1258 Rebecca Street, Oakville

Functional Servicing Report

April 2022

Submitted by:

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Project Number: 2480

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SUBMISSION HISTORY

Submission	Date	In Support Of	Distributed To
1st	April 2022	Zoning By-law Amendment Application	Town of Oakville, Conservation Halton

1.0 INTRODUCTION

SCS Consulting Group Ltd. has been retained by Halton Region to prepare a Functional Servicing Report for a proposed assisted living development located at Rebecca Street and Warminster Drive in the Town of Oakville.

1.1 Purpose of the Report

The Functional Servicing and Stormwater Management (SWM) Report has been prepared in support of a Zoning By-law Amendment (ZBA) application for the proposed development. The Site Plan is provided in **Appendix A**.

The purpose of this report is to demonstrate that the proposed development can be graded and serviced in accordance with the Town of Oakville, Halton Region, Conservation Halton, Ontario Building Code (OBC), and the Ministry of Environment, Conservation and Parks (MECP) design criteria.

1.2 Study Area

The existing site is comprised of vacant open space located within the Fourteen Mile Creek watershed in the Town of Oakville. As shown on **Figure 1.1**, the study area is bound by:

- Rebecca Street to the north;
- Patricia-Picknell Elementary School to the south;
- Single-family residential area to the east; and
- Oakville Public Library and Paramedic Services Station to the west.

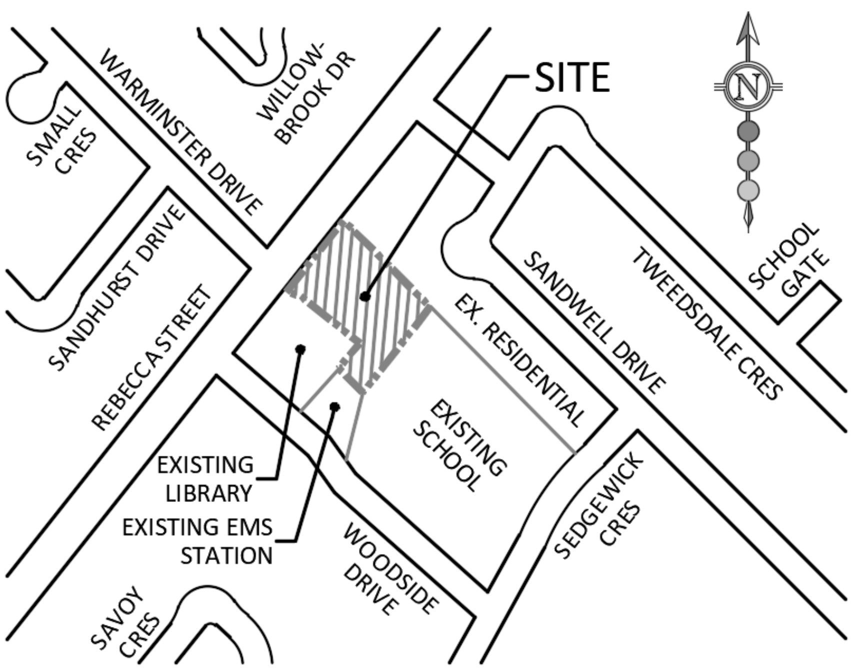

Figure 1.1: Site Location Plan

The proposed development is approximately 0.66 ha in size and consists of three single detached lots fronting onto Rebecca Street and fourteen single storey semi-detached units. The semi-detached units will serve as an affordable independent living community for seniors.

Each of the proposed single detached lots will have independent access onto Rebecca Street. These lots are intended to be sold as serviced lots and will be developed by others.

The independent living community is proposed to include a private laneway with access from Rebecca Street. Pedestrian connections to the neighbouring library will also be provided. The semi-detached units will be constructed as slab-on-grade and will not have basements.

Please refer to the Site Plan in **Appendix A** to view the proposed site layout.

1.3 Background Servicing Information

In preparation of the preliminary servicing and SWM strategies, the following design guidelines and standards were used:

- Town of Oakville, Development Engineering Procedures and Guidelines Manual;
- Development Engineering Procedures and Guidelines Manual Addendum #1 (January 2017);
- North Oakville Sustainable Development Checklist & User Guide – Subdivision and Site Level Design, prepared by the Town of Oakville (May 2008);
- Conservation Halton Policies and Guidelines for the Administration of Ontario Regulation 162/06 (November 2020);
- Conservation Halton Guidelines for Stormwater Management Engineering Submissions (May 2021);
- Halton Region, Water and Wastewater Linear Design Manual, version 4.0 (April 2019);
- Ministry of Environment, Conservation and Parks (MECP) Stormwater Management Planning and Design Manual (March 2003); and
- Ministry of Transportation (MTO) Drainage Management Manual (1997).

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

- Preliminary Geotechnical Investigation, prepared by WSP (February 2021); and
- Proposed Halton Region Paramedic Services – Station No. 15 Stormwater Management Report, prepared by MGM Consulting Inc. (August 2017).

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

- Woodside Drive – Storm Drainage Area Plan No. R-358-00-03, prepared by Trafalgar Engineering Ltd., dated March 2001;

- Woodside Drive – Rebecca to Sta. 0+320 No. 946P1, prepared by Trafalgar Engineering Ltd., dated March 2001;
- Rebecca Street – Watermain Replacement Drawing No. PR-1452, prepared by Marshall Macklin Monaghan Ltd., dated July 1993;
- Rebecca Street –Plan & Profile Showing Proposed Storm Sewer from Third Line Road to Fourteen Mile Creek Drawing No. 2, prepared by Franklin McArthur Associates Ltd., dated February 1958; and
- Utility Investigation, prepared by R&B Locating, dated December 2020.

The above listed drawings have been included in **Appendix B.**

2.0 STORM SERVICING

2.1 Existing Storm Sewer System

As indicated in the utility investigation prepared by R&B Locating and the record drawings (**Appendix B**), the sizes and locations of the existing municipal storm sewers surrounding the site are:

- An 1800 mm diameter concrete storm sewer on Rebecca Street flowing northeast; and
- A 375 mm diameter PVC storm sewer on Woodside Drive flowing southeast.

The existing lands drain southwest via overland flow to the neighbouring Patricia-Picknell Elementary School grounds, where the flows are captured by a ditch inlet catchbasin and conveyed to the existing 375 mm diameter storm sewer on Woodside Drive. Please refer to **Section 3.2** for further discussion of the existing drainage.

As presented in the Town of Oakville Stormwater Management Master Plan, the existing 1800 mm diameter sewer on Rebecca Street is surcharged in the 5 year storm event to an elevation above the pipe obvert but below the manhole rim elevation. A figure showing the results of the Town's capacity assessment is included in **Appendix D**. Based on the Town's Construction Projects web page, there are no works planned in the near future to upgrade the existing storm sewer system.

The Town's SWM Master Plan identifies the existing 375 mm diameter sewer on Woodside Drive as not surcharged in the 5 year storm. This is likely based on the drainage plan prepared by Trafalgar Engineering Ltd (**Appendix B**), which accounted for 0.33 ha of drainage from 1258 Rebecca Street. However, based on the site survey, the entire site area of 0.66 ha plus 0.04 ha of external area currently drains to the Woodside Drive sewer. The Existing Woodside Drive Design Sheet is included in **Appendix D**. The analysis shows that the 375 mm diameter sewer is surcharged at 103% of the pipe capacity during the 5 year storm event under existing conditions.

2.2 Proposed Storm Sewer System

The storm sewer system (minor system) for the proposed development will be designed for the 5 year return storm per the Town of Oakville standards. The storm sewer system will be designed in accordance with the Town of Oakville, Ontario Building Code and MECP guidelines, including the following:

- Minor System Conveyance: 5 Year
- Major System Conveyance: 100 Year
- Time of Concentration: 10 minutes
- Minimum Pipe Size: 300 mm diameter
- Minimum Slope: 0.30%
- Minimum / Maximum Velocity: 0.75 m/s - 4.0 m/s

- Minimum Pipe Cover: 1.20 m (frost cover)

The rainfall intensity will be determined using the values from Table 3.1 of the Town of Oakville Development Engineering Procedures and Guidelines Manual dated January 2011 as shown in **Table 2.2**:

Table 2.2 – Rainfall Intensity Parameters

Return Period Storm	A	B	C
2 Year	725	4.8	0.808
5 Year	1170	5.8	0.843
10 Year	1400	5.8	0.848
25 Year	1680	5.6	0.851
50 Year	1960	5.8	0.861
100 Year	2150	5.7	0.861

The preliminary storm sewer layout is shown on **Figure 2.1**. Flows captured from the independent living community are proposed to be conveyed to the existing 375 mm diameter Woodside Drive storm sewer. The proposed storm service connection for the independent living community will be routed through the neighbouring Paramedic Services Station property, which is owned by Halton Region. The requirement for an easement through the neighbouring property will be determined at the detailed design stage. The proposed service connection will have sufficient depth to service the subject site.

Stormwater from the front yards of the three single family lots is proposed to drain via overland flow to the Rebecca Street right-of-way. Stormwater from the remaining area of the single family lots is proposed to drain via overland flow to the private storm sewer system within the independent living community and ultimately outlet to Woodside Drive. The proposed storm drainage is shown on **Figure 3.2**.

The allowable release rate to the Woodside Drive storm sewer will be 81.4 L/s based on the existing drainage conditions. As shown in the Proposed Woodside Drive Design Sheet (**Appendix D**), the proposed development will not worsen the existing surcharge conditions in the downstream sewer system. Please refer to **Section 3.3** for further discussion of the allowable release rate.

The front yards of the single-family lots will drain uncontrolled to the Rebecca Street right-of-way at a rate of 16.7 L/s in the 100 year storm. This flow corresponds to 0.3% of the existing 1800 mm diameter sewer capacity, and is only a marginal increase in flow. Therefore, the impact on the existing surcharged condition will be minimal. Please refer to the Proposed Rebecca Street Design Sheet in **Appendix D** for further details.

3.0 STORMWATER MANAGEMENT

3.1 Stormwater Runoff Control Criteria

The following stormwater runoff control criteria have been established based on the greatest requirements of each of the design guidelines and standards listed in **Section 1.3**. The stormwater runoff criteria are summarized below in **Table 3.1**.

Table 3.1: Stormwater Runoff Control Criteria

Criteria	Control Measure
Quantity Control	Control proposed peak flows to existing peak flows for the 2 through 100 year storm events. Where runoff is conveyed to an existing storm sewer, limit the maximum peak flow to the existing 5 year storm event peak flow (Conservation Halton).
Quality Control	MECP Enhanced Level Protection (80% TSS Removal).
Erosion Control	Detention/retention of the 25 mm rainfall runoff for a minimum of 24 hours. For smaller site, demonstrate that the use of pipe storage, infiltration, evapotranspiration, and on-site re-use of runoff has been applied to the extent feasible to reduce erosion potential (Conservation Halton).
Water Budget	Replicate/maintain as closely as possible existing hydrologic conditions by maintaining a balance between infiltration, runoff and evapotranspiration and minimize negative impacts to groundwater (Conservation Halton).

3.2 Existing Drainage

The existing lands (0.70 ha) drain southwest via overland flow to an existing ditch at the southwest corner of the site via an existing ditch system (Catchment 102 and External Catchment EXT-1 on **Figure 3.1**). Flow in the existing ditch is captured via an existing ditch inlet catchbasin (DICB) which is connected to the existing 375 mm diameter storm sewer on Woodside Drive and outlets to the Sedgewick Forest and ultimately to Lake Ontario.

3.3 Allowable Release Rate

The allowable release rate for the proposed development has been established based on controlling the proposed peak flows to existing peak flows for the 2 through 100 year storm events however, where runoff is conveyed to an existing storm sewer, the maximum peak flow is limited to the existing 5 year storm event peak flow.

As mentioned in **Section 3.2**, existing drainage from the development and external drainage area, (0.66 ha and 0.04 ha, respectively) **Figure 3.1**, drains to the existing storm sewer on

Woodside Drive. The 5 year flow from the proposed development (and external area) is 81.4 L/s.

As mention in **Section 2.2**, the Woodside Drive storm sewer system design accounted for 0.33 ha of drainage from the site, per the Woodside Drive Storm Drainage Area Plan previously completed by Trafalgar Engineering Ltd (March 2001) (refer to the excerpt in **Appendix B**). A downstream storm sewer analysis of the Woodside Drive storm sewer was completed and results in a surcharged condition.

The downstream storm sewer analysis was updated to include the existing drainage of 0.70 ha which enters the Woodside Drive storm sewer to determine the impacts. The analysis determined that the existing development will not worsen the surcharge condition within the existing Woodside Drive storm sewer as outlined within **Section 2.2**. As such, the allowable release rate is to control proposed peak flows to the existing 5 year peak flow of 81.4 L/s.

The rational method was used to determine the target release rate from the site based on Intensity-Duration-Frequency (IDF) rainfall curves from the Town of Oakville Design Standards. Supporting calculations are provided in **Appendix E**.

3.4 Stormwater Best Management Practices Selection

In accordance with the Ministry of Environment Stormwater Management Planning and Design Manual (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 potential best management practices were evaluated based on the stormwater management objectives listed in **Table 3.1**.

The following study area characteristics were taken into consideration:

- The existing site is mostly undeveloped open space with some existing paved areas;
- Based on the Geotechnical investigation, study area soils consist of 50 – 130 mm layers of topsoil over fill materials extending to depths of 0.8 m to 1.5m. The fill materials are overlain by native silty clay till extending to depths ranging from 1.9m to 2.6 m., which is underlain by shale bedrock;
- Within the installed site wells, groundwater was observed at depths ranging between 1.82 m to 2.77 m below existing grade; and
- The proposed site plan development is approximately 0.66 ha and consists of three single detached lots fronting onto Rebecca Street, fourteen single storey semi-detached units and a proposed laneway.

The following are examples of lot-level, conveyance and end-of-pipe controls that will be evaluated for use in the proposed development. While evaluating the following controls, cost, feasibility, groundwater and grading constraints will be taken into consideration.

Lot-Level Controls

Lot-level controls are at-source measures that reduce runoff prior to stormwater entering the conveyance system, such as:

- Increased topsoil depth;
- Roof leaders to grassed areas;
- At-source storage (i.e. rooftop or parking lot storage);
- Pervious pavements;
- Infiltration trenches/soak-away pits.

Conveyance Controls

Conveyance controls provide treatment of stormwater during the transport of runoff from individual lots to the receiving watercourse or end-of-pipe facility. Examples of conveyance controls include:

- Grassed Swales;
- Pervious pipe system.

End-of-Pipe Controls

End-of-pipe stormwater management facilities receive stormwater flows from a conveyance system (i.e., storm sewers or ditches) and provide treatment of stormwater prior to discharging flows to the receiving watercourse. Typical end-of-pipe controls include:

- Wet ponds;
- Wetlands;
- Dry ponds;
- Infiltration basins; and
- Underground storage.

A comprehensive assessment of LID practices will be provided in support of the Site Plan Application. The development consists of a private road, three single detached lots and fourteen single storey semi-detached units. It is noted that the site has high groundwater levels and the opportunity for infiltration based LIDs are limited. However, a large portion of the private road consists of permeable pavers, therefore infiltration opportunities within the permeable pavers will be explored at the Site Plan Application stage in addition to grassed swales within the single detached lots and increased topsoil depth.

At the detailed design stage, a water balance evaluation will be incorporated into the detailed stormwater management report that discusses the selection of LIDs in accordance with the Town of Oakville Engineering Design Criteria and Conservation Halton guidelines, and quantifies the proposed rainwater retention volume.

3.5 Proposed Storm Drainage

The proposed major and minor system flow patterns and drainage areas are shown on **Figure 3.2**. As illustrated, runoff from the proposed development will be conveyed to the existing Woodside Drive storm sewer. Major and minor system flows from the front portion of the proposed lots on Rebecca Street (Catchment 203, **Figure 3.2**) will drain uncontrolled to Rebecca Street. Major and minor system flows from the rear portion of the proposed lots on Rebecca Street (Catchment 202, **Figure 3.2**) will drain uncontrolled to the private road storm sewer system. Drainage from the remainder of the proposed development (Catchment 201, **Figure 3.2**) will be captured via a proposed internal storm sewer system which will connect to the existing Woodside Drive sewer system.

