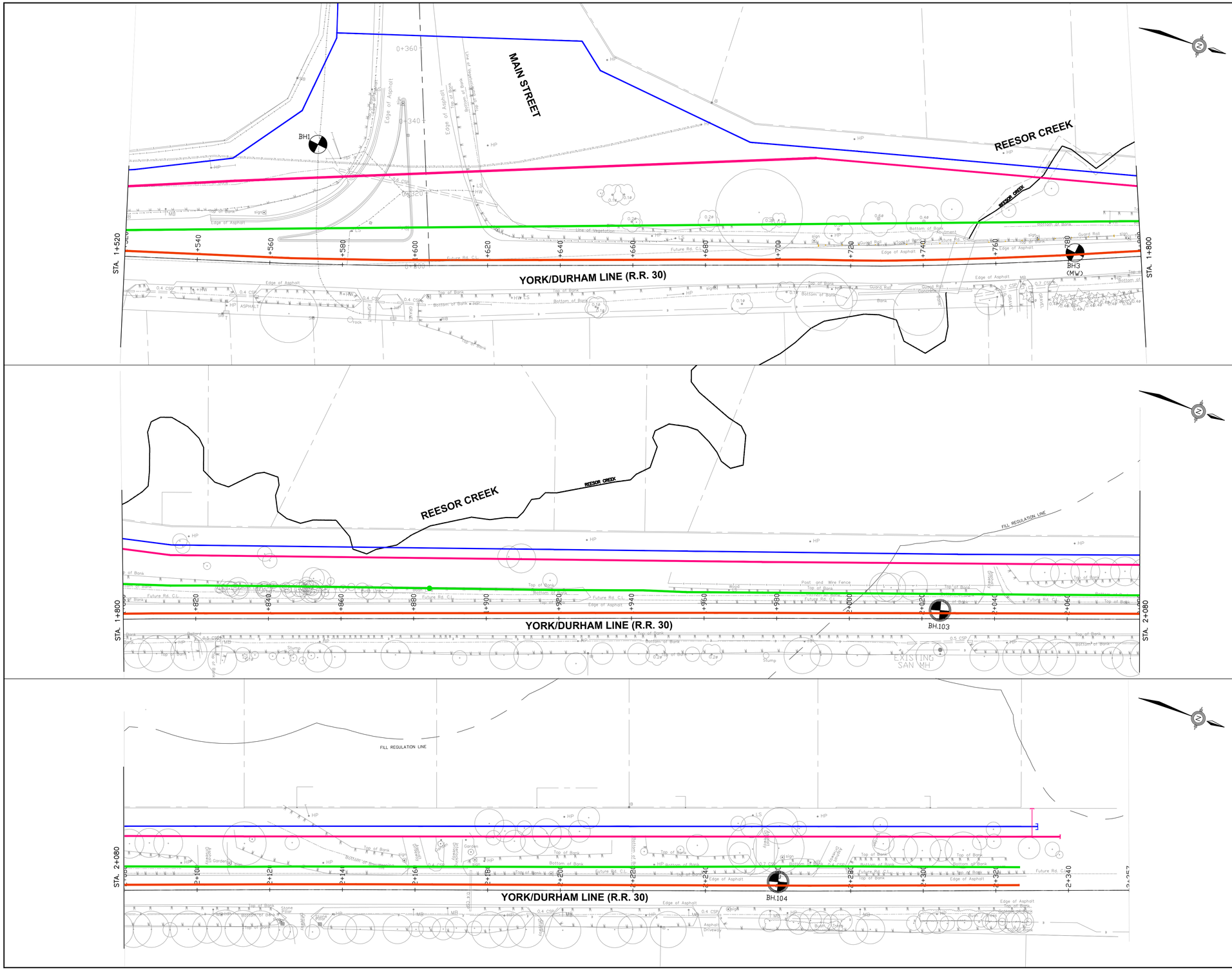
DIRECTOR, ENGINEERING DEPARTMENT DEVELOPMENT SERVICES COMMISSION

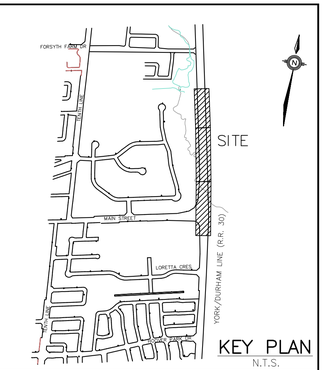
DATE

TOWN OF WHITCHURCH–STOUFFVILLE

YORK/DURHAM LINE (R.R. 30)
SUB–TRUNK #1 SANITARY SEWER
& WATERMAIN
PLAN: STA 0+980 TO STA 1+520

SURVEYED BY: P&P	CHECKED BY: X	CONTRACT NO. XXX–T–XX
DRAWN BY: X	APPROVED BY: X	
DESIGNED BY: X	DATE: NOV./2016	DRAWING NO. FIG. 2a
SCALE: H: 1:500 V: 1:50		
APPROVED AS TO FORM IN RELIANCE UPON THE PROFESSIONAL SKILL AND ABILITY OF CHISHOLM, FLEMING AND ASSOCIATES, CONSULTING ENGINEERS, AS TO DESIGN AND SPECIFICATION.		SHEET NO. X OF X





LEGEND

- PROPOSED WATERMAIN ALIGNMENT
- PROPOSED SANITARY SEWER ALIGNMENT #1
- PROPOSED SANITARY SEWER ALIGNMENT #2
- PROPOSED SANITARY SEWER ALIGNMENT #3

NO.	REVISION	DATE	BY	APPR'D

Chisholm, Fleming and Associates
consulting engineers

BENCH MARK

BENCH MARK IN CONCRETE HEAD WALL AT SEDIMENT POND, 0.80 km EAST OF TENTH LINE ROAD, 0.20 km WEST OF YORK–DURHAM LINE ROAD AND 33.0 m SOUTH OF MANTLE AVE. TABLET SET FLUSH IN SOUTH FACE OF HEADWALL, 0.07 m BELOW TOP OF WALL AND 0.09 m SOUTHEAST FROM THE NORTHWEST CORNER. MANTLE AVE IS 1.2 km SOUTH OF MAIN STREET IN TOWN OF STOUFFVILLE.

APPROVED

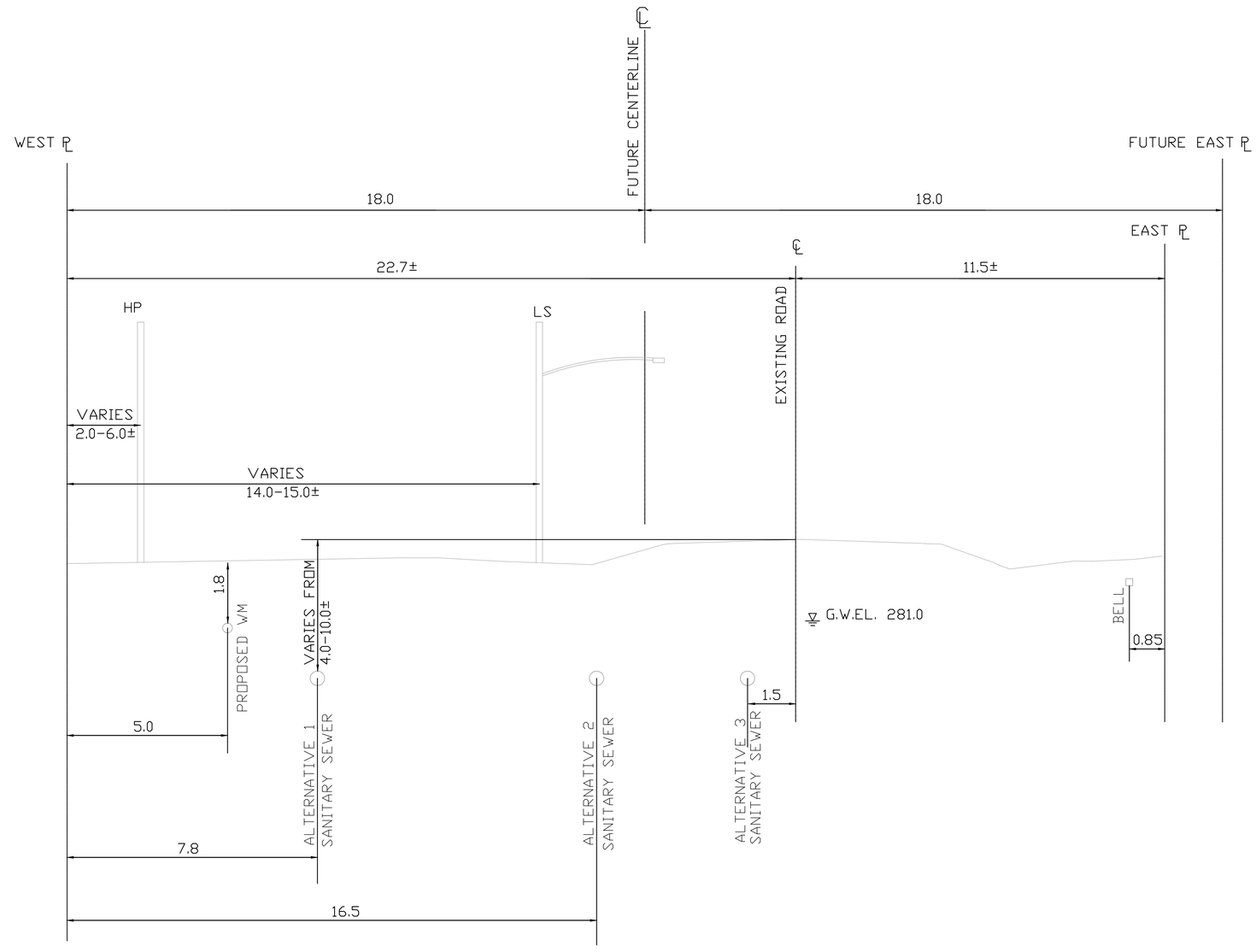
DIRECTOR, ENGINEERING DEPARTMENT
DEVELOPMENT SERVICES COMMISSION

DATE

TOWN OF
WHITCHURCH–STOUFFVILLE

YORK/DURHAM LINE (R.R. 30)
SUB–TRUNK #1 SANITARY SEWER
& WATERMAIN
PLAN: STA 1+520 TO STA 2+080

SURVEYED BY: P&P	CHECKED BY: X	CONTRACT NO. XXX–T–XX
DRAWN BY: X	APPROVED BY: X	
DESIGNED BY: X	DATE: NOV./2016	DRAWING NO. FIG. 2b
SCALE: H: 1:500 V: 1:50		
APPROVED AS TO FORM IN RELIANCE UPON THE PROFESSIONAL SKILL AND ABILITY OF CHISHOLM FLEMING AND ASSOCIATES, CONSULTING ENGINEERS, AS TO DESIGN AND SPECIFICATION.		SHEET NO. X OF X



NOTE:

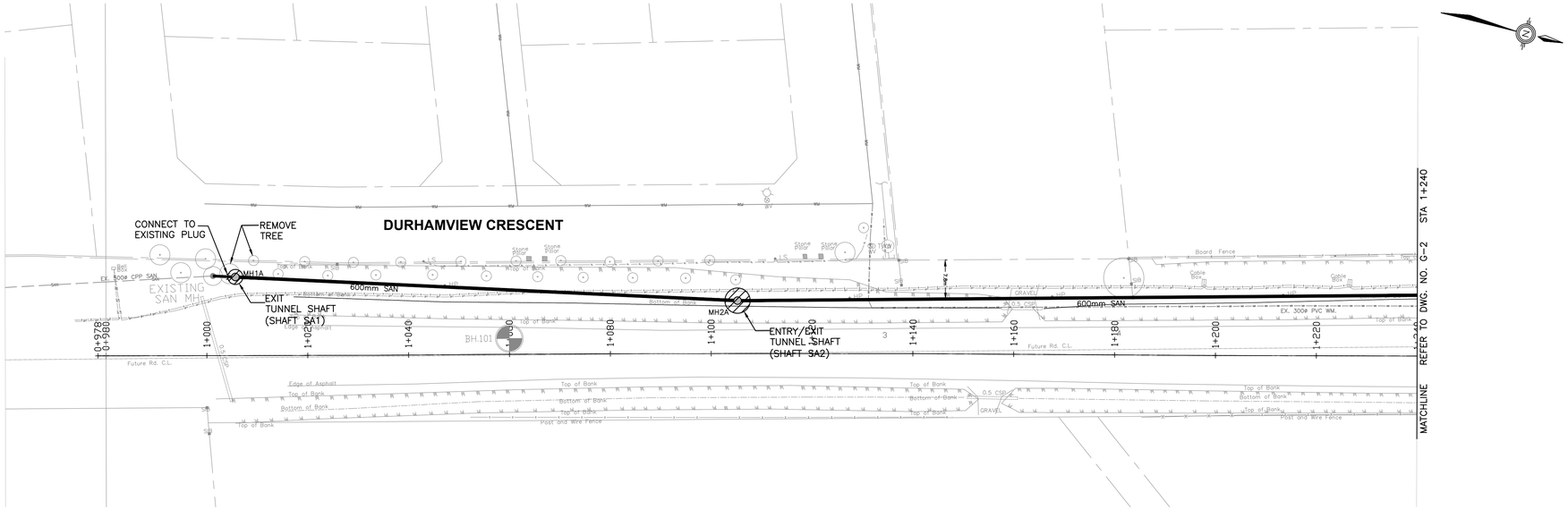
1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SPECIFIED.
2. DEPTH OF COVERS INDICATED ARE THE MINIMUM REQUIRED.

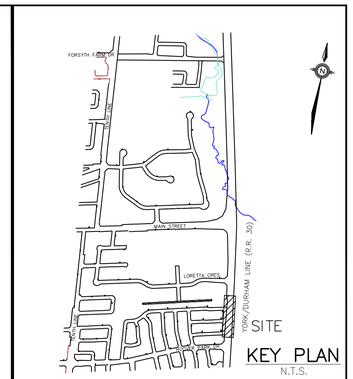
TYPICAL CROSS-SECTION
STA. 1+040 - 1+380
STA. 1+820 - 2+340

TOWN OF
WHITCHURCH–STOUFFVILLE

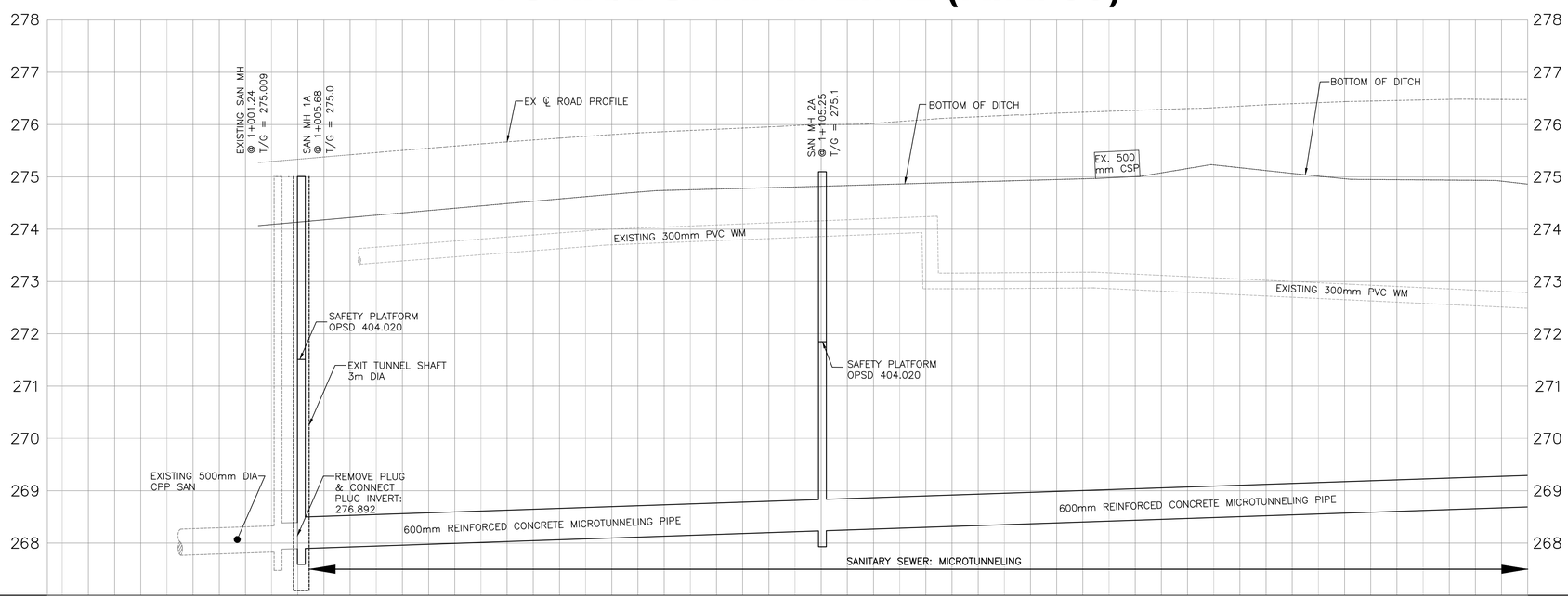
YORK/DURHAM LINE (R.R. 30)
SUB–TRUNK #1 SANITARY SEWER
& WATERMAIN
CROSS SECTION

SURVEYED BY:	CHECKED BY: X	CONTRACT NO. XXX–T–XX
DRAWN BY: X	APPROVED BY: X	
DESIGNED BY: X	DATE: JUN./2015	DRAWING NO. FIG. 3
SCALE: 1:75		
APPROVED AS TO FORM IN RELIANCE UPON THE PROFESSIONAL SKILL AND ABILITY OF CHISHOLM FLEMING AND ASSOCIATES, CONSULTING ENGINEERS, AS TO DESIGN AND SPECIFICATION.		SHEET NO. X OF X





YORK/DURHAM LINE (R.R. 30)



TOP OF WATERMAIN																							TOP OF WATERMAIN
SANITARY SEWER				S 267.83 N 267.88	S 267.89 N 267.90	99.7m – 600mm REINFORCED CONCRETE MICROTUNNELINGT PIPE @ 0.34%					S 268.23 N 268.24	150.0m – 600mm REINFORCED CONCRETE MICROTUNNELINGT PIPE @ 0.34%										SANITARY SEWER
℄ CHAINAGE	0+960	0+980	1+000			1+020	1+040	1+060	1+080	1+100		1+120	1+140	1+160	1+180	1+200	1+220						℄ CHAINAGE

LEGEND

NO.	REVISION	DATE	BY	APPR'D

Chisholm, Fleming and Associates
consulting engineers

BENCH MARK

APPROVED

DIRECTOR, ENGINEERING DEPARTMENT
DEVELOPMENT SERVICES COMMISSION

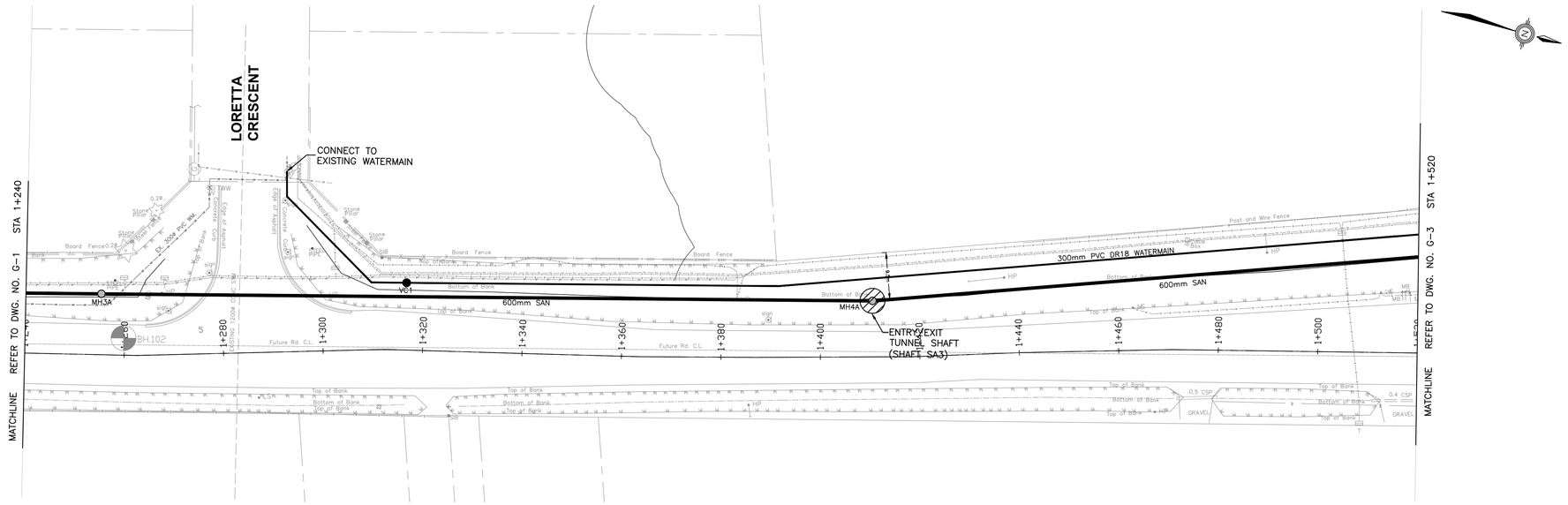
DATE

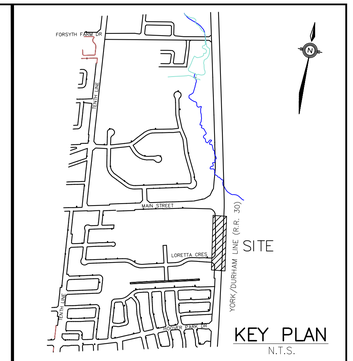
TOWN OF WHITCHURCH–STOUFFVILLE

YORK/DURHAM LINE (R.R. 30)
SUB–TRUNK #1 SANITARY SEWER
PLAN AND PROFILE
STA 0+980 TO STA 1+240

SURVEYED BY: P&P	CHECKED BY: XX	CONTRACT NO. XXX–T–XX
DRAWN BY: XX	APPROVED BY: XX	
DESIGNED BY: XX	DATE: FEB./2017	DRAWING NO. G–1
SCALE: H: 1:500 V: 1:50		SHEET NO. 1 OF 6

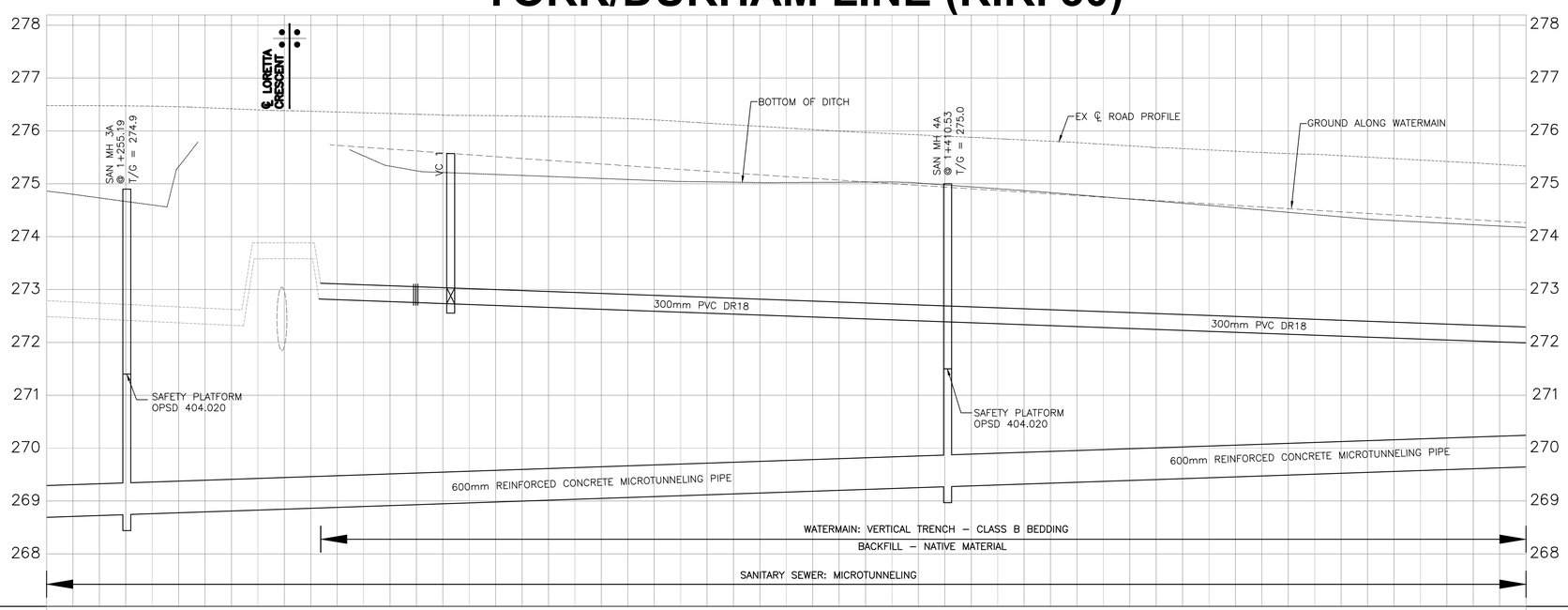
APPROVED AS TO FORM IN RELIANCE UPON THE PROFESSIONAL SKILL AND ABILITY OF CHISHOLM FLEMING AND ASSOCIATES, CONSULTING ENGINEERS, AS TO DESIGN AND SPECIFICATION.





LEGEND

YORK/DURHAM LINE (R.R. 30)



TOP OF WATERMAIN																						TOP OF WATERMAIN
SANITARY SEWER		S 268.74 N 268.75					155.0m – 600mm REINFORCED CONCRETE MICROTUNNELINGT PIPE @ 0.34%					S 269.27 N 269.27					140.0m – 600mm REINFORCED CONCRETE MICROTUNNELINGT PIPE @ 0.34%					SANITARY SEWER
℄ CHAINAGE	1+240	1+260	1+280	1+300	1+320	1+340	1+360	1+380	1+400	1+420	1+440	1+460	1+480	1+500	1+520							℄ CHAINAGE

NO.	REVISION	DATE	BY	APPR'D

Chisholm, Fleming and Associates
consulting engineers

BENCH MARK

APPROVED

DIRECTOR, ENGINEERING DEPARTMENT
DEVELOPMENT SERVICES COMMISSION

DATE

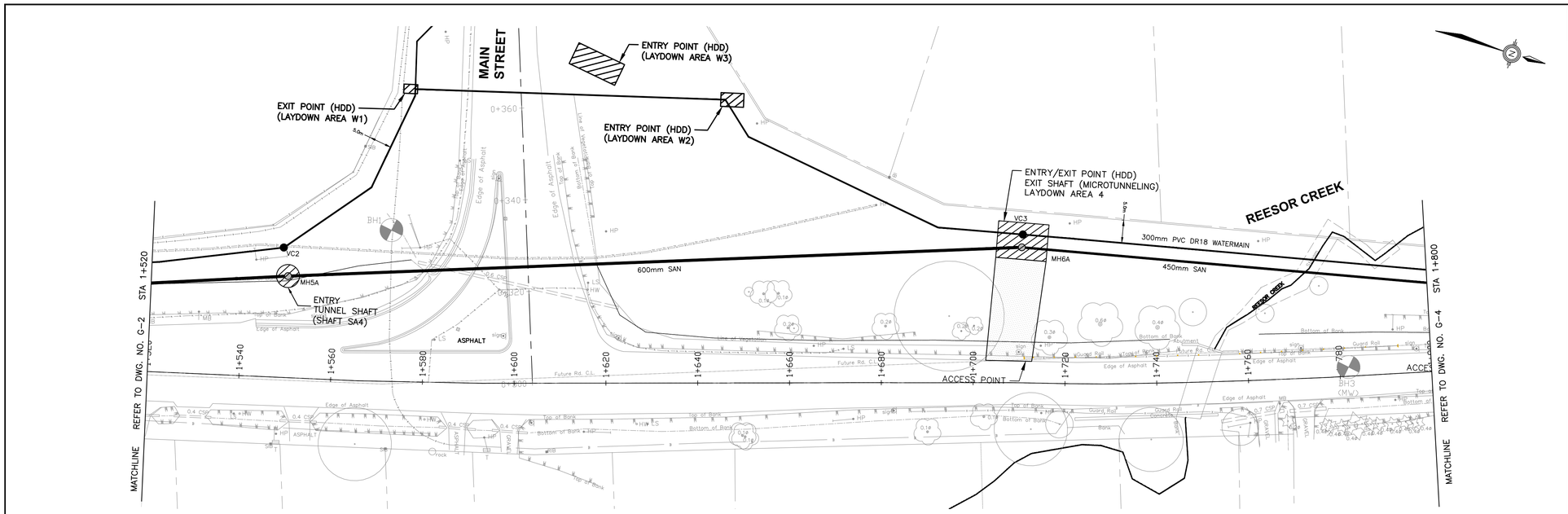
TOWN OF WHITCHURCH–STOUFFVILLE

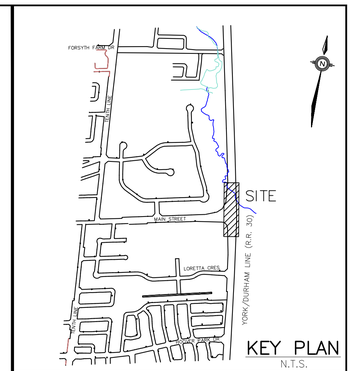
YORK/DURHAM LINE (R.R. 30)
SUB–TRUNK #1 SANITARY SEWER
PLAN AND PROFILE
STA 1+240 TO STA 1+520

SURVEYED BY: P&P	CHECKED BY: XX	CONTRACT NO. XXX–T–XX
DRAWN BY: XX	APPROVED BY: XX	
DESIGNED BY: XX	DATE: FEB./2017	DRAWING NO. G–2
SCALE: H: 1:500	V: 1:50	

APPROVED AS TO FORM IN RELIANCE UPON THE PROFESSIONAL SKILL AND ABILITY OF CHISHOLM FLEMING AND ASSOCIATES, CONSULTING ENGINEERS, AS TO DESIGN AND SPECIFICATION.