3.5.1 Quantity Control

Quantity control for the proposed development will be required to control proposed runoff back to the allowable release rates to the Woodside Drive storm sewer. The allowable release rate for the proposed development, as identified in **Section 3.3**, is to be achieved by utilizing an orifice plate and providing on-site storage of stormwater. Preliminary calculations have been completed and require approximately 176 m^3 of storage, refer to calculations in **Appendix E**. This can be achieved through underground storage in the form of an oversized super pipe, 1.5 m x 1.2 m box culvert. Details will be provided at the Site Plan application stage.

3.5.2 Quality Control

Quality control for the proposed development will be required to be provided on-site. This will be achieved through a combination of on-site LID's and a manufactured treatment device.

Quality control for runoff from the proposed development, Catchments 201 and 202 (**Figure 3.2**) will be provided by a treatment train of Best Management (BMP) techniques which could include additional topsoil depth on all grassed areas, permeable pavers, and grassed swale with an end-of-pipe manufactured treatment device, i.e. Jellyfish Unit JF4-2-1 model or approved equivalent. The manufactured treatment device has been sized to achieve Enhanced level quality control (80% TSS removal) as requested by the Town of Oakville (correspondence provided in **Appendix B**).

3.5.3 Erosion Control

As mentioned within **Section 3.1**, detention/retention of the 25 mm rainfall runoff for a minimum of 24 hours is required. However, for smaller sites, demonstrate that the use of pipe storage, infiltration, and evapotranspiration, and on-site re-use of runoff has been applied to the extent feasible to reduce erosion potential. As the proposed site is 0.66 ha, detention/retention of the 25 mm storm event would be challenging. Every extent possible to detain/retain the 25 mm storm event will be investigated and detailed at the site plan application stage via on-site storage within the proposed superpipe and infiltration within the permeable pavers.

3.5.4 Water Balance

Where feasible, measures to minimize impacts on the water budget will be incorporated into the proposed development design.

As noted in **Section 2.1**, the minimum criteria is to maintain existing hydrology function. Proposed BMP's will be fully explored at site plan application stage and a water balance will be completed to determine the existing, proposed and proposed with mitigation infiltration values. As mentioned within **Section 3.4**, potential preliminary BMP's include infiltration within the permeable pavers, increased topsoil depth and grassed swales.

4.0 SANITARY SERVICING

4.1 Existing Sanitary Sewer System

As indicated in the utility investigation prepared by R&B Locating (**Appendix B**), the sizes and locations of the existing sanitary sewers surrounding the site are:

- A 525 mm diameter vitrified clay sanitary sewer on Rebecca Street flowing northeast;
- A 1350 mm diameter concrete sanitary sewer on Woodside Drive flowing south; and
- A 200 mm diameter PVC sanitary sewer on Woodside Drive flowing south.

The subject site previously had a church building which has now been demolished, but was serviced from the existing 525 mm diameter sewer on Rebecca Street, as shown in the record drawings. Based on the Town of Oakville design criteria, the church would have generated a peak flow of approximately 0.48 L/s. The sanitary flow calculations are included in **Appendix F**.

4.2 Proposed Sanitary Sewer System

The proposed sanitary sewer system for the subject development is illustrated on **Figure 2.1**. The independent living community is proposed to be serviced from the existing 525 mm sanitary sewer on Rebecca Street via a new control manhole at the property line. The three single family lots will also be provided with individual service connections to the 525 mm sanitary sewer per Halton Region standards. The proposed service connections will have approximately 2.5 m of cover at the property line, which is sufficient to service the development.

The sanitary sewers within the site will have slopes ranging between 0.5% and 2% (typically) and will be provided at 2.5 m to 1.5 m deep. The sanitary sewer system will be designed in accordance with the Halton Region and MECP criteria, including but not limited to:

- Residential Sanitary Generation Rate: 275 L/cap/day
- Residential Population Density:
  - 55 persons/ha (Single-family)
  - 100 persons/ha (Semi-detached)
- Peaking Factor: Modified Harmon’s Equation (Min = 2.0)
- Infiltration Rate: 0.286 L/s/ha
- Minimum Pipe Size: 200 mm diameter
- Minimum Velocity: 0.6 m/s
- Maximum Velocity: 3.0 m/s

Based on the design criteria, the proposed site is expected to generate a flow of 0.96 L/s. The net increase in sanitary flow from the development is 0.47 L/s. This increase in flow corresponds to 0.2% of the existing 525 mm sewer capacity. The proposed flow rate is only marginally higher than the existing condition, and therefore the impact on the existing downstream system will be minimal.

Please refer to the sanitary flow calculations in **Appendix F** for further details.

5.0 WATER SUPPLY AND DISTRIBUTION

5.1 Existing Water Distribution

As indicated in the record drawings (**Appendix B**), the following existing watermains surround the site:

- A 600 mm diameter concrete watermain on the northwest side of Rebecca Street;
- A 150 mm diameter PVC watermain on the southeast side of Rebecca Street; and
- A 150 mm diameter watermain on the west side of Woodside Drive.

There are existing hydrants located on Rebecca Street approximately 20 m west and 63 m northeast of the subject site. A hydrant flow test will be completed in the spring in order to confirm the available flow and pressure in the existing water distribution system.

5.2 Proposed Water System

The subject development is proposed to be serviced from the existing 150 mm watermain on the southeast side of Rebecca Street. The three single family lots will be provided with individual service connections and water meters per Halton Region standards. The independent living community will be provided with a private water distribution system, with individual meters for each unit. The preliminary watermain layout is shown on **Figure 2.1**.

The proposed private water distribution system will be designed in accordance with Halton Region and MECP criteria, including but not limited to the following:

- Average Daily Demand: 0.275 m^3 per capita
- Residential Population Density:
  - 100 persons/ha (semi-detached)
  - 55 persons/ha (single family)
- Peaking Factors:
  - Maximum Day = 2.25
  - Maximum Hour = 4.00
- Minimum Pipe Size: 150 mm diameter
- Minimum Pipe Cover: 1.70 m
- Maximum Hydrant Spacing: 150 m (Residential)

Water demand and Fire Underwriters Survey (FUS) calculations can be found in **Appendix G**. The demands for each scenario analysed can be found in **Table 5.1** below. The available pressures in the existing system will be confirmed by hydrant flow test in the spring.

Table 5.1: Water Demands and Required Pressure Ranges

Scenario	Water Demand	Required Pressure Range
Average Day	0.18 L/s	350 – 550 kPa (Preferred) 275 – 700 kPa (Required)
Maximum Day	0.40 L/s	
Maximum Hour	0.71 L/s	
Fire Flow	6,000 L/min	≥ 140 kPa
Fire Flow + Maximum Day	6,024 L/min	

6.0 GRADING

6.1 Existing Grading Conditions

The existing site is relatively flat, with slopes ranging from 1.0 – 3.0% on average. There is an existing ditch in the southeast section of the site which drains south to the existing Patricia-Picknell Elementary School grounds. The ground surface elevations range from 88.90 in the northwest corner of the site to 87.75 in the south corner of the site.

6.2 Proposed Grading Concept

In general, the proposed development has been graded in a manner which satisfies the Town of Oakville lot and road grading criteria, creates the required depth for the sanitary sewer, as well as provision of an efficient earthworks program, including:

- Minimum Road Grade: 0.7%
- Maximum Road Grade: 6.0%
- Minimum Lot Grade: 2%
- Maximum Lot Grade: 5%
- Minimum Driveway Grade: 2%
- Maximum Driveway Grade: 8%
- Minimize the need for retaining walls
- Minimize the volume of earth to be moved and minimize cut/fill differentials
- Minimize the need for rear lot catchbasins
- Achieve the stormwater management objectives required for the proposed development.

A preliminary grading plan is provided on **Figure 6.1**. Details will be provided at the and site plan application stage.

At the detailed design stage, the preliminary grading shown on **Figure 6.1** will be subject to a more in-depth analysis in an attempt to balance the cut and fill volumes and minimize slopes and retaining walls.

7.0 EROSION AND SEDIMENT CONTROL DURING CONSTRUCTION

Erosion and sediment control measures will be designed at the detailed design stage. These measures may include temporary sediment control fencing, a construction access driveway, check dams and temporary sediment control facilities where required. These measures will be designed and constructed as per the "Erosion and Sediment Control Guide for Urban Construction" document (TRCA, 2019).

The detailed erosion and sediment control plan will be approved by the Town of Oakville prior to any site alteration being undertaken. The 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 properties and storm sewers is minimized both during and following construction.

8.0 SUMMARY

This Functional Servicing Report has outlined the means by which:

- The proposed development can be serviced from the existing municipal services (i.e. storm, sanitary and water) within the Rebecca Street and Woodside Drive rights-of way;
- The stormwater management criteria can be achieved; and
- The proposed development can be graded in a manner which satisfies the Town of Oakville grading criteria and the stormwater management requirements for this development.

Respectfully Submitted:

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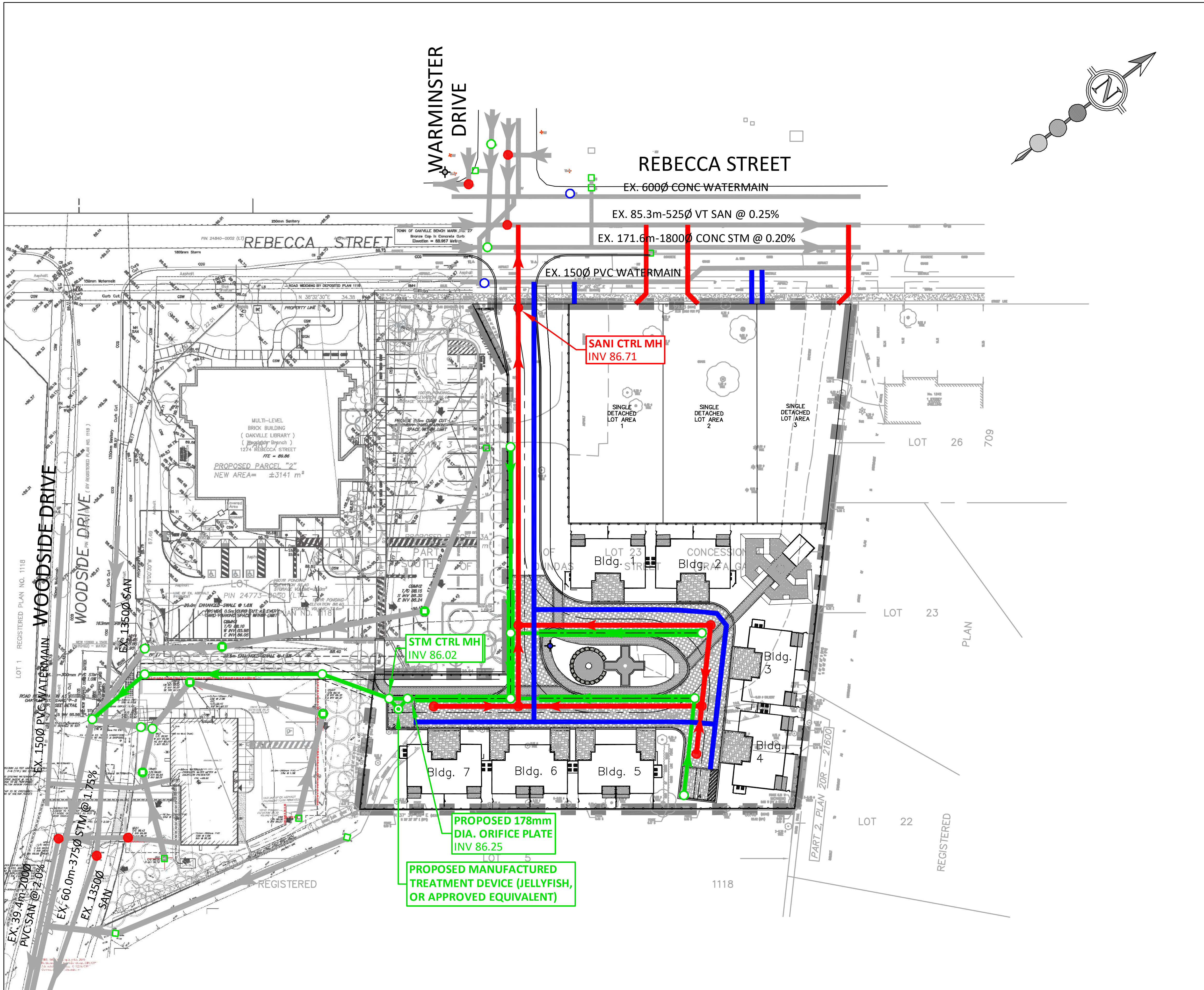

LEGEND:

- PROPERTY BOUNDARY
- PROPOSED STORM SEWER / MANHOLE
- PROPOSED JELLYFISH TREATMENT UNIT
- PROPOSED 1200x1500 BOX CULVERT
- PROPOSED SANITARY SEWER / MANHOLE
- PROPOSED WATERMAIN
- PROPOSED HYDRANT
- EXISTING STORM SEWER / MANHOLE
- EXISTING SANITARY SEWER / MANHOLE
- EXISTING WATERMAIN / CHAMBER
- EXISTING HYDRANT
- PERMEABLE PAVER

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

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HALTON REGION

1258 REBECCA STREET, OAKVILLE

PRELIMINARY SERVICING PLAN

DESIGNED BY:	M.L.M.	CHECKED BY:	P.G.
SCALE:	1:750	DATE:	APRIL 2022
PROJECT No:	2480	FIGURE No:	2.1

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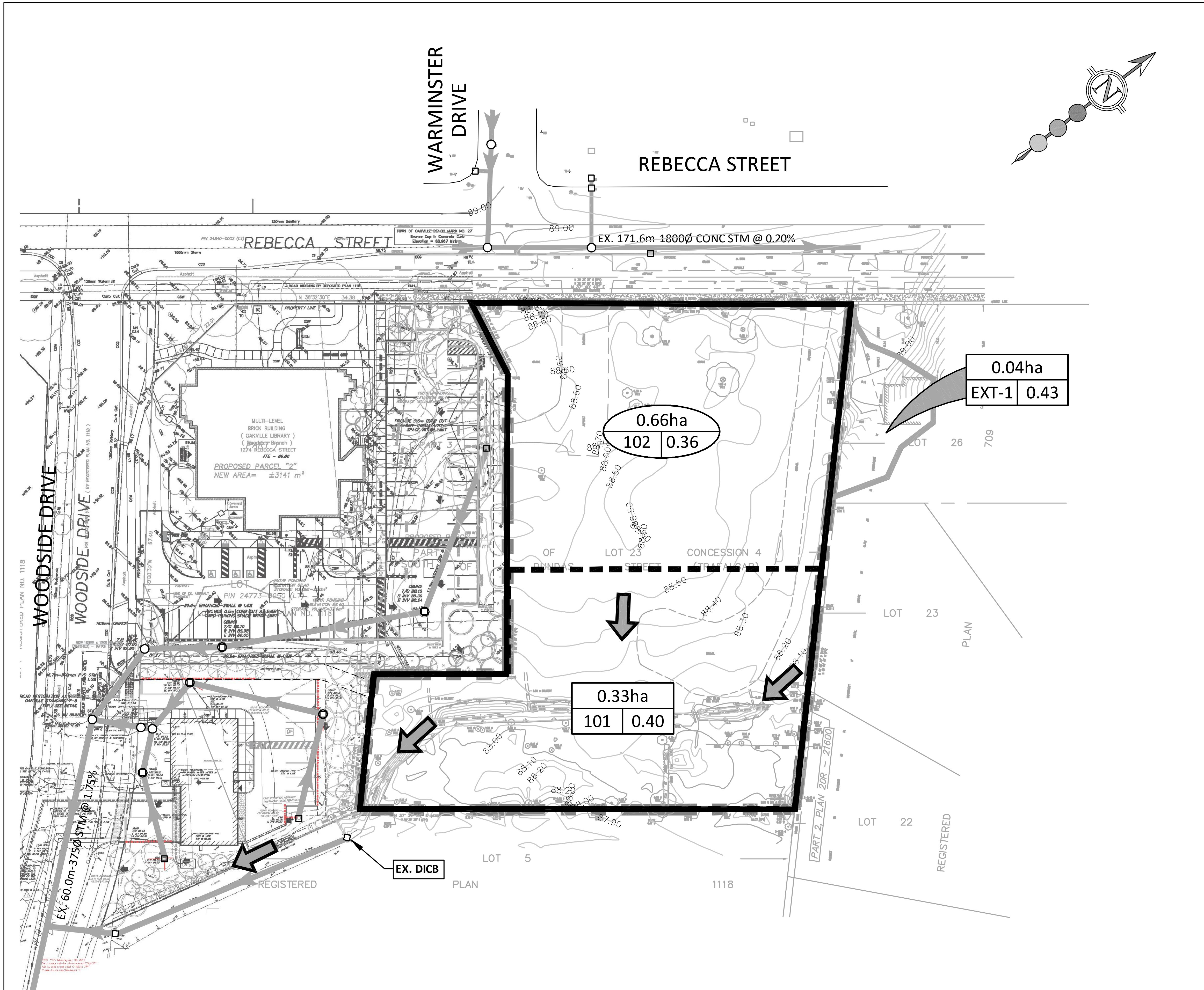

LEGEND:

PROPERTY BOUNDARY

STORM DRAINAGE BOUNDARY

EXTERNAL STORM DRAINAGE BOUNDARY

0.66ha / 102 | 0.36 — DRAINAGE AREA (HECTARES); RUNOFF COEFFICIENT; CATCHMENT ID

MAJOR SYSTEM FLOW

255.50 — EXISTING CONTOUR

EXISTING STORM SEWER AND MANHOLE

0.04ha / EXT-1 | 0.43 — EXTERNAL STORM DRAINAGE AREA (HECTARES); RUNOFF COEFFICIENT; CATCHMENT ID

DRAINAGE AREA ACCOUNTED FOR WITHIN WOODSIDE DRIVE SEWER PER MUNICIPAL DRAWING NO. R-358-00-03 PREPARED BY TRAFALGAR ENGINEERING LTD.

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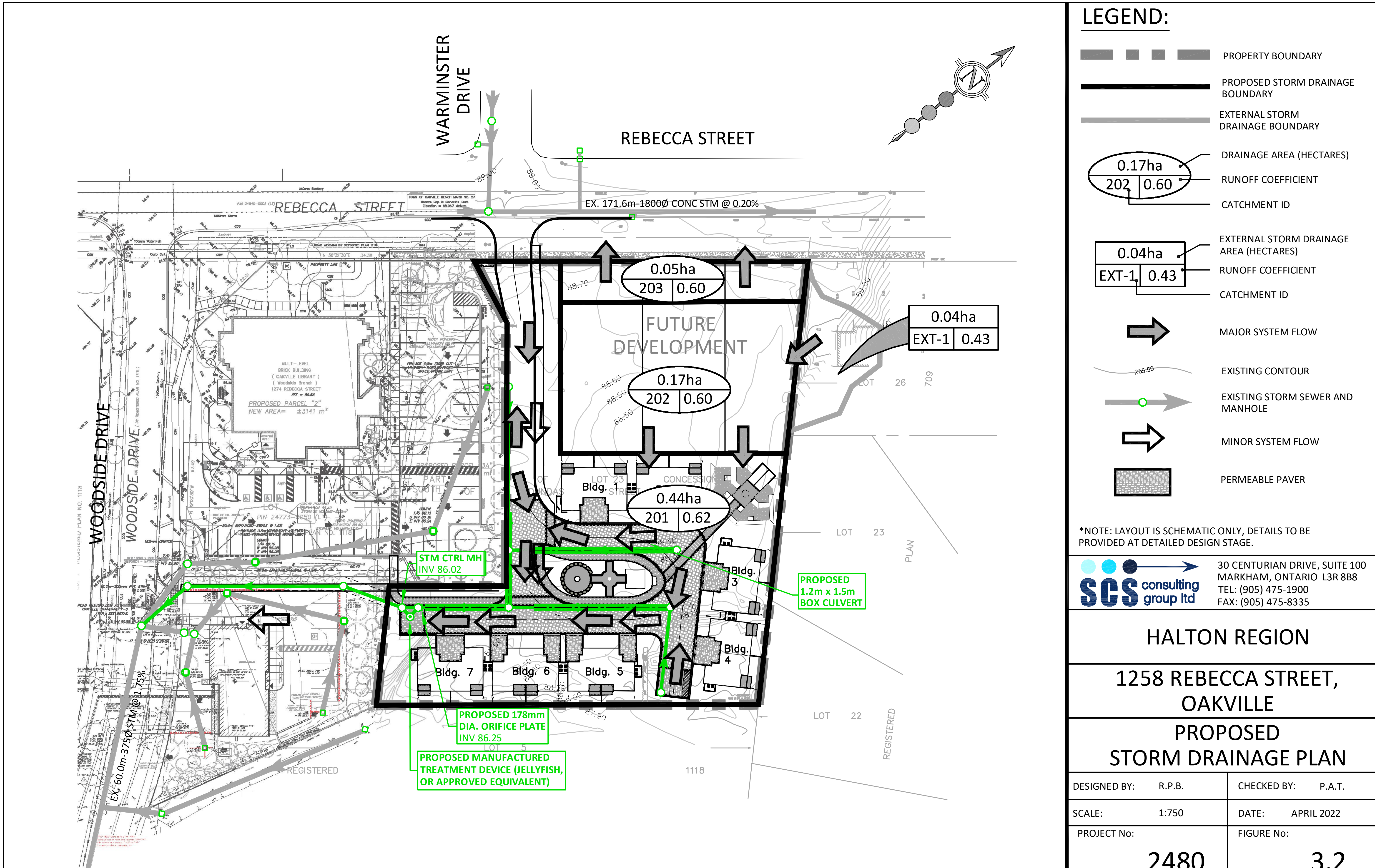
HALTON REGION

1258 REBECCA STREET, OAKVILLE

EXISTING STORM DRAINAGE PLAN

DESIGNED BY:	R.P.B.	CHECKED BY:	P.A.T.
SCALE:	1:750	DATE:	APRIL 2022
PROJECT No:	2480	FIGURE No:	3.1



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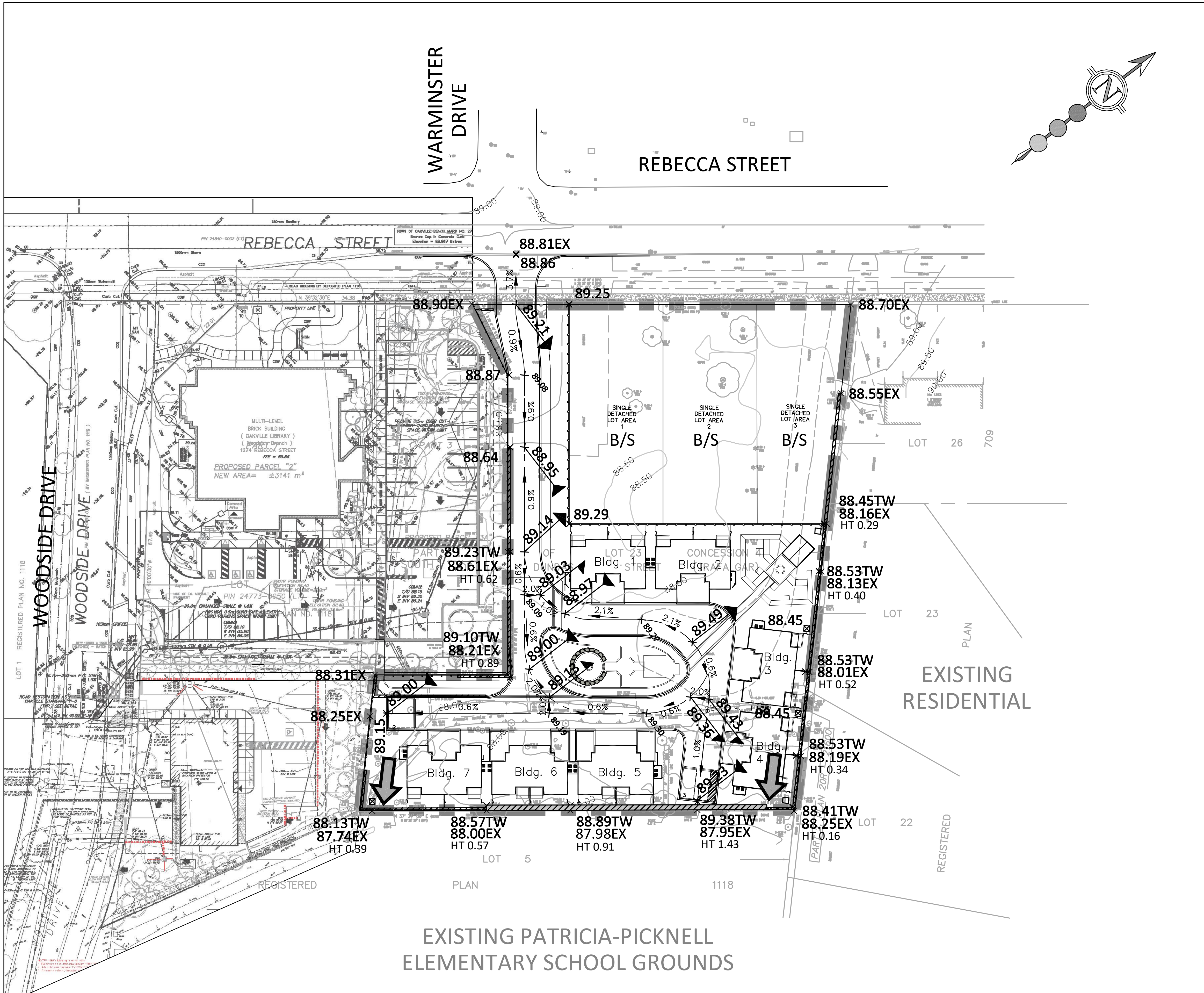
HALTON REGION

1258 REBECCA STREET, OAKVILLE

PROPOSED STORM DRAINAGE PLAN

DESIGNED BY:	R.P.B.	CHECKED BY:	P.A.T.
SCALE:	1:750	DATE:	APRIL 2022
PROJECT No:	2480	FIGURE No:	3.2



LEGEND:

	PROPERTY BOUNDARY
× 89.23	PROPOSED ELEVATION
× 89.23TW	PROPOSED TOP OF WALL ELEVATION
× 89.23EX	EXISTING ELEVATION
HT 0.40	WALL HEIGHT (m)
	PROPOSED TOE WALL
	PROPOSED RETAINING WALL
	REAR LOT CATCHBASIN
	EMERGENCY OVERLAND FLOW DIRECTION
255.50	EXISTING CONTOUR
B/S	LOT TO BE GRADED AS BACK SPLIT

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

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HALTON REGION

1258 REBECCA STREET, OAKVILLE

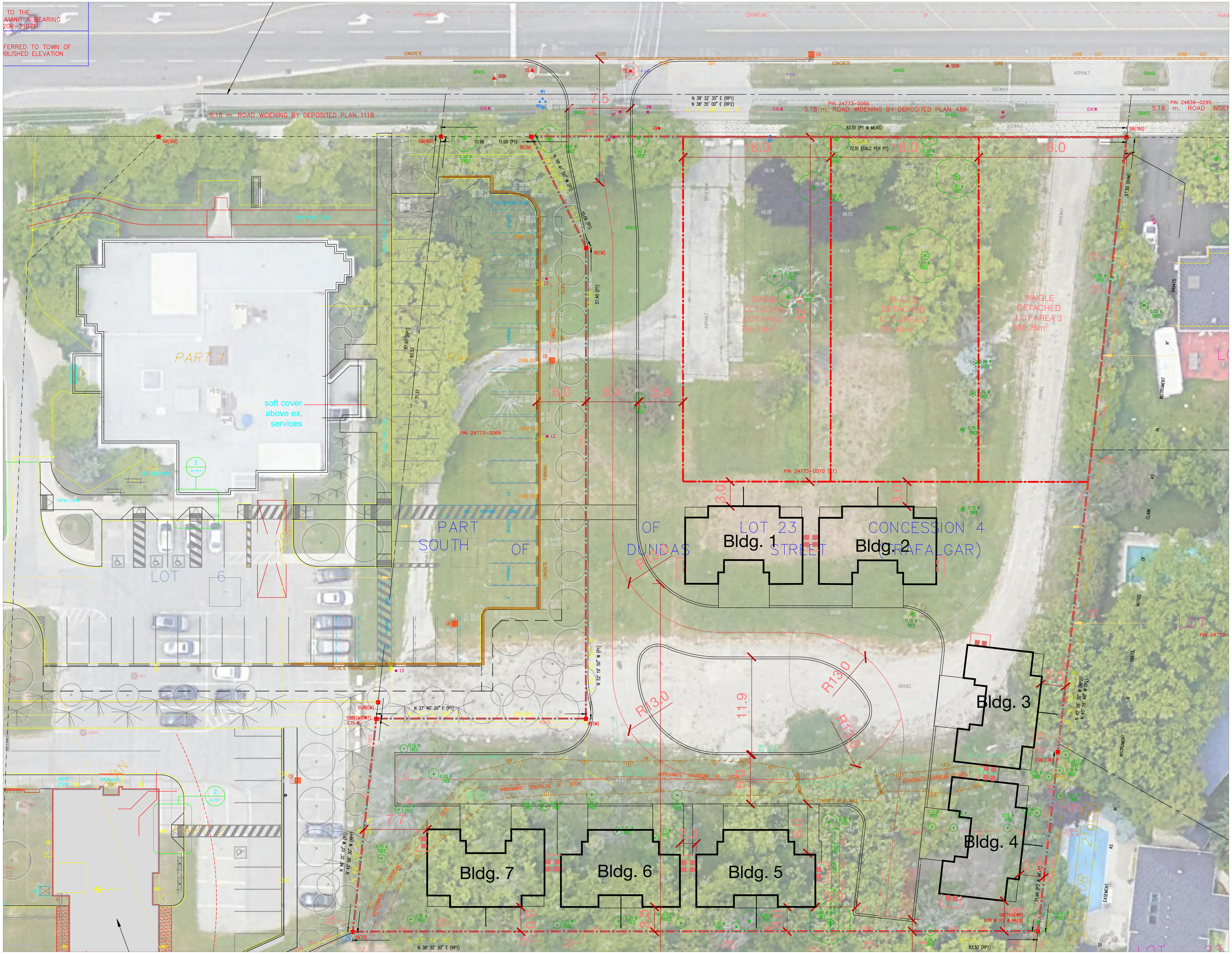
PRELIMINARY GRADING PLAN

DESIGNED BY:	M.L.M.	CHECKED BY:	P.G.
SCALE:	1:750	DATE:	APRIL 2022
PROJECT No:	2480	FIGURE No:	6.1

File: P:\2480 1258 Rebecca Street Oakville – Halton Region\Drawings\FSP\Fig\Report Figures\2480P-GRAD-6.1.dwg – Revised by <MMCCLYMONT> : Fri, Apr 22 2022 – 12:06pm

APPENDIX A

SITE PLAN



1258 REBECCA OAKVILLE

CONCEPT PLAN

TOTAL SITE AREA:	6,597.00sm
18.0m SINGLE DETACHED:	2,169.14sm
SEMI DETACHED:	4,427.86sm

UNITS
SINGLE DETACHED: 3 units
SEMI (TWO SINGLE DWELLINGS): 14 units
TOTAL UNITS/DWELLINGS: 17 units

TOTAL FSI: 25.77 units/ha
SINGLE DETACHED FSI: 13.8 units/ha
SEMI FSI: 31.6 units/ha

LOT AREA (FLOORPLATE | COVERAGE)
SINGLE-DETACHED LOT 1 AREA:
755.45sm (333sm | 44%)