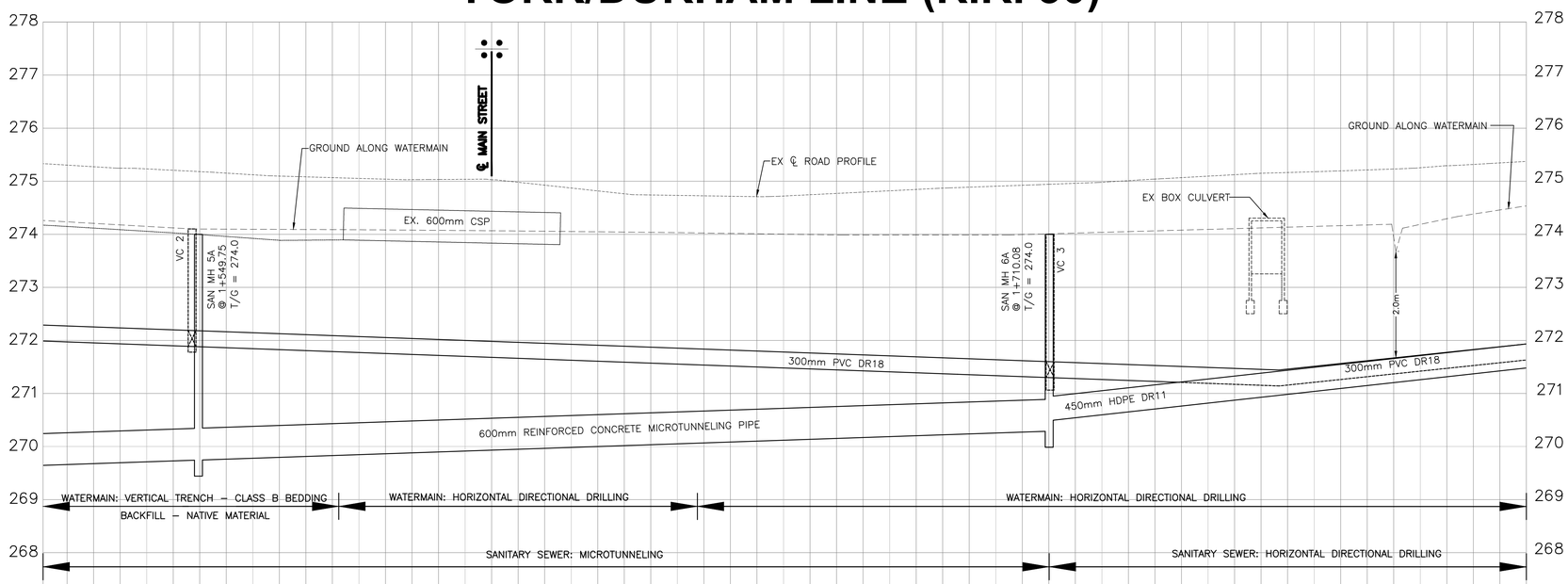
SHEET NO. 2 OF 6





LEGEND

YORK/DURHAM LINE (R.R. 30)



TOP OF WATERMAIN																	TOP OF WATERMAIN
SANITARY SEWER		S 269.74 N 269.75	160.0m – 600mm REINFORCED CONCRETE MICROTUNNELINGT PIPE @ 0.34%							S 270.29 N 270.50	101.9m – 450mm (22in OD) HDPE DR11 @ 1.10%						SANITARY SEWER
℄ CHAINAGE		1+540	1+560	1+580	1+600	1+620	1+640	1+660	1+680	1+700	1+720	1+740	1+760	1+780			℄ CHAINAGE

NO.	REVISION	DATE	BY	APPR'D

Chisholm, Fleming and Associates
consulting engineers

BENCH MARK

APPROVED

DIRECTOR, ENGINEERING DEPARTMENT
DEVELOPMENT SERVICES COMMISSION

DATE

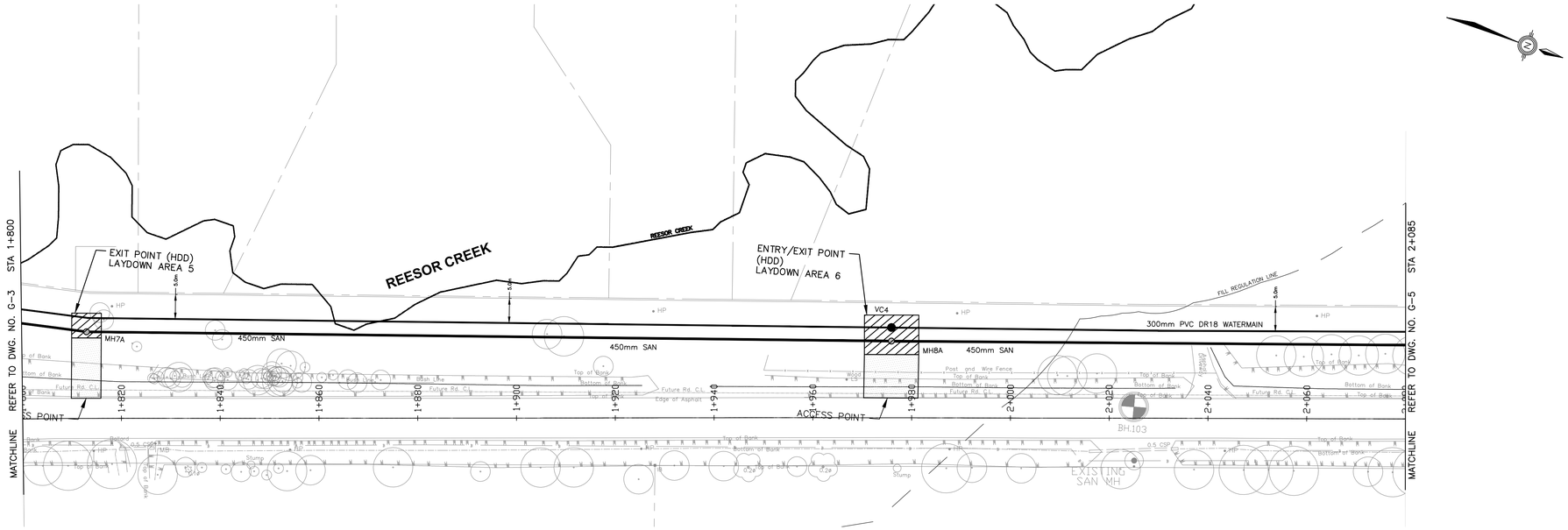
TOWN OF
WHITCHURCH–STOUFFVILLE

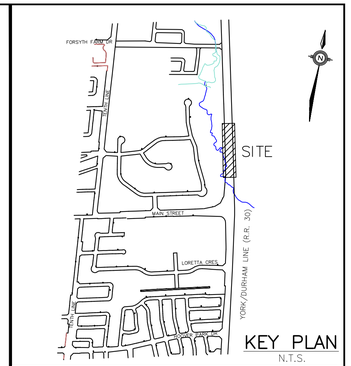
YORK/DURHAM LINE (R.R. 30)
SUB–TRUNK #1 SANITARY SEWER
PLAN AND PROFILE
STA 1+520 TO STA 1+800

SURVEYED BY: P&P	CHECKED BY: XX	CONTRACT NO. XXX–T–XX
DRAWN BY: XX	APPROVED BY: XX	DRAWING NO. G–3
DESIGNED BY: XX	DATE: FEB./2017	
SCALE: H: 1:500 V: 1:50		

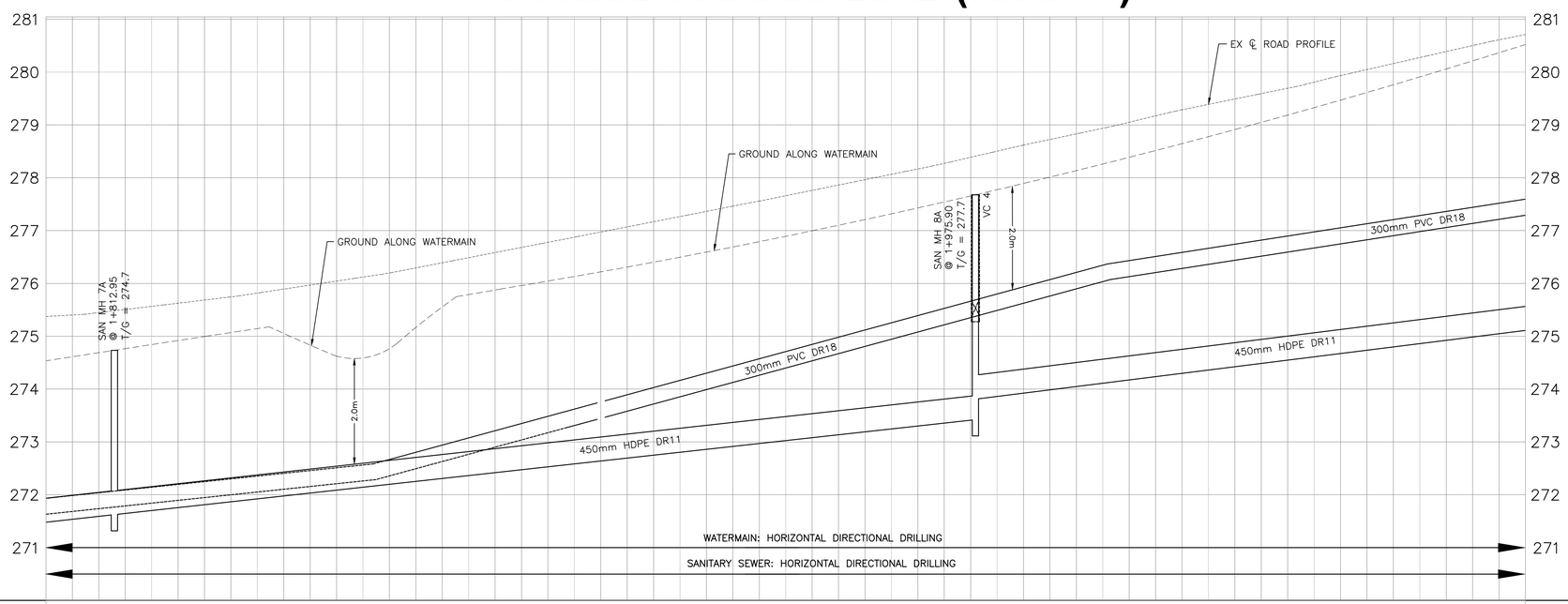
APPROVED AS TO FORM IN RELIANCE UPON THE PROFESSIONAL SKILL AND ABILITY OF CHISHOLM FLEMING AND ASSOCIATES, CONSULTING ENGINEERS, AS TO DESIGN AND SPECIFICATION.

SHEET NO. 3 OF 6





YORK/DURHAM LINE (R.R. 30)



TOP OF WATERMAIN	
SANITARY SEWER	S 271.62 N 271.63 — 163.0m – 450mm (22in OD) HDPE DR11 @ 1.10% — S 273.42 N 273.82 — 137.0m – 450mm (22in OD) HDPE DR11 @ 1.25%
℄ CHAINAGE	1+800, 1+820, 1+840, 1+860, 1+880, 1+900, 1+920, 1+940, 1+960, 1+980, 2+000, 2+020, 2+040, 2+060, 2+080

LEGEND

NO.	REVISION	DATE	BY	APPR'D

Chisholm, Fleming and Associates
consulting engineers

BENCH MARK

APPROVED

DIRECTOR, ENGINEERING DEPARTMENT
DEVELOPMENT SERVICES COMMISSION

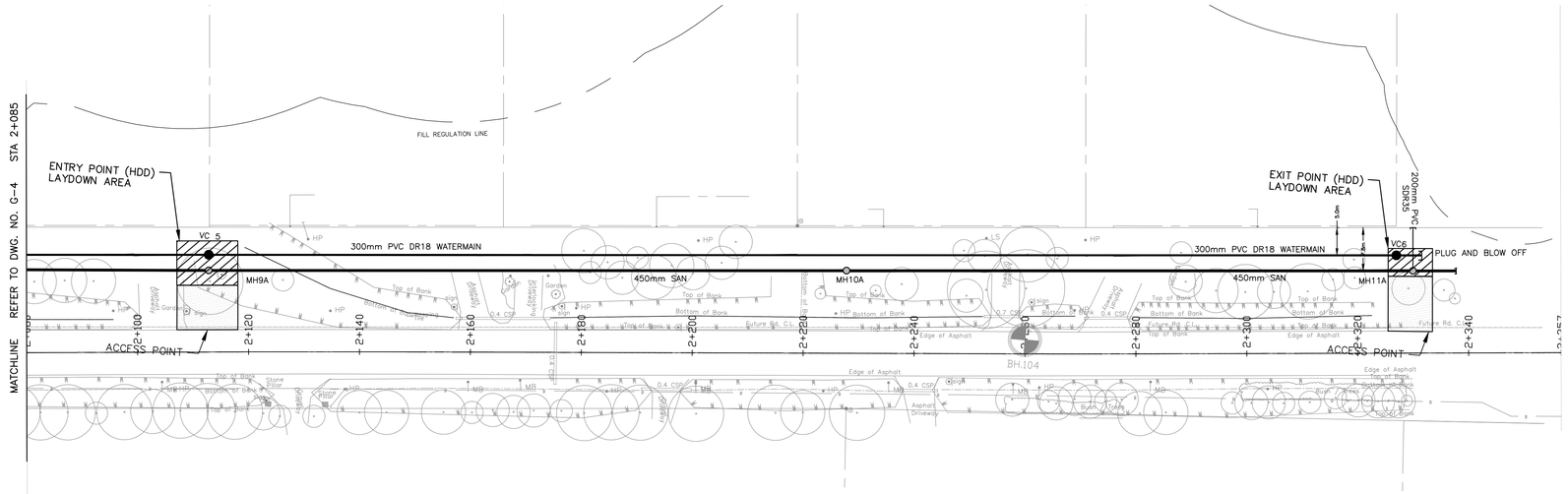
DATE

TOWN OF WHITCHURCH–STOUFFVILLE

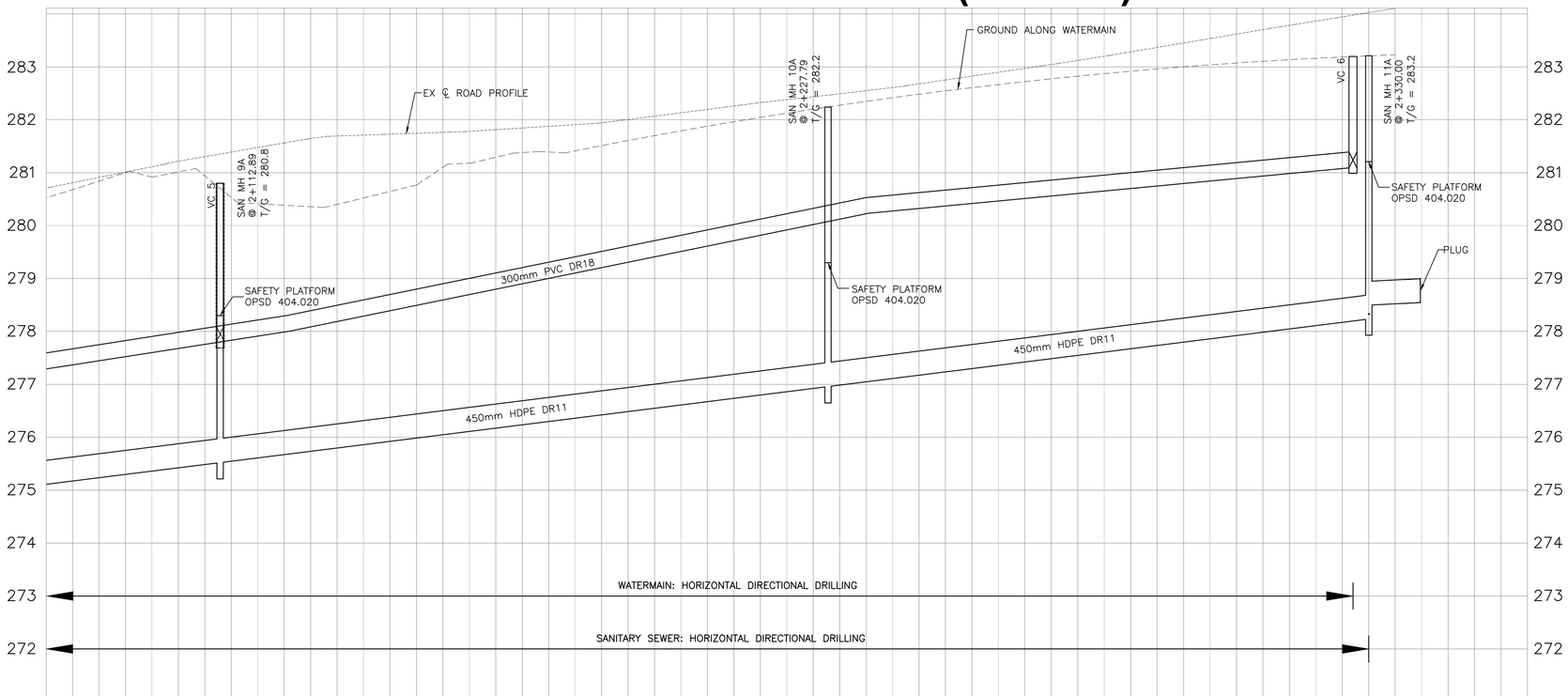
YORK/DURHAM LINE (R.R. 30)
SUB–TRUNK #1 SANITARY SEWER
PLAN AND PROFILE
STA 1+800 TO STA 2+080

SURVEYED BY: P&P	CHECKED BY: XX	CONTRACT NO. XXX–T–XX
DRAWN BY: XX	APPROVED BY: XX	DRAWING NO. G–4
DESIGNED BY: XX	DATE: FEB./2017	
SCALE: H: 1:500 V: 1:50		SHEET NO. 4 OF 6

APPROVED AS TO FORM IN RELIANCE UPON THE PROFESSIONAL SKILL AND ABILITY OF CHISHOLM FLEMING AND ASSOCIATES, CONSULTING ENGINEERS, AS TO DESIGN AND SPECIFICATION.



YORK/DURHAM LINE (R.R. 30)



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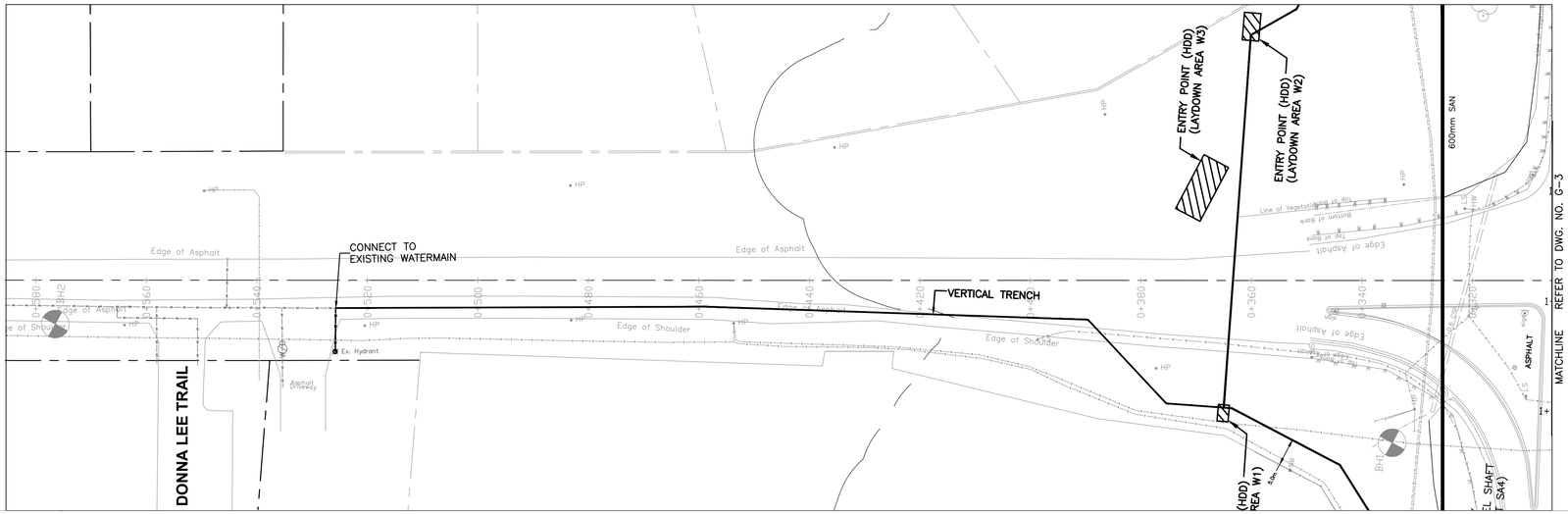
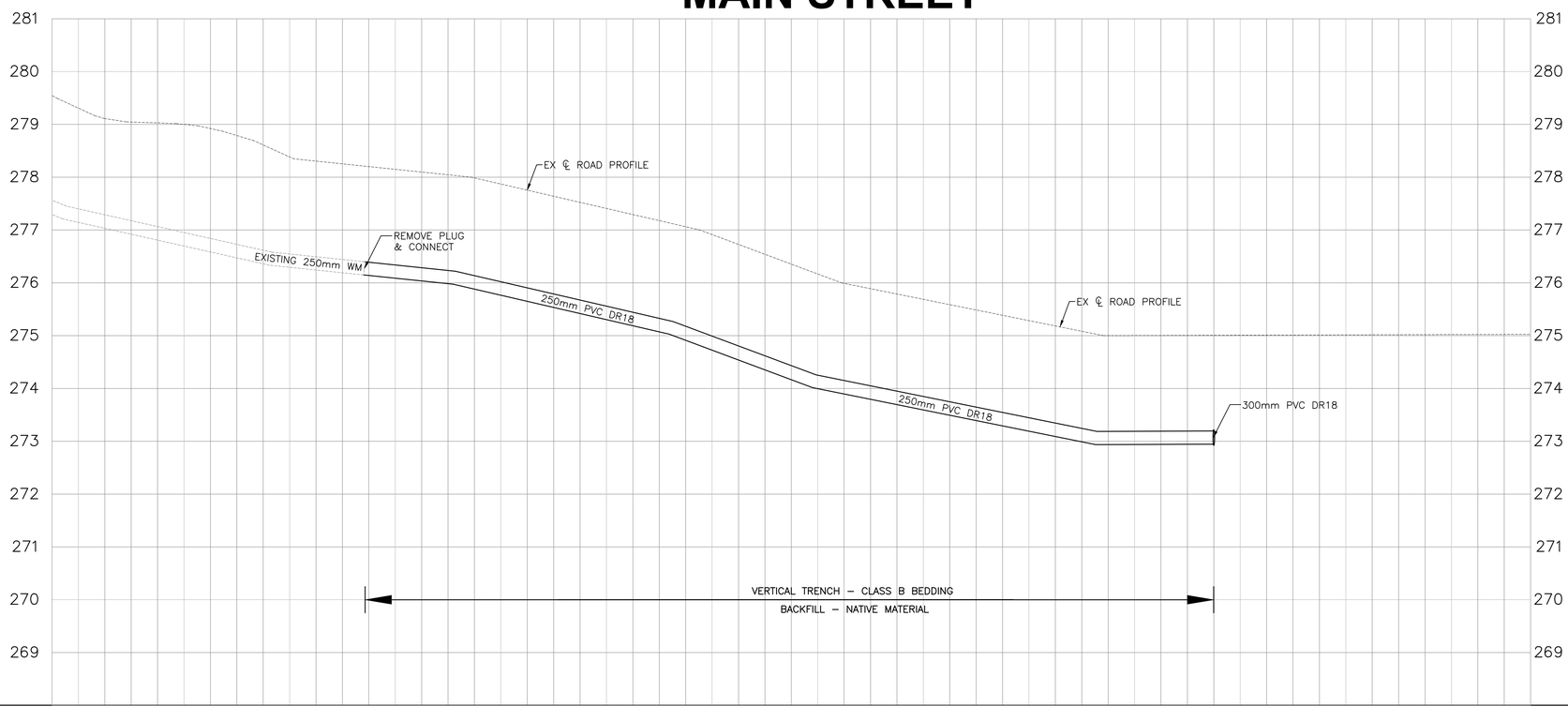
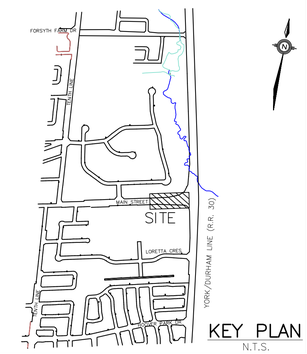


MAIN STREET



TOP OF WATERMAIN	TOP OF WATERMAIN
SANITARY SEWER	SANITARY SEWER
℄ CHAINAGE	℄ CHAINAGE

0+580 0+560 0+540 0+520 0+500 0+480 0+460 0+440 0+420 0+400 0+380 0+360 0+340 0+320



KEY PLAN
N.T.S.

LEGEND

NO.	REVISION	DATE	BY	APPR'D

Chisholm, Fleming and Associates
consulting engineers

BENCH MARK

APPROVED

DIRECTOR, ENGINEERING DEPARTMENT
DEVELOPMENT SERVICES COMMISSION

DATE

TOWN OF
WHITCHURCH–STOUFFVILLE

MAIN STREET
250 mm PVC WATERMAIN
PLAN AND PROFILE
STA 0+320 TO STA 0+580

SURVEYED BY: P&P	CHECKED BY: XX	CONTRACT NO. XXX–T–XX
DRAWN BY: XX	APPROVED BY: XX	
DESIGNED BY: XX	DATE: FEB./2017	DRAWING NO. G–6
SCALE: H: 1:500 V: 1:50		

APPROVED AS TO FORM IN RELIANCE UPON THE PROFESSIONAL SKILL AND ABILITY OF CHISHOLM FLEMING AND ASSOCIATES, CONSULTING ENGINEERS, AS TO DESIGN AND SPECIFICATION.

SHEET NO. 6 OF 6

Appendix B

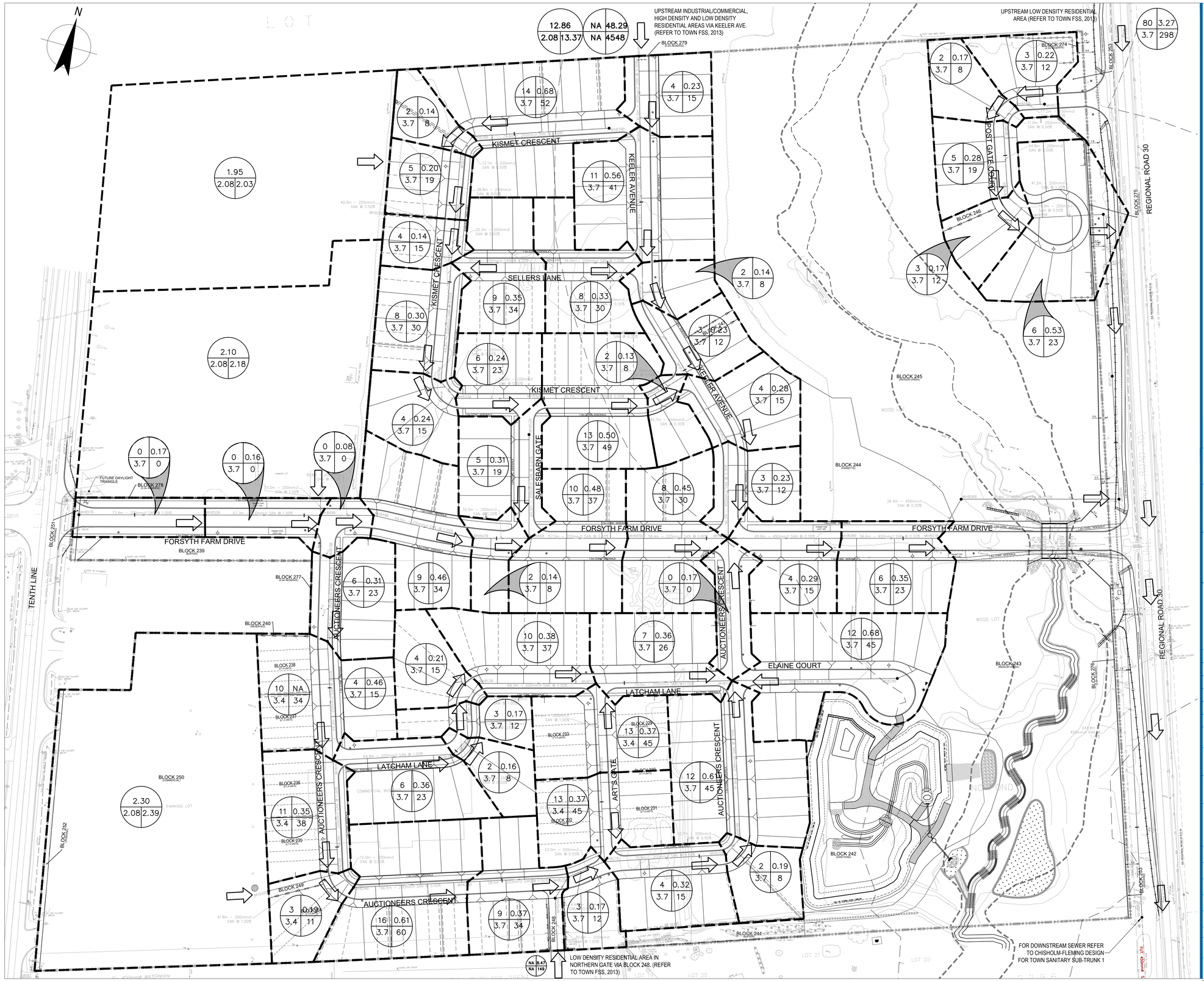
COST ESTIMATE BREAKDOWN

Table 2 – Sanitary Sub-Trunk

Item No.	Description	Unit	Estimated Quantity	Unit Cost	Total Cost
1	450 mm Dia. Sewer, Depth Range 4-5.5m, Installed by Horizontal Dierctional Drilling (HDD)	m	695	$1,750	$1,216,250
2	500 mm Dia. Concrete Pipe by Micro Tunnelling	m	635	$3,250	$2,063,750
3	Shafts 6.5-7.5 Deep	Each	4	$130,000	$520,000
4	Maintenace holes				
	a) 1200 mm, 4.-5.5 m Deep	Each	5	$7,000	$35,000
	b) 1200 mm, 6.5-7.5 m Deep	Each	5	$10,000	$50,000
5	Restoration	allow	1	$15,000	$15,000
	Sub-Total				**$3,900,000**
6	Contigency allowance 15%	1	15%		$585,000
	Estimated Construction Cost				**$4,485,000**

Table 3 – 300 mm Diameter Watermain

Item No.	Description	Unit	Estimated Quantity	Unit Cost	Total Cost
1	300 mm Dia. PVC Watermain - Open Cut Vertical Trench	m	300	$850	$255,000
2	300 mm Dia. PVC watermain - Horizontal Directional Drilling (HDD)	m	750	$1,500	$1,125,000
3	300 mm Dia. PVC along Main Street	m	150	$1,200	$180,000
4	Vlave Chambers 1500 mm Dia.	Each	7	$10,000	$70,000
	Sub-Total				**$1,630,000**
5	Contigency Allowance 15%	1	15%		$244,500
	Estimated Construction Cost				**$1,875,000**



KEY PLAN
N.T.S.

NOTES

1. FOR GENERAL NOTES AND LEGENDS SEE DWG. G201.
2. MEASUREMENTS IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN.
3. CONTRACTOR TO BE RESPONSIBLE FOR LOCATION OF ALL EXISTING U/G & OVERHEAD UTILITIES. UTILITIES TO BE GIVEN ADVANCE NOTICE TO COMPLETE STAKE-OUT(S) PRIOR TO ANY EXCAVATING ETC. THE CONSULTANT ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THE LOCATION OF EXISTING UTILITIES AS INDICATED ON THIS DRAWING.

LEGEND:

RESIDENTIAL

No. OF UNITS	6	AREA IN HECTARES (0.77)
PERSON / UNIT	3.5	POPULATION (21)

COMMERCIAL&INSTITUTIONAL

	2.05	AREA IN HECTARES
DESIGN FLOW IN L/s/ha	2.08	TOTAL FLOW IN L/s (2.67)

DRAINAGE AREA BOUNDARY

SANITARY FLOW DIRECTION

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0 10 20 30 40 50m
SCALE 1:1000 AT ORIGINAL SIZE

GHD
11 Allstate Parkway, Suite 310
Markham Ontario L3R 9T8
T 1 905 752 4300 F 1 905 752 4301
E ytomail@ghd.com W www.ghd.com

TOWN REVIEWED
R.J. Burnside & Associates Limited for the Town of Whitchurch-Stouffville
By: _____
Date: _____

No.	Revision	Job Manager	Project Director	Date	Approved
D	3RD SUBMISSION	R.T.		08/16/17	
C	TRCA SUBMISSION	C.P.		02/23/17	
B	ISSUED FOR TENDER	C.P.		11/11/16	
A	2ND SUBMISSION	C.P.		08/03/16	

Drawing Revisions
Note: * indicates signatures on original issue of drawing or last revision of drawing

TOWN OF WHITCHURCH-STOUFFVILLE
Engineering and Public Works Department

Project **COURTNEY VALLEY ESTATES (19T(W)-01.001)**

Title **SANITARY DRAINAGE AREA PLAN**

Scale	1:1000
Drawn	S. PARK
Designer	S. PARK
Drafting Check	
Design Check	

REGISTERED PROFESSIONAL ENGINEER R.F. TRANQUADA PROVINCE OF ONTARIO

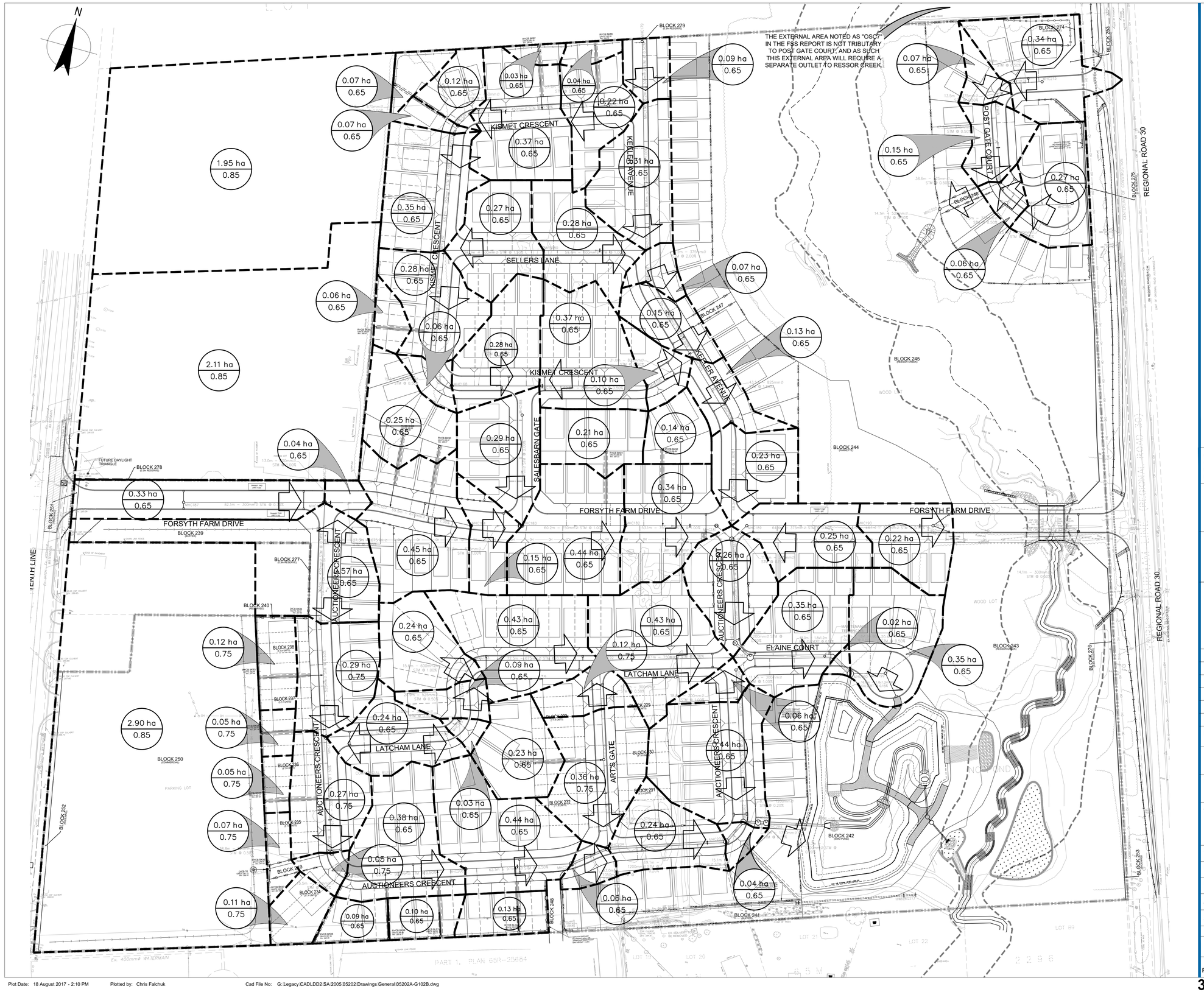
This Drawing must not be used for Construction unless signed as Approved

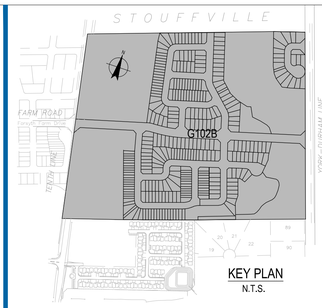
Original Size	Project No.	Drawing No.
Arch D	05202A	G102A
Rev D		

3RD SUBMISSION

TOWN DWG. 8694

Plot Date: 18 August 2017 - 2:03 PM Plotted by: Chris Falchuk Cad File No: G:\Legacy\CADLDD2\SA\2005\05202\Drawings\General\05202A-G102A.dwg





KEY PLAN
N.T.S.

NOTES

1. FOR GENERAL NOTES AND LEGENDS SEE DWG. G201.
2. MEASUREMENTS IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN.
3. CONTRACTOR TO BE RESPONSIBLE FOR LOCATION OF ALL EXISTING U/G & OVERHEAD UTILITIES. UTILITIES TO BE GIVEN ADVANCE NOTICE TO COMPLETE STAKE-OUT(S) PRIOR TO ANY EXCAVATING ETC. THE CONSULTANT ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THE LOCATION OF EXISTING UTILITIES AS INDICATED ON THIS DRAWING.

LEGEND:

1.00 ha — AREA IN HECTARES
0.45 — RUNOFF COEFFICIENT
OVERLAND FLOW
DRAINAGE AREA BOUNDARY

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0 10 20 30 40 50m
SCALE 1:1000 AT ORIGINAL SIZE

GHD
11 Allstate Parkway, Suite 310
Markham Ontario L3R 9T8
T 1 905 752 4300 F 1 905 752 4301
E ytomail@ghd.com W www.ghd.com

TOWN REVIEWED
R.J. Burnside & Associates Limited for the Town of Whitchurch-Stouffville
By: _____
Date: _____

No.	Revision	Job Manager	Project Director	Date	Approved
D	3RD SUBMISSION	R.T.		08/16/17	
C	TRCA SUBMISSION	C.P.		02/23/17	
B	ISSUED FOR TENDER	C.P.		11/11/16	
A	2ND SUBMISSION	C.P.		08/03/16	

Drawing Revisions
Note: * indicates signatures on original issue of drawing or last revision of drawing

TOWN OF WHITCHURCH-STOUFFVILLE
Engineering and Public Works Department

Project **COURTNEY VALLEY ESTATES (19T(W)-01.001)**

Title **STORM DRAINAGE AREA PLAN**

Scale	1:1000
Drawn	S. PARK
Designer	S. PARK
Drafting Check	
Design Check	

REGISTERED PROFESSIONAL ENGINEER — R.F. TRANQUADA — PROVINCE OF ONTARIO

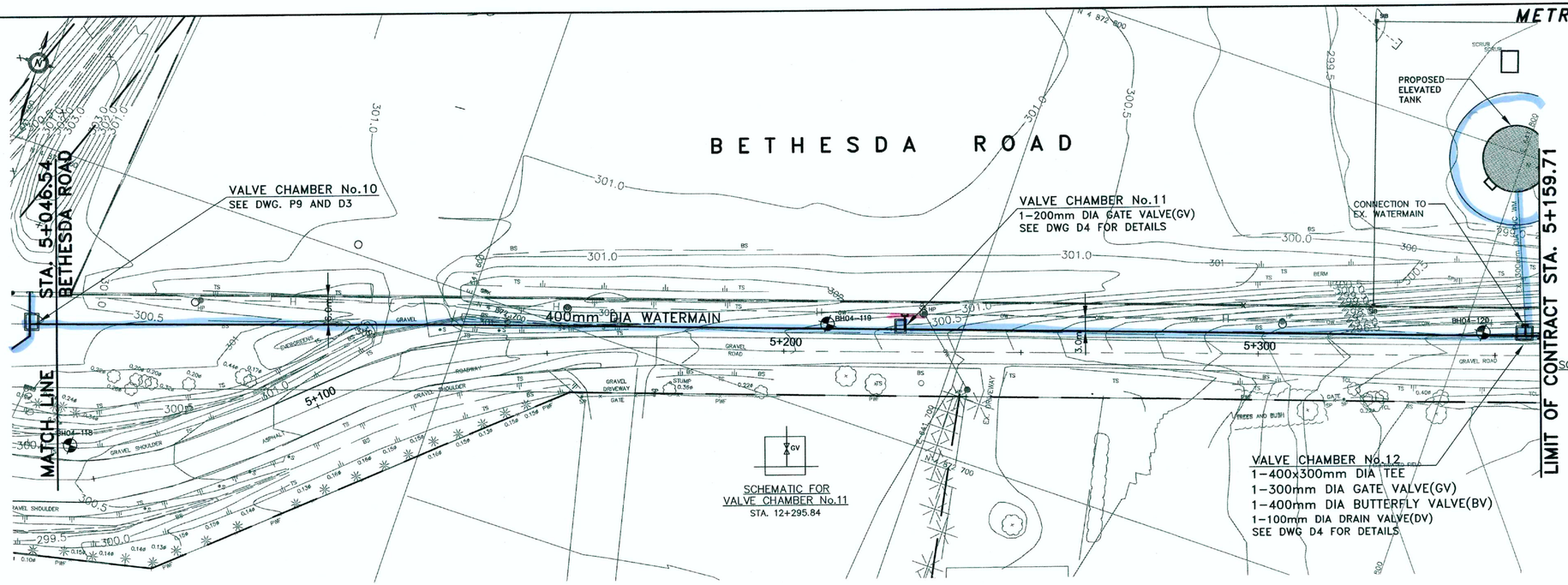
This Drawing must not be used for Construction unless signed as Approved

Original Size	Project No.	Drawing No.
Arch D	05202A	G102B
Rev D		

3RD SUBMISSION

TOWN DWG. 8695

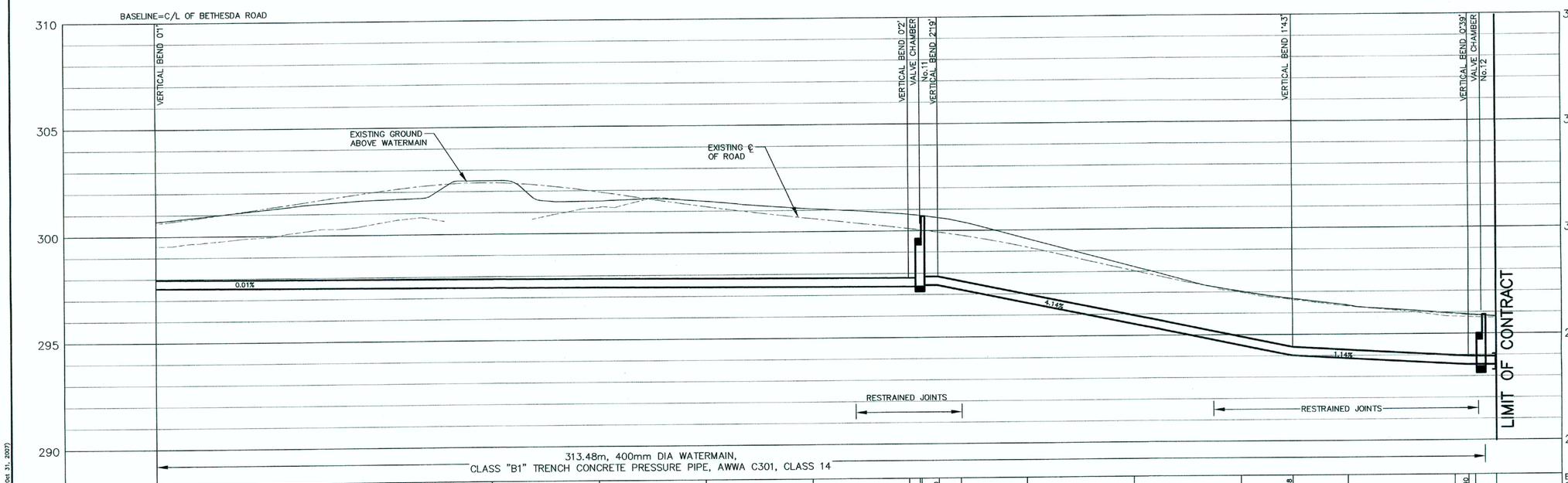
METRIC



RECOMMENDED
AS TO REGIONAL OWNERSHIP
RECOMMENDED ONLY
Lorenna M.
Manager, OMM
POSITION
Supervisor
POSITION
PARTIES MUTUALLY AGREE HIGHLIGHTED INFRASTRUCTURE IS REGIONAL
DATE Sept 27, 2013

WHERE REGIONAL INFRASTRUCTURE BEGINS

WATER - REGIONAL INFRASTRUCTURE



EXISTING GROUND ABOVE WM (m)		300.68												295.68		295.90	
TOP OF PIPE (m)		298.00							297.38	300.60				294.38		293.93	
℄ OF ROAD CHAINAGE		5+046.54		5+100				5+200	5+222.60 / 5+226.46	5+229.44			5+300	5+312.12		5+353.22 / 5+354.81	5+359.71

SCALES
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1m 0 2m Vertical

RECORD DRAWING

MacViro

ORIGINAL SEALED BY: G. S. DICKSON ON FEB. 14, 2006

No.	DATE	REVISIONS	BY
2	OCT/07	RECORD DRAWING	RMF
1	02/06	ISSUED FOR TENDER	GSD

York Region Transportation and Works

DESIGN GSD
DRAWN LP
CHECKED BWB

STOUFFVILLE ZONE 1 AND ZONE 2 TRUNK WATERMAINS
BETHESDA ROAD
WATERMAIN CONSTRUCTION
FROM 5+046.54 TO 5+359.71

DWG. NO. P10
CONT. NO. T-06-05
SHEET NO. 13

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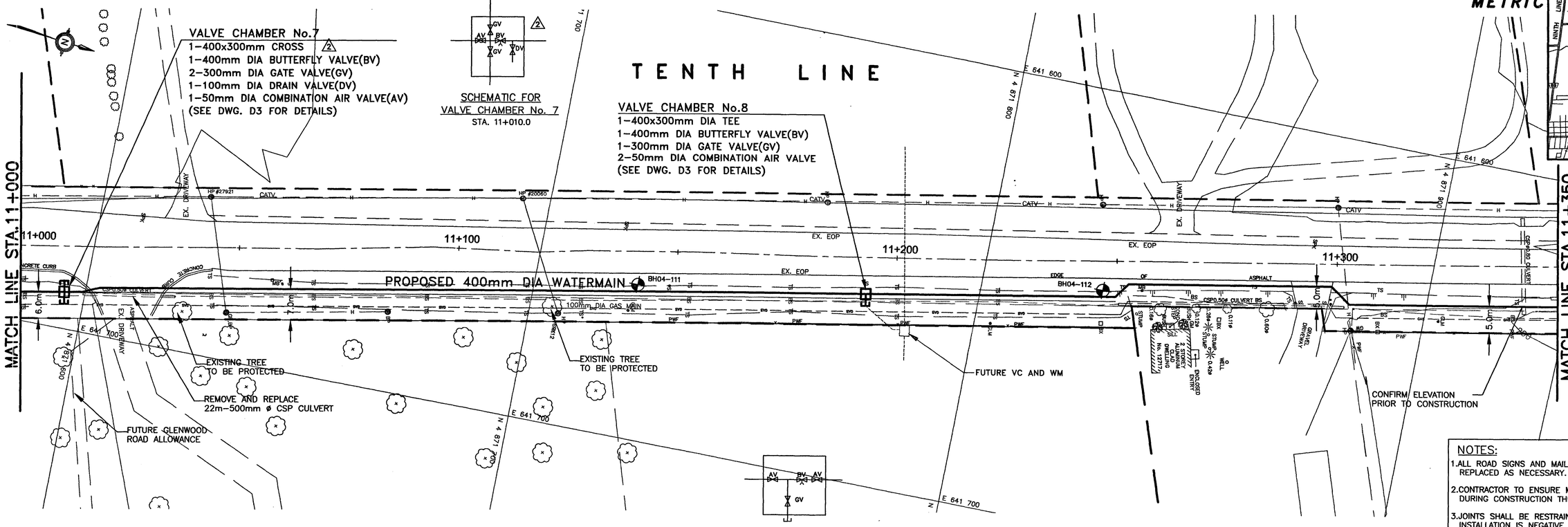
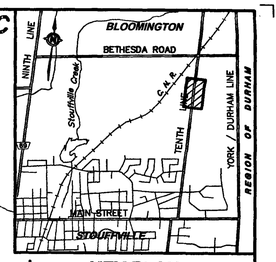


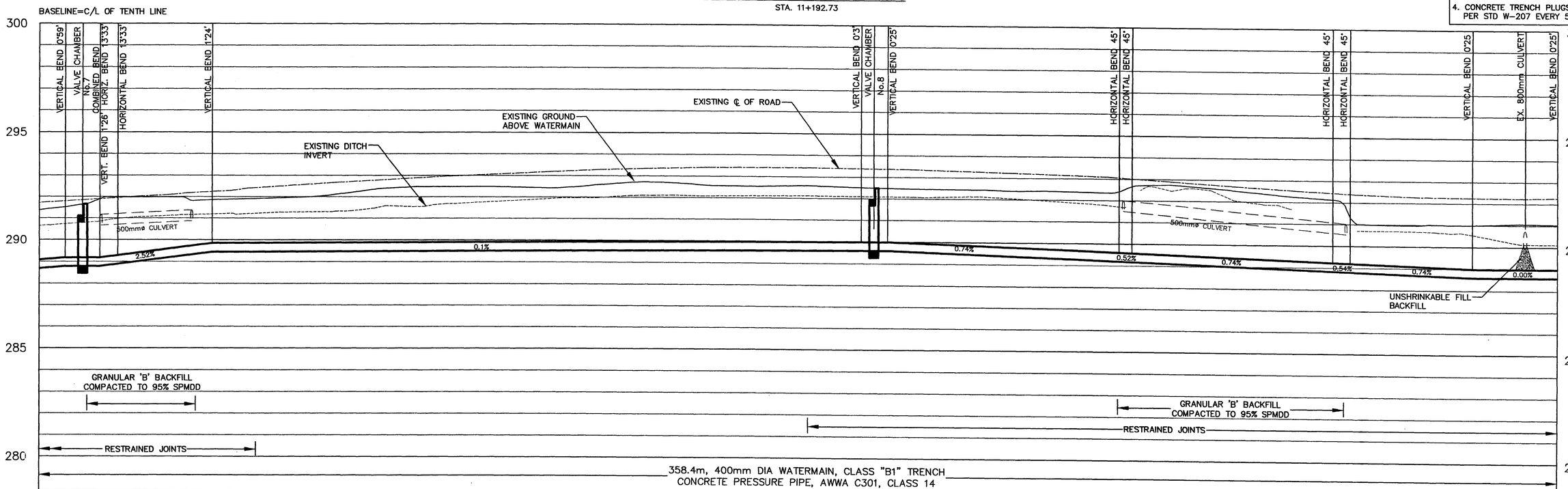


KEY PLAN
N.T.S.

NOTES:

1. ALL ROAD SIGNS AND MAILBOXES TO BE REMOVED AND REPLACED AS NECESSARY.
2. CONTRACTOR TO ENSURE MAIL DELIVERY IS UNINTERRUPTED DURING CONSTRUCTION THROUGH TEMPORARY MAILBOXES.
3. JOINTS SHALL BE RESTRAINED WHERE DIRECTION OF INSTALLATION IS NEGATIVE GRADE IN EXCESS OF 2.0% AND WHERE INDICATED ON THE DRAWINGS.
4. CONCRETE TRENCH PLUGS ARE TO BE INSTALLED AS PER STD W-207 EVERY 50m OF WATERMAIN LENGTH.

BASELINE=C/L OF TENTH LINE



SCALES

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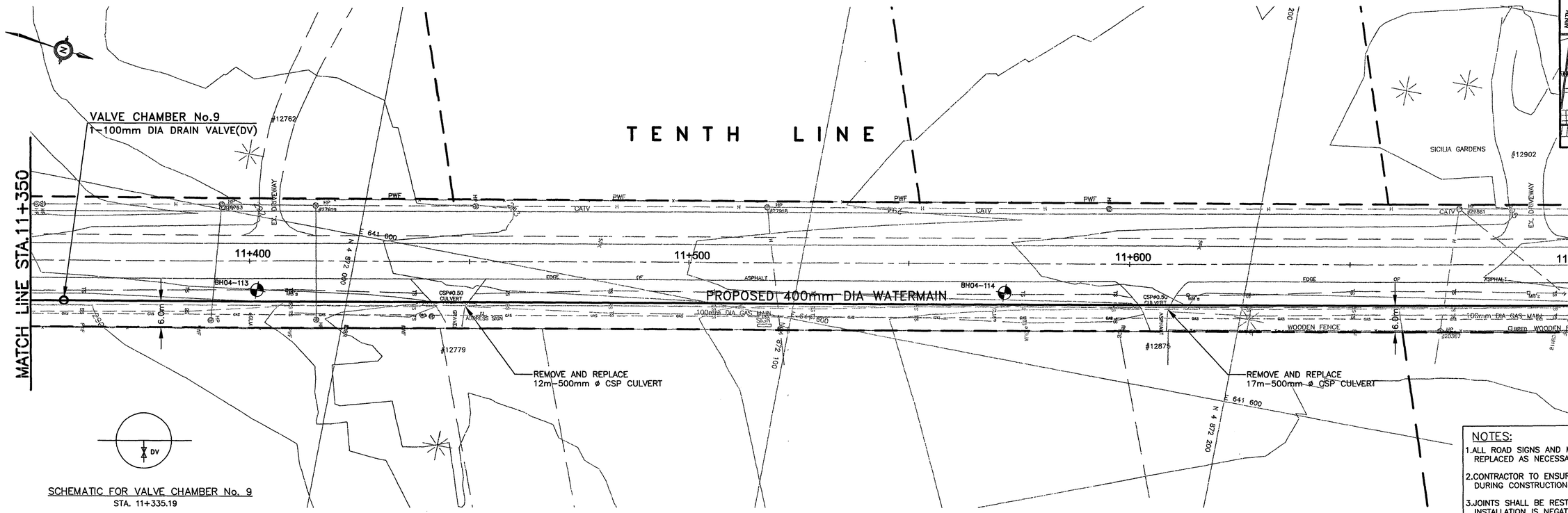
Horizontal

1m 0 2m
Vertical

| | | |

METRIC



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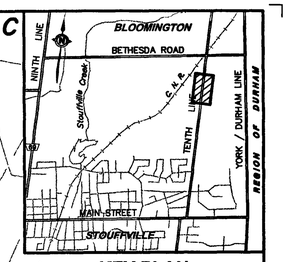
STA. 11+335.19



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N.T.S.

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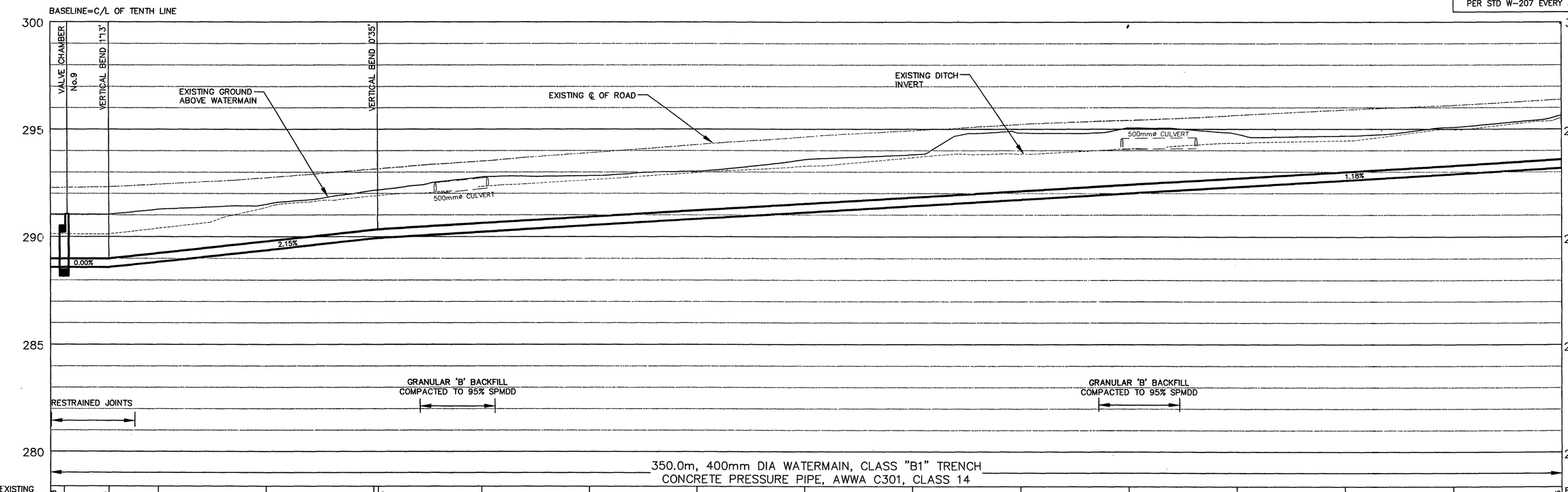


SCALES

5m 0 10m
Horizontal

1m 0 2m
Vertical

EXISTING GROUND ABOVE WM (m)	291.03	291.03			292.15											295.65
TOP OF PIPE (m)	288.99	288.99			290.33											293.56
℄ OF ROAD CHAINAGE	11+350 11+353.19	11+365.54		11+400	11+426.02		11+500				11+600					11+700

LICENSED PROFESSIONAL ENGINEER
G.S. DICKSON
100020152
PROVINCE OF ONTARIO

NOTE:
THE LOCATION OF UTILITIES IS APPROXIMATE ONLY, AND THE EXACT LOCATION SHOULD BE DETERMINED BY CONSULTING THE MUNICIPAL AUTHORITIES AND UTILITY COMPANIES CONCERNED. THE CONTRACTOR SHALL PROVE THE LOCATION OF UTILITIES AND SHALL BE RESPONSIBLE FOR ADEQUATE PROTECTION FROM DAMAGE DURING CONSTRUCTION.

MacViro

No.	DATE		BY
1	02/06	ISSUED FOR TENDER	GSD

York Region Transportation and Works

DESIGN GSD
DRAWN LP
CHECKED BWB

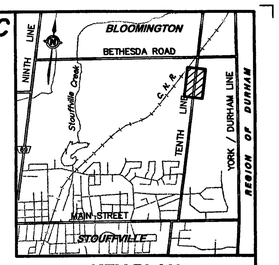
7182

STOUFFVILLE ZONE 1 AND ZONE 2 TRUNK WATERMAINS
TENTH LINE
WATERMAIN CONSTRUCTION
FROM 11+350 TO 11+700

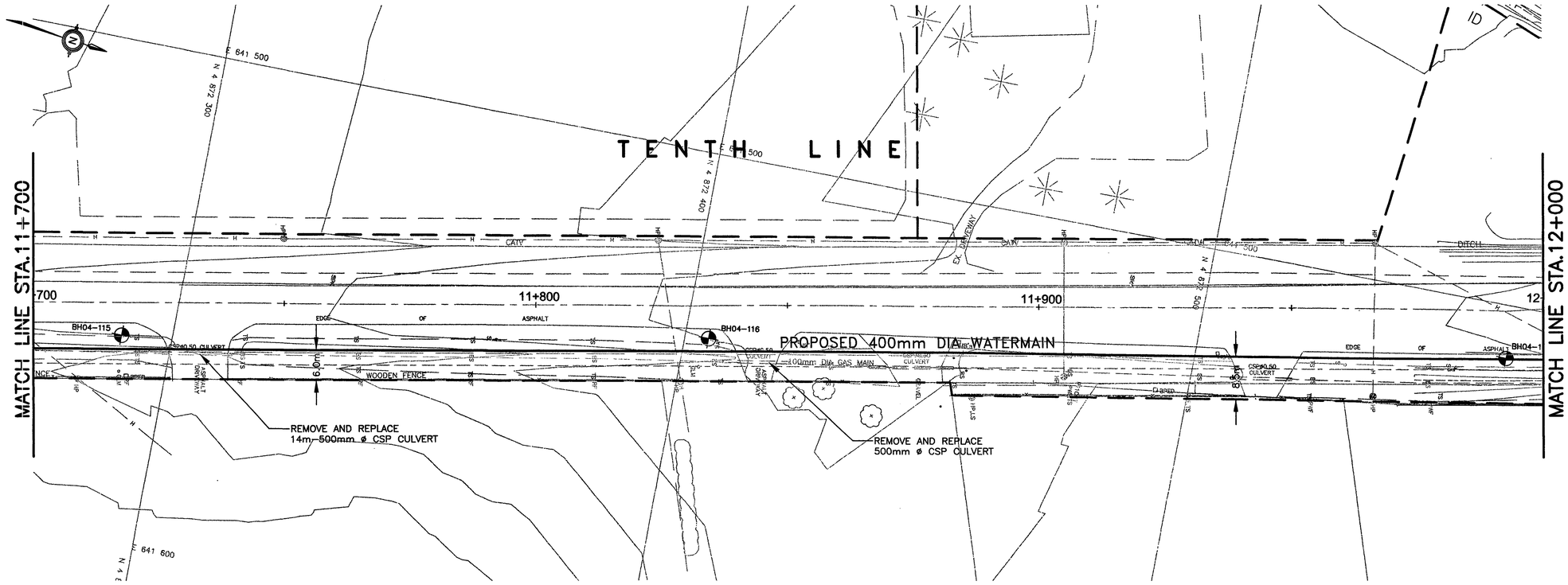
DWG. NO. P7
CONT. NO. T-06-05
SHEET NO. 10

H:\467A\Detailed Design\BASSMAP\bassmap.dwg (Feb 13, 2006)

METRIC



KEY PLAN
N.T.S.



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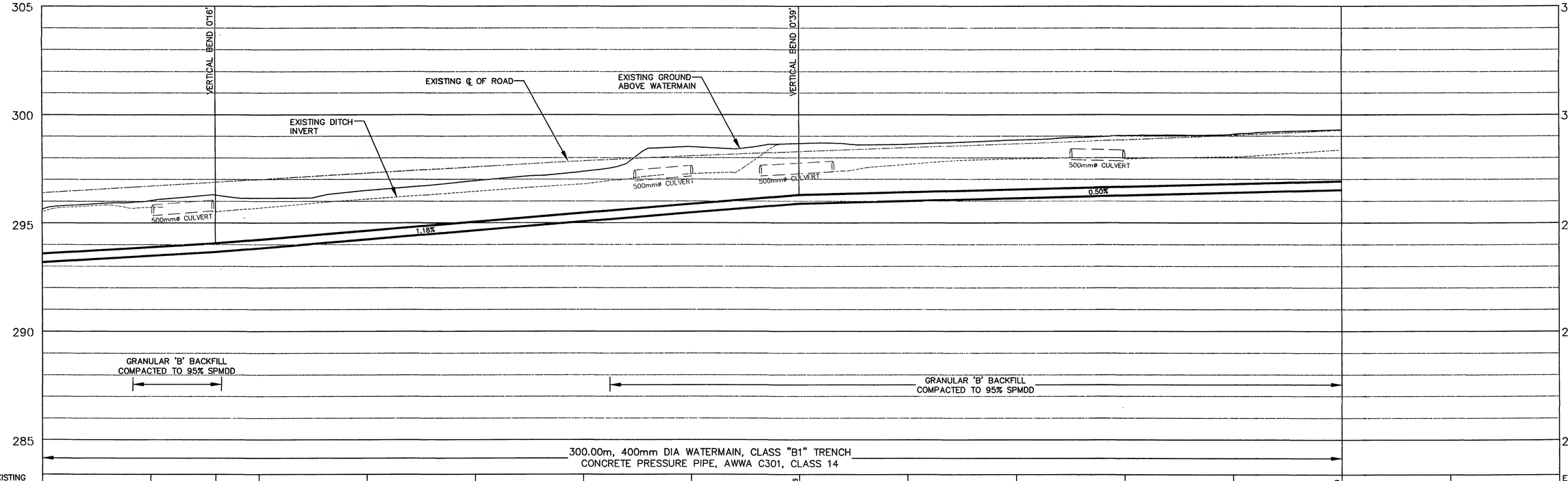
BASELINE=C/L OF TENTH LINE



SCALES

5m 0 10m Horizontal

1m 0 2m Vertical

EXISTING GROUND ABOVE WM (m)	295.65	296.28					298.66					299.29		
TOP OF PIPE (m)	293.56	294.06					296.28					296.93		
℄ OF ROAD CHAINAGE	11+700	11+740.01			11+800		11+875		11+900			12+000		

LICENSED PROFESSIONAL ENGINEER G.S. DICKSON 100020152 PROVINCE OF ONTARIO

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MacViro

No.	DATE		BY
1	02/06	ISSUED FOR TENDER	GSD

York Region Transportation and Works

DESIGN GSD
DRAWN LP
CHECKED BWB

STOUFFVILLE ZONE 1 AND ZONE 2 TRUNK WATERMAINS

7183

TENTH LINE
WATERMAIN CONSTRUCTION
FROM 11+700 TO 12+000

DWG. NO. P8
CONT. NO. T-06-05
SHEET NO. 11

E:\467A\Detailed Design\BASEMAP\basemap.dwg (Feb 13, 2006)

Soil Engineers Ltd.
CONSULTING ENGINEERS
GEOTECHNICAL • ENVIRONMENTAL • HYDROGEOLOGICAL • BUILDING SCIENCE
90 WEST BEAVER CREEK ROAD, SUITE 100, RICHMOND HILL, ONTARIO L4B 1E7 · TEL: (416) 754-8515 · FAX: (905) 881-8335

BARRIE	MISSISSAUGA	OSHAWA	NEWMARKET	MUSKOKA	HAMILTON
TEL: (705) 721-7863	TEL: (905) 542-7605	TEL: (905) 440-2040	TEL: (905) 853-0647	TEL: (705) 684-4242	TEL: (905) 777-7956
FAX: (705) 721-7864	FAX: (905) 542-2769	FAX: (905) 725-1315	FAX: (905) 881-8335	FAX: (705) 684-8522	FAX: (905) 542-2769

Appendix C-1

Groundwater Level Monitoring Summary

REFERENCE NO. 2103-W118

BH/MW	Ground Level Elevation (masl)	Units	28-Apr-21	28-May-21	29-Jun-21	27-Jul-21	31-Aug-21	30-Sep-21	30-Oct-21	30-Nov-21	23-Dec-21	21-Jul-23	23-Nov-23	28-Dec-23	24-Jan-24	28-Feb-24	12-Mar-24	1-Apr-24	22-May-24	25-Jun-24	25-Jul-24	28-Aug-24	25-Sep-24	23-Oct-24	27-Nov-24	23-Dec-25	6-Jan-26
1	290.56	mbgs	1.66	2.23	2.51	2.24	3.00	1.83	1.21	1.56	1.29	1.59	2.13	0.69	0.47	0.73	0.74	1.20	1.37	1.32	1.71	1.52	2.37	2.88	2.24	1.22	1.43
		masl	288.90	288.33	288.05	288.32	287.56	288.73	289.35	289.00	289.27	288.97	288.43	289.87	290.09	289.83	289.82	289.36	289.19	289.24	288.85	289.04	288.19	287.68	288.32	289.34	289.13
5	289.88	mbgs	3.52	3.61	3.95	4.02	4.27	4.30	3.71	3.48	2.65	2.85	3.85	2.79	3.06	2.59	2.41	2.55	2.48	2.88	2.86	2.79	3.41	3.71	3.95	3.73	3.72
		masl	286.36	286.27	285.93	285.86	285.61	285.58	286.17	286.40	287.23	287.03	286.03	287.09	286.82	287.29	287.47	287.33	287.40	287.00	287.02	287.09	286.47	286.17	285.93	286.15	286.16
9	292.02	mbgs	6.43	6.53	6.77	6.85	7.01	7.06	6.78	6.51	6.15	6.24	6.69	6.65	6.41	6.04	6.02	5.91	5.65	5.96	6.10	6.19	6.36	6.56	6.71	7.07	7.04
		masl	285.59	285.49	285.25	285.17	285.01	284.96	285.24	285.51	285.87	285.78	285.33	285.37	285.61	285.98	286.00	286.11	286.37	286.06	285.92	285.83	285.66	285.46	285.31	284.95	284.98
11	293.16	mbgs	6.52	6.61	6.84	6.91	7.07	7.13	6.94	6.76	6.44	6.14	6.67	6.63	6.44	6.05	6.02	5.92	5.74	6.04	6.08	6.22	6.41	6.62	6.76	7.00	7.10
		masl	286.64	286.55	286.32	286.25	286.09	286.03	286.22	286.40	286.72	287.02	286.49	286.53	286.72	287.11	287.14	287.24	287.42	287.12	287.08	286.94	286.75	286.54	286.40	286.16	286.06
15	291.40	mbgs	4.55	4.76	4.98	5.07	5.17	5.21	4.98	4.79	4.54	NA	4.74	4.42	4.36	3.98	3.93	3.95	3.79	3.95	4.08	4.22	4.39	4.65	4.78	4.56	4.22
		masl	286.85	286.64	286.42	286.33	286.23	286.19	286.42	286.61	286.86	NA	286.66	286.98	287.04	287.42	287.47	287.45	287.61	287.45	287.32	287.18	287.01	286.75	286.62	286.84	287.18
16	291.30	mbgs	3.74	3.91	4.19	4.27	4.45	4.52	4.32	4.18	3.74	3.44	5.03	3.89	3.51	3.19	2.98	3.09	2.97	3.25	3.25	3.25	3.72	3.93	3.93	3.80	4.59
		masl	287.56	287.39	287.11	287.03	286.85	286.78	286.98	287.12	287.56	287.86	286.27	287.41	287.79	288.11	288.32	288.21	288.33	288.05	288.05	288.05	287.58	287.37	287.37	287.50	286.71

Soil Engineers Ltd.