SINGLE-DETACHED LOT 2 AREA:
755.44sm (383sm | 51%)

SINGLE-DETACHED LOT 3 AREA:
658.25sm (297sm | 45%)

SEMI-DETACHED LOT AREA:
4,427.86sm (826sm | 19%)

0 5m 10m 20m

No.	REVISION	DATE	BY

CLIENT
HALTON REGION

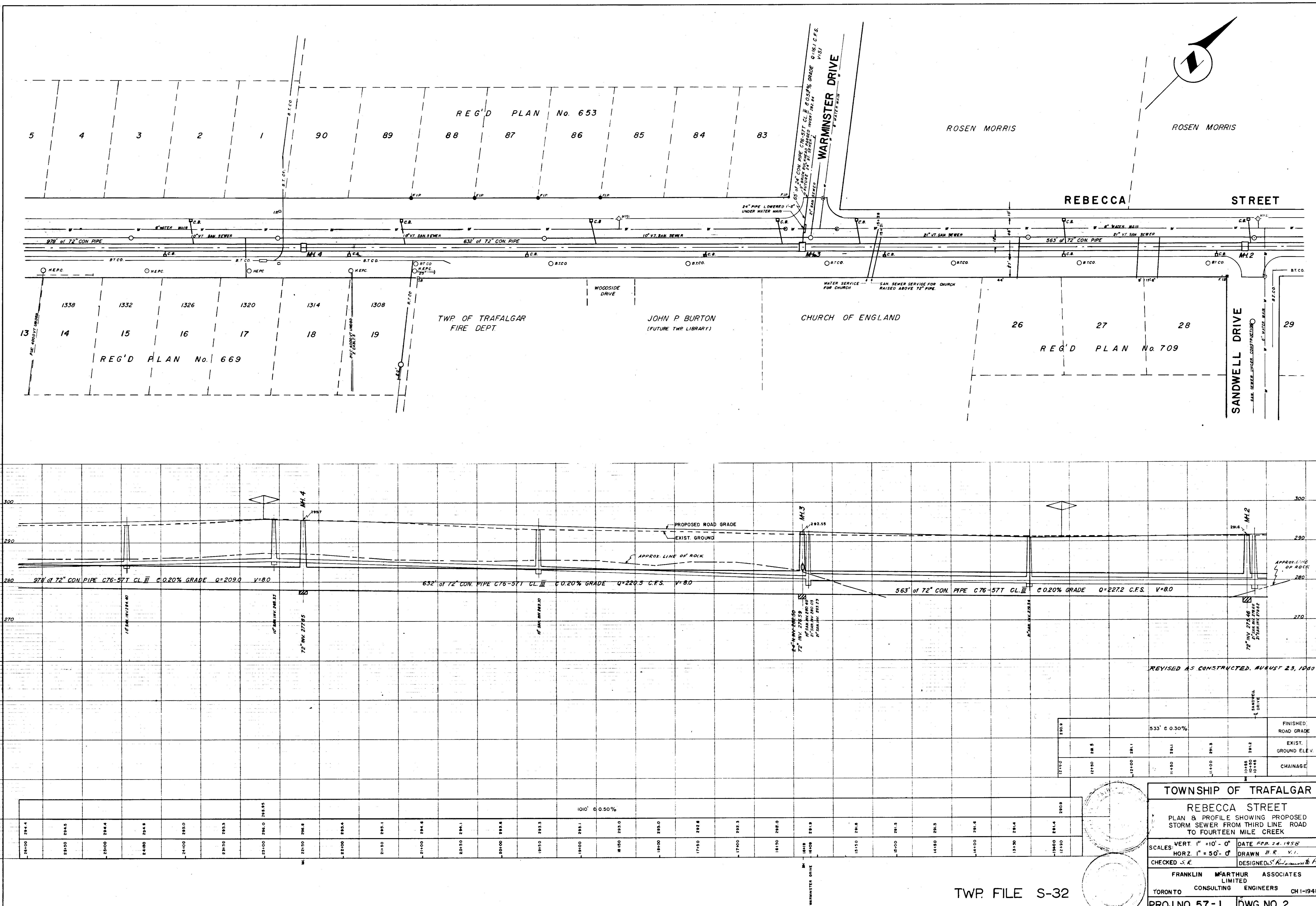
FOTENN
Planning + Design
174 Spadina Ave, Suite 304, Toronto ON M5T 2C2
416.789.4530 www.fotenn.com

DESIGNED	UMG
REVIEWED	UMG
DATE	2022.02.31

P4

APPENDIX B

RECORD DRAWINGS AND BACKGROUND INFORMATION



TOWNSHIP OF TRAFALGAR

REBECCA STREET

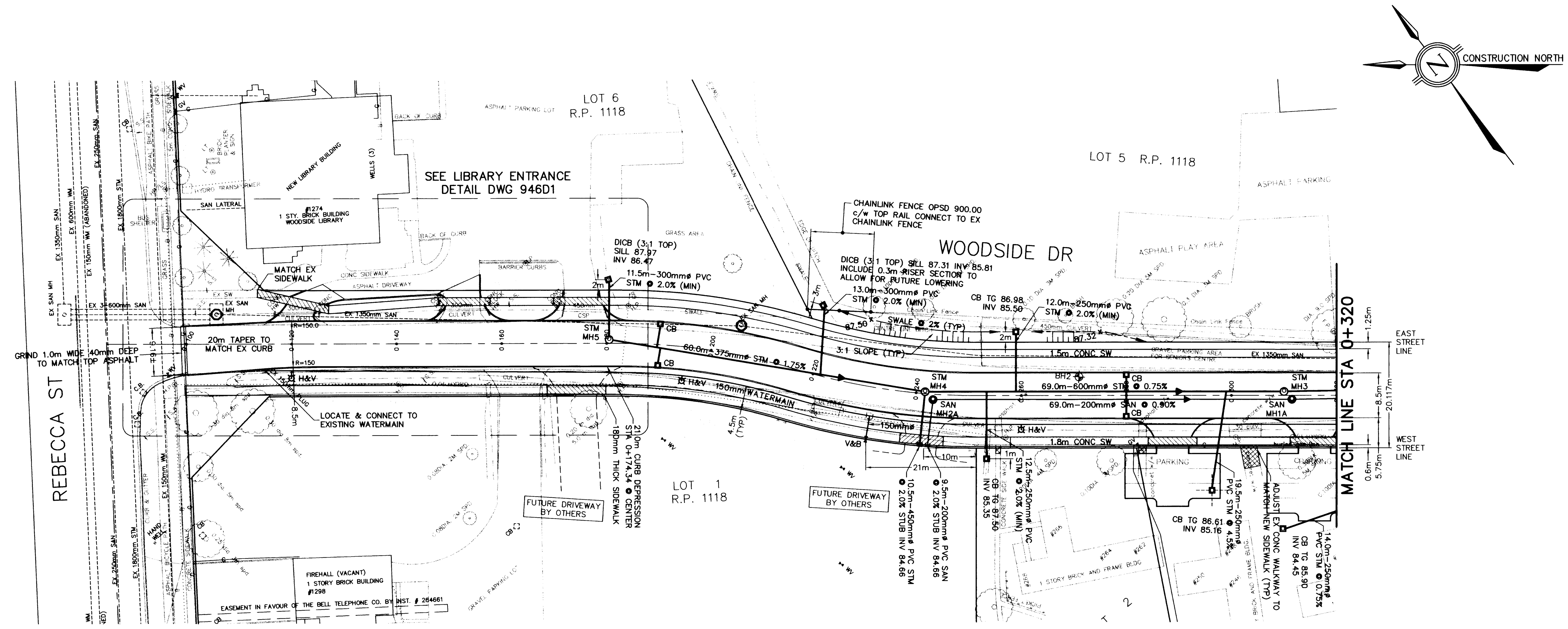
PLAN & PROFILE SHOWING PROPOSED STORM SEWER FROM THIRD LINE ROAD TO FOURTEEN MILE CREEK

SCALES: VERT. 1" = 10'-0" HORZ. 1" = 50'-0"	DATE FEB. 24. 1958
	DRAWN B.R. V.I.
CHECKED S.R.	DESIGNED

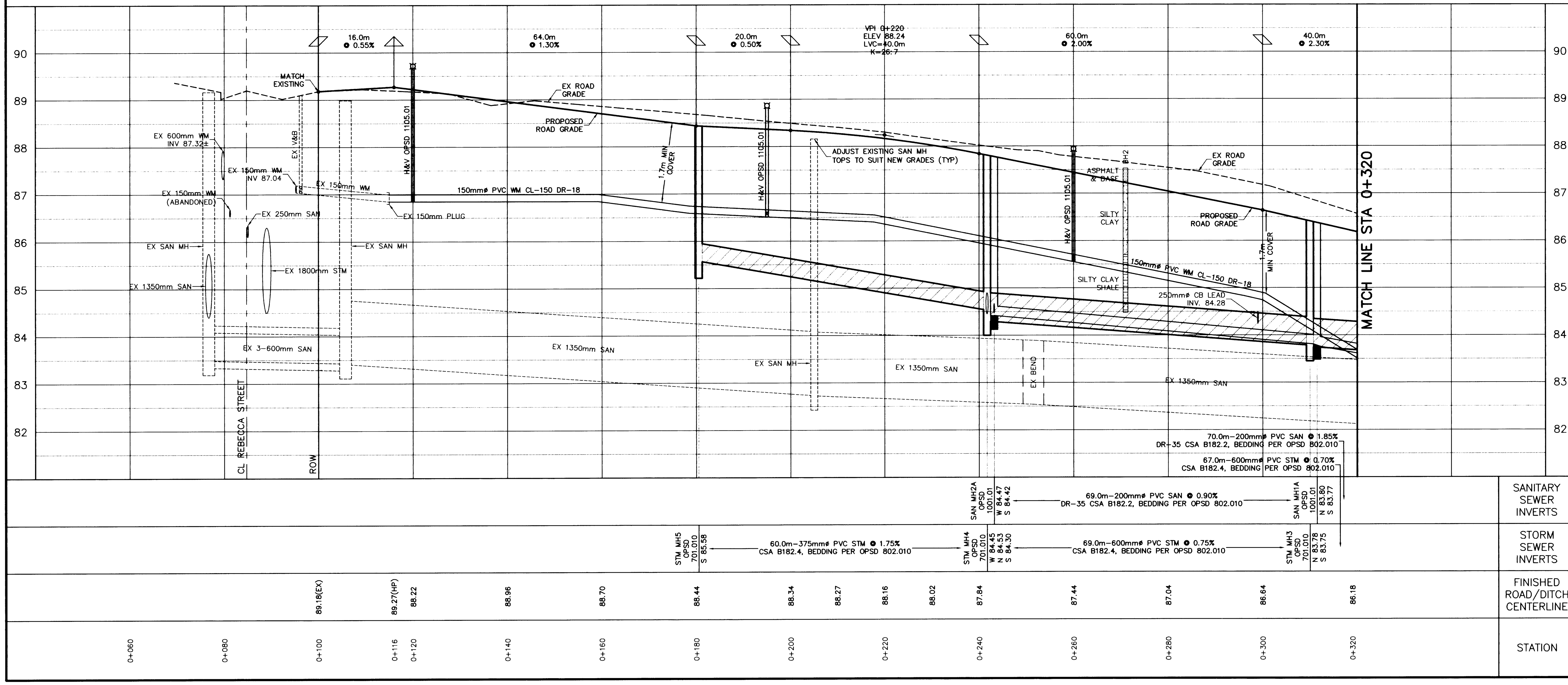
FRANKLIN McARTHUR ASSOCIATES LIMITED
TORONTO CONSULTING ENGINEERS CH1-1948

PROJ. NO. 57-1 DWG. NO. 2

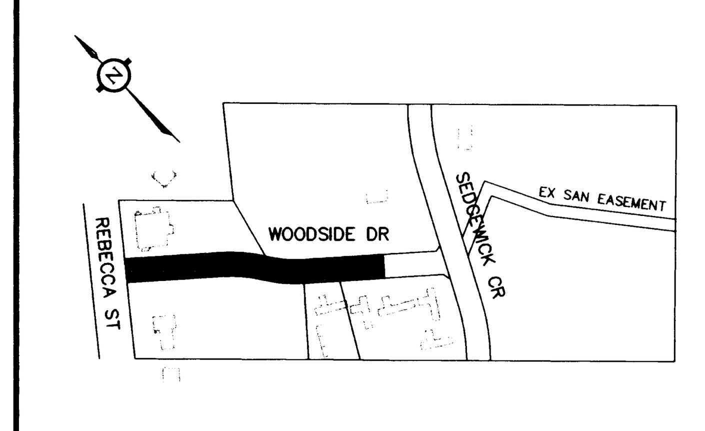
R-358-00-06



WOODSIDE DRIVE



KEY PLAN



LEGEND

- PROPOSED CATCHBASIN
- PROPOSED STORM MANHOLE
- PROPOSED SANITARY MANHOLE
- PROPOSED FIRE HYDRANT
- PROPOSED VALVE & BOX
- PROPOSED STORM SEWER
- PROPOSED SANITARY SEWER
- PROPOSED CHAINLINK FENCE
- PROPOSED SNOW FENCE
- PROPOSED GUIDE RAIL
- PROPOSED 180mm THICK SIDEWALK
- PROPOSED SIDEWALK ADJUSTMENT
- PROPOSED CURB DEPRESSION
- PROPOSED ADJUST MANHOLE OR VALVE

NOTE
FOR GENERAL NOTES AND DETAILS REFER TO DWG 946D1

BENCHMARK
ALL BENCH MARK INFORMATION DERIVED FROM TOWN OF OAKVILLE BENCHMARK #36 HAVING AN ELEVATION OF 94.369

No	Date	By/DRN	REVISIONS
3	MAR/27/01	SP/dk	SANITARY LATERAL LOWERED
2	FEB/23/01	SP/dk	REVISED PER TOWN/REGION COMMENTS
1	JAN/16/01	SP/dk	REVISED PER TOWN/REGION COMMENTS

Design DB	Chk'd SP	Cad File	946P1
Drawn DK	Chk'd SP	Plot Date	MAR/29/01

Scale HOR 1:500, VER 1:50

References

APPROVALS

Municipal
APPROVED IN PRINCIPLE SUBJECT TO DETAIL CONSTRUCTION CONFORMING TO TOWN OF OAKVILLE STANDARDS AND SPECIFICATIONS.
Date: March 30/01
R.G.GREEN, Director of Public Works

Field Notes
Bell ☐ Hydro ☒
Gas ☐ Cable ☒
Traf. ☐ Water ☐

Regional
DESIGN OF WASTEWATER & WATER SERVICES APPROVED SUBJECT TO DETAIL CONSTRUCTION CONFORMING TO HALTON REGION STANDARDS & SPECIFICATIONS & LOCATION APPROVAL FROM AREA MUNICIPALITY
Signed: Date: March 30, 2001
Planning & Public Works Department