Although groundwater storage experiences both gains and losses on a short-term basis, the net change in groundwater storage (DGS) over the long-term is generally zero. For this reason, the change in groundwater storage (zero (0)) has not been included in the water balance calculations.

Evapotranspiration (ET) refers to the transfer of water from vegetation and the soil surface to the atmosphere in the form of water vapour. The term considers evaporation from the soil surface and from man-made surfaces together with transpiration from plants.

9.4 Site Water Balance Component

Water balance analyses were completed for pre-development and post-development conditions, separately, with the details presented below:

9.4.1 Pre-Development Water Balance

The Subject Site was previously used for agricultural land usage, but now comprises a vacant farm field. The neighbouring properties consist mainly of farm fields and associated houses and structures to the north, east and west, and south of the subject site.

Based on a review of the pre- and post-development areas provided via email on March 12, 2026, from SCS Consulting Group, the total Subject Site area is 102,800 $m^{2,}$ out of which the pervious area is 102,800.0 m^2 with no current impervious area. The pre-development water balance for the Subject Site is calculated by multiplying the existing undeveloped Site areas (Landscaped and Existing Green Areas) and existing building and paved area by the various, averaged annualized depth estimates for precipitation, ET, infiltration and runoff. The average annual area-based estimates for each water balance component are summarized in **Table 9-2**.

Table 9-2 Summary of Pre-Development Volumetric Water Balance Components

Pre-Development Site Breakdown Areas	Coverage Area (m^2)	Precipitation (m^3/year)	Evapotranspiration (m^3/year)	Infiltration (m^3/year)	Run off (m^3/year)
Existing Impervious Area	0	0	0	0	0
Existing Pervious Area (Green Area)	102,800.00	89,127.600	49,549.60	26,111.20	13,466.80
Total	**102,800.00**	**89,127.60**	**49,549.60**	**26,111.20**	**13,466.80**

9.4.2 Post-Development Water Balance

The total Subject Site area for the post-development is 102,800.0 $m^{2,}$ out of which the total impervious area and pervious areas of 52,957.0 m^2 and 49,842.70 m^2 are proposed, respectively. The post-development change in impervious areas was obtained by referencing the pre- and post-development plans provided via email on March 12, 2026, from SCS Consulting Group.

The post-development water balance is calculated using the same depth-based components that were used for the pre-development water balance calculations, i.e., average annual precipitation and average annual ET. The estimates for runoff and ET for impervious surfaces are 90% and 10% of the average annual precipitation, respectively. The estimated post-development water balance volumes are provided in **Table 9-3** below. The existing and proposed building coverage area was obtained by reviewing the pre- and post-development plans provided via email on March 12, 2026, from SCS Consulting Group.

Table 9-3 Summary of Post-Development Volumetric Water Balance Components

Post-Development Site Breakdown Areas	Coverage Area (m^2)	Precipitation (m^3/year)	Evapotranspiration (m^3/year)	Infiltration (m^3/year)	Run off (m^3/year)
Proposed Impervious Area (Stacked Townhouse-SKTH)	3,861.00	3,347.49	334.75	0.00	3,012.74
Proposed Impervious Area (Onstreet Townouse - OSTH)	1,305.00	1,131.44	113.15	0.00	1,018.29
Proposed Impervious Area (Rear Lot Townhouse-RLTH)	4,185.00	3,628.40	362.84	0.00	3,265.56
Proposed Impervious Area (Back to Back Townhouse-B2)	8,082.00	7,007.09	700.71	0.00	6,306.38
Proposed Impervious Area (8.5 m Lane Way)	6,710.00	5,817.57	581.76	0.00	5,235.81
Proposed Impervious Area (School Block)	17,352.00	15,044.18	1,504.41	0.00	13,539.77
Proposed Impervious Area (20 m ROW)	5,557.30	4,818.18	481.82	0.00	4,336.36
Proposed Impervious Area (SWM Block)	5,905.00	5,119.63	511.96	0.00	4,607.67
Proposed Pervious Area (Stacked Townhouse-SKTH)	429.00	371.94	206.77	108.97	56.20
Proposed Pervious Area (Onstreet Townouse - OSTH)	435.00	377.15	209.67	110.49	56.99
Proposed Pervious Area (Rear Lot Townhouse-RLTH)	465.00	403.16	224.13	118.11	60.92
Proposed Pervious Area (Back to Back Townhouse-B2)	898.00	778.57	432.84	228.09	117.64
Proposed Pervious Area (School Block)	4,338.00	3,761.04	2,090.92	1,101.85	568.27
Proposed Pervious Area (20 m ROW)	3,782.70	3,279.60	1,823.26	960.81	495.53
Proposed Pervious Area (SWM Block)	5,905.00	5,119.63	2,846.21	1,499.87	773.55
Proposed Pervious Area (Open Space / Environmental Area/ Future Development)	33,590.00	29,122.53	16,190.38	8,531.86	4,400.29
Total	**102,800.00**	**89,127.60**	**28,615.58**	**12,660.05**	**47,851.97**

9.5 Site Water Balance

The volumetric comparisons in evapotranspiration, infiltration and runoff between the pre-developed and post-developed sites are summarized in **Table 8-4**.

Table 9-4 Pre- and Post-Development Volumetric Water Balance Gain/Loss

	Precipitation (m^3/year)	Evapotranspiration (m^3/year)	Infiltration (m^3/year)	Run off (m^3/year)
Pre-Development	89,127.60	49,549.60	26,111.20	13,466.80
Post-Development	89,127.60	28,615.58	12,660.05	47,851.97
Loss (-) and Gain (+)	-	-20,934.02	-13,451.15	34,385.17

A review of the findings indicates that a total decrease of 20,934.02 m^3/year and 13,451.15 m^3/year for ET and infiltration, respectively, and an increase of 34,385.17 m^3/year for runoff are expected for the post-development Site.

Pre- and post-water balance components for the Subject Site were also assessed. The results are presented in **Table 9-5**.

Table 9-5 Pre- and Post-Development Water Balance Components Gain/Loss

Pre-Development Site Breakdown Areas	Precipitation (mm/year)	Evapotranspiration (mm/year)	Infiltration (mm/year)	Run off (mm/year)
Pre-Development	867.00	482.00	254.00	131.00
Post-Development	867.00	278.36	123.15	465.49
Loss (-) and Gain (+)	-	-203.64	-130.85	334.49

A review of **Table 9-5** indicates that a total loss of 203.64 mm/yr or 42 % and 130.85 mm/ye or 52% in ET and infiltration, and a total gain of 334.49 mm/yr or 255% is anticipated in runoff for the post-development Subject Site, respectively.

Long-Term Groundwater Monitoring in BH/MW 16: The monitoring program in BH/MW-16 was conducted between November 23, 2023 and January 7, 2026. A review of the monitoring results indicates that the shallow groundwater table generally increased through the winter months and spring, followed by a gradual decline during the summer and early fall, exhibiting a consistent seasonal pattern. Groundwater levels rose through late fall and winter into spring of 2024, declined through summer and fall of 2024, and again increased during winter and spring of 2025 before declining through late summer and fall of 2025. The highest and lowest shallow groundwater table elevations were approximately 289.21 masl and 286.85 masl, recorded on April 14, 2024 and December 19, 2025, respectively. The interpreted hydrograph indicates that the shallow groundwater table increases in response to precipitation events with a delayed response.

A review of the shallow groundwater table recorded during the monitoring program between 2019 and 2026 in the monitoring wells installed within the glacial till (Halton Till or equivalent) indicates that the shallow groundwater table is under impression of precipitation and it responds with a delay due to the relatively low permeability of the glacial till. The shallow groundwater table decreases during dry seasons and increases again during wet seasons and snow melting. The fluctuation rate varies based on the sand seems appearance in the glacial till that facilitates shallow groundwater flow.

7.2 Hydraulic Conductivity Testing

7.2.1 Single Well Response Test

The In-situ hydraulic conductivity testing was conducted in six (6) monitoring wells with sufficient groundwater. All the boreholes and monitoring wells underwent a single well response testing (SWRT) to assess the hydraulic conductivity (K) for saturated shallow aquifer or water-bearing units at the depths of the well screens. Each monitoring well was equipped with a digital transducer to record the fluctuation to complete the SWRT. The results of the SWRT tests are presented in **Appendix D**, with a summary of the findings provided in **Table 7-1**.

Table 7-1 A Summary of Falling Head Hydraulic Conductivity Testing

Well ID	Ground El. (masl)	Monitoring Well Depth (mbgs)	Screen Interval (mbgs)	Screened Soil Strata	Hydraulic Conductivity (K in m/sec)	Test Method
BH/MW 1	290.56	6.1	3.1 – 6.1	Silty Clay Till	5.7×10^{-7}	Falling Head
BH/MW 5	289.88	6.1	3.1 – 6.1	Silty Clay Till and Silty Sand	1.4×10^{-7}	Falling Head
BH/MW 9	292.02	10.7	7.7 – 10.7	Silty Sand	1.4×10^{-5}	Falling Head
BH/MW 11	293.16	10.7	7.7 – 10.7	Silty Sand	2.5×10^{-5}	Falling Head
BH/MW 15	291.40	6.1	3.1 – 6.1	Silty Clay Till	1.1×10^{-6}	Falling Head
BH/MW 16	291.30	6.1	3.1 – 6.1	Silty Clay Till	7.5×10^{-7}	Falling Head

Notes:
mbgs metres below ground surface
masl metres above sea level

7.2.2 Hydraulic Conductivity Test Using Grain Size Distribution Graphs

The Hazen Equation method was adopted to estimate the hydraulic conductivity (K) for different soil layers which may contain groundwater during the seasonal high-water table (spring) period, or if they are not encountered within the screen intervals.

The Hazen Equation method relies on the interrelationship between hydraulic conductivity and effective grain size, d_{10}, in the soil media. This empirical relation predicts a power-law relation with K, as follow:

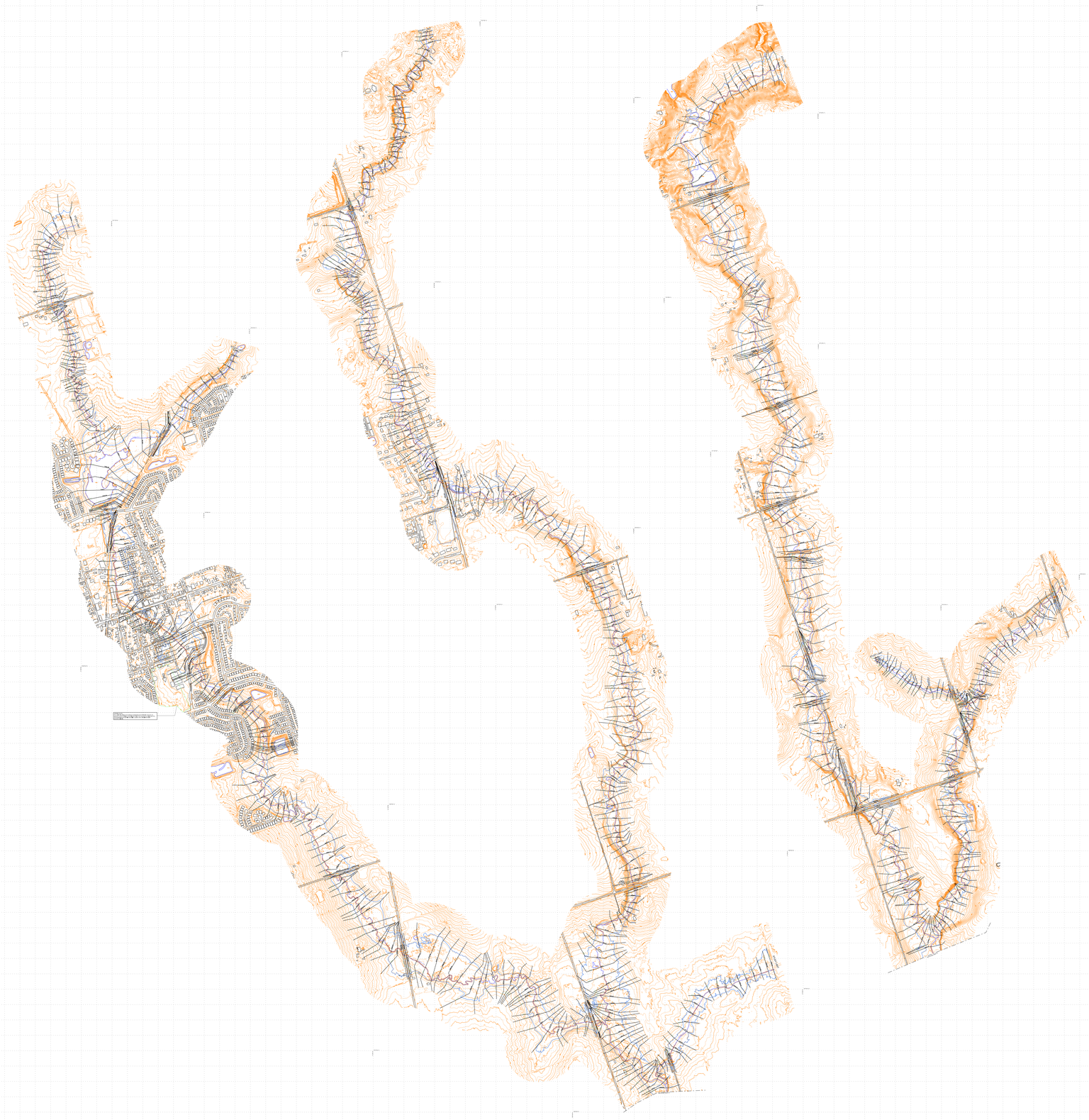
$$K = Ad_{10}^2$$

where;

d_{10}: Value of the soil grain size gradation curve as determined by sieve analysis, whereby 10% by weight of the soil particles are finer and 90% by weight of the soil particles are coarser.

A: Coefficient; it is equal to 1 when K in cm/sec and d_{10} is in mm

The Hazen Equation estimation provides an indication of the groundwater yield capacity for saturated soil strata at the depths where soils samples were selected for grain size analysis. The grain size distribution graphs prepared for the geotechnical investigation were used to estimate the hydraulic conductivity, with the details are presented in **Appendix A**. The results of the Hazen equation are provided in **Table 7-2**, below.



Duffins Creek Flood Plain Mapping Update

Hydraulic Engineering Consultant:

wood.

LICENSED PROFESSIONAL ENGINEER
M.J. SENIOR
100118537
2020-09-30
PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER
M.M.L. BRITTON
100020862
2020-09-30
PROVINCE OF ONTARIO

The professional engineer's seal and signature verifies the location of the floodline and associated water surface elevations only. For additional information please see CFN 61408 for the final report : Duffins Creek Floodplain Mapping.

AIRBORNE IMAGING
A Clean Harbors Company

Mapping Note;

The flood line on this map was produced from hydraulic modelling software using a digital elevation model (DEM) with 1m grid resolution. The DEM was created using bare earth mass points with a vertical accuracy tolerance of +/- 0,10 m on hard flat surfaces. The mass points were collected using LIDAR flown in 2014/2015 by Airborne Imaging.

The spot elevations shown on this map were produced by TRCA using the DEM mentioned above. The contour lines were produced by TRCA by smoothing the full resolution DEM to create smooth lines for cartographic display and should therefore be used as reference only. The river banks were produced by TRCA and are approximate, contours within close proximity are a result of interpolation from the DEM surface and should not be considered a true representation of the water surface or bathymetry.

Contour labels and spot elevations are represented as metres above sea level (masl).

The planimetric data on this map were acquired from various sources with different collection dates and are provided for reference only. The building footprints were acquired from City of Pickering and Town of Ajax in 2018 and from York Region in 2019.

The vertical datum is the Canadian Geodetic Vertical Datum of 1928:1978 Ontario Adjusted Version.
The horizontal datum is North American Datum of 1983, UTM 6° projection Zone 17, Central Meridian 81° W.

Grid interval 100 m.

LEGEND

- Contour - 5m
- Contour - 1m
- Contour - 0.5m
- Spot Elevation (.172.79)
- Building
- Road
- Elevation Data from 2019
  * elevation data within this boundary was acquired in 2019 by Airborne Imaging
- Bridge/Culvert
- Railway
- Water Feature and Drainage
- River Bank (approximate)
- Regulatory Flood Line

Hydraulic Model Legend :

water surface elevation (masl) **100 year storm** — 136.24
cross section ID — **1146**
water surface elevation (masl) **regional storm** — 138.99
HEC-RAS cross section (Cut left to right looking downstream)
watercourse
flow direction arrow

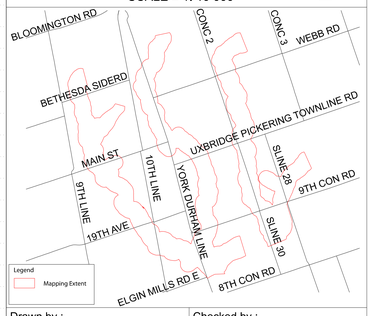
NOTE : The regulatory flood elevation is the greater of the regional storm or 100 year storm,
When the 100 year storm is greater, it is symbolized as follows - *136.24*

River and Reach name label from Model: *River Name - Reach Name* *ex. Pretty River - Reach 1*

0 200 400 600 800m

N

SCALE = 1: 10 000



Drawn by : MDT

Checked by : QIY

SHEET : 08 of 08

Toronto and Region Conservation Authority

5 Shoreham Dr., Downsview, ON M3N 1S4(416)-661-6600, info@trca.on.ca

- Rock Check Dams (RCD):
  - During construction activities, RCD are anticipated to be used within stormwater drainage ditches as part of the sediment and erosion control plan. The configuration of drainage ditches and RCDs will be completed during the Detailed Design stage.
- Environmental Fencing:
  - In general, environmental fencing should be placed around the limits of construction and topsoil stockpiles. Double row environment fences with straw bales in between are recommended in areas adjacent to the areas of environmental significance, such as the bordering watercourses and the associated valley lands. It is proposed to inspect all physical barriers be inspected weekly and after significant rainfall events.
- Monitoring:
  - It is essential to demonstrate that the sediment and erosion control measures are properly installed and well maintained. They should be monitored on daily basis to show that they function as intended. The ESC plan should provide the framework for the inspection, maintenance, and record-keeping procedures for all stages of construction. The deficient parts to be repaired/replaces as soon as they are detected. In order to mitigate the adverse environmental impacts caused by the release of sediment-laden runoff into receiving watercourses, measures for erosion and sediment control are required for construction sites. This is an important component of land development that plays a large role in the protection of downstream watercourses and aquatic habitat. Control measures must be selected that are appropriate for the erosion potential of the site and it is important that they be implemented and modified on a staged basis to reflect the site activities. Furthermore, their effectiveness decreases with sediment loading and therefore, inspection and maintenance is required.

10.3 Vegetation Protection Zones

The primary function of a VPZ is to protect natural heritage features from the potential adverse effects of adjacent development. As detailed in **Section 3.2.2.3**, Dillon and the TRCA conducted a site investigation to formally stake the significant woodland dripline. As the dripline encompasses the mapped extent of the unevaluated wetlands and watercourse, it was established as the governing limit of the Town's Environmentally Significant Area adjacent to the proposed development. Consequently, this staked boundary served as the primary constraint for determining required setbacks and minimum protection zones.

To adhere to TRCA and Town policies (refer to **Sections 2.2.5.1** and **2.3.2.2**) and to align with ecological best management practices, a 10 m VPZ was applied to the significant woodland, regulatory floodplain, LTSTOS, and 41 m wide meanderbelt (**Figure 4**). While the SWM pond block necessitates a localized encroachment of 0.0007 ha into the 10 m LTSTOS and meanderbelt VPZ, these areas will be fully naturalized as part of the SWM pond's landscape design. Consequently, the ecological function of the buffer is preserved and still provides a vegetated setback maintained between the proposed development and the natural heritage features.

These 10 m setbacks have been integrated into the Environmentally Significant Area to prevent impacts to the woodland, wetland, and watercourse habitats resulting from the proposed development. The VPZ along the eastern portion of the Property within the SWM block will be restored with robust native vegetation, as described in **Section 10.4**. This restoration is intended to mitigate the colonization of invasive species, enhance the ecological integrity of the woodland, and provide a functional buffer for sediment and erosion control.

10.4 Landscape Restoration Plan

As discussed in **Section 9.1.3**, the proposed development will necessitate the removal of select trees, shrubs, and groundcover within the designated development footprint, which includes the FODM3-1 feature. To mitigate these impacts, a Landscape Restoration Plan will be prepared during the detailed design stage. This plan will be designed to offset vegetation removal through the strategic use of native tree and shrub species. This includes tree compensation requirements as per Town policies, and the restoration and enhancement of the buffer areas along the woodland dripline. As removal of the FODM3-1 feature is required to facilitate the proposed development, all tree removals will be compensated at the prescribed ratios in accordance with the Town's Tree Protection By-law. As detailed in the Arborist Report by Strybos Barron King Ltd. (2026), these requirements will be met through on-site replanting or cash-in-lieu payments, replacing a monoculture with a more diverse, sustainably managed canopy.

It is also recommended that all proposed seed mixes be native to the Duffins Creek watershed and align with the technical recommendations outlined in the TRCA Seed Mix Guidelines (2022). Compliance with tree replacement ratios and compensation strategies will be finalized in consultation with the Town, as required.

The planting plan includes, but is not limited to:

- A mix of native deciduous and coniferous trees and shrubs within the VPZ area;
- Sodding within portions of the development; and
- A native seed mix for enhancement within the VPZ area.

The following monitoring and maintenance measures may also be recommended:

- Removal of invasive tree and shrubs, where applicable;
- Watering and weeding of newly planted areas as required for proper establishment of plantings; and
- Replacement of dead material from previous year's planting.

Appendix C Hydrology Modelling

The following secure link is being provided by **SCS Consulting Group** to share Acorn North, Northcape, and Acorn South related digital data:

https://filesafecloud.scsconsultinggroup.com/url/wffgddhpajadcp5s

Please click on the link and download all files from this location.

- Proposed SWM Pond E1 Visual Otthymo Modelling

Proposed Conditions
VO Parameter Summary

Acorn North, Northcape, Acorn South
Project Number: 2076
Date: April 2026
Designer Initials: S.B.

STANDHYD

Number	201	208
Description		
DT(min)	2	2
Area (ha)	18.77	3.72
TIMP[2]	0.80	0.62
XIMP[1,2]	0.74	0.38
CN* (AMC II)	64.0	52.0
CN* (AMC III)	81.0	71.0
IA(mm)	5.0	5.0
SLPP(%)	2	2
LGP(m)	40	40
MNP	0.25	0.25
DPSI (mm)	1.0	1.0
SLPI(%)	1	1
LGI(m)	353.74	157.48
MNI	0.013	0.013

[1]Note that where there is NO directly connected area (ie: roof runoff to grassed areas), the hydrology program does not accept XIMP=0%, therefore, XIMP = 1% has been used
[2]Note that where there is NO pervious area, the hydrology program does not accept TIMP and XIMP=100%, therefore, TIMP and XIMP = 99% has been used

Proposed Conditions
CN Calculations

Acorn North, Northcape, Acorn South
Project Number: 2076
Date: April 2026
Designer Initials: S.B.

Site Soils: (per Soil Engineers Ltd. for Acorn North, Northcape, and Acorn South)

Soil Type		Hydrologic Soil Group
Sandy Silt Till	Acorn North	B
Silty Clay	Acorn South	C
Sandy Silt Till and Silty Clay Till	Northcape	BC

TABLE OF CURVE NUMBERS (CN's)**

Land Use		Hydrologic Soil Type							Manning's 'n'	Source
		A	AB	B	BC	C	CD	D		
Meadow	"Good"	30	44	58	64.5	71	74.5	78	0.40	MTO
Woodlot	"Fair"	36	48	60	66.5	73	76	79	0.40	MTO
Gravel		76	80.5	85	87	89	90	91	0.30	USDA
Lawns	"Good"	39	50	61	67.5	74	77	80	0.25	USDA
Pasture/Range		58	61.5	65	70.5	76	78.5	81	0.17	MTO
Crop		66	70	74	78	82	84	86	0.13	MTO
Fallow (Bare)		77	82	86	89	91	93	94	0.05	MTO
Low Density Residences		57	64.5	72	76.5	81	83.5	86	0.25	USDA
Streets, paved		98	98	98	98	98	98	98	0.01	USDA

1. MTO Drainage Manual (1997), Design Chart 1.09-Soil/Land Use Curve Numbers
2. USDA (1986), Urban Hydrology for Small Watersheds, Table 2.2-Runoff Curve Numbers for Urban Areas

HYDROLOGIC SOIL TYPE (%) - Proposed Conditions

Catchment	Hydrologic Soil Type							TOTAL
	A	AB	B	BC	C	CD	D	
201			33	27	40			100
208			100					100

LAND USE (%) - Proposed Conditions

Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Total
201				100.0						100.0
208				100.0						100.0

Note: Where STANDHYD command used (shaded), impervious fraction is not considered in CN determination, since %Imp directly input in STANDHYD command

CURVE NUMBER (CN) - Existing Conditions

Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Total
201	0.0	0.0	0.0	68.0	0.0	0.0	0.0	0.0	0.0	68
208	0.0	0.0	0.0	61.0	0.0	0.0	0.0	0.0	0.0	61

** AMC II assumed

Proposed Conditions
CN Calculations

Step	Input Values		
	Subcatchment:	201	208
1	**CN (AMC II):**	**68**	**61**
2	CN (AMC III) =	84	78
3	100 Year Precipitation, P =	87.5	87.5

$$Q = \frac{(P - Ia)^2}{(P - Ia) + S}$$

Q = rainfall excess or runoff, mm
S = potential maximum retention or available storage, mm

$$CN = \frac{25400}{S + 254}$$

CN* = modified SCS curve # that better reflects Ia conditions in Ontario

	Output Values		
	Subcatchment:	201	208
	S_{III} =	48.38	71.64
	SCS Assumption of 0.2 S = Ia =	9.68	14.33
4	Q_{III} =	47.99	36.97
	Preferred Initial Abstraction, Ia =	5.0	5.0
5	S^*_{III} =	59.33	101.59
6	CN^*_{III} =	81.07	71.43
	CN^*_{III}=	**81**	**71**
7	**CN^*_{II}=**	**64**	**52**

Explanation of Procedure

1 Determine CN based on typical AMC II conditions (attached)
2 Convert CN from AMC II to AMC III conditions (standard SCS tables)
3 Get precipitation depth P for 100 year storm
4 Using CN_{III} with Ia = 0.2S, compute Q_{III} for 100 year precipitation
5 For the same Q_{III}, compute S^*_{III} using Ia=1.5mm (or otherwise determined)
6 Compute CN^*_{III} using S^*_{III}
7 Calculate CN^*_{II} using SCS conversion table

Acorn North, Northcape, Acorn South
Project Number: 2076
Date: April 2026
Designer Initials: S.B.

Proposed Conditions
IA Calculations

LAND USE (%) - Proposed Conditions										
Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Total
201				100.0						100.0
208				100.0						100.0

IA VALUES (mm) - Proposed Conditions										
Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Total
IA (mm)	8	10	2	5	8	8	3	2	2	
201				5.0						5.0
208				5.0						5.0

* IA values based on TRCA guidelines

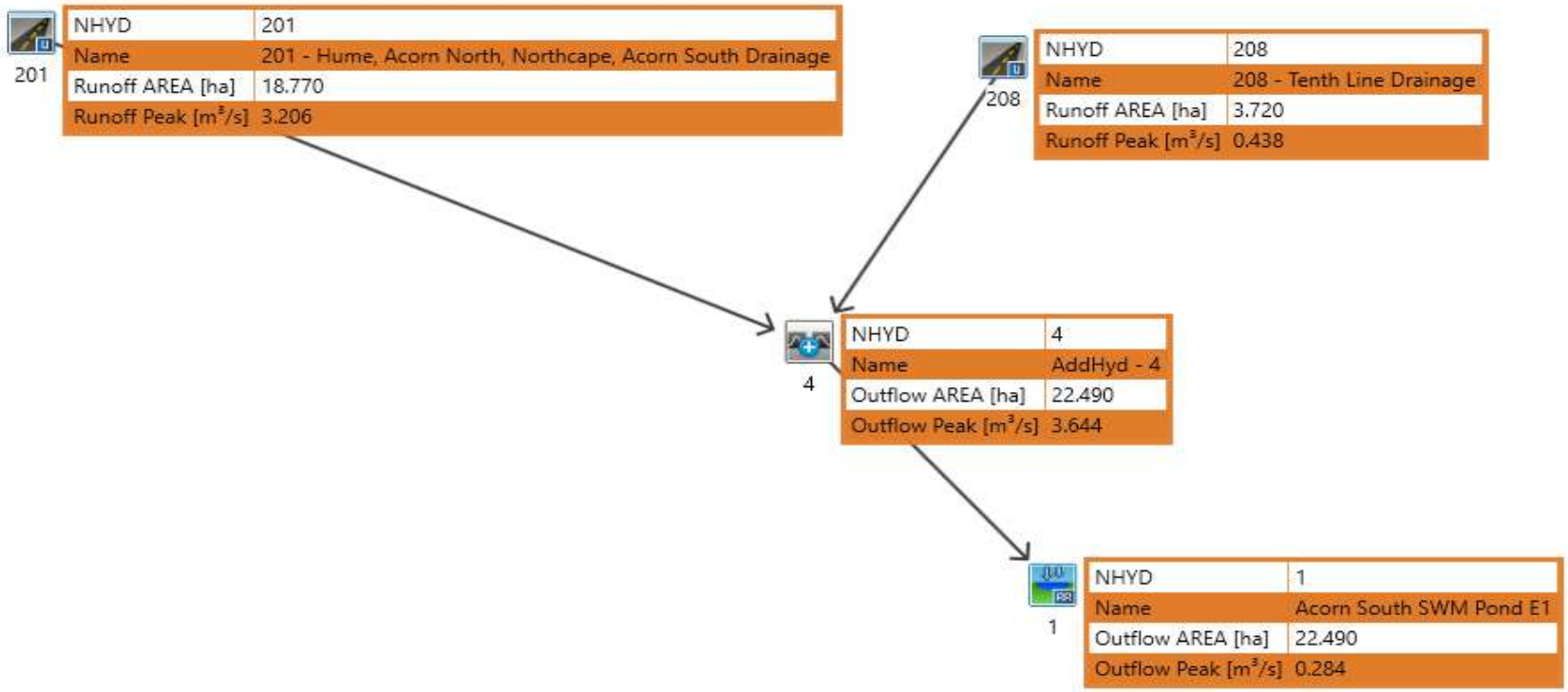
Acorn North, Northcape, Acorn South
Project Number: 2076
Date: April 2026
Designer Initials: S.B.

Proposed Conditions
Percent Impervious Calculations

			StandHyd IDs		
			201	208	
Catchment Area (ha)			18.77	3.72	
Land Use Areas	Timp	Ximp	Land Use Areas		Total
Parks	15%	0%	1.25		1.25
Stacked Townhouses (SKTH)	90%	90%	1.47		1.47
On Street Townhouses (OSTH)	75%	60%	0.35		0.35
Rear Lot Townhouses (RLTH)	90%	90%	2.65		2.65
Back to Back Townhouses (B2B)	90%	90%	2.18		2.18
Apartments (Mixed Use and Residential)	93%	93%	2.94		2.94
8.5m Laneway	100%	100%	2.19		2.19
SWM Pond	50%	50%	1.33		1.33
20.0m ROW	74%	49%	2.18		2.18
33.0m ROW	62%	38%		3.72	3.72
School	80%	60%	2.17		2.17
Open Space + NHS	0%	0%	0.05		0.05
		Total Land Use =	18.77	3.72	22.49
		Timp =	80%	62%	77%
		Ximp =	74%	38%	68%

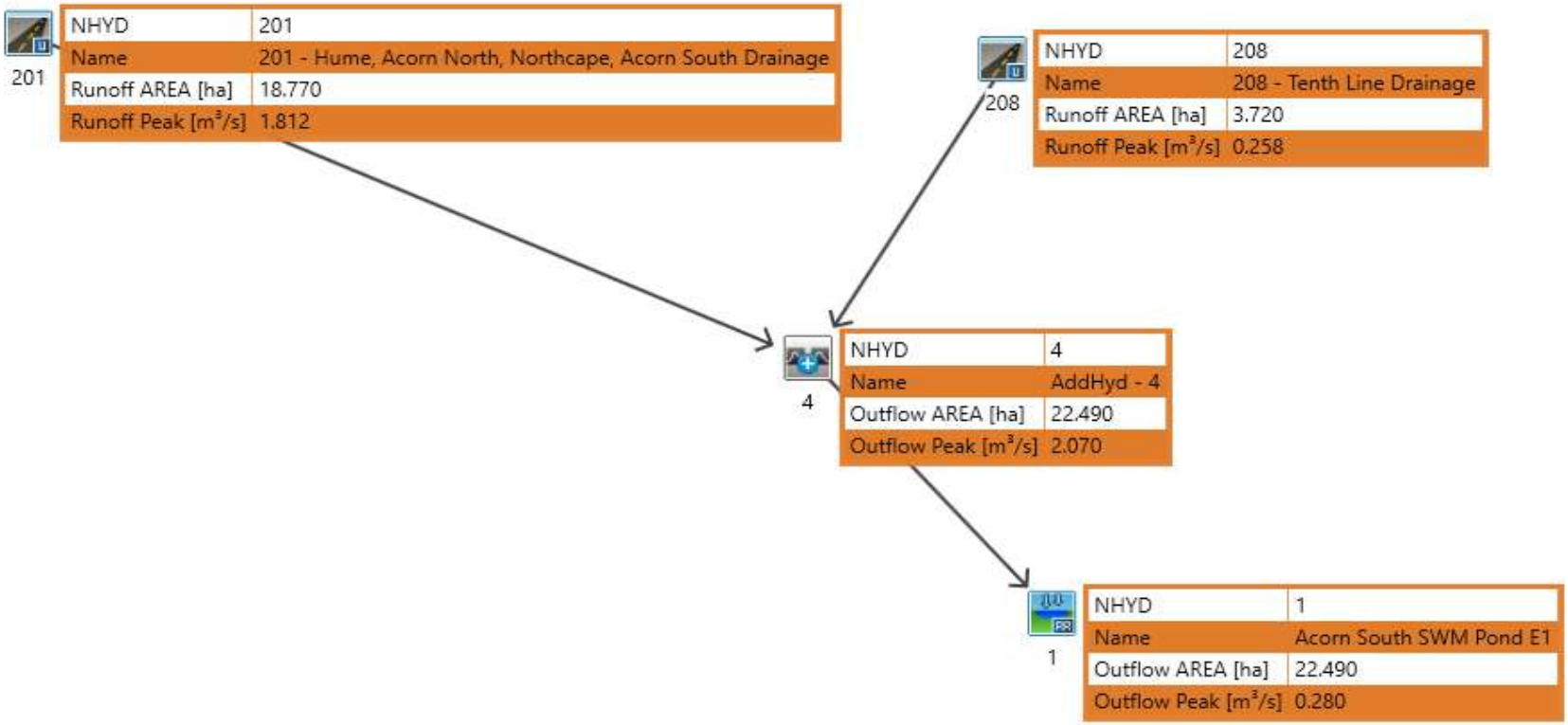
Acorn South
Project Number: 2435
Date: April 2026
Designer Initials: S.B.

VO Model Schematic
Hydrology Modelling -
100 Year Storm (6 hour AES)



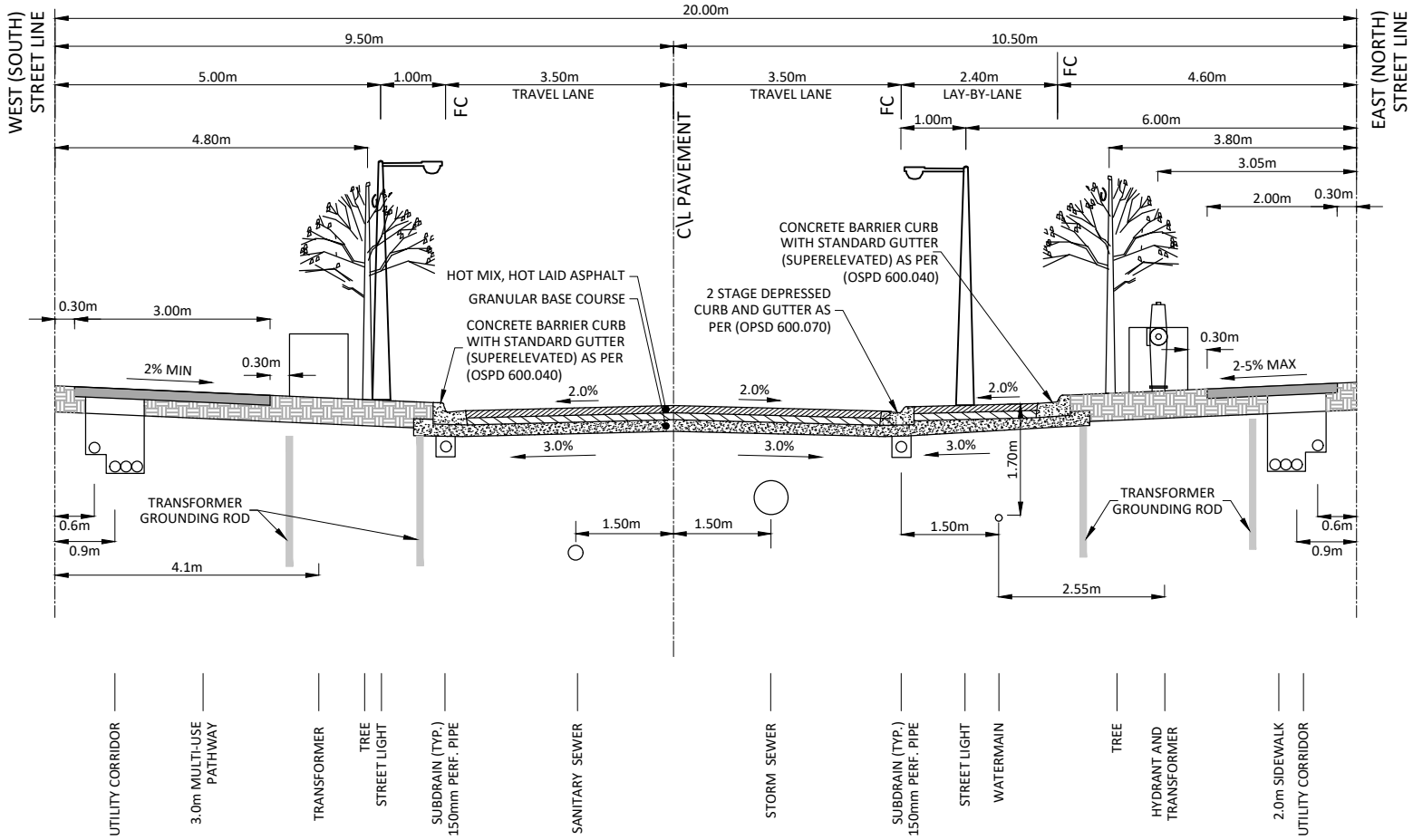
Acorn South
Project Number: 2435
Date: April 2026
Designer Initials: S.B.

VO Model Schematic
Hydrology Modelling -
100 Year Storm (12 hour AES)



Appendix D Right of Way Cross-Section

SCS consulting group ltd



NOTES:

1. LAY-BY PARKING TO BE PROVISIONED WITH SIDEWALK RAMP CONNECTIONS TO THE IN BOULEVARD PEDESTRIAN CORRIDOR AT 18m+ INTERVALS IN ACCORDANCE WITH OPSD 310.033
2. 2.00 m SIDEWALKS ARE REQUIRED IN MTSA LOCATIONS AND CONNECTING NEIGHBOURHOODS
3. SUBGRADE TO BE COMPACTED TO 95% STANDARD PROCTOR DENSITY
4. PAVEMENT DESIGN TO BE DETERMINED BY SOILS REPORT / MINIMUM TOWN STANDARDS
5. 150mmØ SUBDRAINS SHALL BE INSTALLED UNDER ALL CURBS
6. BOULEVARDS TO BE SODDED ON 300mm TOPSOIL WITH No. 1 NURSERY SOD
7. ALL UNITS ARE IN METRES UNLESS OTHERWISE NOTED
8. LAY-BY PARKING SPOTS & PEDESTRIAN ACCESS POINTS TO BE OUTLINED WITH PAINTED LINES

*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

ACORN SOUTH - TENTH LINE, STOUFFVILLE	FSSR		20.0m ROW	
SCS consulting group ltd 30 CENTURIAN DRIVE, SUITE 100 MARKHAM, ONTARIO L3R 8B8 TEL: (905) 475-1900 FAX: (905) 475-8335	DESIGNED BY: N.D.M.	CHECKED BY: S.M.S.	PROJECT No: 2435	FIGURE No: D.1
	SCALE: 1:1000	DATE: MAY 2026		

File: P:\2076 Trinison – Tenth Line, Stouffville\Drawings\FSP\Fig\Report Figures\2076P–C.1–ROW–XSEC.dwg – Revised by <TMCNEIL> : Tue, Apr 21 2026 – 2:46pm

Appendix E Stormwater Management Calculations

SCS consulting group ltd

Weighted Impervious Calculation

Catchment ID	Total Area	Imperviousness	Impervious Area
	(ha)	(%)	(ha)
201	18.77	80	15.02
208	3.72	62	2.31
Total	**22.49**	**77**	**17.32**

Permanent Pool and Extended Detention Sizing
SWM Facility E1

Acorn South
Project Number: 2435
Date: April 2026
Designer Initials: S.B.

PERMANENT POOL

Level of Protection = Enhanced (Level 1)

Weighted Impervious = 77 %

Drainage Area = 22.49 ha

SWMP Type = 4. Wet Pond

Required Permanent Pool (including 40m^3/ha for extended detention)= 236.7 m^3/ha
Required Permanent Pool (minus 40m^3/ha for extended detention)= 197 m^3/ha

Required Permanent Pool = 4424 m^3

TABLE 3.2 - WATER QUALITY STORAGE REQUIREMENTS
(FROM MECP SWM PLANNING AND DESIGN MANUAL - 2003)

Protection Level	SWMP Type	Storage Volume (m^3/ha) for Impervious Level			
		35%	55%	70%	85%
Enhanced (Level 1)	1. Infiltration	25	30	35	40
	2. Wetlands	80	105	120	140
	3. Hybrid Wet Pond/Wetland	110	150	175	195
	4. Wet Pond	140	190	225	250
Normal (Level 2)	1. Infiltration	20	20	25	30
	2. Wetlands	60	70	80	90
	3. Hybrid Wet Pond/Wetland	75	90	105	120
	4. Wet Pond	90	110	130	150
Basic (Level 3)	1. Infiltration	20	20	20	20
	2. Wetlands	60	60	60	60
	3. Hybrid Wet Pond/Wetland	60	70	75	80
	4. Wet Pond	60	75	85	95
	5. Dry Pond (Continuous Flow)	90	150	200	240

EXTENDED DETENTION

Using the 25mm - 4 hour Chicago Storm

Erosion Control Volume (V) = Runoff Depth (mm) x Drainage Area (ha) x 10 (m^3) / (mm)(ha)

Erosion Control Volume (V) = 17.37 mm x 22.49 ha x 10 m^3 / mm·ha

Erosion Control Volume (V) = 3907 m^3

Using 40m^3/ha

Extended Detention Volume (V) = 40m^3/ha x Drainage Area (ha)

Extended Detention Volume (V) = 40 m^3/ha 22.49 ha

Extended Detention Volume (V) = 900 m^3

Governing Volume (V) = 3907 m^3

Permanent Pool and Extended Detention Sizing
SWM Facility E1

	Elevation (m)	Area (m^2)	Area (m^2)	H (m)	Vol (m^3)	Volume (m^3)	Storage (m^3)	Depth (m)	
	285	1052				0		0	
			1403	0.5	702				
	285.5	1754				702		0.5	
			2020	0.5	1010				
	286	2285				1711		1	
			2625	0.57	1496				
	286.57	2965				3207		1.57	
			4011	0.43	1725				
	287	**5057**				4932	**0**	**2**	**N.W.L.**
			5581	0.43	2400				
	287.43	6104				7332	2400	2.43	
			6519	0.57	3716				
	288.00	6933				11047	6115	3.00	
			7507	0.80	6006				
Emergency spillway invert	288.80	8081				17053	12121	3.80	

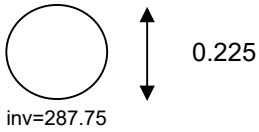
Permanent Pool Volume Required =	4424	m^3	Active storage required =	11,793 m^3
Permanent Pool Volume Provided =	4932	m^3	Active storage provided =	12,121 m^3

Acorn South
Project Number: 2435
Date: April 2026
Designer Initials: S.B.

SWM Facility E1
CONTROL STRUCTURE SUMMARY

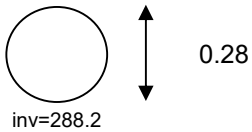
Orifice 2

Invert =	287.75	m
Size =	0.225	m
Orifice Coefficient, C =	0.62	
Obvert =	287.975	m



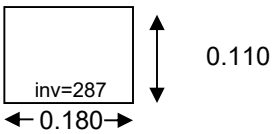
Orifice 3 (Round Only)

Invert =	288.20	m
Size =	0.280	m
C =	0.62	
Obvert =	288.48	m



Orifice 1 (Square)

Invert =	287.00	m
Width=	0.180	m
C =	0.62	
Obvert =	287.11	m
Height =	0.110	m
Channel Width, b =	3.0	m



SWM Facility E1
CONTROL STRUCTURE SUMMARY

Acorn South
Project Number: 2435
Date: April 2026
Designer Initials: S.B.

Starting Water Level (m) = 287.00
Elevation Increment (m) = 0.02

Shading represents Storage-Discharge pairings used in VO modelling

Upstream Elevation (m)	Orifice 1 Outflow (cms)	Orifice 2 Outflow (cms)	Orifice 3 Outflow (cms)	Backwater Elevation (m)	Stage (m)	Total Flow (cms)	Storage (m^3)	Detention Time (hrs)	12-Hour AES	6-Hour AES
287.00	0.000	0.000	0.000	0.00	287.00	0.000	0	0.0	Orifice 1 Elevation = 287.00 m	
287.02	0.000	0.000	0.001	0.00	287.02	0.001	102	0.0		
287.04	0.000	0.000	0.003	0.00	287.04	0.003	204	0.0		
287.06	0.000	0.000	0.005	0.00	287.06	0.005	308	7.9		
287.08	0.000	0.000	0.007	0.00	287.08	0.007	412	12.9		
287.10	0.000	0.000	0.010	0.00	287.10	0.010	518	16.5		
287.12	0.000	0.000	0.014	0.00	287.12	0.014	624	19.0		
287.14	0.000	0.000	0.016	0.00	287.14	0.016	732	21.0		
287.16	0.000	0.000	0.018	0.00	287.16	0.018	840	22.8		
287.18	0.000	0.000	0.019	0.00	287.18	0.019	950	24.4		
287.20	0.000	0.000	0.021	0.00	287.20	0.021	1060	26.0		
287.22	0.000	0.000	0.022	0.00	287.22	0.022	1171	27.4		
287.24	0.000	0.000	0.023	0.00	287.24	0.023	1284	28.8		
287.26	0.000	0.000	0.025	0.00	287.26	0.025	1397	30.1		
287.28	0.000	0.000	0.026	0.00	287.28	0.026	1511	31.4		
287.30	0.000	0.000	0.027	0.00	287.30	0.027	1627	32.6		
287.32	0.000	0.000	0.028	0.00	287.32	0.028	1743	33.7		
287.34	0.000	0.000	0.029	0.00	287.34	0.029	1860	34.9		
287.36	0.000	0.000	0.030	0.00	287.36	0.030	1978	36.0		
287.38	0.000	0.000	0.031	0.00	287.38	0.031	2097	37.1		
287.40	0.000	0.000	0.032	0.00	287.40	0.032	2218	38.1		
287.42	0.000	0.000	0.033	0.00	287.42	0.033	2339	39.2		
287.44	0.000	0.000	0.034	0.00	287.44	0.034	2461	40.2		
287.46	0.000	0.000	0.035	0.00	287.46	0.035	2583	41.2		
287.48	0.000	0.000	0.035	0.00	287.48	0.035	2707	42.2		
287.50	0.000	0.000	0.036	0.00	287.50	0.036	2830	43.1		
287.52	0.000	0.000	0.037	0.00	287.52	0.037	2955	44.1		
287.54	0.000	0.000	0.038	0.00	287.54	0.038	3080	45.0		
287.56	0.000	0.000	0.039	0.00	287.56	0.039	3205	45.9		
287.58	0.000	0.000	0.039	0.00	287.58	0.039	3332	46.8		
287.60	0.000	0.000	0.040	0.00	287.60	0.040	3458	47.7		
287.62	0.000	0.000	0.041	0.00	287.62	0.041	3586	48.6		
287.64	0.000	0.000	0.042	0.00	287.64	0.042	3713	49.4		
287.66	0.000	0.000	0.042	0.00	287.66	0.042	3842	50.3		
287.68	0.000	0.000	0.043	0.00	287.68	0.043	3971	51.1	Ext. Det. Volume	
287.70	0.000	0.000	0.044	0.00	287.70	0.044	4101	52.0		
287.72	0.000	0.000	0.044	0.00	287.72	0.044	4231	52.8		
287.74	0.000	0.000	0.045	0.00	287.74	0.045	4362	53.6	Orifice 2 Elevation = 287.75 m	
287.76	0.000	0.000	0.046	0.00	287.76	0.046	4493	54.4		
287.78	0.001	0.000	0.046	0.00	287.78	0.047	4625	55.2		
287.80	0.002	0.000	0.047	0.00	287.80	0.049	4758	55.9		
287.82	0.005	0.000	0.048	0.00	287.82	0.052	4891	56.7		
287.84	0.007	0.000	0.048	0.00	287.84	0.056	5024	57.4		
287.86	0.011	0.000	0.049	0.00	287.86	0.059	5159	58.0		2 Year
287.88	0.014	0.000	0.049	0.00	287.88	0.064	5294	58.6		
287.90	0.021	0.000	0.050	0.00	287.90	0.071	5429	59.2		
287.92	0.026	0.000	0.051	0.00	287.92	0.077	5565	59.7		
287.94	0.030	0.000	0.051	0.00	287.94	0.082	5702	60.2		
287.96	0.034	0.000	0.052	0.00	287.96	0.086	5839	60.6	2 Year	
287.98	0.037	0.000	0.052	0.00	287.98	0.090	5977	61.1		
288.00	0.040	0.000	0.053	0.00	288.00	0.093	6115	61.5		

SWM Facility E1
CONTROL STRUCTURE SUMMARY

Acorn South
Project Number: 2435
Date: April 2026
Designer Initials: S.B.

Starting Water Level (m) = 287.00
Elevation Increment (m) = 0.02

Shading represents Storage-Discharge pairings used in VO modelling

Upstream Elevation (m)	Orifice 1 Outflow (cms)	Orifice 2 Outflow (cms)	Orifice 3 Outflow (cms)	Backwater Elevation (m)	Stage (m)	Total Flow (cms)	Storage (m^3)	Detention Time (hrs)	12-Hour AES	6-Hour AES
288.02	0.043	0.000	0.053	0.00	288.02	0.097	6254	61.9		
288.04	0.046	0.000	0.054	0.00	288.04	0.100	6394	62.3		
288.06	0.049	0.000	0.055	0.00	288.06	0.103	6534	62.7		
288.08	0.051	0.000	0.055	0.00	288.08	0.106	6674	63.0		
288.10	0.053	0.000	0.056	0.00	288.10	0.109	6816	63.4		
288.12	0.055	0.000	0.056	0.00	288.12	0.112	6957	63.8		5 Year
288.14	0.058	0.000	0.057	0.00	288.14	0.114	7100	64.1		
288.16	0.060	0.000	0.057	0.00	288.16	0.117	7243	64.5		
288.18	0.062	0.000	0.058	0.00	288.18	0.119	7386	64.8	5 Year	
288.20	0.063	0.000	0.058	0.00	288.20	0.122	7530	65.1	Orifice 3 Elevation = 288.20 m	
288.22	0.065	0.000	0.059	0.00	288.22	0.124	7675	65.5		
288.24	0.067	0.002	0.059	0.00	288.24	0.128	7820	65.8		
288.26	0.069	0.004	0.060	0.00	288.26	0.132	7966	66.1		
288.28	0.071	0.007	0.060	0.00	288.28	0.138	8113	66.4		10 Year
288.30	0.072	0.010	0.061	0.00	288.30	0.143	8260	66.7		
288.32	0.074	0.014	0.061	0.00	288.32	0.149	8407	67.0	10 Year	
288.34	0.075	0.014	0.062	0.00	288.34	0.152	8555	67.2		
288.36	0.077	0.024	0.062	0.00	288.36	0.163	8704	67.5		
288.38	0.079	0.034	0.063	0.00	288.38	0.175	8853	67.7		
288.40	0.080	0.041	0.063	0.00	288.40	0.185	9003	68.0		
288.42	0.082	0.048	0.064	0.00	288.42	0.193	9154	68.2		
288.44	0.083	0.053	0.064	0.00	288.44	0.200	9305	68.4		
288.46	0.084	0.059	0.064	0.00	288.46	0.207	9456	68.6		
288.48	0.086	0.063	0.065	0.00	288.48	0.214	9608	68.8		25 Year
288.50	0.087	0.068	0.065	0.00	288.50	0.220	9761	69.0	25 Year	
288.52	0.089	0.072	0.066	0.00	288.52	0.226	9914	69.2		
288.54	0.090	0.076	0.066	0.00	288.54	0.232	10068	69.4		
288.56	0.091	0.079	0.067	0.00	288.56	0.237	10223	69.6		
288.58	0.092	0.083	0.067	0.00	288.58	0.242	10378	69.8		
288.60	0.094	0.086	0.068	0.00	288.60	0.248	10533	69.9		
288.62	0.095	0.089	0.068	0.00	288.62	0.253	10689	70.1	50 Year	50 Year
288.64	0.096	0.093	0.068	0.00	288.64	0.257	10846	70.3		
288.66	0.098	0.096	0.069	0.00	288.66	0.262	11003	70.4		
288.68	0.099	0.099	0.069	0.00	288.68	0.267	11161	70.6		
288.70	0.100	0.101	0.070	0.00	288.70	0.271	11320	70.8		
288.72	0.101	0.104	0.070	0.00	288.72	0.276	11479	70.9		
288.74	0.102	0.107	0.071	0.00	288.74	0.280	11638	71.1	100 Year	
288.76	0.103	0.110	0.071	0.00	288.76	0.284	11799	71.2		100 Year
288.78	0.105	0.112	0.071	0.00	288.78	0.288	11959	71.4		
288.80	0.106	0.115	0.072	0.00	288.80	0.292	12121	71.6		
288.82	0.107	0.117	0.072	0.00	288.82	0.296	12283	71.7		
288.84	0.108	0.120	0.073	0.00	288.84	0.300	12445	71.9		
288.86	0.109	0.122	0.073	0.00	288.86	0.304	12608	72.0		
288.88	0.110	0.124	0.073	0.00	288.88	0.308	12772	72.2		
288.90	0.111	0.127	0.074	0.00	288.90	0.312	12936	72.3		
288.92	0.112	0.129	0.074	0.00	288.92	0.315	13100	72.5		
288.94	0.113	0.131	0.075	0.00	288.94	0.319	13266	72.6		
288.96	0.114	0.133	0.075	0.00	288.96	0.323	13432	72.7		
288.98	0.115	0.135	0.075	0.00	288.98	0.326	13598	72.9		
289.00	0.116	0.137	0.076	0.00	289.00	0.330	13765	73.0	Top of Facility (289.00)	

FOREBAY SIZING CALCULATIONS

Forebay

Elevation (m)	Area (m^2)	Average Area (m^2)	Height (m)	Volume (m^3)	Cumulative Volume (m^3)	Depth (m)
285	147				0	0
		364	0.5	182		
285.5	581				182	0.5
		692	0.5	346		
286	803				528	1
		945	0.57	538		
286.57	1086				1,066	1.57
		1286	0.43	553		
287	1486				1,619	2

Total Permanent Pool

Elevation (m)	Area (m^2)	Average Area (m^2)	Height (m)	Volume (m^3)	Cumulative Volume (m^3)	Depth (m)
285	1052				0	0
		1403	0.5	702		
285.5	1754				702	0.5
		2020	0.5	1,010		
286	2285				1,711	1
		2625	0.57	1,496		
286.57	2965				3,207	1.57
		4011	0.43	1,725		
287	5057				4,932	2

Minimum Criteria (per MECP guidelines)

Forebay area is **29** % of total Permanent Pool area
Maximum Forebay area is **33** % of total Permanent Pool area
Therefore the minimum criteria per MECP guidelines is satisfied.

2. Forebay Settling Length

Dist = (r x Q_p / V_s)$^{0.5}$

Dist = (2.11 * 0.04 / 0.0003)^0.5

Dist = 16.8

where:
Dist = forebay length (m)
r = length to width ratio
= 2.11
Q_p = peak flow rate from pond during design quality storm (m^3/s) (Refer to VO model output)
= 0.040
V_s = settling velocity (m/s)*
= 0.0003

Minimum forebay length is (m)	**16.8**
Actual forebay length is (m)	**55.9**
	CRITERIA SATISFIED

3. Forebay Dispersion Length

Dist = (8 x Q) / (d x V_f)

Dist = (8 * 2.568) / (2 * 0.5)

Dist = 20.5

where:
Dist = forebay length (m)
Q = inlet flow rate (m^3/s) (5-year inflow) (Per storm design sheet in this appendix)
= 2.57
d = depth of permanent pool in forebay (m)
= 2
V_f = desired velocity in forebay (m/s)*
0.5

Minimum forebay length is (m)	**20.5**
Actual forebay length is (m)	**55.9**
	CRITERIA SATISFIED

4. Minimum Forebay Bottom Width

Width = Dist / 8

Width = 20.5 / 8

Width = 2.6

where:
Width = minimum forebay bottom width (m)
Dist = minimum forebay length (m)
= 20.5

Minimum bottom width is (m)	**2.6**
Actual bottom width is (m)	**12.0**
	CRITERIA SATISFIED

5. Maximum Velocity Check

V = Q/A

V = 1.56 / 40.77

V = 0.04

where:
V = velocity (m/s)
Q = inlet flow rate (m3/s) - 25mm 4 hr Chicago (Refer to VO model output)
= 1.56
A = average cross-sectional area of entire forebay (m^2) (see **Page 3**)
= 40.8

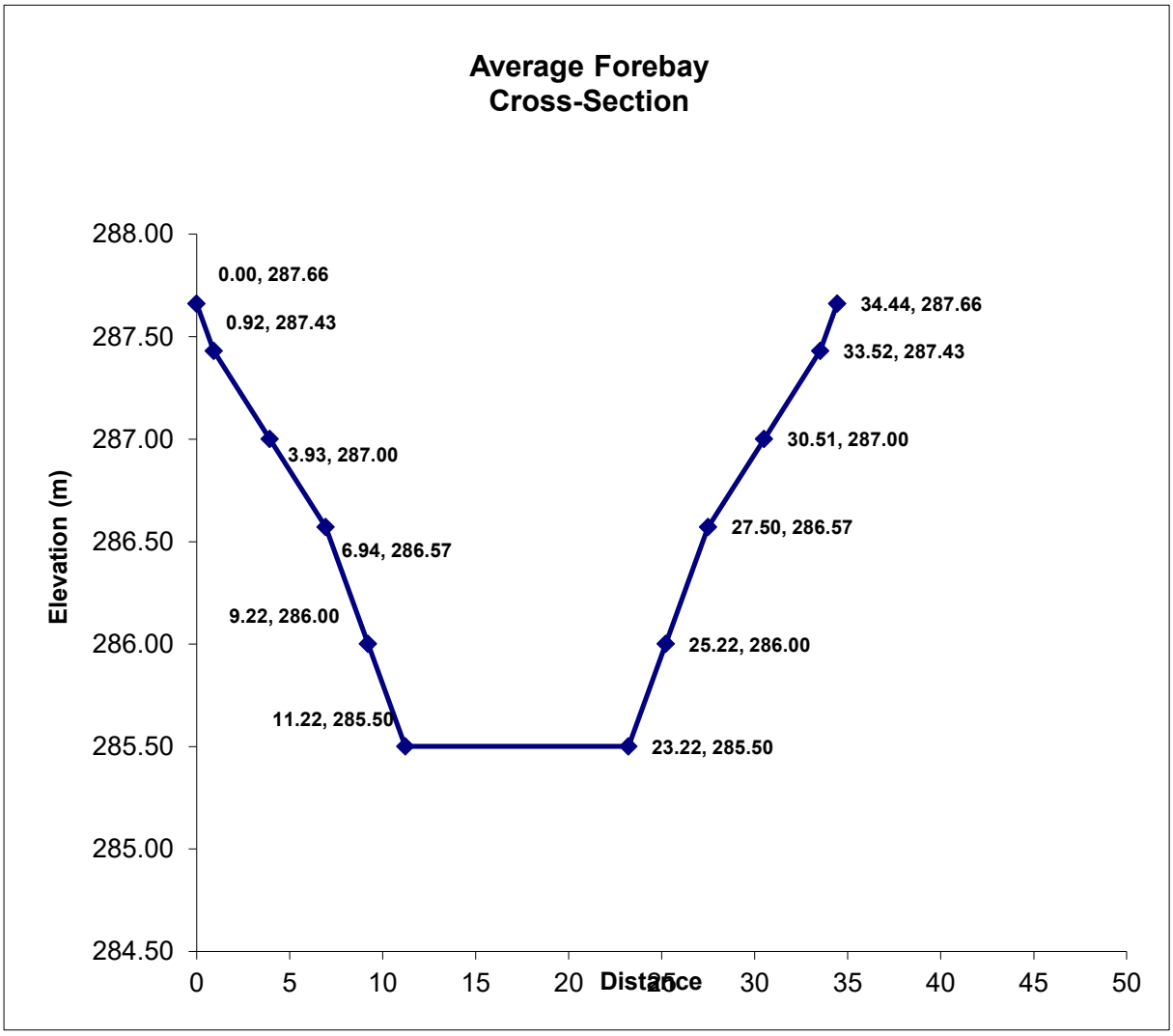
Maximum velocity permitted is (m/s)	**0.15**
Actual velocity is (m/s)	**0.04**
	CRITERIA SATISFIED

*Value recommended by the MECP Stormwater Management Planning & Design Manual

FOREBAY SIZING CALCULATIONS

Distance (m)	Elevation (m)	Depth (m)	Incremental Area (m^2)
0.00	287.66	0.00	--
0.92	287.43	0.23	0.11
3.93	287.00	0.66	1.34
6.94	286.57	1.09	2.63
9.22	286.00	1.66	3.14
11.22	285.50	2.16	3.82
23.22	285.50	2.16	25.92
25.22	286.00	1.66	3.82
27.50	286.57	1.09	3.14
30.51	287.00	0.66	2.63
33.52	287.43	0.23	1.34
34.44	287.66	0.00	0.11

Area (m^2) = 40.77



Please refer to Overland Flow Drainage Plan (Figure E.1) in this appendix

Catchment A

Land Use	Total Area	5 Year Runoff Coefficient	100 Year Runoff Coefficient	Weighted 5 Year Runoff Coefficient	Weighted 100 Year Runoff Coefficient
	(ha)	(-)	(-)	(-)	(-)
Stacked Townhouses (SKTH)	0.32	0.83	1.00	0.16	0.19
Rear Lot Townhouses (RLTH)	0.13	0.83	1.00	0.06	0.08
Apartments	0.64	0.85	1.00	0.33	0.39
20.0m ROW	0.36	0.72	0.90	0.16	0.20
Laneways	0.20	0.90	1.00	0.11	0.12
Total	**1.65**			**0.82**	**0.98**

Catchment B

Land Use	Total Area	5 Year Runoff Coefficient	100 Year Runoff Coefficient	Weighted 5 Year Runoff Coefficient	Weighted 100 Year Runoff Coefficient
	(ha)	(-)	(-)	(-)	(-)
Open Space/ NHS	0.04	0.00	0.00	0.00	0.00
Parks	0.53	0.25	0.31	0.11	0.13
On Street Townhouses (OSTH)	0.15	0.73	0.91	0.09	0.11
20.0m ROW	0.52	0.72	0.90	0.30	0.38
Total	**1.24**			**0.50**	**0.62**

Catchment C

Land Use	Total Area	5 Year Runoff Coefficient	100 Year Runoff Coefficient	Weighted 5 Year Runoff Coefficient	Weighted 100 Year Runoff Coefficient
	(ha)	(-)	(-)	(-)	(-)
Parks	0.73	0.25	0.31	0.14	0.17
Rear Lot Townhouses (RLTH)	0.21	0.83	1.00	0.13	0.16
20.0m ROW	0.38	0.72	0.90	0.21	0.26
Total	**1.31**			**0.48**	**0.59**

Catchment D

Land Use	Total Area	5 Year Runoff Coefficient	100 Year Runoff Coefficient	Weighted 5 Year Runoff Coefficient	Weighted 100 Year Runoff Coefficient
	(ha)	(-)	(-)	(-)	(-)
33.0m ROW	3.72	0.63	0.79	0.63	0.79
Total	**3.72**			**0.63**	**0.79**

Catchment E

Land Use	Total Area	5 Year Runoff Coefficient	100 Year Runoff Coefficient	Weighted 5 Year Runoff Coefficient	Weighted 100 Year Runoff Coefficient
	(ha)	(-)	(-)	(-)	(-)
Rear Lot Townhouses (RLTH)	0.72	0.83	1.00	0.20	0.24
Back to Back Townhouses (B2B)	0.62	0.83	1.00	0.17	0.20
Apartments	1.09	0.85	1.00	0.30	0.36
Laneways	0.62	0.90	1.00	0.18	0.20
Total	**3.04**			**0.85**	**1.00**

Catchment F

Land Use	Total Area	5 Year Runoff Coefficient	100 Year Runoff Coefficient	Weighted 5 Year Runoff Coefficient	Weighted 100 Year Runoff Coefficient
	(ha)	(-)	(-)	(-)	(-)
Rear Lot Townhouses (RLTH)	1.33	0.83	1.00	0.30	0.37
Back to Back Townhouses (B2B)	0.63	0.83	1.00	0.15	0.17
Apartments	0.77	0.85	1.00	0.18	0.21
Open Space/ NHS	0.02	0.00	0.00	0.00	0.00
Laneways	0.88	0.90	1.00	0.22	0.24
Total	**3.63**			**0.85**	**0.99**

Catchment G

Land Use	Total Area	5 Year Runoff Coefficient	100 Year Runoff Coefficient	Weighted 5 Year Runoff Coefficient	Weighted 100 Year Runoff Coefficient
	(ha)	(-)	(-)	(-)	(-)
Stacked Townhouses (SKTH)	0.60	0.83	1.00	0.19	0.23
Rear Lot Townhouses (RLTH)	0.14	0.83	1.00	0.04	0.05
Back to Back Townhouses	1.19	0.83	1.00	0.37	0.45
Laneways	0.72	0.90	1.00	0.25	0.27
Total	**2.65**			**0.85**	**1.00**

Catchment H

Land Use	Total Area	5 Year Runoff Coefficient	100 Year Runoff Coefficient	Weighted 5 Year Runoff Coefficient	Weighted 100 Year Runoff Coefficient
	(ha)	(-)	(-)	(-)	(-)
Rear Lot Townhouses (RLTH)	0.34	0.83	1.00	0.30	0.36
20.0m ROW	0.60	0.72	0.90	0.46	0.57
Total	**0.94**			**0.76**	**0.94**

Catchment I

Land Use	Total Area	5 Year Runoff Coefficient	100 Year Runoff Coefficient	Weighted 5 Year Runoff Coefficient	Weighted 100 Year Runoff Coefficient
	(ha)	(-)	(-)	(-)	(-)
School	2.17	0.75	0.94	0.75	0.94
Total	**2.17**			**0.75**	**0.94**

Catchment J

Land Use	Total Area	5 Year Runoff Coefficient	100 Year Runoff Coefficient	Weighted 5 Year Runoff Coefficient	Weighted 100 Year Runoff Coefficient
	(ha)	(-)	(-)	(-)	(-)
On Street Townhouses (OSTH)	0.17	0.73	0.91	0.29	0.36
Rear Lot Townhouses (RLTH)	0.16	0.83	1.00	0.30	0.36
Open Space/ NHS	0.02	0.83	1.00	0.04	0.05
Laneways	0.08	0.90	1.00	0.17	0.19
Total	**0.44**			**0.79**	**0.95**

Catchment K

Land Use	Total Area	5 Year Runoff Coefficient	100 Year Runoff Coefficient	Weighted 5 Year Runoff Coefficient	Weighted 100 Year Runoff Coefficient
	(ha)	(-)	(-)	(-)	(-)
20.0m ROW	0.32	0.72	0.90	0.72	0.90
Total	**0.32**			**0.72**	**0.90**

Required 20.0m Right-of-Way Capacity
Critical Location 1

Acorn North, Northcape, Acorn South
Project Number: 2076
Date: April 2026
Designer Initials: S.B.