Stamp
LICENSED PROFESSIONAL ENGINEER
29-3-01
S. L. POTTER
PROVINCE OF ONTARIO

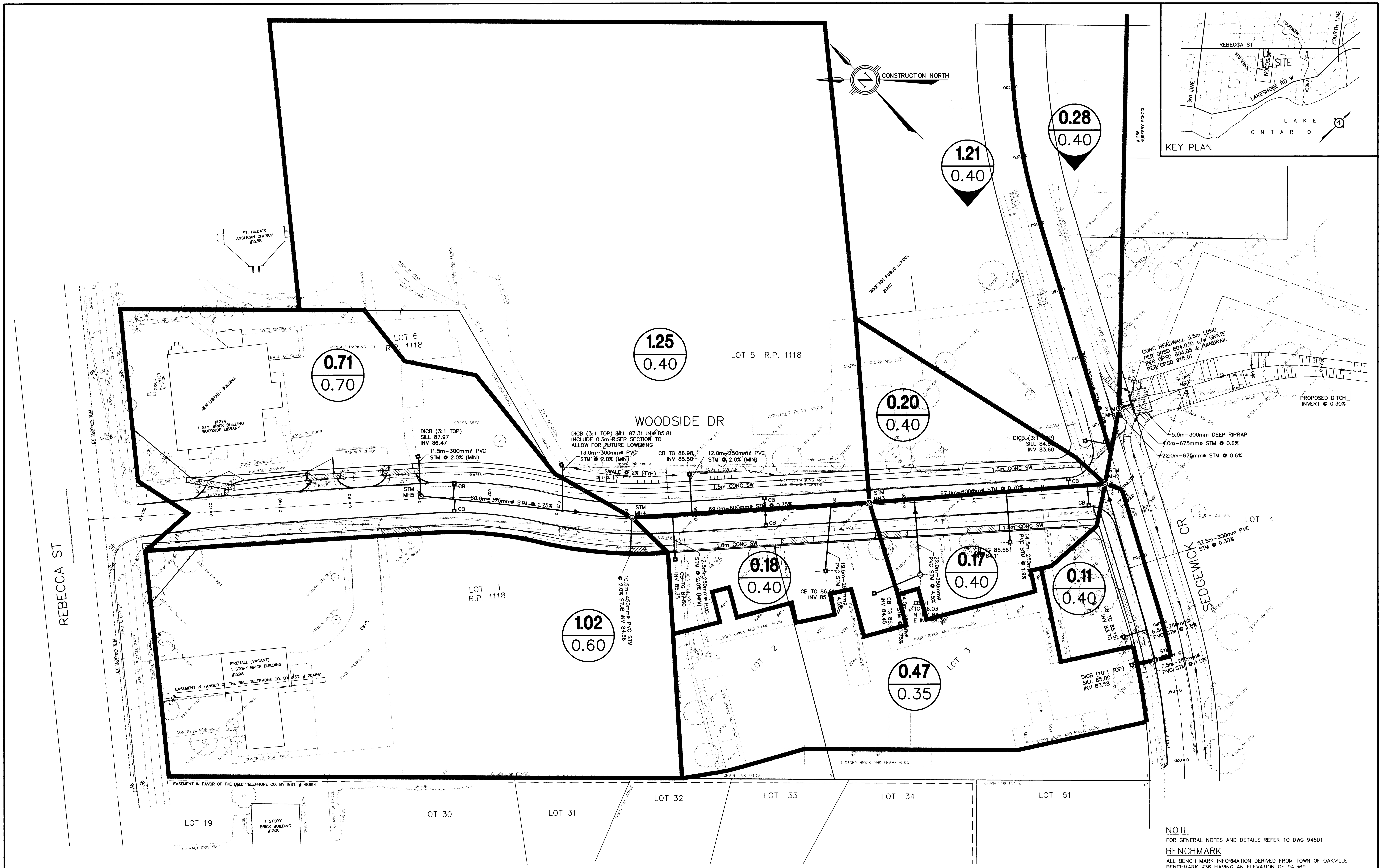
Consultant
TRAFALGAR ENGINEERING LTD.
481 MORDEN ROAD OAKVILLE, ONTARIO L6K 3W6
TEL: (905) 338-3366 FAX: (905) 338-7734
trafalgareng@globalserve.net

Municipality
TOWN OF OAKVILLE
REGIONAL MUNICIPALITY OF HALTON

Title
WOODSIDE DRIVE
RECONSTRUCTION
WOODSIDE DRIVE
REBECCA TO STA 0+320

Municipal Drawing No. R-358-00-06	
Contract No. R-358-00	Consultant Drawing No. 946P1
	Sheet 1 of 2
	Regional File No. DO-375

R-358-00-03



NOTE

FOR GENERAL NOTES AND DETAILS REFER TO DWG 946D1

BENCHMARK

ALL BENCH MARK INFORMATION DERIVED FROM TOWN OF OAKVILLE BENCHMARK #36 HAVING AN ELEVATION OF 94.369

LEGEND

- PROPOSED CATCHBASIN
- PROPOSED STORM MANHOLE
- PROPOSED SANITARY MANHOLE
- PROPOSED FIRE HYDRANT
- PROPOSED VALVE & BOX
- PROPOSED STORM SEWER
- PROPOSED SANITARY SEWER
- 1.02 — DRAINAGE AREA IN HECTARES
- 0.60 — RUN-OFF COEFFICIENT
- DRAINAGE BOUNDARY

No	Date	By/DRN	REVISIONS
2	FEB/23/01	SP/dk	REVISED PER TOWN/REGION COMMENTS
1	JAN/16/01	SP/dk	REVISED PER TOWN/REGION COMMENTS

Design	DB	Chk'd	SP	Cad File	946S3
Drawn	DK	Chk'd	SP	Plot Date	MAR/29/01
Scale 1:500				References	

Municipal Approval
APPROVED IN PRINCIPLE SUBJECT TO DETAIL CONSTRUCTION CONFORMING TO TOWN OF OAKVILLE STANDARDS AND SPECIFICATIONS.
Date March 30/01
R.G.GREEN, Director of Public Works

Field Notes

Bell	☐	Hydro	☒
Gas	☐	Cable	☒
Traf.	☐	Water	☐

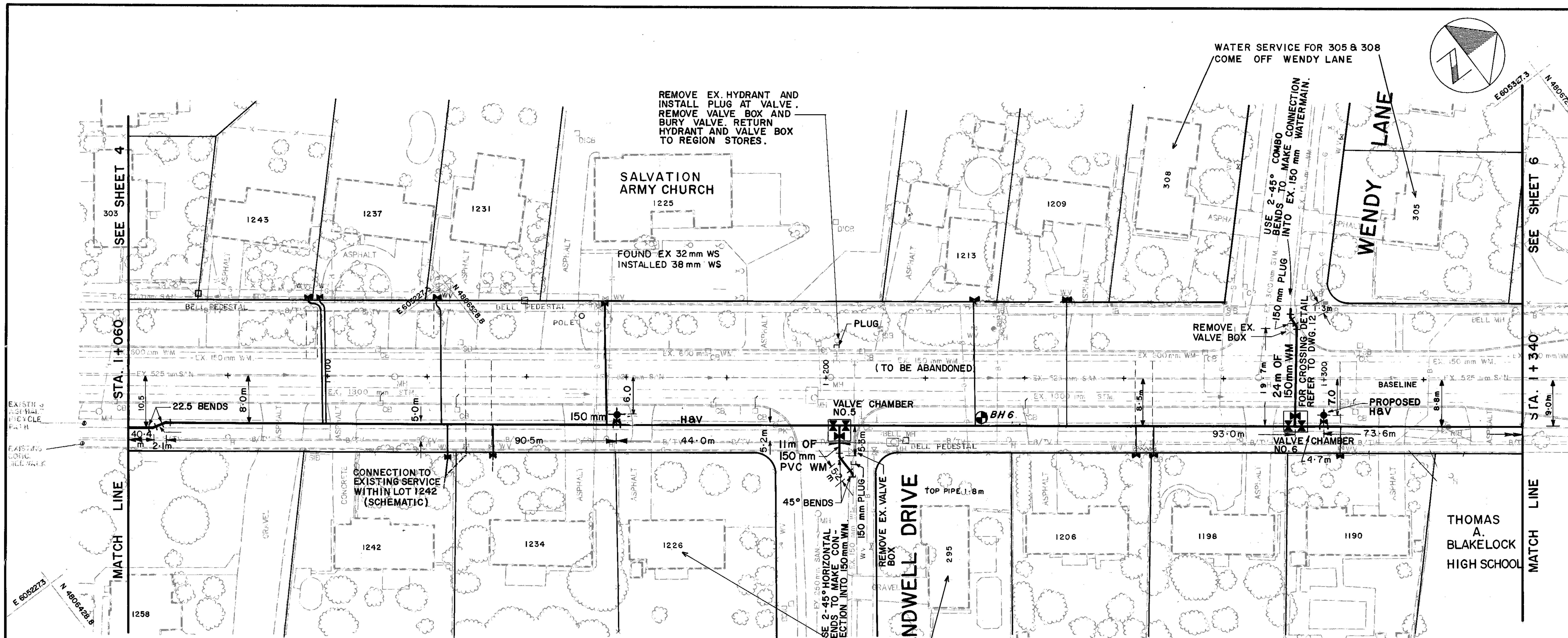
Stamp: LICENSED PROFESSIONAL ENGINEER S. L. POTTER PROVINCE OF ONTARIO 21-3-01

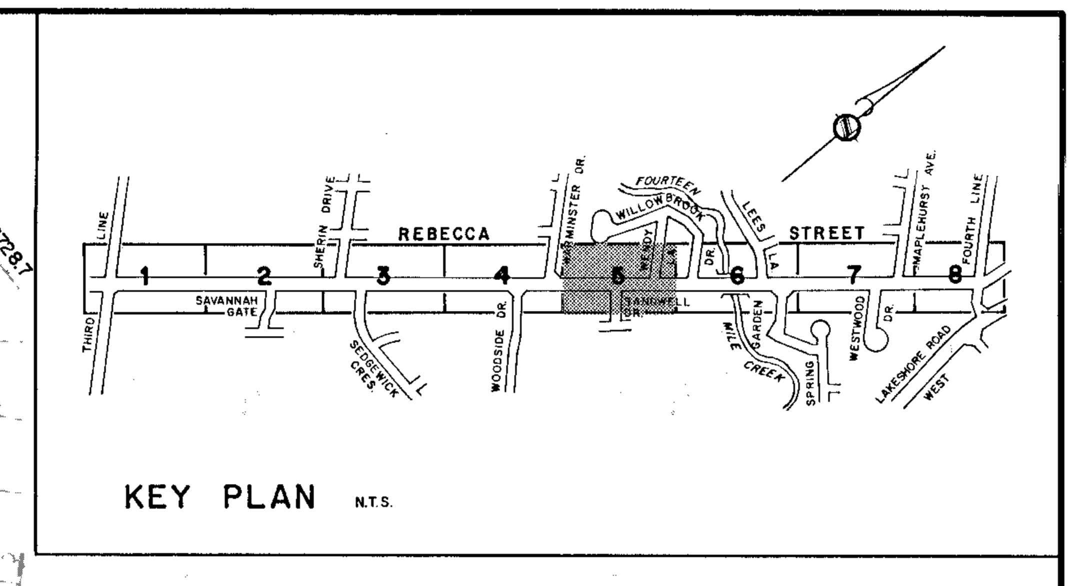
Consultant
TRAFALGAR ENGINEERING LTD.
481 MORDEN ROAD OAKVILLE, ONTARIO L6K 3W6
TEL: (905) 338-3366 FAX: (905) 338-7734
trafalgareng@globalserve.net

Municipality
TOWN OF OAKVILLE
REGIONAL MUNICIPALITY OF HALTON

Title
WOODSIDE DRIVE
RECONSTRUCTION
STORM
DRAINAGE AREA PLAN

Municipal Drawing No. R-358-00-03
Contract No. R-358-00
Consultant Drawing No. 946S3
Sheet 1 of 1
Regional File No. DO-375





WATERMAIN DATA					
ITEM	STATION	℄ CONSTR. OFFSET	STD. DWG.	INVERT ELEV.	REMARKS
22.5° HORIZ. BEND	1+065.0	10.5 RT		86.790	
22.5° HORIZ. BEND	1+068.0	9.5 RT		86.790	
HYDRANT & VALVE	1+158.0	7.0 RT	1105.01	86.520	150 mm TEE-150Ø GV & B
VALVE CHAMBER No.5	1+202.5	9.5 RT	W-2	86.380	150mm TEE, 3-150Ø GV & B
VALVE CHAMBER No.6	1+294.5	9.5 RT	W-2	86.210	150mm TEE, 3-150Ø GV & B
HYDRANT & VALVE	1+300.0	7.0 RT	1105.01	86.210	150mm TEE - 150Ø GV & B
22.5° HORIZ. BEND	1+313.0	9.5 RT		86.080	
22.5° HORIZ. BEND	1+318.5	7.0 RT		86.030	
22.5° HORIZ. BEND	1+331.0	7.0 RT		85.900	
22.5° HORIZ. BEND	1+338.0	10.5 RT		85.830	

THRUST RESTRAINT

Proposed 150 mm Dia. watermain to be restrained 17.0 metres along each side of all vertical bends, horizontal bends, tees, crosses, reducers, valves, plugs and hydrants.

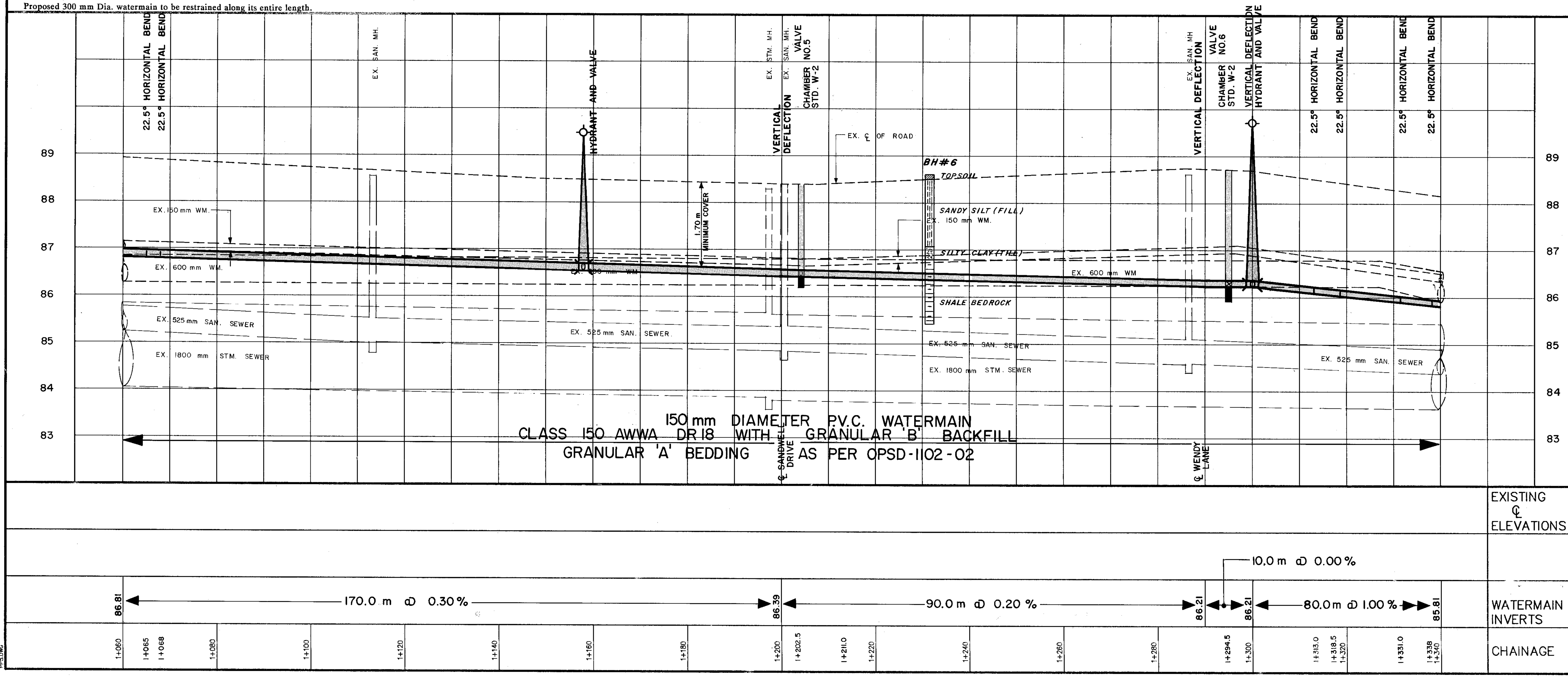
Proposed 200 mm Dia. watermain to be restrained 23.0 metres along each side of all vertical bends, horizontal bends, tees, crosses, reducers, valves, plugs and hydrants.

Proposed 300 mm Dia. watermain to be restrained along its entire length.

REBECCA STREET

WATER SERVICE FOR 1226 & 295 COME OFF SANDWELL DRIVE.