Town of Stouffville 5 Year (Rational Method)	
Area (ha) =	4.20
Runoff Coeff. =	0.62
T_c (min) =	15.00
a=	**1015.963**
b=	**5.255**
c=	**0.826**
Intensity (mm/hr) =	84.66
Runoff (m^3/s)=	**0.61**

(Assumes initial Tc of 10 minutes and 600m flowing at 2 m/s)

5 Year Catchments			
Subcatchment	**Area (ha)**	**Runoff Coefficient**	**Weighted Runoff Coefficient**
A	1.65	0.82	0.32
B	1.24	0.50	0.15
C	1.31	0.48	0.15
	4.20		0.62

Town of Stouffville 100 Year (Rational Method)	
Area (ha) =	4.20
Runoff Coeff. =	0.75
T_c (min) =	15.00
a=	**2051.707**
b=	**6.230**
c=	**0.860**
Intensity (mm/hr) =	148.23
Runoff (m^3/s)=	**1.30**

(Assumes initial Tc of 10 minutes and 600m flowing at 2 m/s)

100 Year Catchments			
Subcatchment	**Area (ha)**	**Runoff Coefficient**	**Weighted Runoff Coefficient**
A	1.65	0.98	0.38
B	1.24	0.62	0.18
C	1.31	0.59	0.18
	4.20		0.75

Required Flow Capacity:

$Q_{100yr} - Q_{5y} =$ **0.69 m^3/s**

Maximum available overland flow (with 0.3m maximum flow depth above the gutter) in 20.0m ROW at 0.5% road slope with 2% boulevards = 2.01 m^3/s.

Therefore, the 20.0m ROW has the capacity to convey the required 100-5 year flows at Critical Location 1

Required 20.0m Right-of-Way Capacity
Critical Location 2

Acorn North, Northcape, Acorn South
Project Number: 2076
Date: April 2026
Designer Initials: S.B.

Town of Stouffville 5 Year (Rational Method)	
Area (ha) =	10.26
Runoff Coeff. =	0.84
T_c (min) =	15.18
a=	**1015.963**
b=	**5.255**
c=	**0.826**
Intensity (mm/hr) =	84.06
Runoff (m^3/s)=	**2.01**

(Assumes initial Tc of 10 minutes and 621m flowing at 2 m/s)

5 Year Catchments			
Subcatchment	**Area (ha)**	**Runoff Coefficient**	**Weighted Runoff Coefficient**
E	3.04	0.85	0.25
F	3.63	0.85	0.30
G	2.65	0.85	0.22
H	0.94	0.76	0.07
	10.26		0.84

Town of Stouffville 100 Year (Rational Method)	
Area (ha) =	10.26
Runoff Coeff. =	0.99
T_c (min) =	15.18
a=	**2051.707**
b=	**6.230**
c=	**0.860**
Intensity (mm/hr) =	147.19
Runoff (m^3/s)=	**4.16**

(Assumes initial Tc of 10 minutes and 621m flowing at 2 m/s)

100 Year Catchments			
Subcatchment	**Area (ha)**	**Runoff Coefficient**	**Weighted Runoff Coefficient**
E	3.04	1.00	0.30
F	3.63	0.99	0.35
G	2.65	1.00	0.26
H	0.94	0.94	0.09
	10.26		0.99

Required Flow Capacity:

$Q_{100yr} - Q_{5y} =$ **2.15 m^3/s**

Maximum available overland flow in 20.0m ROW at 0.5% road slope with 5% boulevards = 2.54 m^3/s.
Therefore, the 20.0m ROW has the capacity to convey the required 100-5 year flows at Critical Location 2

Required 20.0m Right-of-Way Capacity
Critical Location 2

Acorn North, Northcape, Acorn South
Project Number: 2076
Date: April 2026
Designer Initials: S.B.

Town of Stouffville 5 Year (Rational Method)	
Area (ha) =	10.26
Runoff Coeff. =	0.84
T_c (min) =	15.18
a=	**1015.963**
b=	**5.255**
c=	**0.826**
Intensity (mm/hr) =	84.06
Runoff (m^3/s)=	**2.01**

(Assumes initial Tc of 10 minutes and 621m flowing at 2 m/s)

5 Year Catchments			
Subcatchment	**Area (ha)**	**Runoff Coefficient**	**Weighted Runoff Coefficient**
E	3.04	0.85	0.25
F	3.63	0.85	0.30
G	2.65	0.85	0.22
H	0.94	0.76	0.07
	10.26		0.84

Town of Stouffville 10 Year (Rational Method)	
Area (ha) =	10.26
Runoff Coeff. =	0.84
T_c (min) =	15.18
a=	**1279.709**
b=	**5.715**
c=	**0.841**
Intensity (mm/hr) =	99.32
Runoff (m^3/s)=	**2.38**

(Assumes initial Tc of 10 minutes and 621m flowing at 2 m/s)

10 Year Catchments			
Subcatchment	**Area (ha)**	**Runoff Coefficient**	**Weighted Runoff Coefficient**
E	3.04	0.85	0.25
F	3.63	0.85	0.30
G	2.65	0.85	0.22
H	0.94	0.76	0.07
	10.26		0.84

Required Flow Capacity:

$Q_{10yr} - Q_{5y} =$ **0.37 m^3/s**

Maximum available overland flow in 20.0m ROW at 0.5% road slope with 5% boulevards = 2.54 m^3/s.
Therefore, the 20.0m ROW has the capacity to convey the required 10-5 year flows at Critical Location 2

5 MM RETENTION SUMMARY

Acorn South, Northcape, Acorn North
Project Number: 2076
Date: March 2026
Designer Initials: S.B.

Post Development Conditions

Landowner	Total Developable Area (ha)	Imperviousness (%)	Total Water Retention Target Volume (m^3)
Acorn North	4.88	79.1%	193.2
Northcape	4.82	80.7%	194.4
Acorn South	6.92	76.5%	264.8
Total	**16.62**	**79%**	**652.4**

5 MM RETENTION (ACORN NORTH)

Acorn South, Northcape, Acorn North
Project Number: 2076
Date: March 2026
Designer Initials: S.B.

Post Development Conditions

Land Use Areas	Area (ha)	Imperviousness (%)	Impervious Area (ha)	Target Water Retention (mm)	Water Retention Target Volume (m^3)
	(1)			(2)	(3) = (2)x(1)x10 m3/ha-mm
Parks	0.51	15%	0.08	5	3.9
Stacked Townhouses (SKTH)	0.13	90%	0.12	5	5.8
Rear Lot Townhouses (RLTH)	0.91	90%	0.82	5	41.1
Back to Back Townhouses (B2B)	0.62	90%	0.56	5	27.8
Apartments (Mixed Use and Residential)	1.23	93%	1.14	5	57.0
8.5m Laneway	0.67	100%	0.67	5	33.5
20m ROW	0.81	60%	0.48	5	24.2
Total	**4.88**		**3.86**		**193.2**

5 MM RETENTION (NORTHCAPE)

Acorn South, Northcape, Acorn North
Project Number: 2076
Date: March 2026
Designer Initials: S.B.

Post Development Conditions

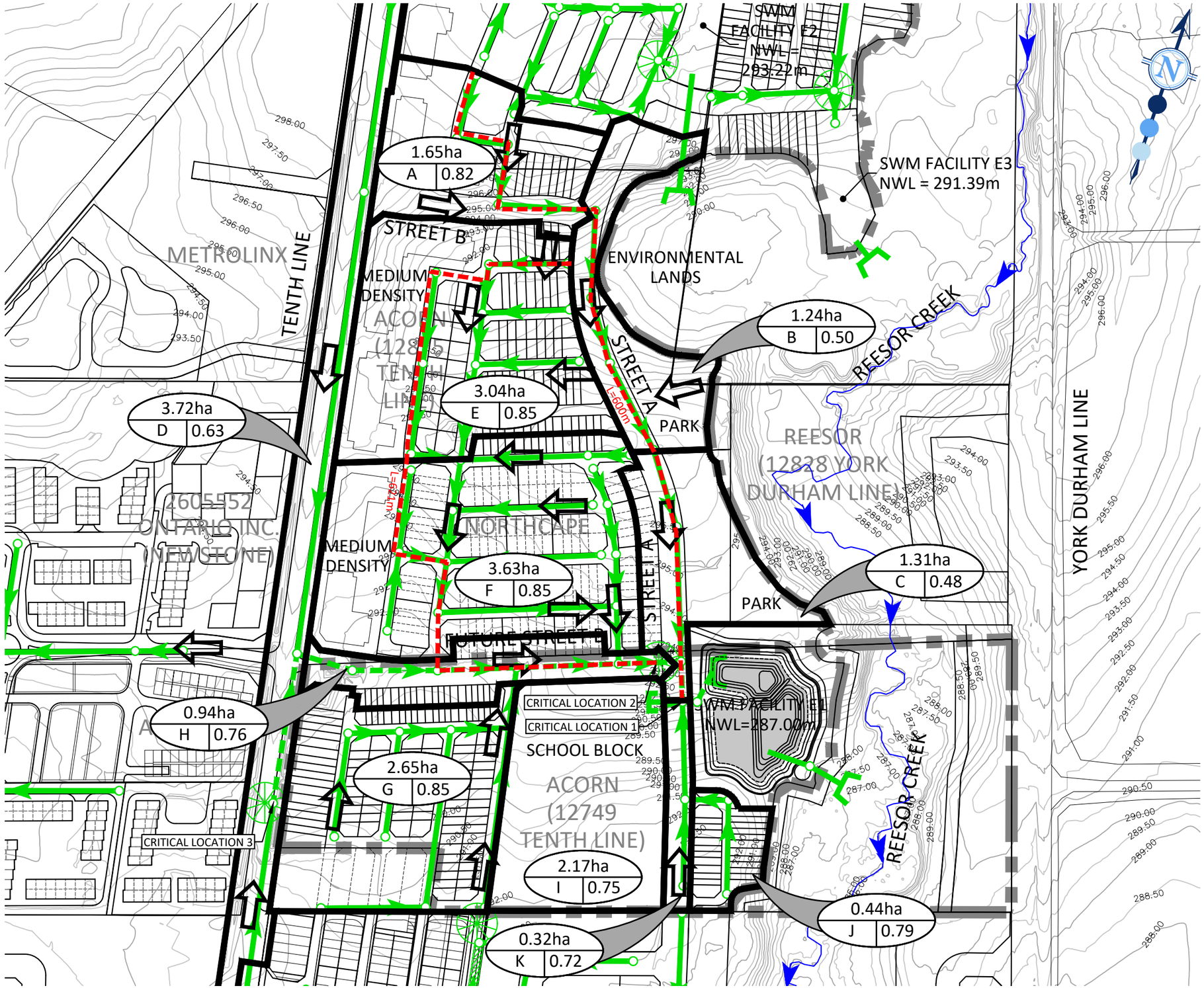
Land Use Areas	Area (ha)	Imperviousness (%)	Impervious Area (ha)	Target Water Retention (mm)	Water Retention Target Volume (m^3)
	(1)			(2)	(3) = (2)x(1)x10 m3/ha-mm
Parks	0.46	15%	0.07	5	3.5
Rear Lot Townhouses (RLTH)	1.54	90%	1.39	5	69.4
Back to Back Townhouses (B2B)	0.63	90%	0.57	5	28.5
Apartments (Mixed Use and Residential)	0.77	93%	0.71	5	35.5
8.5m Laneway	0.84	100%	0.84	5	42.2
20.0m ROW	0.36	60%	0.22	5	10.8
Open Space/ Environmental Area	0.02	0%	0.00	5	0.0
SWM Block	0.18	50%	0.09	5	4.5
Total	**4.82**		**3.89**		**194.4**

5 MM RETENTION (ACORN SOUTH)

Acorn South, Northcape, Acorn North
Project Number: 2076
Date: March 2026
Designer Initials: S.B.

Post Development Conditions

Land Use Areas	Area (ha)	Imperviousness (%)	Impervious Area (ha)	Target Water Retention (mm)	Water Retention Target Volume (m^3)
	(1)			(2)	(3) = (2)x(1)x10 m3/ha-mm
Stacked Townhouses (SKTH)	0.43	90%	0.39	5	19.3
On Street Townhouses (OSTH)	0.17	75%	0.13	5	6.5
Rear Lot Townhouses (RLTH)	0.47	90%	0.42	5	20.9
Back to Back Townhouses (B2B)	0.90	90%	0.81	5	40.4
8.5m Laneway	0.67	100%	0.67	5	33.6
School Block	2.17	80%	1.74	5	86.8
20.0m ROW	0.93	60%	0.56	5	27.8
SWM Block	1.18	50%	0.59	5	29.5
Total	**6.92**		**5.30**		**264.8**



LEGEND:

- LIMIT OF ACORN SOUTH PROPERTY
- LIMIT OF DEVELOPMENT
- 270.25 — EXISTING CONTOUR AND ELEVATION
- STORM DRAINAGE BOUNDARY
- L=457m — TIME TO PEAK FLOW PATH AND LENGTH
- 100 YEAR CAPTURE LOCATION
- 1.65ha / C 0.80 — DRAINAGE AREA (HECTARES); RUNOFF COEFFICIENT; CATCHMENT ID
- MAJOR SYSTEM - OVERLAND FLOW
- STORM SEWER AND MAINTENANCE HOLE
- 100 YEAR STORM SEWER AND MAINTENANCE HOLE

*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

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FSSR

ACORN SOUTH - TENTH LINE, STOUFFVILLE

OVERLAND FLOW DRAINAGE PLAN

DESIGNED BY:	S.B.	CHECKED BY:	N.D.M
SCALE:	1:3000	DATE:	MAY 2026
PROJECT No:	2435	FIGURE No:	E.1

5-Year Storm Design
Acorn North, Northcape, Acorn South

Town of Whitchurch-Stouffville

Rainfall Intensity (i) = $\frac{A}{(T_c+B)^c}$

A= 1015.963
B= 5.255
c= 0.826

Starting T_c (min)= 10

Project: Acorn North, Northcape, Acorn South
Project No. 2076
Date: 1-Mar-26
Designed By: S.B.
Reviewed By: N.D.M.

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LOCATION			5 YEAR						TOTAL FLOW	PIPE DATA							
STREET	MAINTENANCE HOLE FROM	MAINTENANCE HOLE TO	5-YEAR AREA (ha)	RUNOFF COEFF. (R)	"AR"	ACCUM. "AR"	RAINFALL INTENSITY (mm/hr)	ACCUM. FLOW (m3/s)	TOTAL (Qdes) (m3/s)	LENGTH (m)	SLOPE (%)	PIPE DIAMETER (mm)	FULL FLOW CAPACITY (m3/s)	FULL FLOW VELOCITY (m/s)	TIME OF CONC. (min)	ACCUM. TIME OF CONC. (min)	CAPACITY (% FULL) Qdes/Qcap
Catchment A	A	B	1.65	0.82	1.35	1.35	107.00	0.402	0.402	211.0	0.50	675	0.594	1.661	2.12	12.12	68%
Catchment B	B	C	1.24	0.50	0.62	1.97	96.11	0.527	0.527	192.0	0.50	750	0.787	1.782	1.80	13.91	67%
Catchment C	C	MH North of Capture Point	1.31	0.48	0.63	2.60	88.61	0.640	0.640	164.0	0.50	825	1.014	1.899	1.44	15.35	63%
Catchment D	D	H	3.72	0.63	2.34	2.34	79.90	0.520	0.520	223.0	0.30	1050	1.495	1.727	2.15	18.62	35%
Catchment E	E	F	3.04	0.85	2.58	2.58	107.00	0.768	0.768	160.0	0.50	825	1.014	1.899	1.40	11.40	76%
Catchment F	F	H	3.63	0.85	3.09	5.67	99.49	1.567	1.567	154.0	0.50	1050	1.930	2.230	1.15	12.56	81%
Catchment G	G	H	2.65	0.85	2.25	2.25	107.00	0.669	0.669	298.0	0.50	825	1.014	1.899	2.62	12.62	66%
Catchment H	H	Capture Point	0.94	0.76	0.71	10.98	73.90	2.254	2.254	185.0	0.30	1500	3.870	2.191	1.41	20.03	58%
Catchment I	I	SWMF E1 Inlet	2.17	0.75	1.63	1.63	107.00	0.484	0.484	22.0	0.50	675	0.594	1.661	0.22	10.22	81%
Catchment J	J	K	0.44	0.79	0.35	0.35	107.00	0.103	0.103	22.0	0.50	450	0.201	1.268	0.29	10.29	51%
Catchment K	K	SWMF E1 Inlet	0.32	0.75	0.24	0.59	105.35	0.172	0.172	127.0	0.50	450	0.201	1.268	1.67	11.96	85%
Capture Point to SWMF E1 Inlet	Capture Point	SWMF E1 Inlet	0.00	0.00	0.00	10.98	70.49	2.150	2.150	30.0	0.30	2100	9.492	2.742	0.18	20.21	23%
SWM Facility E1 Forebay	SWMF E1 Inlet	SWMF E1 FB	0.00	0.00	0.00	13.20	70.07	2.568	2.568	32.0	0.30	2100	9.492	2.742	0.19	20.41	27%

10-Year Storm Design
Acorn North, Northcape, Acorn South

Town of Whitchurch-Stouffville

Rainfall Intensity (i) = $\frac{A}{(T_c+B)^c}$

Starting T_c (min)= 10

A= 1279.709
B= 5.715
c= 0.841

NOTES:
-Initial time of concentration from Catchment D to Catchment H (16.47 minutes) based on time of concentration calculated in ROW capacity calculation for Critical Location 3 on Tenth Line.
-CB flows entered to replicate 5 year flows through storm sewer.
-A 2400mm x 1500mm diameter box culvert is proposed to convey flows from the 100 year capture point at the Future Street B / Street A intersection to the SWMF E1 forebay. A 2100mm diameter pipe has been used to replicate the same waterway area as the proposed box culvert.
- External flow at Capture Point to SWMF E1 Inlet per 10-year ROW capacity calculation in this appendix

Project: Acorn North, Northcape, Acorn South
Project No. 2076
Date: 16-Mar-26
Designed By: S.B.
Reviewed By: N.D.M.

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LOCATION			10 YEAR						CB FLOW			EXTERNAL FLOWS				TOTAL FLOW	PIPE DATA							
STREET	MANHOLE FROM	MANHOLE TO	100-YEAR AREA (ha)	RUNOFF COEFF. "R"	"AR"	ACCUM. "AR"	RAINFALL INTENSITY (mm/hr)	ACCUM. FLOW (m3/s)	CB's (#)	FLOW (m3/s)	ACCUM. CB FLOW (m3/s)	AREA (ha)	FLOW RATE (l/s/ha)	EXT. FLOW (m3/s)	ACCUM. EXT. FLOW (m3/s)	TOTAL (Qdes) (m3/s)	LENGTH (m)	SLOPE (%)	PIPE DIAMETER (mm)	FULL FLOW CAPACITY (m3/s)	FULL FLOW VELOCITY (m/s)	TIME OF CONC. (min)	ACCUM. TIME OF CONC. (min)	CAPACITY (% FULL) Qdes/Qcap
Catchment A	A	B	0.000	0.000	0.000	0.000	126.19	0.000	11	0.402	0.402	0.000	0.000	0.000	0.000	0.402	211.0	0.50	675	0.594	1.661	2.12	12.12	68%
Catchment B	B	C	0.000	0.000	0.000	0.000	113.46	0.000	3	0.125	0.527	0.000	0.000	0.000	0.000	0.527	192.0	0.50	750	0.787	1.782	1.80	13.91	67%
Catchment C	C	MH North of Capture Point	0.000	0.000	0.000	0.000	104.66	0.000	3	0.113	0.640	0.000	0.000	0.000	0.000	0.640	164.0	0.50	825	1.014	1.899	1.44	15.35	63%
Catchment D	D	H	3.720	0.790	2.939	2.939	94.42	0.771	0	0.000	0.000	0.000	0.000	0.000	0.000	0.771	223.0	0.30	1050	1.495	1.727	2.15	18.62	52%
Catchment E	E	F	0.000	0.000	0.000	0.000	126.19	0.000	21	0.768	0.768	0.000	0.000	0.000	0.000	0.768	160.0	0.50	825	1.014	1.899	1.40	11.40	76%
Catchment F	F	H	0.000	0.000	0.000	0.000	117.42	0.000	22	0.799	1.567	0.000	0.000	0.000	0.000	1.567	154.0	0.50	1050	1.930	2.230	1.15	12.56	81%
Catchment G	G	H	0.000	0.000	0.000	0.000	126.19	0.000	18	0.669	0.669	0.000	0.000	0.000	0.000	0.669	298.0	0.50	825	1.014	1.899	2.62	12.62	66%
Catchment H	H	Capture Point	0.000	0.000	0.000	2.939	87.35	0.713	0	0.000	2.236	0.000	0.000	0.000	0.000	2.949	185.0	0.30	1500	3.870	2.191	1.41	20.03	76%
Catchment I	I	SWMF E1 Inlet	0.000	0.000	0.000	0.000	126.19	0.000	13	0.484	0.484	0.000	0.000	0.000	0.000	0.484	22.0	0.50	675	0.594	1.661	0.22	10.22	81%
Catchment J	J	K	0.000	0.000	0.000	0.000	126.19	0.000	3	0.103	0.103	0.000	0.000	0.000	0.000	0.103	22.0	0.50	450	0.201	1.268	0.29	10.29	51%
Catchment K	K	SWMF E1 Inlet	0.000	0.000	0.000	0.000	124.27	0.000	2	0.069	0.172	0.000	0.000	0.000	0.000	0.172	127.0	0.50	450	0.201	1.268	1.67	11.96	85%
Capture Point to SWMF E1 Inlet	Capture Point	SWMF E1 Inlet	0.000	0.000	0.000	2.939	83.32	0.680	0	0.000	2.236	1.000	366.000	0.366	0.366	3.282	30.0	0.30	2100	9.492	2.742	0.18	20.21	35%
SWM Facility E1 Forebay	SWMF E1 Inlet	SWMF E1 FB	0.000	0.000	0.000	2.939	82.82	2.568	0	0.000	2.892	0.000	0.000	0.000	0.366	5.826	32.0	0.30	2100	9.492	2.742	0.19	20.41	61%

100-Year Storm Design
Acorn North, Northcape, Acorn South

Town of Whitchurch-Stouffville

Rainfall Intensity (i) = $\frac{A}{(T_c+B)^c}$

Starting T_c (min)= 10

A= 2051.707
B= 6.23
c= 0.86

NOTES:
-Initial time of concentration from Catchment D to Catchment H (16.47 minutes) based on time of concentration calculated in ROW capacity calculation for Critical Location 3 on Tenth Line.
-CB flows entered to replicate 5 year flows through storm sewer.
-A 2400mm x 1500mm diameter box culvert is proposed to convey flows from the 100 year capture point at the Future Street B / Street A intersection to the SWMF E1 forebay. A 2100mm diameter pipe has been used to replicate the same waterway area as the proposed box culvert.
- External flow at Capture Point to SWMF E1 Inlet per 100-year ROW capacity calculation in this appendix

Project: Acorn North, Northcape, Acorn South
Project No. 2076
Date: 01-Mar-26
Designed By: S.B.
Reviewed By: N.D.M.

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LOCATION			100 YEAR						CB FLOW			EXTERNAL FLOWS				TOTAL FLOW	PIPE DATA							
STREET	MANHOLE FROM	MANHOLE TO	100-YEAR AREA (ha)	RUNOFF COEFF. "R"	"AR"	ACCUM. "AR"	RAINFALL INTENSITY (mm/hr)	ACCUM. FLOW (m3/s)	CB's (#)	FLOW (m3/s)	ACCUM. CB FLOW (m3/s)	AREA (ha)	FLOW RATE (l/s/ha)	EXT. FLOW (m3/s)	ACCUM. EXT. FLOW (m3/s)	TOTAL (Qdes) (m3/s)	LENGTH (m)	SLOPE (%)	PIPE DIAMETER (mm)	FULL FLOW CAPACITY (m3/s)	FULL FLOW VELOCITY (m/s)	TIME OF CONC. (min)	ACCUM. TIME OF CONC. (min)	CAPACITY (% FULL) Qdes/Qcap
Catchment A	A	B	0.000	0.000	0.000	0.000	186.74	0.000	11	0.402	0.402	0.000	0.000	0.000	0.000	0.402	211.0	0.50	675	0.594	1.661	2.12	12.12	68%
Catchment B	B	C	0.000	0.000	0.000	0.000	168.05	0.000	3	0.125	0.527	0.000	0.000	0.000	0.000	0.527	192.0	0.50	750	0.787	1.782	1.80	13.91	67%
Catchment C	C	MH North of Capture Point	0.000	0.000	0.000	0.000	155.08	0.000	3	0.113	0.640	0.000	0.000	0.000	0.000	0.640	164.0	0.50	825	1.014	1.899	1.44	15.35	63%
Catchment D	D	H	3.720	0.790	2.939	2.939	139.94	1.142	0	0.000	0.000	0.000	0.000	0.000	0.000	1.142	223.0	0.30	1050	1.495	1.727	2.15	18.62	76%
Catchment E	E	F	0.000	0.000	0.000	0.000	186.74	0.000	21	0.768	0.768	0.000	0.000	0.000	0.000	0.768	160.0	0.50	825	1.014	1.899	1.40	11.40	76%
Catchment F	F	H	0.000	0.000	0.000	0.000	173.88	0.000	22	0.799	1.567	0.000	0.000	0.000	0.000	1.567	154.0	0.50	1050	1.930	2.230	1.15	12.56	81%
Catchment G	G	H	0.000	0.000	0.000	0.000	186.74	0.000	18	0.669	0.669	0.000	0.000	0.000	0.000	0.669	298.0	0.50	825	1.014	1.899	2.62	12.62	66%
Catchment H	H	Capture Point	0.000	0.000	0.000	2.939	129.45	1.057	0	0.000	2.236	0.000	0.000	0.000	0.000	3.293	185.0	0.30	1500	3.870	2.191	1.41	20.03	85%
Catchment I	I	SWMF E1 Inlet	0.000	0.000	0.000	0.000	186.74	0.000	13	0.484	0.484	0.000	0.000	0.000	0.000	0.484	22.0	0.50	675	0.594	1.661	0.22	10.22	81%
Catchment J	J	K	0.000	0.000	0.000	0.000	186.74	0.000	3	0.103	0.103	0.000	0.000	0.000	0.000	0.103	22.0	0.50	450	0.201	1.268	0.29	10.29	51%
Catchment K	K	SWMF E1 Inlet	0.000	0.000	0.000	0.000	183.93	0.000	2	0.069	0.172	0.000	0.000	0.000	0.000	0.172	127.0	0.50	450	0.201	1.268	1.67	11.96	85%
Capture Point to SWMF E1 Inlet	Capture Point	SWMF E1 Inlet	0.000	0.000	0.000	2.939	123.46	1.008	0	0.000	2.236	1.000	2148.000	2.148	2.148	5.392	30.0	0.30	2100	9.492	2.742	0.18	20.21	57%
SWM Facility E1 Forebay	SWMF E1 Inlet	SWMF E1 FB	0.000	0.000	0.000	2.939	122.73	2.568	0	0.000	2.892	0.000	0.000	0.000	2.148	7.608	32.0	0.30	2100	9.492	2.742	0.19	20.41	80%

Worksheet for 20.0m ROW - 2.0% Boulevards

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

Input Data	
Channel Slope	0.500 %
Normal Depth	0.27 m

Section Definitions

Station (m)	Elevation (m)
0+00.00	0.266
0+00.30	0.260
0+03.30	0.200
0+05.80	0.150
0+05.95	0.150
0+06.00	0.000
0+06.30	0.025
0+09.50	0.089
0+12.70	0.025
0+13.00	0.000
0+13.05	0.150
0+13.20	0.150
0+17.70	0.240
0+19.70	0.280
0+20.00	0.286

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.266)	(0+00.30, 0.260)	0.025
(0+00.30, 0.260)	(0+03.30, 0.200)	0.013
(0+03.30, 0.200)	(0+05.80, 0.150)	0.025
(0+05.80, 0.150)	(0+13.20, 0.150)	0.013
(0+13.20, 0.150)	(0+17.70, 0.240)	0.025
(0+17.70, 0.240)	(0+19.70, 0.280)	0.013
(0+19.70, 0.280)	(0+20.00, 0.286)	0.025

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Discharge	2.01 m^3/s

Worksheet for 20.0m ROW - 2.0% Boulevards

Results	
Roughness Coefficient	0.018
Elevation Range	0.000 to 0.286 m
Flow Area	2.2 m²
Wetted Perimeter	19.222 m
Hydraulic Radius	0.12 m
Top Width	19.00 m
Normal Depth	0.27 m
Critical Depth	0.25 m
Critical Slope	0.711 %
Velocity	0.91 m/s
Velocity Head	0.042 m
Specific Energy	0.31 m
Froude Number	0.847
Flow Type	Subcritical

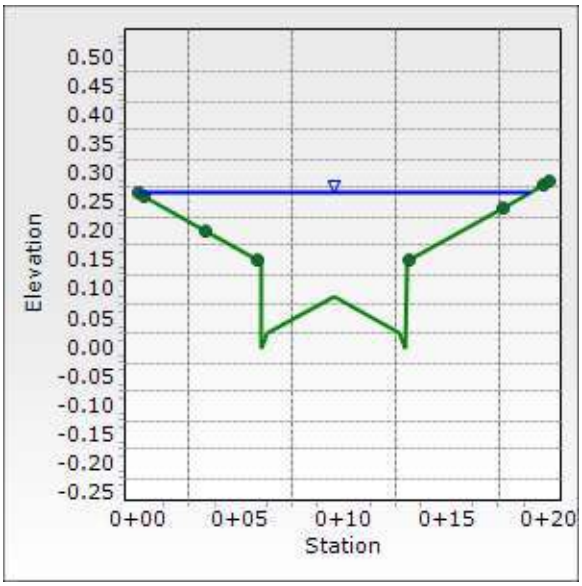
GVF Input Data	
Downstream Depth	0.00 m
Length	0.000 m
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 m
Profile Description	N/A
Profile Headloss	0.00 m
Downstream Velocity	Infinity m/s
Upstream Velocity	Infinity m/s
Normal Depth	0.27 m
Critical Depth	0.25 m
Channel Slope	0.500 %
Critical Slope	0.711 %

Cross Section for 20.0m ROW - 2.0% Boulevards

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

Input Data	
Channel Slope	0.500 %
Normal Depth	0.27 m
Discharge	2.01 m³/s



20.0m ROW - 5.0% Boulevards

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

Input Data	
Channel Slope	0.500 %
Normal Depth	0.30 m

Section Definitions

Station (m)	Elevation (m)
0+00.00	0.440
0+00.30	0.425
0+03.30	0.275
0+05.80	0.150
0+05.95	0.150
0+06.00	0.000
0+06.30	0.025
0+09.50	0.089
0+12.70	0.025
0+13.00	0.000
0+13.05	0.150
0+13.20	0.150
0+17.70	0.375
0+19.70	0.475
0+20.00	0.490

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.440)	(0+00.30, 0.425)	0.025
(0+00.30, 0.425)	(0+03.30, 0.275)	0.013
(0+03.30, 0.275)	(0+05.80, 0.150)	0.025
(0+05.80, 0.150)	(0+13.20, 0.150)	0.013
(0+13.20, 0.150)	(0+17.70, 0.375)	0.025
(0+17.70, 0.375)	(0+19.70, 0.475)	0.013
(0+19.70, 0.475)	(0+20.00, 0.490)	0.025

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Discharge	2.54 m^3/s

20.0m ROW - 5.0% Boulevards

Results	
Roughness Coefficient	0.019
Elevation Range	0.000 to 0.490 m
Flow Area	2.2 m²
Wetted Perimeter	13.627 m
Hydraulic Radius	0.16 m
Top Width	13.40 m
Normal Depth	0.30 m
Critical Depth	0.28 m
Critical Slope	0.654 %
Velocity	1.13 m/s
Velocity Head	0.065 m
Specific Energy	0.37 m
Froude Number	0.882
Flow Type	Subcritical

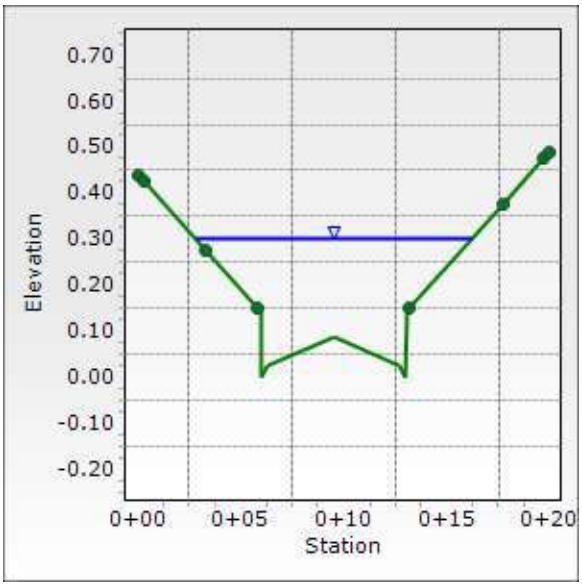
GVF Input Data	
Downstream Depth	0.00 m
Length	0.000 m
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 m
Profile Description	N/A
Profile Headloss	0.00 m
Downstream Velocity	Infinity m/s
Upstream Velocity	Infinity m/s
Normal Depth	0.30 m
Critical Depth	0.28 m
Channel Slope	0.500 %
Critical Slope	0.654 %

20.0m ROW - 5.0% Boulevards

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

Input Data	
Channel Slope	0.500 %
Normal Depth	0.30 m
Discharge	2.54 m³/s



Appendix F SWM Plan Feasibility

SCS consulting group ltd

LOW IMPACT DEVELOPMENT MEASURE MATRIX

Project Number: 2076
Date: March 2026
Designer Initials: S.B.