FOR GENERAL NOTES AND BENCHMARKS SEE DRAWING No.1



Nº	Date	By	REVISIONS
	02/03/97	JAC	AS CONSTRUCTED
	11/19/96	WGN	AS CONSTRUCTED

Design J.S.	Ch'kd T.R.	Date JULY 1993	
Drawn R.M.M.	Ch'kd R.H.G.		
Scale Horiz. Vert.		References	

APPROVALS

Municipal

ISSUED MAR 2 8 1995 HALTON REGION PUBLIC WORKS

Field Notes REGION BOOK # 497 & 498

Regional

Commissioner of Public Works

Director of Design & Construction

Stamp: LICENSED PROFESSIONAL ENGINEER J. SFRAMELI PROVINCE OF ONTARIO May 9/94

Marshall Macklin Monaghan Limited
Thornhill
Consulting Engineers – Surveyors – Planners

Halton

TITLE

WATERMAIN REPLACEMENT
REBECCA STREET
TOWN OF OAKVILLE
FROM
30m E. OF WARMINSTER DRIVE TO
50m E. OF WENDY LANE

Consultant File Nº 10-93022

Regional Drawing Nº O- 9397

CONTRACT Nº W-1452-95

Drawing Nº PR-1452

SHEET 5 OF 14

O- 9397

NOTE

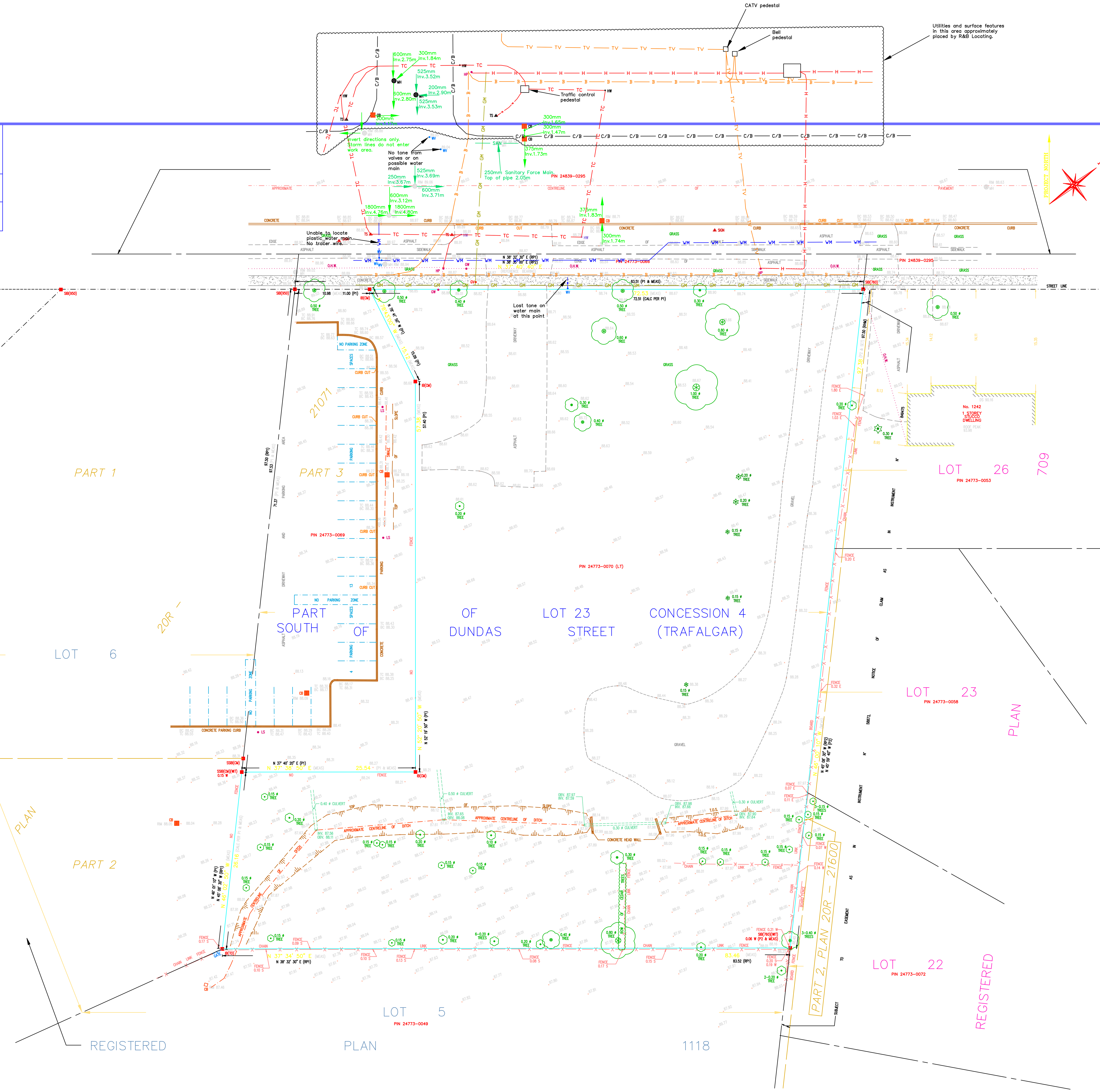
1. THIS PLAN MUST BE READ IN CONJUNCTION WITH SURVEY REPORT DATED NOVEMBER 30TH, 2020.
2. THIS PLAN AND REPORT WERE PREPARED FOR TYHE REGIONAL MUNICIPALITY OF HALTON AND THE UNDERSIGNED ACCEPTS NO RESPONSIBILITY FOR USE BY OTHER PARTIES.

BEARING NOTE:

BEARINGS ARE GRID AND ARE REFERRED TO THE SOUTHERLY LIMIT OF REBECCA STREET HAVING A BEARING OF N 37° 40' 40" E AS SHOWN ON PLAN 20R-21071.

ELEVATION NOTE

ELEVATIONS ARE GEODETIC AND ARE REFERRED TO TOWN OF OAKVILLE BENCH MARK N° 277 WITH A PUBLISHED ELEVATION OF 88.967 METRES.



SURVEYOR'S REAL PROPERTY REPORT AND PLAN OF TOPOGRAPHY OF
PART OF LOT 23, CONCESSION 4
SOUTH OF DUNDAS STREET
GEOGRAPHIC TOWNSHIP OF TRAFALGAR
TOWN OF OAKVILLE
REGIONAL MUNICIPALITY OF HALTON

SCALE 1 : 250

0 1 2 3 4 5 10 15 20 25 metres

GENESIS LAND SURVEYING INC.

METRIC NOTE

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

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
2147866

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

LEGEND

■	DENOTES	SURVEY MONUMENT FOUND
□	DENOTES	SURVEY MONUMENT PLANTED
WIT	DENOTES	WITNESS
IB	DENOTES	IRON BAR
SIB	DENOTES	STANDARD IRON BAR
SSIB	DENOTES	SHORT STANDARD IRON BAR
NI	DENOTES	NOT IDENTIFIED
RP1	DENOTES	REGISTERED PLAN 1118
RP2	DENOTES	REGISTERED PLAN 709
TO	DENOTES	TOWN OF OAKVILLE
P1	DENOTES	PLAN 20R-21071
P2	DENOTES	PLAN 20R-21600
760	DENOTES	K. H. McCONNELL LTYD., O.L.S.
CM/950	DENOTES	CUNNINGHAM McCONNEL LTD., O.L.S.
KHM	DENOTES	PLAN OF SURVEY BY K. H. McCONNELL O.L.S., DATED JUNE 5, 1957
PIN	DENOTES	PROPERTY IDENTIFIER NUMBER
N.S.E.W.	DENOTES	NORTH, SOUTH, EAST, WEST
MEAS.	DENOTES	MEASURED
CALC.	DENOTES	CALCULATED
INV./OBV.	DENOTES	INVERT/OBVERT
HP	DENOTES	HYDO POLE
O.H.W.	DENOTES	OVERHEAD UTILITY CABLES
GW	DENOTES	GUY WIRES
LS	DENOTES	LIGHT STANDARD
TS	DENOTES	TRAFFIC SIGN
MH	DENOTES	MANHOLE
CB	DENOTES	CATCH BASIN
DS	DENOTES	DOOR SILL ELEVATION
TC/BC	DENOTES	TOP/BOTTOM OF CURB
T.O.S.	DENOTES	TOP OF SLOPE
GM	DENOTES	GAS METER
WV	DENOTES	WATER VALVE
ø	DENOTES	DIAMETER

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 16TH, 2020.

NOV. 30TH, 2020
DATE

AMAR LOAI
Ontario Land Surveyor

GENESIS Land Surveying Inc.

10 FOUR SEASONS PLACE, 10TH FLOOR
TORONTO, M9B 6H7
T 905-499-2956 T 1800-262-9784
WWW.GENESISLANDSURVEY.COM

DRAFTED BY: G.S.R	CHECKED BY: A.L.	PROJECT No. GLS-0729

MaintenanceHole
Hydrant
SewerMain
Watermain
ServiceLateral
ServiceLead
PumpingStation

Halton REGION

0 5 10 Meters

REGIONAL MUNICIPALITY OF HALTON, ITS EMPLOYEES, OFFICERS AND AGENTS ARE NOT RESPONSIBLE FOR ANY ERRORS, OMISSIONS OR INACCURACIES, WHETHER DUE TO THEIR NEGLIGENCE OR OTHERWISE. ALL INFORMATION SHOULD BE VERIFIED

2017 Orthophoto
Created: April 2020
Public Works Information

APPENDIX C

TOPOGRAPHIC SURVEY

SCS consulting group ltd

NOTE

1. THIS PLAN MUST BE READ IN CONJUNCTION WITH SURVEY REPORT DATED NOVEMBER 30TH, 2020.
2. THIS PLAN AND REPORT WERE PREPARED FOR TYHE REGIONAL MUNICIPALITY OF HALTON AND THE UNDERSIGNED ACCEPTS NO RESPONSIBILITY FOR USE BY OTHER PARTIES.

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ELEVATION NOTE

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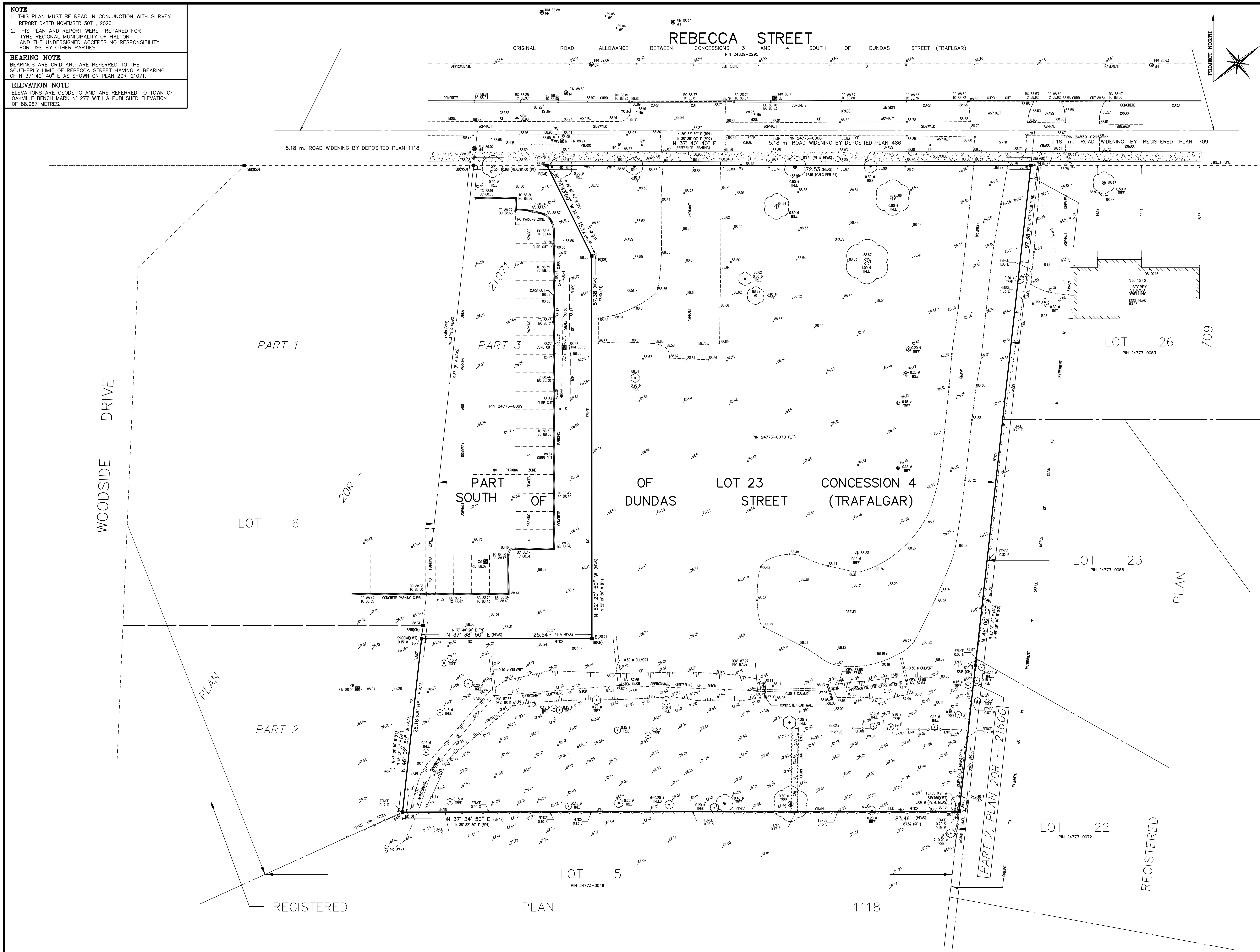

SURVEYOR'S REAL PROPERTY REPORT AND PLAN OF TOPOGRAPHY OF PART OF LOT 23, CONCESSION 4 SOUTH OF DUNDAS STREET

GEOGRAPHIC TOWNSHIP OF TRAFALGAR

TOWN OF OAKVILLE

REGIONAL MUNICIPALITY OF HALTON

SCALE 1 : 250

0 1 2 3 4 5 10 15 20 25 metres

GENESIS LAND SURVEYING INC.

METRIC NOTE

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

ASSOCIATION OF ONTARIO LAND SURVEYORS
2147866
AMAR LOAI
THIS PLAN IS NOT VALID UNLESS IT IS AN EMBOSSED ORIGINAL COPY ISSUED BY THE SURVEYOR
In accordance with Regulation 1026, Section 29(3)

LEGEND

■	DENOTES	SURVEY MONUMENT FOUND
□	DENOTES	SURVEY MONUMENT PLANTED
WIT	DENOTES	WITNESS
IB	DENOTES	IRON BAR
SIB	DENOTES	STANDARD IRON BAR
SSIB	DENOTES	SHORT STANDARD IRON BAR
NI	DENOTES	NOT IDENTIFIED
RP1	DENOTES	REGISTERED PLAN 1118
RP2	DENOTES	REGISTERED PLAN 709
TO	DENOTES	TOWN OF OAKVILLE
P1	DENOTES	PLAN 20R–21071
P2	DENOTES	PLAN 20R–21600
760	DENOTES	K. H. McCONNELL LTYD., O.L.S.
CM/950	DENOTES	CUNNINGHAM McCONNEL LTD., O.L.S.
KHM	DENOTES	PLAN OF SURVEY BY K. H. McCONNELL O.L.S., DATED JUNE 5, 1957
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N.S.E.W.	DENOTES	NORTH, SOUTH, EAST, WEST
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CALC.	DENOTES	CALCULATED
INV./OBV.	DENOTES	INVERT/OBVERT
HP	DENOTES	HYDO POLE
O.H.W.	DENOTES	OVERHEAD UTILITY CABLES
GW	DENOTES	GUY WIRES
LS	DENOTES	LIGHT STANDARD
TS	DENOTES	TRAFFIC SIGN
MH	DENOTES	MANHOLE
CB	DENOTES	CATCH BASIN
DS	DENOTES	DOOR SILL ELEVATION
TC/BC	DENOTES	TOP/BOTTOM OF CURB
T.O.S.	DENOTES	TOP OF SLOPE
GM	DENOTES	GAS METER
WV	DENOTES	WATER VALVE
ø	DENOTES	DIAMETER

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NOV. 30TH, 2020
DATE

Amar Loai
AMAR LOAI
Ontario Land Surveyor

GENESIS Land Surveying Inc.