Stormwater Management Practice		Description	Quality Control	Quantity Control	Erosion Control	Water Balance	Contraints/ Controls /Requirements	Potentially Feasible (Yes/No)
Lot Level Controls	Increased Topsoil Depth	An increase in the restored topsoil depth on lots can be used to promote lot level infiltration and evapotranspiration.	✓			✓	Town standards require topsoil depth to be a maximum of 250 mm. This option is potentially feasible for the site plan blocks. To be determined at the site plan stage.	Yes (site plan only)
	Bio-Retention	Planting of gardens and other vegetation designed to minimize local runoff or use rainwater as a watering source can be used to reduce rainwater runoff by increasing evaporation, transpiration, and infiltration. By promoting infiltration through bioretention, water quality and volume control is provided for the volume of water retained.	✓				LIDs are not permitted within rights-of-ways or park blocks per Town standards. This option is potentially feasible for the site plan blocks. To be determined at the site plan stage.	Yes (site plan only)
	Passive Landscaping	Planting of gardens and other vegetation designed to minimize local runoff or use rainwater as a watering source can be used to reduce rainwater runoff by increasing evaporation, transpiration, and infiltration. By promoting infiltration through passive landscaping, water quality and runoff volume control is provided for the volume of water retained.	✓				This option is potentially feasible for the site plan blocks. To be determined at the site plan stage.	Yes (site plan only)
	Roof Runoff to Soak-away Pits	Directing roof runoff to subsurface soak-away pits can be used to promote infiltration. By promoting infiltration, water quality and runoff volume control is provided for the volume of water retained, in addition to providing water balance benefits.	✓			✓	This option is potentially feasible for the site plan blocks if clean rooftop runoff can be directed to the soakaway pits. To be determined at the site plan stage.	Yes (site plan only)
	Roof Runoff to Retention Cisterns	Directing roof runoff to rainwater retention cisterns (i.e. rain barrels or rainwater re-use) will contribute to water quality and water balance control. The retained rainwater can be harvested for re-use such as irrigation and/or rainwater re-use.	✓			✓	This option is potentially feasible for the site plan blocks. To be determined at the site plan stage.	Yes (site plan only)
	Green Roofs	Best suited for flat roofs, greenroofs provide rainwater retention in the growing medium where it is evaporated, evapo-transpirated, or slowly drains away after the rainfall event.		✓			This option is potentially feasible for the site plan blocks if the townhouse products have flat roofs. To be determined at the site plan stage.	Yes (site plan only)
	Parking Lot Detention Storage	Often employed with large parking lot footprints, flow attenuation for quantity or extended detention control can be provided via a flow restriction with stormwater storage provided via ponding within parking areas.		✓	✓		Potentially feasible for the school block.	Yes (site plan only)
	Roof Top Detention Storage	Often employed with large roof top footprints for commercial, industrial or employment land uses. Flow attenuation for quantity control can be provided via a flow restriction with stormwater storage provided via ponding on the rooftop. Note: Rooftop storage is not permitted upstream or within MTO's jurisdiction (i.e. highways).		✓			Potentially feasible for the school block. Potentially feasible for the site plan blocks. To be determined at the site plan stage.	Yes (site plan only)
	Roof Overflow to Grassed Areas	Directing roof leaders to grassed areas will contribute to water quality and water balance control by encouraging stormwater retention.	✓			✓	Potentially feasible for townhouses within the site plan blocks. To be determined at the site plan stage.	Yes (site plan only)

LOW IMPACT DEVELOPMENT MEASURE MATRIX

Project Number: 2076
Date: March 2026
Designer Initials: S.B.

Stormwater Management Practice		Description	Quality Control	Quantity Control	Erosion Control	Water Balance	Contraints/ Controls /Requirements	Potentially Feasible (Yes/No)
	Pervious Pavement	By encouraging infiltration and filtration, pervious pavement can contribute to water quality, balance and erosion control based on the volume retained in the underbedding.	✓		✓	✓	Not permitted due to highly vulnerable groundwater and salt infiltration concerns.	No
	Vegetated Filter Strip	At source filtration and infiltration may be encouraged through the use of vegetated filter strips by directing sheet flow from impermeable areas to the strip prior to being collected via the storm system.	✓			✓	Potentially feasible for the site plan blocks. To be determined at the site plan stage.	Yes (site plan only)
	Rear Lot Infiltration Trenches	At source infiltration may be encouraged by use of infiltration trenches collecting flow from the rear roofs via the roof leaders discharging to rear yards and conveyed overland to the infiltration trenches.	✓			✓	Potentially feasible for townhouses within the site plan blocks. To be determined at the site plan stage.	Yes (site plan only)
Conveyance Controls	Grassed Swales	A grassed swale will promote infiltration, filtration, and evapotranspiration, contributing to water quality and runoff volume control. Grassed swales need an unimpeded and relatively wide stretch of landscaped area, such as within a wide boulevard with no driveways, to function properly.	✓			✓	Potentially feasible for the site plan blocks. To be determined at the site plan stage.	Yes (site plan only)
	Exfiltration at Rear Lot Catchbasins	Where rear lot catchbasins are required due to grading constraints, a perforated pipe system could be incorporated into the rear lot catchbasin design to promote infiltration of 'clean' stormwater runoff. By promoting infiltration, water quality, runoff volume control and water balance benefits are provided for the volume of water retained.	✓			✓	Potentially feasible for the site plan blocks. To be determined at the site plan stage.	Yes (site plan only)
	Street Infiltration Trenches	Infiltration trenches can be used as part of the conveyance system with flow from the the right-of-way captured by catchbasins and conveyed to the infiltration trenches. Flows in excess of the infiltration capacity will overflow to the storm sewer system.	✓			✓	LIDs are not permitted within rights-of-way per Town standards. Road runoff is not permitted to infiltrate due to groundwater vulnerability and salt concerns.	No
	Street Filtration Trenches	Filtration trenches can be used as part of the conveyance system with flow from the the right-of-way captured by catchbasins and conveyed to the filtration trenches. This provides quality control for road drainage in areas where infiltration is not feasible due high groundwater and/or poor draining soils.	✓				LIDs are not permitted within rights-of-way per Town standards. Potentially feasible for the site plan blocks. To be determined at the site plan stage.	No
	Pervious Street Catchbasin System	Providing perforated pipe from the catchbasins to infiltrate stormwater with an overflow to the storm sewer system provides water balance and runoff volume control. Conflicts with municipal utilities and the possibility for groundwater contamination from street runoff (salts, hydrocarbons, etc.) to be considered in the design.				✓	LIDs are not permitted within rights-of-way per Town standards. Road runoff is not permitted to infiltrate due to groundwater vulnerability and salt concerns	No

LOW IMPACT DEVELOPMENT MEASURE MATRIX

Project Number: 2076
Date: March 2026
Designer Initials: S.B.

Stormwater Management Practice		Description	Quality Control	Quantity Control	Erosion Control	Water Balance	Contraints/ Controls /Requirements	Potentially Feasible (Yes/No)
End-of-Pipe Controls	Stormwater Detention Facility (Underground)	To meet quantity erosion control targets, stormwater runoff storage and attenuation through the use of flow restrictors can be used to control stormwater release rates. To accommodate the reduced release rate, stormwater detention facilities are required to store stormwater runoff.		✓	✓		Not required as a wet pond is a feasible solution.	Yes, but not required
	Wet Ponds, Wetlands, Dry Ponds	Sized in accordance with the MECP criteria, these end of pipe facilities can provide water quality, quantity, and erosion control treatment.	✓	✓	✓		A wet pond based on Town of Whitchurch-Stouffville and MECP Criteria is proposed.	Yes
	Filtration Trench	To provide additional water quality control, volume control and extended detention through filtration, end-of-pipe stormwater filtration systems can be provided in areas where high groundwater does not allow infiltration	✓				Not required as enhanced level quality controls are met through the proposed Wet Pond SWM Facility.	Yes, but not required
	Manufactured Treatment Device (MTD): Oil-Grit Separator or Stormwater Filter	A properly sized manufactured treatment device (MTD) can assist in providing Enhanced (MOE, 2003) treatment and can contribute to the treatment train approach for water quality control.	✓				Required in site plan blocks for pre-treatment to remove 80% of suspended solids from runoff prior to discharging to the municipal storm sewer, per Town criteria.	Yes (site plan only)

Appendix G Sanitary Sewer Design Sheets

SCS consulting group ltd

Sanitary Population Calculations

Catchment 301

Drainage Area (ha) = 6.00

Land Use	*Units*	*Equivalent Population/Unit*	*Equivalent Population*
Hume - Apartments	66	2.2	145
Hume - Townhouses	302	2.9	876
Piechatzek - Townhouses	34	2.9	99
		Total Equivalent Population	**1120**

Catchment 302

Drainage Area (ha) = 2.79

Land Use	*Units*	*Equivalent Population/Unit*	*Equivalent Population*
Stateview - Townhouses	130	2.9	377
Stateview - Single Detached	22	3.2	70
		Total Equivalent Population	**447**

Catchment 303

Drainage Area (ha) = 5.30

Land Use	*Units*	*Equivalent Population/Unit*	*Equivalent Population*
Metrolinx - Apartments	233	2.2	513
		Total Equivalent Population	**513**

Catchment 307

Drainage Area (ha) = 3.26

Land Use	*Units*	*Equivalent Population/Unit*	*Equivalent Population*
Acorn North - Apartments	314	2.2	691
Acorn North - Townhouses	102	2.9	296
		Total Equivalent Population	**987**

Catchment 308

Drainage Area (ha) = 3.82

Land Use	*Units*	*Equivalent Population/Unit*	*Equivalent Population*
Northcape - Apartments	161	2.2	354
Northcape - Townhouses	132	2.9	383
		Total Equivalent Population	**737**

Catchment 309

Drainage Area (ha) = 8.09

Land Use	*Units*	*Equivalent Population/Unit*	*Equivalent Population*
Newstone - Apartments	562	2.2	1236
Newstone - Townhouses	600	2.9	1740
Land Use	*Gross Lot Area (ha)*	*Equivalent Population/ha*	*Equivalent Population*
Newstone - Commercial	0.283	80	23
		Total Equivalent Population	**2999**

Sanitary Population Calculations

Catchment 310
Drainage Area (ha) = 2.03

Land Use	*Units*	*Equivalent Population/Unit*	*Equivalent Population*
Ambria - Townhouses	148	2.9	429
Ambria - Apartments	358	2.2	788
Land Use	*Gross Lot Area (ha)*	*Equivalent Population/ha*	*Equivalent Population*
Ambria - Commercial	0.02	80	1
		Total Equivalent Population	**1218**

Catchment 311
Drainage Area (ha) = 2.83

Land Use	*Units*	*Equivalent Population/Unit*	*Equivalent Population*
Acorn South - Townhouses (SKTH)	36	2.9	104
Acorn South - Townhouses (RLTH)	21	2.9	61
Acorn South - Townhouses (B2B)	76	2.9	220
Brundale - Townhouses	35	2.9	102
		Total Equivalent Population	**487**

Catchment 313
Drainage Area (ha) = 0.44

Land Use	*Units*	*Equivalent Population/Unit*	*Equivalent Population*
Acorn South - Townhouses (OSTH)	12	2.9	35
Acorn South - Townhouses (RLTH)	12	2.9	35
		Total Equivalent Population	**70**

Catchment 314
Drainage Area (ha) = 2.17

Land Use	*Gross Area (ha)*	*Equivalent Population/ha*	*Equivalent Population*
School	2.17	80	174
		Total Equivalent Population	**174**

Catchment 316
Drainage Area (ha) = 1.91

Land Use	*Units*	*Equivalent Population/Unit*	*Equivalent Population*
Trudel - Townhouses	106	2.9	307
		Total Equivalent Population	**307**

Catchment 317
Drainage Area (ha) = 0.55

Land Use	*Units*	*Equivalent Population/Unit*	*Equivalent Population*
Reesor - Medium Density	68	2.3	154
		Total Equivalent Population	**154**

Catchment 318
Drainage Area (ha) = 0.44

Land Use	*Units*	*Equivalent Population/Unit*	*Equivalent Population*
Acorn South (York Durham Line) - Medium Density	55	2.3	123
		Total Equivalent Population	**123**

Sanitary Design Sheet
Acorn North, Northcape, Acorn South
Local and Subtrunk 1 Alignment 1
Whitchurch-Stouffville, York

Minimum Sewer Diameter (mm) =	200	Avg. Domestic Flow (l/cap/day) =	350
Mannings n =	0.013	Infiltration Rate (l/s/ha) =	0.23
Minimum Velocity (m/s) =	0.60	Max. Harmon Peaking Factor =	4.0
Maximum Velocity (m/s) =	3	Min. Harmon Peaking Factor =	2.0
Minimum Pipe Slope (%) =	0.50	NOMINAL PIPE SIZE USED	

Project: Acorn North, Northcape, Acorn South
Project No. 2273
Date: 12-Mar-26
Designed By: S.B.
Reviewed By: N.D.M.

P:\2076 Trinison - Tenth Line, Stouffville\Design\Pipe Design\Sanitary\[2076 - Sanitary Sheet Design-Alignment 1.xlsm]Design

LOCATION			RESIDENTIAL						INDUSTRIAL/COMMERCIAL/INSTITUTIONAL					FLOW CALCULATIONS								PIPE DATA				
STREET	MANHOLE FROM	MANHOLE TO	AREA (ha)	ACCUM. AREA (ha)	DENSITY PER UNIT (p/unit)	DENSITY PER HA (p/ha)	RESIDENTIAL POPULATION	ACCUM. RESIDENTIAL POPULATION	AREA (ha)	ACCUM. AREA (ha)	POPULATION DENSITY (p/ha)	FLOW RATE (l/s/ha)	ACCUM. EQUIV. POPULATION	INFILTRATION (L/s)	TOTAL ACCUM. POPULATION	AVG. DOMESTIC FLOW (L/s)	ACCUM. AVG. DOMESTIC FLOW (L/s)	PEAKING FACTOR	PEAKED RESIDENTIAL FLOW (L/s)	ICI FLOW (L/s)	TOTAL FLOW (L/s)	LENGTH (m)	PIPE DIAMETER (mm)	SLOPE (%)	FULL FLOW CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)
Catchment 302 to 301 (Stateview)	302	301	2.79	2.79		160.2	447	447	0.00	0.00	0	0	0	0.6	447	1.8	1.8	4.00	7.2	0.0	7.9	100.0	200	0.50	23.2	0.74
Catchment 301 to 305 (HUME and Pietchatzek)	301	305	6.00	8.79		186.7	1120	1567	0.00	0.00	0	0	0	2.0	1567	4.5	6.3	3.67	23.3	0.0	25.3	100.0	250	0.50	42.0	0.86
Catchment 303 to 304 (Metrolinx)	303	304	5.30	5.30		96.8	513	513	0.00	0.00	0	0	0	1.2	513	2.1	2.1	3.97	8.2	0.0	9.5	100.0	200	0.50	23.2	0.74
Catchment 304 to 305 (Street B)	304	305	0.35	5.65			0	513	0.00	0.00	0	0	0	1.3	513	0.0	2.1	3.97	8.2	0.0	9.5	100.0	200	0.50	23.2	0.74
Catchment 305 to 306 (Acorn North Street A)	305	306	1.02	15.46			0	2080	0.00	0.00	0	0	0	3.6	2080	0.0	8.4	3.57	30.1	0.0	33.7	100.0	250	0.50	42.0	0.86
Catchment 306 to 315 (Northcape Street A)	306	315	1.01	16.47			0	2080	0.00	0.00	0	0	0	3.8	2080	0.0	8.4	3.57	30.1	0.0	33.9	100.0	250	0.50	42.0	0.86
Catchment 307 to 308 (Acorn North)	307	308	3.26	3.26		302.8	987	987	0.00	0.00	0	0	0	0.7	987	4.0	4.0	3.80	15.2	0.0	16.0	100.0	250	0.50	42.0	0.86
Catchment 308 to 312 (Northcape)	308	312	3.82	7.08		192.9	737	1724	0.00	0.00	0	0	0	1.6	1724	3.0	7.0	3.64	25.4	0.0	27.0	100.0	300	0.50	68.3	0.97
Catchment 310 to 309 (Ambria)	310	309	2.03	2.03		599.5	1217	1217	0.02	0.02	80	0	1	0.5	1218	4.9	4.9	3.74	18.5	0.0	18.9	100.0	200	0.50	23.2	0.74
Catchment 309 to 312 (Newstone)	309	312	8.09	10.12		367.9	2976	4193	0.283	0.30	80	0	24	2.4	4217	12.1	17.1	3.31	56.6	0.0	59.0	100.0	375	0.30	96.0	0.87
Catchment 311 to 312 (Acorn South Block 1)	311	312	2.83	2.83		172.1	487	487	0.00	0.00	0	0	0	0.7	487	2.0	2.0	3.98	7.9	0.0	8.5	100.0	200	0.50	23.2	0.74
Catchment 312 to 315 (Acorn South Block 6)	312	315	0.58	20.61			0	6404	0.00	0.30	0	0	24	4.8	6428	0.0	26.0	3.14	81.8	0.0	86.6	100.0	450	0.30	156.1	0.98
Catchment 313 to 315 (Acorn South Block 2)	313	315	0.44	0.44		159.1	70	70	0.00	0.00	0	0	0	0.1	70	0.3	0.3	4.00	1.1	0.0	1.2	100.0	200	0.50	23.2	0.74
Catchment 314 to 315 (School Block)	314	315	0.00	0.00			0	0	2.17	2.17	80	0	174	0.5	174	0.7	0.7	4.00	2.8	0.0	3.3	100.0	200	0.50	23.2	0.74
Catchment 315 to CVE West (Acorn South Street A)	315	CVE WEST	0.44	37.96			0	8554	0.00	2.47	0	0	198	9.3	8752	0.0	35.5	3.01	106.8	0.0	116.1	100.0	450	0.40	180.2	1.13

Sanitary Design Sheet
Acorn North, Northcape, Acorn South
Local and Subtrunk 1 Alignment 2
Whitchurch-Stouffville, York

Minimum Sewer Diameter (mm) =	200	Avg. Domestic Flow (l/cap/day) =	350
Mannings n =	0.013	Infiltration Rate (l/s/ha) =	0.23
Minimum Velocity (m/s) =	0.60	Max. Harmon Peaking Factor =	4.0
Maximum Velocity (m/s) =	3	Min. Harmon Peaking Factor =	2.0
Minimum Pipe Slope (%) =	0.50	NOMINAL PIPE SIZE USED	

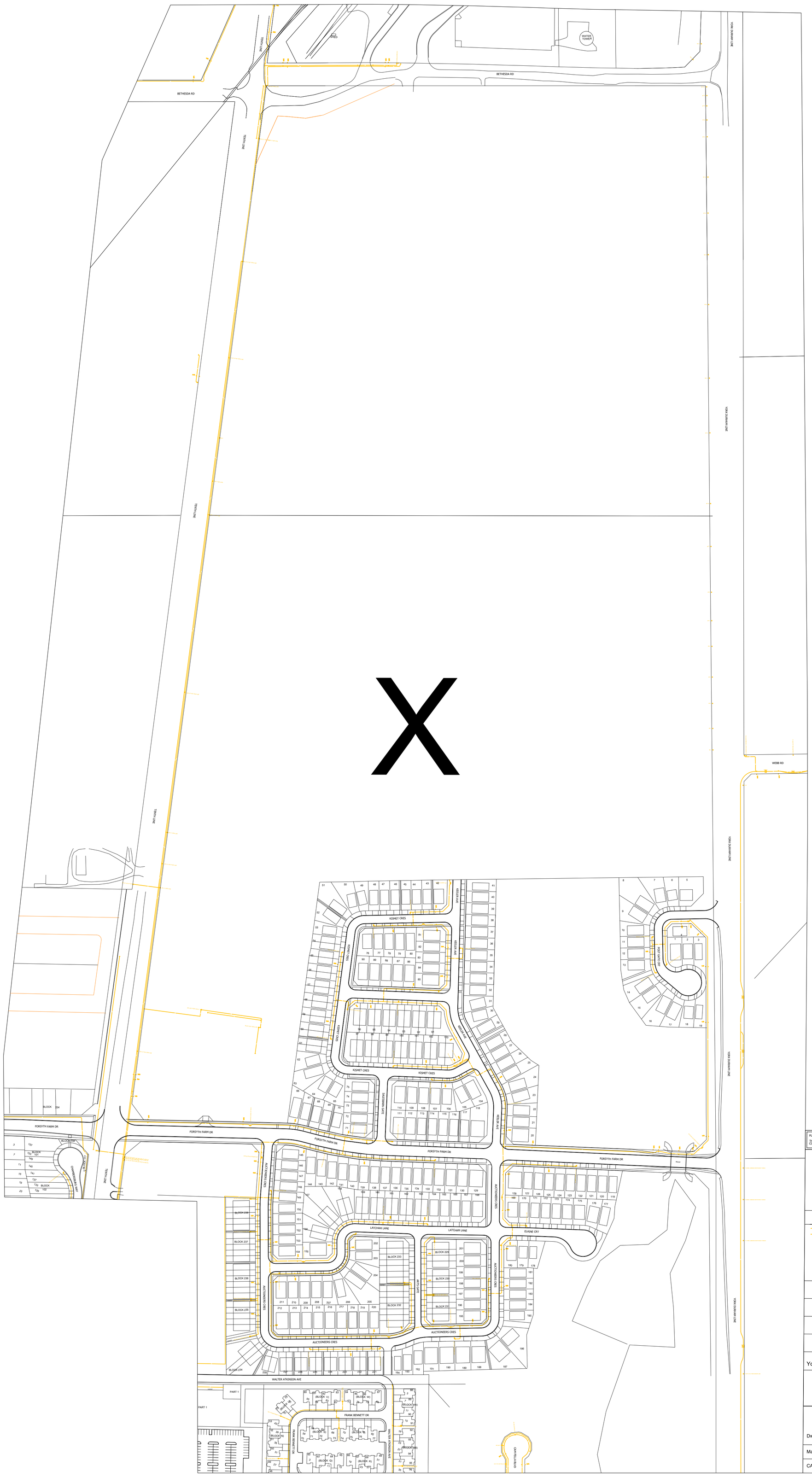
Project: Acorn North, Northcape, Acorn South
Project No. 2076
Date: 12-Mar-26
Designed By: S.B.
Reviewed By: N.D.M.

P:\2076 Trinison - Tenth Line, Stouffville\Design\Pipe Design\Sanitary\[2076 - Sanitary Sheet Design-Alignment 2.xlsm]Design

LOCATION			RESIDENTIAL						INDUSTRIAL/COMMERCIAL/INSTITUTIONAL					FLOW CALCULATIONS								PIPE DATA				
STREET	MANHOLE		AREA	ACCUM. AREA	DENSITY		RESIDENTIAL POPULATION	ACCUM. RESIDENTIAL POPULATION	AREA	ACCUM. AREA	POPULATION DENSITY	FLOW RATE	ACCUM. EQUIV. POPULATION	INFILTRATION	TOTAL ACCUM. POPULATION	AVG. DOMESTIC FLOW	ACCUM. AVG. DOMESTIC FLOW	PEAKING FACTOR	PEAKED RESIDENTIAL FLOW	ICI FLOW	TOTAL FLOW	LENGTH	PIPE DIAMETER	SLOPE	FULL FLOW CAPACITY	FULL FLOW VELOCITY
	FROM	TO	(ha)	(ha)	PER UNIT (p/unit)	PER HA (p/ha)			(ha)	(ha)	(p/ha)	(l/s/ha)		(L/s)		(L/s)	(L/s)		(L/s)	(L/s)	(L/s)	(m)	(mm)	(%)	(L/s)	(m/s)
Catchment 302 to 301 (Stateview)	302	301	2.79	2.79		160.2	447	447	0.00	0.00	0	0	0	0.6	447	1.8	1.8	4.00	7.2	0.0	7.9	100.0	200	0.50	23.2	0.74
Catchment 301 to 305 (HUME and Pietchatzek)	301	305	6.00	8.79		186.7	1120	1567	0.00	0.00	0	0	0	2.0	1567	4.5	6.3	3.67	23.3	0.0	25.3	100.0	250	0.50	42.0	0.86
Catchment 303 to 304 (Metrolinx)	303	304	5.30	5.30		96.8	513	513	0.00	0.00	0	0	0	1.2	513	2.1	2.1	3.97	8.2	0.0	9.5	100.0	200	0.50	23.2	0.74
Catchment 304 to 305 (Street B)	304	305	0.35	5.65			0	513	0.00	0.00	0	0	0	1.3	513	0.0	2.1	3.97	8.2	0.0	9.5	100.0	200	0.50	23.2	0.74
Catchment 305 to 306 (Acorn North Street A)	305	306	1.02	15.46			0	2080	0.00	0.00	0	0	0	3.6	2080	0.0	8.4	3.57	30.1	0.0	33.7	100.0	250	0.50	42.0	0.86
Catchment 306 to 315 (Northcape Street A)	306	315	1.01	16.47			0	2080	0.00	0.00	0	0	0	3.8	2080	0.0	8.4	3.57	30.1	0.0	33.9	100.0	250	0.50	42.0	0.86
Catchment 307 to 308 (Acorn North)	307	308	3.26	3.26		302.8	987	987	0.00	0.00	0	0	0	0.7	987	4.0	4.0	3.80	15.2	0.0	16.0	100.0	250	0.50	42.0	0.86
Catchment 308 to 312 (Northcape)	308	312	3.82	7.08		192.9	737	1724	0.00	0.00	0	0	0	1.6	1724	3.0	7.0	3.64	25.4	0.0	27.0	100.0	300	0.50	68.3	0.97
Catchment 310 to 309 (Ambria)	310	309	2.03	2.03		599.5	1217	1217	0.02	0.02	80	0	1	0.5	1218	4.9	4.9	3.74	18.5	0.0	18.9	100.0	200	0.50	23.2	0.74
Catchment 309 to 312 (Newstone)	309	312	8.09	10.12		367.9	2976	4193	0.283	0.30	80	0	24	2.4	4217	12.1	17.1	3.31	56.6	0.0	59.0	100.0	375	0.30	96.0	0.87
Catchment 311 to 312 (Acorn South Block 1)	311	312	2.83	2.83		172.1	487	487	0.00	0.00	0	0	0	0.7	487	2.0	2.0	3.98	7.9	0.0	8.5	100.0	200	0.50	23.2	0.74
Catchment 312 to 315 (Acorn South Block 6)	312	315	0.58	20.61			0	6404	0.00	0.30	0	0	24	4.8	6428	0.0	26.0	3.14	81.8	0.0	86.6	100.0	450	0.30	156.1	0.98
Catchment 313 to 315 (Acorn South Block 2)	313	315	0.44	0.44		159.1	70	70	0.00	0.00	0	0	0	0.1	70	0.3	0.3	4.00	1.1	0.0	1.2	100.0	200	0.50	23.2	0.74
Catchment 314 to 315 (School Block)	314	315	0.00	0.00			0	0	2.17	2.17	80	0	174	0.5	174	0.7	0.7	4.00	2.8	0.0	3.3	100.0	200	0.50	23.2	0.74
Catchment 315 to SAN YDN (Acorn South Street A)	315	SAN YDN	0.44	37.96			0	8554	0.00	2.47	0	0	198	9.3	8752	0.0	35.5	3.01	106.8	0.0	116.1	100.0	450	0.50	201.5	1.27

Appendix H Utilities Considerations

SCS consulting group ltd



X

PLEASE NOTE:

THIS DRAWING IS FOR MARKUP ONLY - NOT FOR PERMIT TO PROCEED CONSTRUCTION. BELL CANADA PLANT LOCATION IS APPROXIMATE.

BELL CANADA

Municipal Operations Department
Floor 5 Blue, 100 Borough Drive
Scarborough, Ontario, M1P 4W2
Ph. 416-296-6929

This plan or drawing is the property of Bell Canada and the copyright of which is owned by Bell Canada. This plan or drawing may not be copied or used by others without the written consent of Bell Canada, which may be withheld at Bell Canada's discretion.

Bell Canada Legend Info

- C — Existing Conduit
- B — Existing Buried Cable
- Existing Manhole
- HH — Existing Handhole / GLB
- CSP — Existing Central Splitting Point
- BP — Existing Bell Pole
- Existing Pedestal

CALL FOR LOCATES
1-800-400-2255

HAND DIG
if within 1m of Bell plant

HAND DIG
when crossing Bell plant

Maintain clearance of 0.6m

If further details required
You must acquire Locates or Test Pits

telecon design
7777 BEDFORD RD
VAUGHAN, ONT, CANADA L4L 0C8
TEL: (905) 566-2882

Dwg # - 1

Mark Up # - 66037

CAD Tech - HOA TRAN

Mark-ups@enbridge.com
500 Consumers Road
North York, Ontario M2J 1P8
Canada

EGD File Number: 42823834

Re: Locates Request - Bethesda Side Road and Tenth Line, Whitchurch-Stouffville

- By law utility locations must be obtained prior to starting any excavation or ground disturbance activity, such as pile driving, boring, auguring or digging. Contact Ontario One Call at 1-800-400-2255 or www.on1call.com at least 5 business days before beginning work to obtain utility locates.
- Refer to the "Third Party Requirements in the Vicinity of Natural Gas Facilities" for requirements and precautions for working safety in the vicinity of natural gas pipelines. The most recent version of this document is available at: https://enbridgegas.com/~/media/extranet-pages/safety/before-you-dig/Third-Party-Requirements-in-the-Vicinity-of-Natural-Gas-Facilities
- Enbridge's responses are based on the information available and are valid for a period of 6 months from issue.

☐ **VITAL MAIN**

- You are working within 3.0m of a Vital Main Pipeline. In order to accommodate Enbridge vital main standby requirements, our Damage Prevention department must be contacted a minimum of three business days prior to commencing any excavation at 1-866-922-3622 to schedule a site meeting.