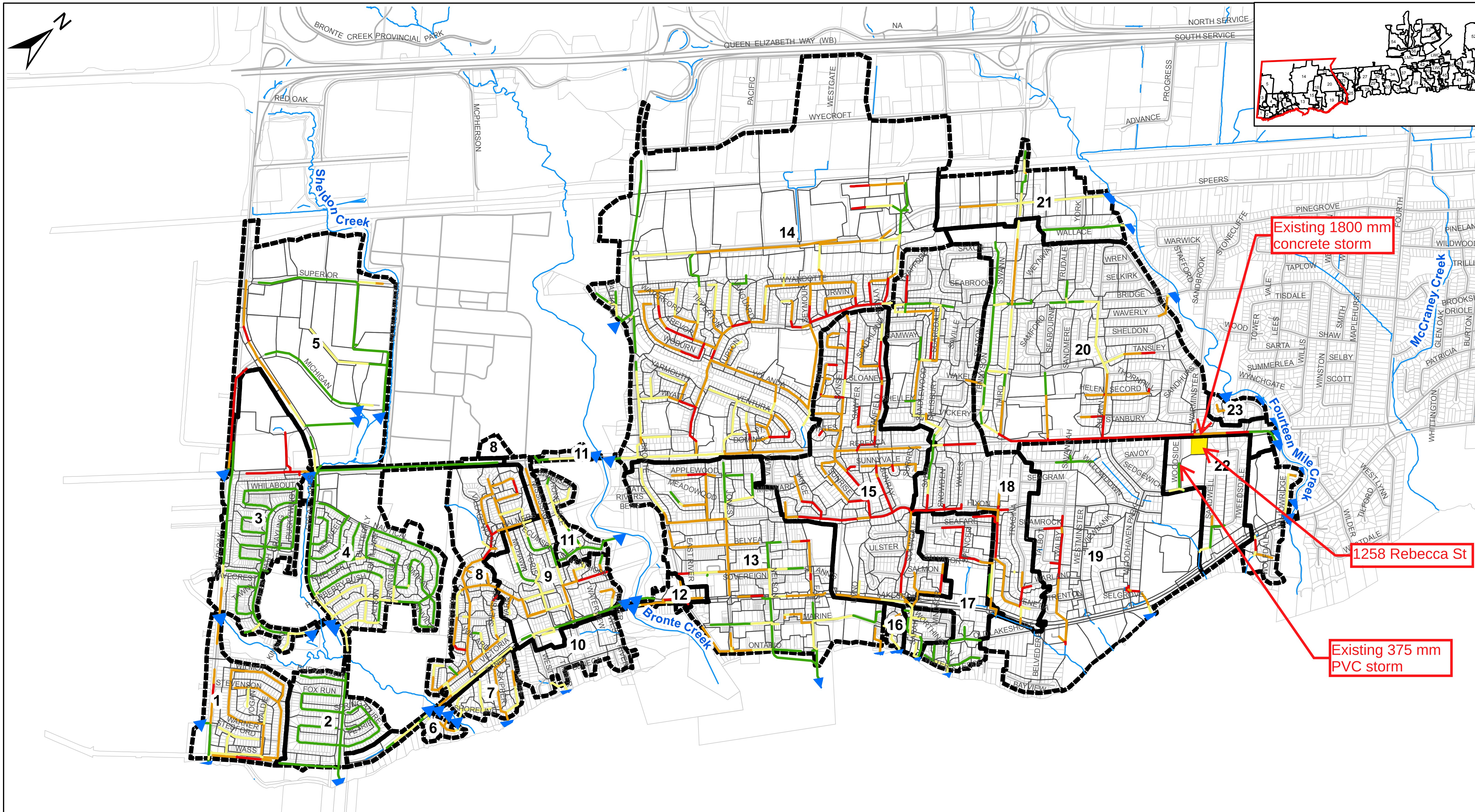
10 FOUR SEASONS PLACE, 10TH FLOOR
TORONTO, M9B 6H7
T 905-499-2956 T 1800-262-9784
WWW.GENESISLANDSURVEY.COM

DRAFTED BY: G.S.R	CHECKED BY: A.L.	PROJECT No. GLS-0729

APPENDIX D

STORM SERVICING CALCULATIONS

SCS consulting group ltd



Legend

Network	Roads	**Minor System Performance**			
Subcatchment	Streams	Unsurcharged			
Parcels	Outfalls	Below 1/2 Surcharging Depth and Above Obvert			
		Above 1/2 Surcharging Depth and Below Rim Elevation			
		Surcharged Above Rim Elevation			

Stormwater Management Master Plan

Phase 2

Town of Oakville

5 Year Minor System Performance Assessment - Existing Condition (Part 1)

wood.

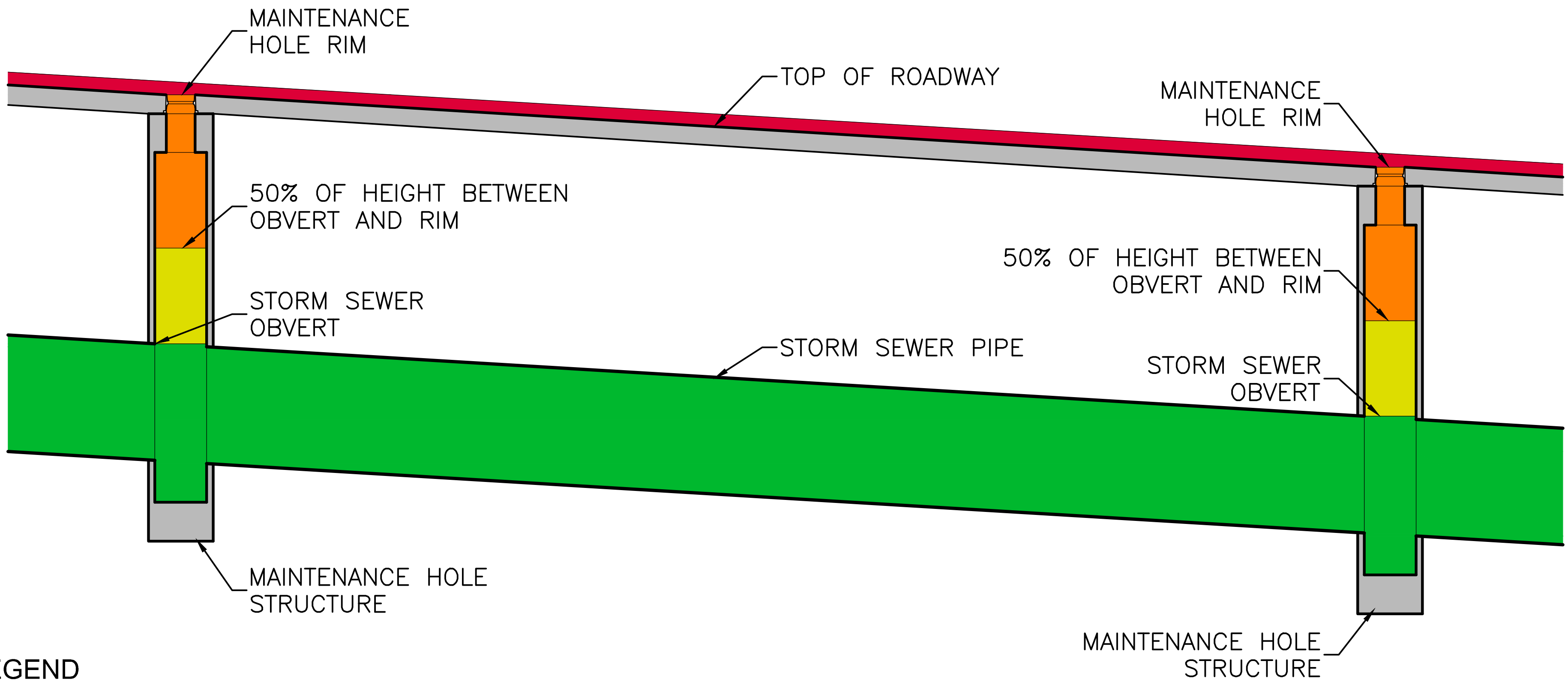
Scale **1:18,650**

0 100 200 400 600 800 Meters

Project No. **TP 115045**

Drawing No. **F1-1**

Plotted: 2019-09-04 Plotted By: richard.bartolo
Last Saved: 2019-09-04 Last Saved By: richard.bartolo Path: P:\Work\TP115045\Water\Dwg\2019-09 (SWM)\Fig RoadFloodConditions.dwg



LEGEND

- FLOW WITHIN STORM SEWER
- SURCHARGE WITHIN MAINTENANCE HOLE TO 50% BETWEEN STORM SEWER OBVERT AND TOP OF RIM
- SURCHARGE TO MAINTENANCE HOLE RIM ELEVATION
- SPILL ONTO ROADWAY

SCALE VALID ONLY FOR LETTER VERSION

STORMWATER MANAGEMENT PLAN PHASE 2 TOWN OF OAKVILLE	SCHEMATIC OF MINOR SYSTEM LEVEL OF SERVICE CONDITIONS PERTAINING TO 5 YEAR STORM EVENT	wood.	Scale: NOT TO SCALE Consultant File No.: TP115045 Figure No.: 7.1

SCS consulting group ltd

5-Year Storm Design - Existing Woodside Drive
Independent Living Facility
1258 Rebecca Street
Town of Oakville, Halton Region

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

Starting T_c (min)= 10

A= 1170
B= 5.8
c= 0.843

= **Includes 0.33 ha from Woodside Drive Drainage Plan, 0.33 ha of remaining 1258 Rebecca St Site Area and 0.04 ha External Drainage**

Project: Independent Living Facility
Project No. 2480
Date: 11-Apr-22
Designed By: M.L.M.
Reviewed By: P.G.

P:\2480 1258 Rebecca Street Oakville - Halton Region\Design\Pipe Design\Storm\[2480-POST Dev-Storm Design Sheet-Rebecca Street.xlsm]Design

LOCATION			5 YEAR						EXTERNAL FLOWS				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)	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)
PATRICIA-PICKNELL SCHOOL GROUNDS	EX.DICB1	EX.MH5	0.70	0.37	0.26	0.26	114.21	0.081	0.000	0.000	0.000	0.000	0.081	13.0	2.00	300	0.137	1.935	0.11	10.11
WOODSIDE DRIVE	EX.MH5	EX.MH4	0.71	0.70	0.50	0.75	113.54	0.238	0.000	0.000	0.000	0.000	0.238	60.0	1.75	375	0.232	2.100	0.48	10.59
WOODSIDE DRIVE	EX.PLUG	EX.MH4	1.02	0.60	0.61	0.61	114.21	0.194	0.000	0.000	0.000	0.000	0.194	10.5	2.00	450	0.403	2.535	0.07	10.07
WOODSIDE DRIVE	EX.MH4	EX.MH3	1.10	0.40	0.44	1.81	110.75	0.555	0.000	0.000	0.000	0.000	0.555	69.0	0.75	600	0.531	1.881	0.61	11.20
WOODSIDE DRIVE	EX.MH3	EX.MH2	0.37	0.40	0.15	1.95	107.38	0.583	0.000	0.000	0.000	0.000	0.583	67.0	0.70	600	0.513	1.817	0.61	11.81
SEDGEWICK DRIVE	EX.DICB2	EX.CBMH6	0.47	0.35	0.16	0.16	114.21	0.052	0.000	0.000	0.000	0.000	0.052	7.5	1.00	250	0.059	1.211	0.10	10.10
SEDGEWICK DRIVE	EX.CBMH6	EX.MH2	0.11	0.40	0.04	0.21	113.59	0.066	0.000	0.000	0.000	0.000	0.066	52.5	0.30	300	0.053	0.749	1.17	11.27
SEDGEWICK DRIVE	EX.MH2	EX.MH1	1.21	0.40	0.48	2.65	104.21	0.766	0.000	0.000	0.000	0.000	0.766	22.0	0.60	675	0.651	1.820	0.20	12.02
SEDGEWICK FOREST OUTFALL	EX.MH1	EX.HW	0.28	0.40	0.11	2.76	103.22	0.791	0.000	0.000	0.000	0.000	0.791	4.0	0.60	675	0.651	1.820	0.04	12.05

5-Year Storm Design - Proposed Woodside Drive
Independent Living Facility
1258 Rebecca Street
Town of Oakville, Halton Region

SCS consulting group ltd

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

A= 1170
B= 5.8
c= 0.843

Starting T_c (min)= 10

[blue] = **Includes 1258 Rebecca St and 0.04 ha External Drainage Area**

[orange] = **Allowable Release Rate**

Project: Independent Living Facility
Project No. 2480
Date: 11-Apr-22
Designed By: M.L.M.
Reviewed By: P.G.

P:\2480 1258 Rebecca Street Oakville - Halton Region\Design\Pipe Design\Storm\[2480-POST Dev-Storm Design Sheet-Rebecca Street.xlsm]Design

LOCATION			5 YEAR						EXTERNAL FLOWS				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)	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)
1258 REBECCA STREET	MH1	EX.MH5	0.00	0.00	0.00	0.00	114.21	0.000	0.70	116.29	0.081	0.081	0.081	15.0	0.50	375	0.124	1.123	0.22	10.22
WOODSIDE DRIVE	EX.MH5	EX.MH4	0.71	0.70	0.50	0.50	112.87	0.156	0.00	0.00	0.000	0.081	0.237	60.0	1.75	375	0.232	2.100	0.48	10.70
WOODSIDE DRIVE	EX.PLUG	EX.MH4	1.02	0.60	0.61	0.61	114.21	0.194	0.00	0.00	0.000	0.000	0.194	10.5	2.00	450	0.403	2.535	0.07	10.07
WOODSIDE DRIVE	EX.MH4	EX.MH3	1.10	0.40	0.44	1.55	110.12	0.474	0.00	0.00	0.000	0.081	0.555	69.0	0.75	600	0.531	1.881	0.61	11.31
WOODSIDE DRIVE	EX.MH3	EX.MH2	0.37	0.40	0.15	1.70	106.79	0.503	0.00	0.00	0.000	0.081	0.585	67.0	0.70	600	0.513	1.817	0.61	11.92
SEDGEWICK DRIVE	EX.DICB2	EX.CBMH6	0.47	0.35	0.16	0.16	114.21	0.052	0.00	0.00	0.000	0.000	0.052	7.5	1.00	250	0.059	1.211	0.10	10.10
SEDGEWICK DRIVE	EX.CBMH6	EX.MH2	0.11	0.40	0.04	0.21	113.59	0.066	0.00	0.00	0.000	0.000	0.066	52.5	0.30	300	0.053	0.749	1.17	11.27
SEDGEWICK DRIVE	EX.MH2	EX.MH1	1.21	0.40	0.48	2.39	103.66	0.688	0.00	0.00	0.000	0.081	0.769	22.0	0.60	675	0.651	1.820	0.20	12.13
SEDGEWICK FOREST OUTFALL	EX.MH1	EX.HW	0.28	0.40	0.11	2.50	102.68	0.713	0.00	0.00	0.000	0.081	0.795	4.0	0.60	675	0.651	1.820	0.04	12.16

100-Year Storm Design - Proposed Rebecca Street
Independent Living Facility
1258 Rebecca Street
Town of Oakville, Halton Region

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

A= 2150
B= 5.7
c= 0.861

Starting T_c (min)= 10

Project: Independent Living Facility
Project No. 2480
Date: 11-Apr-22
Designed By: M.L.M.
Reviewed By: P.G.

P:\2480 1258 Rebecca Street Oakville - Halton Region\Design\Pipe Design\Storm\[2480-POST Dev-Storm Design Sheet-Rebecca Street.xlsm]Design

LOCATION			100 YEAR						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)	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)
REBECCA STREET	EX.MH3	EX.MH2	0.05	0.60	0.030	0.030	200.80	0.017	0.000	0.000	0.000	0.000	0.017	171.6	0.20	1800	5.138	2.020	1.42	11.42

APPENDIX E

STORMWATER MANAGEMENT CALCULATIONS

1258 Rebecca Street Oakville
Project Number: 2480
Date: April 2022
Designer Initials: R.P.B.

ALLOWABLE RELEASE RATE
AREA ACCOUNTED FOR IN WOODSIDE DRIVE SEWER

5 Year storm

IDF Parameters*

a = 1170
t = 10 min
b = 5.8
c = 0.843

Runoff Coefficient: **C1 =** 0.40

Allowable Release Rate Calculation				
Outlet	**Area**	**time**	**Intensity**	**Flow**
ID		**t**	**i=a/(t+b)^c**	**Q=CiA/360**
	ha	*min*	*mm/hr*	*l/s*
Woodside Drive	0.33	10.00	114.21	42.4

* a,b,c's per Town of Oakville

As identified on the Woodside Drive Reconstruction Storm Drainage Area Plan prepared by Trafalgar Engineering Ltd. dated March 2001 (refer to **Appendix B**), approximately 0.33 ha of the existing site has been accounted for within the Woodside Drive storm sewer system.

ALLOWABLE RELEASE RATE EXISTING DRAINAGE TO WOODSIDE DRIVE SEWER

5 Year storm

IDF Parameters*

a = 1170
t = 10 min
b = 5.8
c = 0.843

Runoff Coefficient: **C1 =** 0.37

Allowable Release Rate Calculation				
Outlet	**Area**	**time**	**Intensity**	**Flow**
ID		**t**	**i=a/(t+b)^c**	**Q=CiA/360**
	ha	*min*	*mm/hr*	*l/s*
Woodside Drive	0.70	10.00	114.21	81.41

* a,b,c's per Town of Oakville

Although the Woodside Drive sewer was initially designed to accommodate an area of 0.33 ha with a runoff coefficient of 0.40, in the existing condition approximately 0.70 ha with a runoff coefficient of 0.37 drains into the Woodside Drive sewer. An updated storm sewer analysis was completed and determined that runoff from existing development will not increase the surcharge within the existing Woodside Drive sewer. Therefore, the allowable release rate to the Woodside Drive storm sewer is 81.41 L/s.

PROPOSED WEIGHTED RUNOFF COEFFICIENT

Catchment 201 Outlets to: Woodside Drive

	Runoff Coefficient	Area (ha)	Weighted Runoff Coefficient	Weighted Runoff Coefficient (100 Year)
Asphalt	0.90	0.10	0.21	0.24
Rooftops	0.90	0.09	0.18	0.20
Permeable Pavement	0.55	0.12	0.15	0.18
Grass	0.25	0.13	0.07	0.09
TOTAL		0.44	0.62	0.71

Catchment 202 Outlets to: Woodside Drive

	Runoff Coefficient	Area (ha)	Weighted Runoff Coefficient	Weighted Runoff Coefficient (100 Year)
Future Residential Development	0.60	0.17	0.60	0.75
TOTAL		0.17	0.60	0.75

Catchment EXT-1 Outlets to: Woodside Drive

	Runoff Coefficient	Area (ha)	Weighted Runoff Coefficient	Weighted Runoff Coefficient (100 Year)
Asphalt	0.90	0.003	0.07	0.07
Rooftops	0.90	0.01	0.18	0.20
Grass	0.25	0.03	0.18	0.23
TOTAL		0.04	0.43	0.50

Catchment 203 Outlets to: Rebecca Street

	Runoff Coefficient	Area (ha)	Weighted Runoff Coefficient	Weighted Runoff Coefficient (100 Year)
Future Residential Development	0.60	0.05	0.60	0.75
TOTAL		0.05	0.60	0.75

Woodside Drive Total

Catchment	Runoff Coefficient	Area	Weighted Runoff Coefficient
201	0.62	0.44	0.42
202	0.60	0.17	0.16
EXT-1	0.43	0.04	0.03
TOTAL		0.65	0.60

Rebecca Street Total

Catchment	Runoff Coefficient	Area	Weighted Runoff Coefficient
203	0.60	0.05	0.60
TOTAL		0.05	0.60

Overall Total

Catchment	Runoff Coefficient	Area	Weighted Runoff Coefficient
201	0.62	0.44	0.39
202	0.60	0.17	0.15
EXT-1	0.43	0.04	0.02
203	0.60	0.05	0.04
TOTAL		0.70	0.60

SUMMARY

					100 Year				
Catchment ID	Routing		Runoff Coef.	Area (ha)	Release Rate (L/s) [1,3]	Storage Required (m^3) [1]	Storage Available (m^3)	Orifice Release Rate (L/s)[2]	Uncontrolled Release Rate (L/s)
201	is routed through		0.71	0.44	81.4	175.7	180.0	81.4	
202	is routed through	201	0.75	0.17	72.1	0.0	0.0	-	72
EXT-1	is routed through	202	0.50	0.04	11.1	0.0	0.0	-	11
203	is routed through		0.75	0.05	20.0	0.0	0.0	-	20
Total				0.70	184.6	175.7	180.0	-	

Woodside Drive Allowable Release Rate	81.4	L/s
Woodside Drive Proposed Release Rate	81.4	L/s
Rebecca Street Proposed Release Rate	20.0	L/s

Notes:

[1] Per Modified Rational Calculations (attached)

[2] See attached for orifice details

[3] The allowable release rate was determined using the total existing drainage to the Woodside Drive storm sewer

Area ID: 201

Area =	**0.442** ha			
"C" =	**0.71**			
AC=	**0.3159**			
Tc =	**10.0** min			
Time Increment =	**15.0** min			
Release Rate =	**81.40** l/s		of Oakville	100 Year
Max.Storage =	**175.7** m^3		a=	2150
			b=	5.7
			c=	0.861

NOTE: Catchment 202 is routed through Catchment 201

Time (min)	Rainfall Intensity (mm/hr)	Storm Runoff (l/s)	Runoff Volume[1] (m^3)	Released Volume (m^3)	Storage Volume (m^3)	
10.0	200.8	176.33	149.1	48.8	100.2	
25.0	112.7	98.99	224.2	85.5	138.7	
40.0	80.0	70.28	276.8	122.1	154.7	
55.0	62.7	55.04	322.2	158.7	163.5	
70.0	51.8	45.51	364.2	195.4	168.8	
85.0	44.4	38.95	404.1	232.0	172.1	
100.0	38.9	34.14	442.8	268.6	174.1	
115.0	34.7	30.45	480.5	305.2	175.2	
130.0	31.4	27.53	517.6	341.9	175.7	<<<<
145.0	28.6	25.16	554.1	378.5	175.6	
160.0	26.4	23.18	590.2	415.1	175.1	
175.0	24.5	21.52	626.0	451.8	174.3	
190.0	22.9	20.09	661.6	488.4	173.2	
205.0	21.5	18.85	696.9	525.0	171.8	
220.0	20.2	17.77	732.0	561.7	170.3	
235.0	19.1	16.81	766.9	598.3	168.6	
250.0	18.2	15.96	801.7	634.9	166.8	
265.0	17.3	15.19	836.3	671.5	164.8	
280.0	16.5	14.50	870.9	708.2	162.7	
295.0	15.8	13.88	905.3	744.8	160.5	
310.0	15.2	13.31	939.7	781.4	158.2	
325.0	14.6	12.79	973.9	818.1	155.8	
340.0	14.0	12.31	1008.1	854.7	153.4	
355.0	13.5	11.87	1042.2	891.3	150.9	

[1] **The released volume from Catchment 202 has been added to the runoff volume of Catchment 201**

Area ID 201

Orifice Equation: $Q = C_dA(2gh)^{1/2}$

Type of Control: vertical
Location: 1

Orifice Diameter: 178 mm
Area: 0.025 m^2
g = 9.81 m/sec^2
C_d = 0.62

Pipe Storage

Diameter (mm)	Area (m^2)	Length (m)	Volume (m^3)
1.2 * 1.5 BOX	1.800	100	180.0
		Total Volume	**180.0**

	Stage (m)	Head (m)	Storage (m^3)	Discharge (m^3/s)
Invert E.L.	86.25	0.00	0.0	0.00
100 Year WL	87.75	1.41	180.0	0.081

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MODIFIED RATIONAL METHOD

1258 Rebecca Street Oakville
Project Number: 2480
Date: April 2022
Designer Initials: R.P.B.

Area ID: 202

Area =	**0.172**	ha
"C" =	**0.75**	
AC=	**0.1292**	
Tc =	**10.0**	min
Time Increment =	**15.0**	min
Release Rate =	**72.10**	l/s
Max.Storage =	**0.0**	m^3

of Oakville	100 Year
a=	2150
b=	5.7
c=	0.861

NOTE: Catchment 202 is routed through Catchment 201

Time (min)	Rainfall Intensity (mm/hr)	Storm Runoff (l/s)	Runoff Volume (m^3)	Released Volume (m^3)	Storage Volume (m^3)
10.0	200.8	72.10	43.3	43.3	0.0

<<<<

MODIFIED RATIONAL METHOD

Area ID: EXT-1

Area =	**0.040** ha			
"C" =	**0.50**			
AC=	**0.0200**			
Tc =	**10.0** min			
Time Increment =	**15.0** min			
Release Rate =	**11.14** l/s		of Oakville	100 Year
Max.Storage =	**0.0** m^3		a=	2150
			b=	5.7
			c=	0.861

NOTE: Catchment EXT-1 is routed through Catchment 201.

Time (min)	Rainfall Intensity (mm/hr)	Storm Runoff (l/s)	Runoff Volume (m^3)	Released Volume (m^3)	Storage Volume (m^3)	
10.0	200.8	11.14	6.7	6.7	0.0	<<<<

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MODIFIED RATIONAL METHOD

Area ID: 203

Area =	**0.048**	ha
"C" =	**0.75**	
AC=	**0.0359**	
Tc =	**10.0**	min
Time Increment =	**15.0**	min
Release Rate =	**20.01**	l/s
Max.Storage =	**0.0**	m^3

of Oakville 100 Year

a=	2150
b=	5.7
c=	0.861

Time (min)	Rainfall Intensity (mm/hr)	Storm Runoff (l/s)	Runoff Volume (m^3)	Released Volume (m^3)	Storage Volume (m^3)	
10.0	200.8	20.01	12.0	12.0	0.0	<<<<

APPENDIX F

SANITARY FLOW CALCULATIONS

SCS consulting group ltd

SANITARY SEWER FLOW CALCULATIONS

Job Number: 2480
Date: April 2022
Designer Initials: M.L.M.

1258 Rebecca Street

Proposed Sanitary Flow Calculations	
Average Residential Flow Rate	275.0 litres/capita/day
Residential Population Density	
Single Family	55 persons/ha
Semi-detached	100 persons/ha
Residential Population	
Single Family (0.22 ha)	12 persons
Semi-detached (0.44 ha)	44 persons
Total population	**56 persons**
Peaking Factor	4.30
Residential Peak Flow	0.77 L/s
Site Area	0.66 ha
Infiltration (0.286 L/s/ha)	0.189 L/s
Total Proposed Peak Sanitary Flow	***0.96 L/s***
Existing Sanitary Flow Calculations	
Community Services Flow Rate	11,000 litres/ha/day
Community Services Population Density	40 persons/ha
Community Services Population (0.66 ha)	**26.4 persons**
Peaking Factor	3.49
Existing Peak Flow	0.29 L/s
Site Area	0.66 ha
Infiltration (0.286 L/s/ha)	0.189 L/s
Total Existing Peak Flow	***0.48 L/s***
Net Increase in Sanitary Peak Flow	***0.47 L/s***

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Sanitary Design Sheet
1258 Rebecca Street
Halton Region
Town of Oakville

Project: 1258 Rebecca Street
Project No. 2480
Date: 21-Apr-22
Designed By: M.M.
Reviewed By: P.G.

Minimum Sewer Diameter (mm) =	200	**Avg. Domestic Flow (l/cap/day) =**	275
Mannings n =	0.013	**Infiltration Rate (l/s/ha) =**	0.286
Minimum Velocity (m/s) =	0.60	**Max. Harmon Peaking Factor =**	0.0
Maximum Velocity (m/s) =	3.65	**Min. Harmon Peaking Factor =**	2.0
Minimum Pipe Slope (%) =	0.50	**NOMINAL PIPE SIZE USED**	

P:\2480 1258 Rebecca Street Oakville - Halton Region\Design\Pipe Design\Sanitary\[2480-Sanitary Sheet Design.xlsm]Design

LOCATION			RESIDENTIAL							INDUSTRIAL/COMMERCIAL/INSTITUTIONAL					FLOW CALCULATIONS								PIPE DATA				
STREET	MANHOLE FROM	MANHOLE TO	AREA	ACCUM. AREA	UNITS	DENSITY PER UNIT	DENSITY PER HA	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
			(ha)	(ha)	(#)	(p/unit)	(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)
1258 REBECCA STREET	CTRL.MH	EX.MH1A	0.66	0.66	0		84.8	56	56	0	0	0	0	0	0.19	56	0.2	0.2	4.30	0.77	0.0	0.96	15.9	200	1.00	32.8	1.04
REBECCA STREET	EX.MH1A	EX.MH2A	0	0.66	0			0	56	0	0	0	0	0	0.19	56	0.0	0.2	4.30	0.77	0.0	0.96	85.3	525	0.25	214.9	0.99

APPENDIX G

WATER MODELLING ANALYSIS

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Multi Use Water Demand Table

Date: April 2022
Project No.: 2480
Prepared By: M.L.M.

WATER CONNECTION	
Connection Point	**Rebecca Street**
Residential Water Usage Rate	0.275 m^3/ca/day
Single Family Population	12 persons
Semi-detached Population	44 persons
Hydrant flow test	To be completed in spring
Hydrant flow test location	

	Presure (kPa)	Flow (in L/s)	Time
Minimum water pressure			
Maximum water pressure			

No.	WATER DEMANDS					
	Demand Type	**Residential Peaking Factor**	**Single Family Demand** (L/s)	**Residential Peaking Factor**	**Semi-Detached Demand** (L/s)	**Total Demand** (L/s)
1	Average Day	1.00	0.04	1.00	0.14	0.18
2	Maximum Day	2.25	0.09	2.25	0.32	0.40
3	Maximum Hour	4.00	0.15	4.00	0.56	0.71
5	Fire flow (see *Note 1*)	-	67 (4,000 L/min)	-	100 (6,000 L/min)	100.0 (6,000 L/min)
6	Maximum day plus fire flow	-	-	-	-	100.4 (6,024 L/min)

Notes

1. Single Family fire demand is based on FUS Note J - "Short Method" for detached one family dwellings.
   Semi-Detached fire demand calculations are attached.

Project No. 2480
Date: April 2022
Designed by: M.L.M.

FIRE FLOW REQUIREMENT

PROJECT INFORMATION

Address: 1258 Rebecca Street
Town of Oakville

Notes: Semi-Detached homes
Fire area is based on **Buildings 5-7**, wood frame structures separated by less than 3 m.

BASE FLOW CALCULATION				FLOW (L/min)
A=	Effective area	335	m^2	
C=	Wood frame	1.5		
F=	Required fire flow	6,040	L/min.	
"F" Rounded to nearest 1,000		6,000	L/min.	6,000

FLOW 'F' ADJUSTMENTS				CREDITS	CHARGES	FLOW (L/min)
Occupancy Adjustments (F')		%				
Limited combustible		-15%	-900	-900		5,100
Exposure Adjustments (E)						
Exposure	Sep. (m)	Charge				
N	30	10%				
E	15	15%				
S	70	0%				
W	32	5%				
E = Total Exposure Charge		30%	1,530		1530	6,630
Sprinkler Adjusments (S)						
Sprinklered as per NFPA 13		No	0			6,630
Standard Water Supply		Yes	-510	-510		6,120
Fully supervised water supply		No	0			6,120
REQUIRED FLOWS (F"=F+E+S)			(L/min)			6,000

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