☐ **CONFLICT**

- We have an **OBJECTION** to your proposed plant as indicated. Please refer to attached drawings for information on our existing or proposed gas plant our existing and/or proposed gas plant within the road allowance.
- You must submit a revised design for our approval that meets the requirements detailed in the Third-Party Requirements guidelines before proceeding.
- If relocation of our plant is required, please contact:

☐ Toronto Region	Jonathan Mansikka	(416) 495-4855	jonathan.mansikka@enbridge.com
☐ Central Region West	Evguenia Clark	(416) 758-7939	evguenia.clark@enbridge.com
☐ Central Region East	Heather Whitten	(416) 357-6721	Heather.Whitten@enbridge.com
☐ Ottawa Region	Kyle Witney	(613) 748-6770	kyle.witney@enbridge.com
☐ Niagara Region	Rob D'Onofrio	(905) 641-4876	robert.donofrio@enbridge.com

☐ **EASEMENT REQUIRED**

- Enbridge has no objection to this proposed application. Prior to Land Sale/Closure, we require an easement to protect our exising gas infrastructure. Please contact ONTLands@enbridge.com.

☐ **NO CONFLICT**

- We have **NO OBJECTION** to your proposed plant as indicated. Please refer to the attached drawings for information on our existing and/or proposed gas plant within the road allowance.
- GAS MAINS MUST BE FIELD LOCATED. Before digging, please call ONTARIO ONE CALL at 1-800-400-2255 for free gas locates.

☑ **GENERAL LOCATION**

- The information provided is for GENERAL LOCATION only and is not an approval. Detailed plans must be submitted for our review before an approval will be granted.
- Refer to the attached drawings for information on our existing and/or proposed gas plant within the road allowance.

Atlas Plate Legend

- Proposed
- Construct
- Pending Decomission
- Active, Low Pressure
- Active, Medium Pressure
- Active, Intermediate Pressure
- Active, High Pressure
- Active, High Pressure PE
- Active, Extra High Pressure
- Active, Unodourized Transmission Pressure, IMP;VITAL
- Proposed, IMP; CER;VITAL
- Construct, IMP;VITAL
- Active, Intermediate Pressure, IMP;CER
- Active, High Pressure, CER; VITAL
- Active, Extra High Pressure, IMP;CER; VITAL
- Pending Decomission, IMP;CER;VITAL

Abbreviations

Line Presure Descriptors

LP	Low pressure
MP	Medium Pressure
IMP	Integrity Management Program (main)
HP	High pressure
XHP	Extra high pressure
VITAL	Vital Gas main
IP	Intermediate Pressure

Pipe Descriptors

PE	Plastic main
SC	Steel coated main
ST	Steel main
CER	Canada Energy Regulator (formerly National Energy Board)
NPS	Nominal Pipe Size *(Number denotes pipe size in* inches e.g. NPS 8 = Nominal Pipe Size 8 inches)

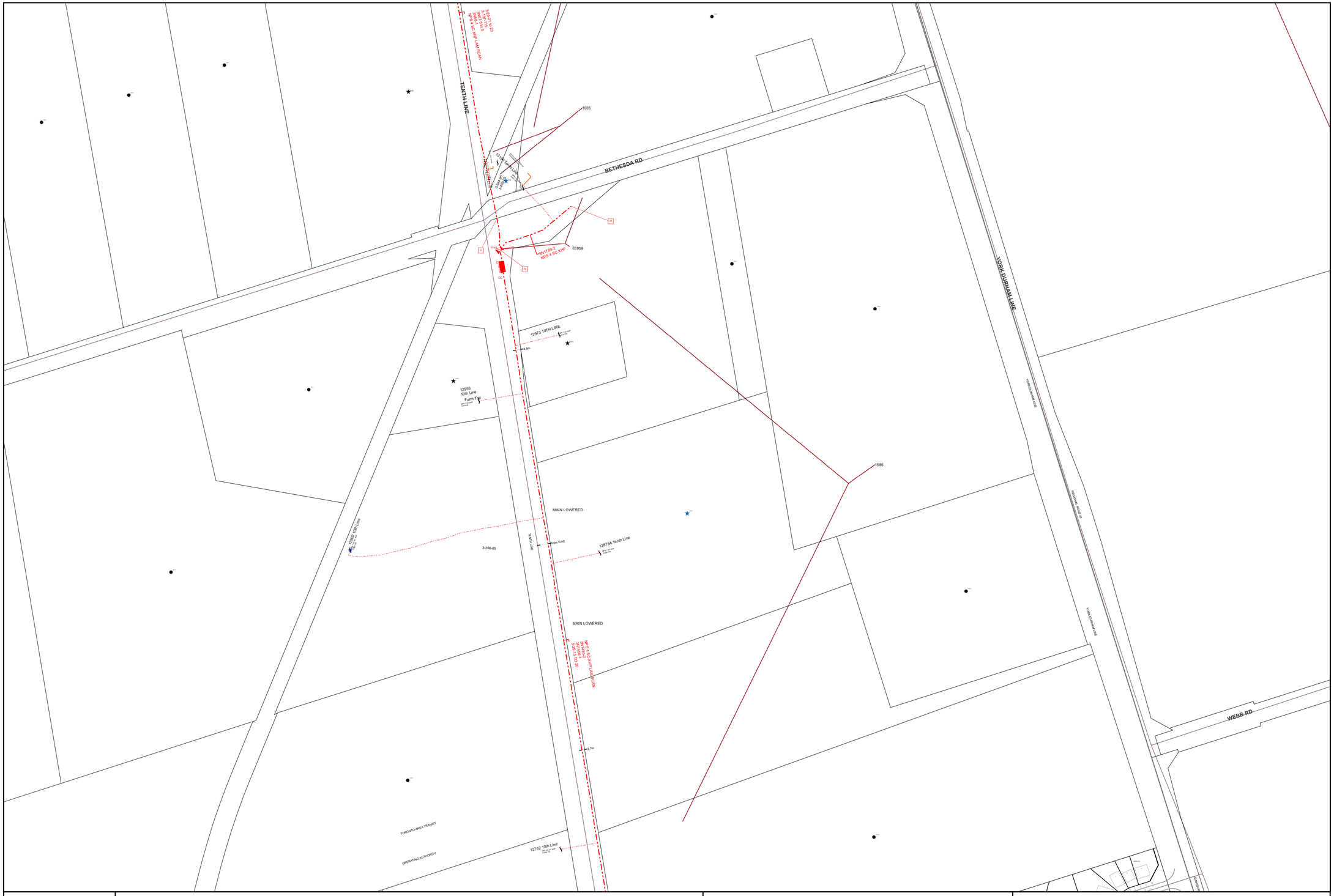
Topographical Feature Descriptors:

AE	Asphalt edge
BL	Building Line
BP	Bell pole/pedestal
BPED	Bell pedestal
C/L	Centreline of road way/pavement
CB	Catch Basin
CL	Curb line/curb or edge of pavement
DCB	Double catch basin
E/P	Edge of Pavement
E/W SL	East of the west street line
FH	Fire Hydrant
FL	Fence line
HP	Hydro pole
HT	Hydro transformer or hydro box
LP	Light post
LS	Light Standard
MH	Manhole
N/S SL	North of the south street line
POLE L	Pole line
POLE(S)	Pole(s)
S/S SL	South of the south street line
SL	Street line or property line
SM	Sewer manhole
SWK	Sidewalk or walk
UW	Under sidewalk
W/E SL	West of the east street line
WVCH	Water valve chamber

Main Reference Descriptors

N/S SL	North of the south street line
S/S SL	South of the south street line
W/E SL	West of the west street line
E/W SL	East of the west street line
N/S CL	North of the south curb line
S/N CL	South of the north curb line
E/W CL	East of the west curb line
W/E CL	West of the east curb line
E/E CL	East of the east curb line
W/W CL	West of the west curb line
N/N CL	North of the north curb line
S/S CL	South of the south curb line
E/P	Edge of pavement
C/L	Centre line of road
W/WBL	West of west building line
W/EBL	West of eats building line
E/EBL	East of east building line
N/NBL	North of north buliding line
N/SBL	North of south buliding line
S/SBL	South of south buliding line
S/NBL	South of north building line

Inside	Measured from centreline of street furniture towards streetline
Outside	Measured from centreline of street furniture towards road



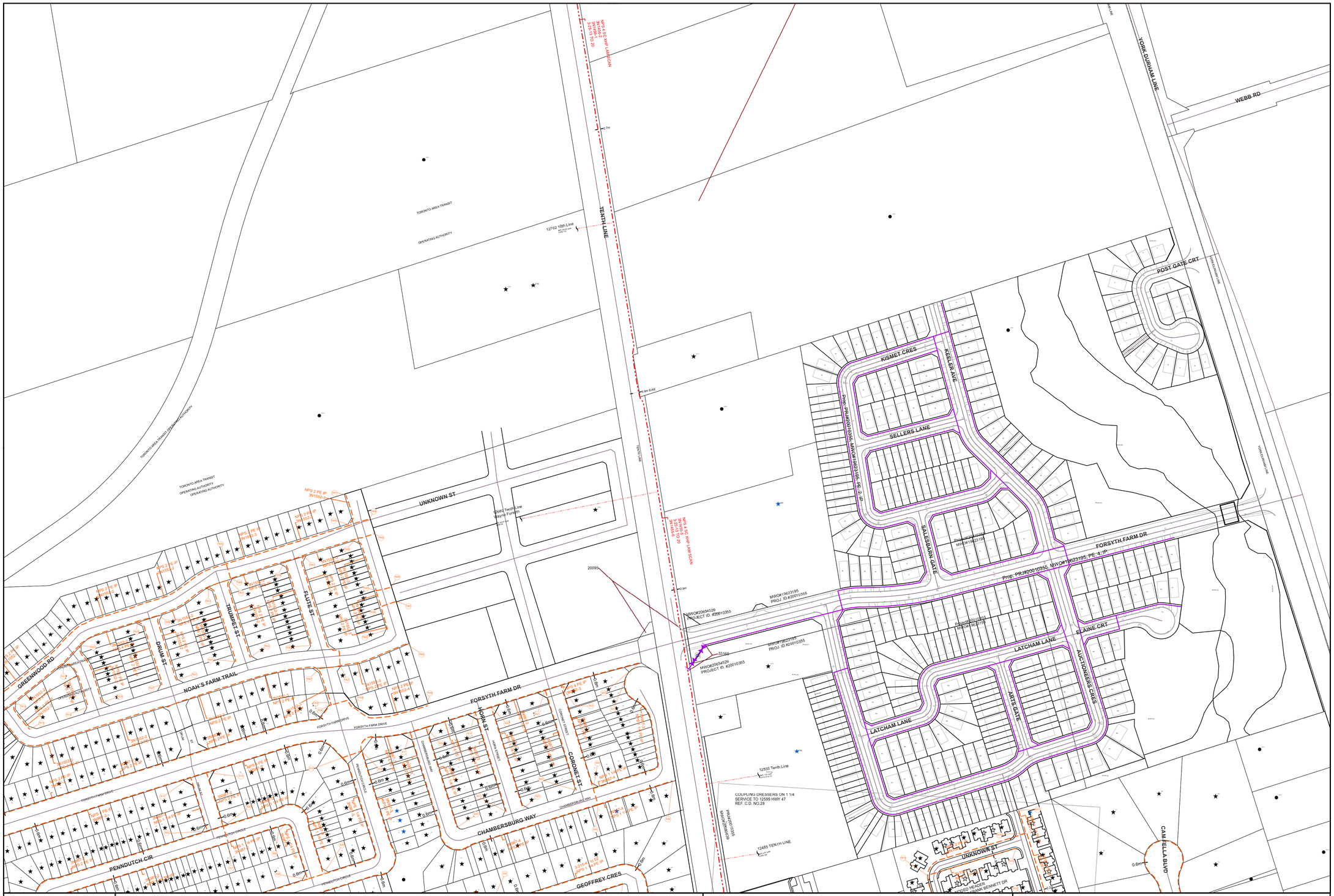
N

ENBRIDGE

Plotted By: Vinay Merugu

Date Plotted: 3/14/2024 7:12:57 AM

Note : Map is not to scale.



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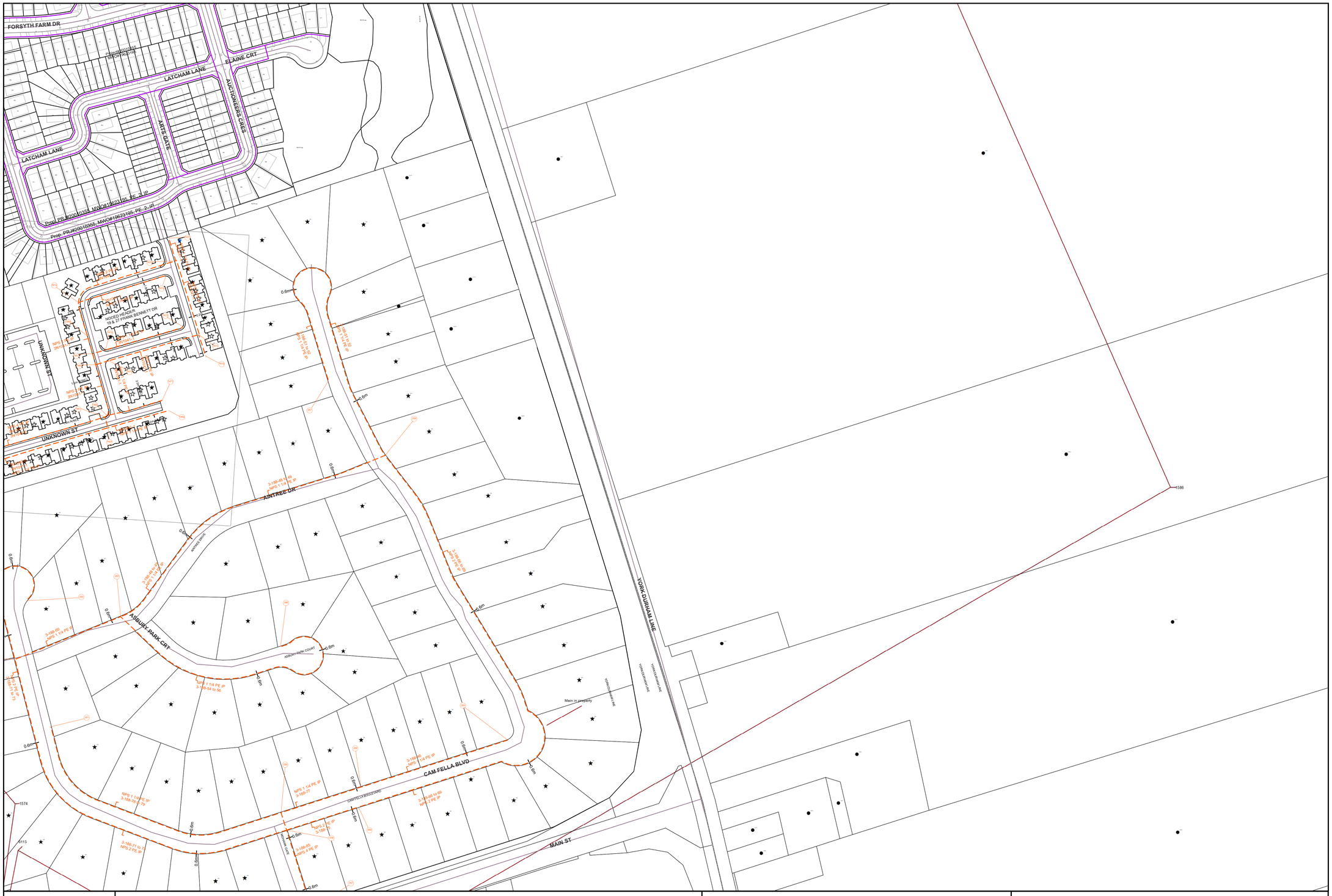
ENBRIDGE

Plotted By: Vinay Merugu

Date Plotted: 3/14/2024 7:20:01 AM

Note : Map is not to scale.



N

ENBRIDGE

Plotted By: Vinay Merugu

Date Plotted: 3/14/2024 7:03:05 AM

Note : Map is not to scale.

G-tel Engineering Inc.

1150 Frances St 2nd Floor
London, Ontario
N5W 5N5

Planning Request For: HONI Planning (H1DPLAN),

Ticket #: 20232526064

Issued By: **G-tel Lookup Dept.**

Date: 06/24/2023

Time: 17:10:40

Requester: GAURI MURRIA

Requester's Email: gmurria@scsconsultinggroup.com

Requesting Company: SCS CONSULTING GROUP LTD.

Fax #:

Ticket Request Type: **Design And Planning**

Location: TENTH LINE

Locate Details:
PROPOSED RESIDENTIAL SUBDIVISION REQUESTING EXISTING UTILITY INFORMATION ADJACENT TO THE SUBJECT LANDS.

Remarks:
PROPOSED RESIDENTIAL SUBDIVISION REQUESTING EXISTING UTILITY INFORMATION ADJACENT TO THE SUBJECT LANDS.DEPTH UNKNOWN905 642

Comments To Excavator:

If you have any questions or concerns regarding your planning request, please call G-tel Engineering at 1-866-692-0208, dial 0 and request the lookup department.

CAUTION: The details provided are to be used solely for planning your design and not for excavation. You must call Ontario One Call at 1-800-400-2255 at least 1 week prior to excavation to obtain a physical locate.

See disclaimer document for further details.

Planning Request Disclaimer

This letter is to indicate that the drawing(s) and information provided is the property of Hydro One and its licensees (all rights reserved), and is to be used for planning and design purposes only solely to assist you in reviewing your project. The drawing(s) and information is not to be altered or used for any other purpose.

Please note that the attached drawings represent Hydro One distribution lines.

The attached drawing(s) and information **do not** include Hydro One transmission line information and they do **not** include privately owned/third party owned conductor.

The drawing(s) and information is **not** to be used for excavation purposes. The distribution lines and equipment locations indicated should not be relied upon for construction purposes as being exact. The exact location, configuration and/or materials used may not be accurately represented.

The drawing(s) and information are not to be relied upon by any third parties. Hydro One assumes no liability for the incorrect reliance or use of the drawing(s) or information.

You understand that you must contact Ontario One Call (1-800-400-2255) for more details for your excavation purposes, and must contact Ontario One Call to obtain locates a minimum of 5 business days prior to your excavation needs.

Hydro One
Distribution Damage Prevention Team

Hydro One Network

Layer name	Display	Description
PRI_UG_CONDUCTOR		Primary Underground – 2.4/4.16kV; 4.8/8.32 kV
		Primary Underground – 7.2/12.51 kV
		Primary Underground – 16.0/27.6 kV; 34.5 kV; 44 kV
		Primary Underground – All other voltage
PRI_OH_CONDUCTOR		Primary Overhead – 2.4/4.16kV; 4.8/8.32 kV
		Primary Overhead – 7.2/12.51 kV
		Primary Overhead – 16.0/27.6 kV; 44 kV
		Primary Overhead – All other voltage
SEC_UG_CONDUCTOR		Secondary Underground Conductor
SEC_OH_CONDUCTOR		Secondary Overhead Conductor
TRANSFORMER		Single Phase Underground
		Single Phase Overhead
POLES		Poles
AWITCHINGFACILITY		Structures: Pad, Vault and Other
BUSBAR		Shown same as Primary Underground
RISERS		PVC or Fiberglass type risers

Hydro One Landbase

Layer name	Display	Description
STREETS		Centre line of road
PARCELS		Polygons representing parcel

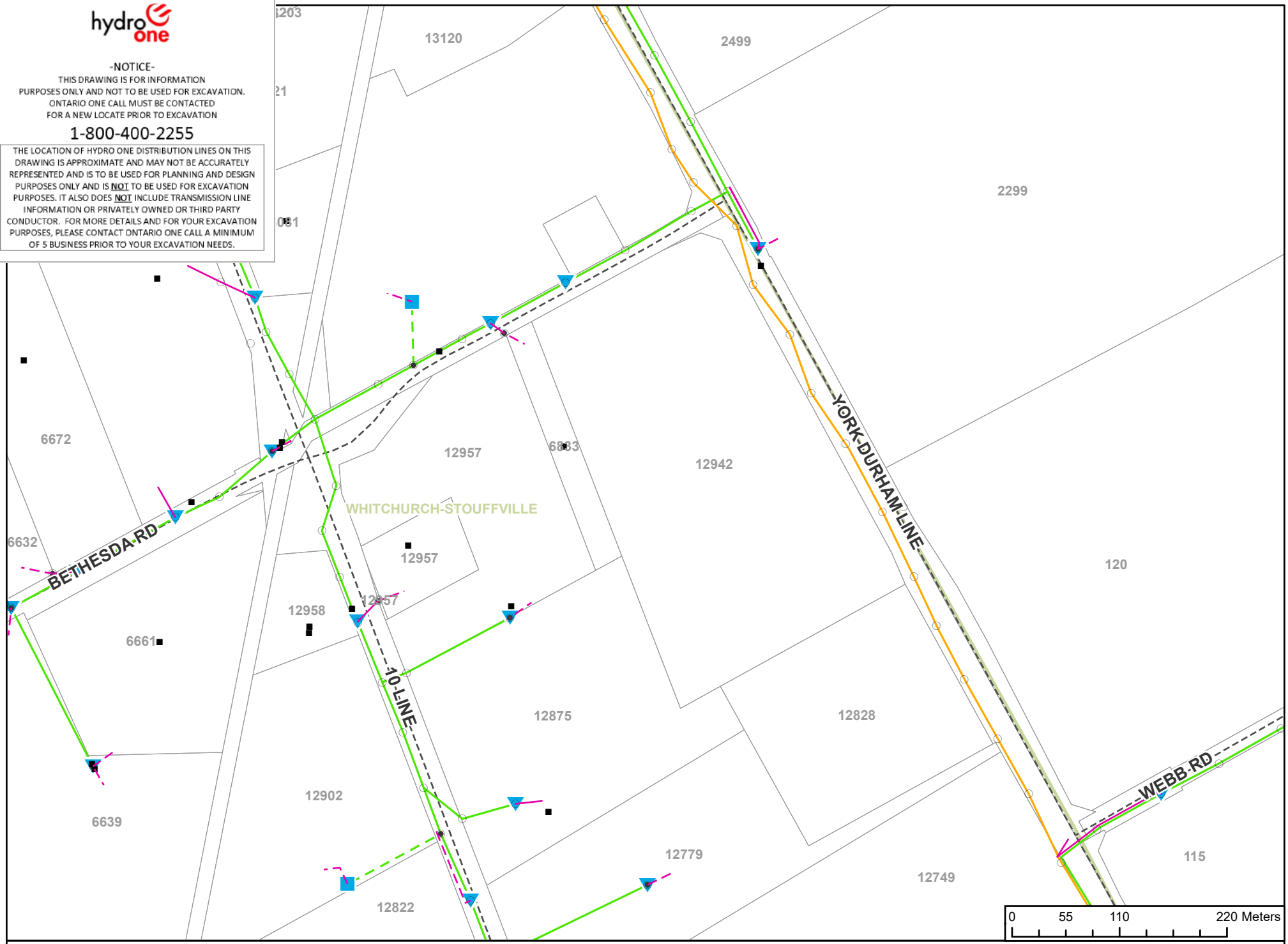
hydro one

-NOTICE-

THIS DRAWING IS FOR INFORMATION PURPOSES ONLY AND NOT TO BE USED FOR EXCAVATION. ONTARIO ONE CALL MUST BE CONTACTED FOR A NEW LOCATE PRIOR TO EXCAVATION

1-800-400-2255

THE LOCATION OF HYDRO ONE DISTRIBUTION LINES ON THIS DRAWING IS APPROXIMATE AND MAY NOT BE ACCURATELY REPRESENTED AND IS TO BE USED FOR PLANNING AND DESIGN PURPOSES ONLY AND IS NOT TO BE USED FOR EXCAVATION PURPOSES. IT ALSO DOES NOT INCLUDE TRANSMISSION LINE INFORMATION OR PRIVATELY OWNED OR THIRD PARTY CONDUCTOR. FOR MORE DETAILS AND FOR YOUR EXCAVATION PURPOSES, PLEASE CONTACT ONTARIO ONE CALL A MINIMUM OF 5 BUSINESS PRIOR TO YOUR EXCAVATION NEEDS.



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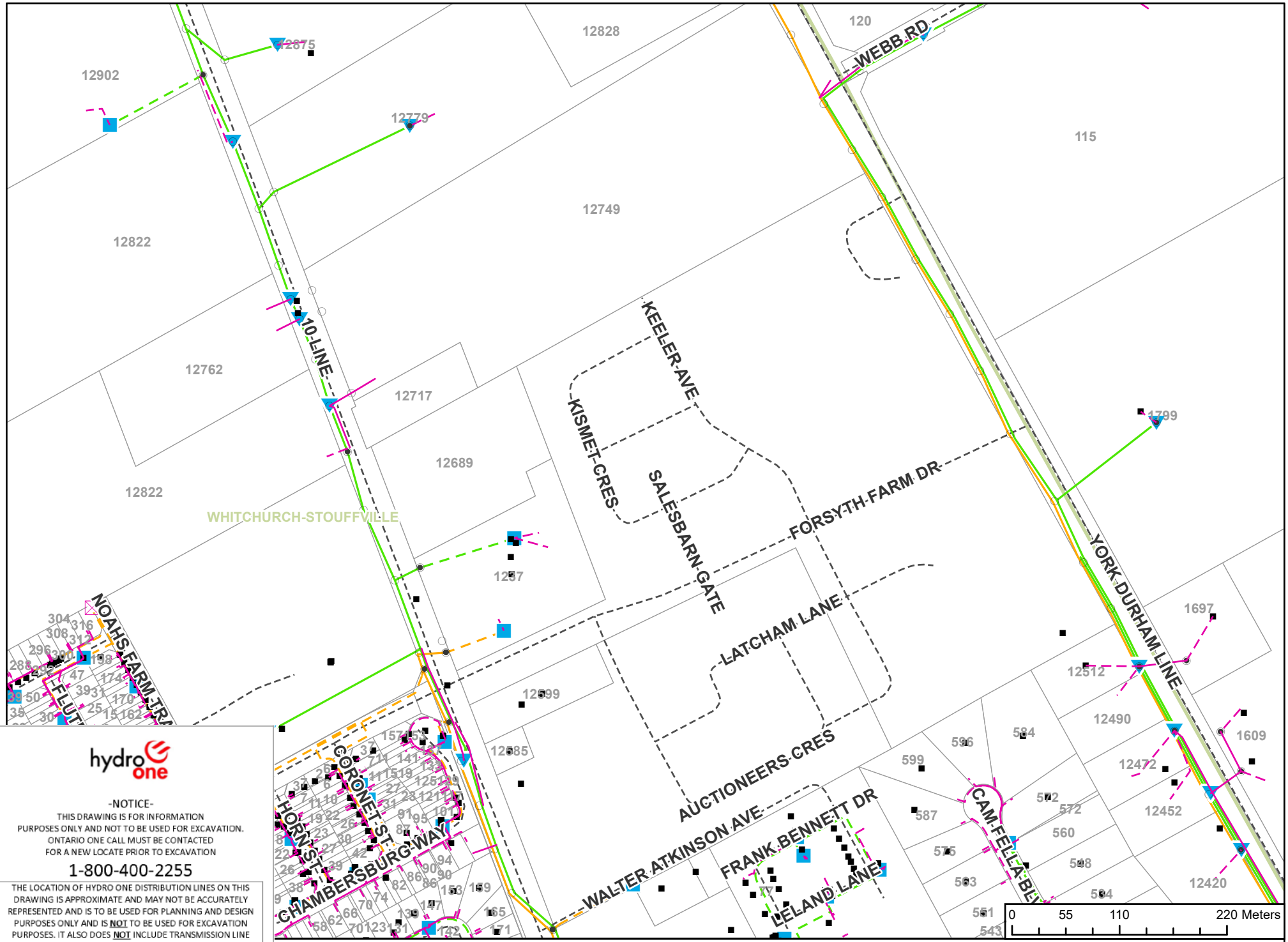

hydro one

-NOTICE-

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1-800-400-2255

THE LOCATION OF HYDRO ONE DISTRIBUTION LINES ON THIS DRAWING IS APPROXIMATE AND MAY NOT BE ACCURATELY REPRESENTED AND IS TO BE USED FOR PLANNING AND DESIGN PURPOSES ONLY AND IS NOT TO BE USED FOR EXCAVATION PURPOSES. IT ALSO DOES NOT INCLUDE TRANSMISSION LINE INFORMATION OR PRIVATELY OWNED OR THIRD PARTY CONDUCTOR. FOR MORE DETAILS AND FOR YOUR EXCAVATION PURPOSES, PLEASE CONTACT ONTARIO ONE CALL A MINIMUM OF 5 BUSINESS PRIOR TO YOUR EXCAVATION NEEDS.

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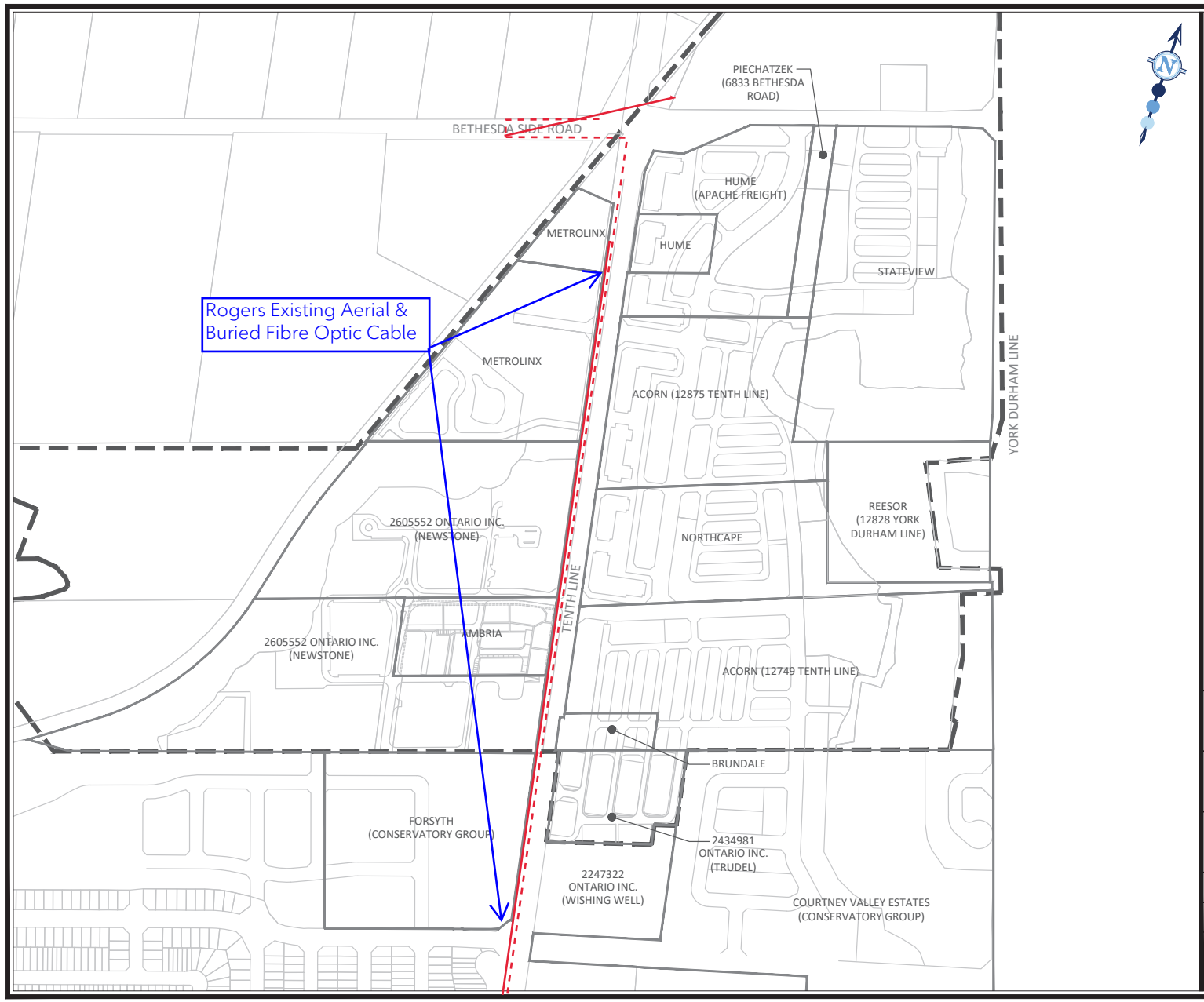

LEGEND:

- STOUFFVILLE PHASE 3 EAST BOUNDARY
- OWNERSHIP BOUNDARY

*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

SCS consulting group ltd
30 CENTURIAN DRIVE, SUITE 100
MARKHAM, ONTARIO L3R 8B8
TEL: (905) 475-1900
FAX: (905) 475-8335

STOUFFVILLE PHASE 3 EAST LANDOWNERS GROUP

OWNERSHIP PLAN

DESIGNED BY: C.A.M.	CHECKED BY: J.L.B.
SCALE: 1:5000	DATE: JUNE 2023
PROJECT No: 2273	FIGURE No: 1.0

File: P:\2273 Lincolnville Landowners Group\Drawings\Cost Sharing\Base\2273CS-BASE.dwg - Revised by <CMACDONALD> : Wed, Sep 20 2023 - 10:13am

SCS Consulting Group Ltd
30 Centurian Drive, Suite 100
Markham, ON, L3R 8B8
Phone 905 475 1900
Fax 905 475 8335