URBANTECH®

FUNCTIONAL SERVICING REPORT

560 Main Street East

TOWN OF MILTON

REGION OF HALTON

PREPARED FOR
560 Main Street East Milton Inc.

Urbantech File No.: 21-672

2nd SUBMISSION – SEPTEMBER 2022
1ST SUBMISSION – APRIL 2021

Urbantech® Consulting, A Division of Leighton-Zec Ltd. | 3760 14th Avenue, Suite 301 · Markham · ON · L3R 3T7 | 905.946.9461

urbantech.com

TABLE OF CONTENTS

Urbantech® Consulting, A Division of Leighton-Zec Ltd. | 3760 14th Avenue, Suite 301 · Markham · ON · L3R 3T7 | 905.946.9461
urbantech.com

1 INTRODUCTION

1.1. BACKGROUND

Urbantech Consulting has been retained by 560 Main Street East Milton Inc. to prepare a Functional Servicing Report (FSR) in support of the zoning application associated with their property at 560 Main Street East in the Town of Milton, Ontario. The combined 1.20 Ha. parcel is bounded by Main Street East to the north-west, the Canadian Pacific Railway (CPR) corridor to the south and Wilson Drive extension to the east). The legal description of the property is Part of Lot 13, Concession 3, Geographic Township of Trafalgar, Town of Milton, Regional Municipality of Halton.

The proposed site contains 2 towers (Tower A and Tower B) with associated drive aisles, and 2 levels of underground garage.

This study presents the recommended stormwater management and municipal servicing scheme for the development of the subject property and provides an assessment of the impact of the current site plan concept on existing infrastructure. This report is also applicable for any future revisions to the site plan, assuming the revisions are minor and in general conformance with the concepts outlined herein.

The information presented in this report are in general conformance with the latest standards and criteria within following guidelines:

- Engineering and Parks Standards, Town of Milton, March 2019
- Stormwater Management Planning and Design Manual by the Ministry of Environment (MOE)
- Regional Municipality of Halton Water and Wastewater Linear Design Manual, October 2019

2 GRADING & ROADS

The site grading design considers the following objectives and constraints:

- Conform to Town of Milton grading criteria
- Match existing boundary conditions
- Match development proposals for the Wilson Drive extension
- Provide overland flow conveyance for major storm conditions
- Provides appropriate cover on proposed servicing

As outlined in Milton's *Major Transit State Area and Mobility Hub Study*, a Wilson Drive extension (section 4.3) is proposed from Main Street East to the west limit of the GO Station to the east. The subject site is intended to front onto the proposed Wilson Drive extension.

The existing site generally slopes from north to south at approximately 0.5%. Utilizing the existing elevations at the Main Street intersection and acknowledging that a 2.5 m safety berm will be required along the 10m setback from CPR, we have assumed a north-to-south sloping of the Wilson Drive extension of 0.50%. Internal roads and parking areas are graded at 0.5% minimum slope. The proposed parking area and internal roadway is designed with a maximum depth of ponding of 0.30m, and emergency flows spilling towards the adjacent right-of-way on the Wilson Drive extension.

Three retaining walls are proposed along the southern property limit of the site adjacent to the 2.5m-high safety berm. The retaining walls are required due to space constraints between the safety berm and the proposed heights of the retaining walls range from 1.1m-2.3m.

Property line elevations along Main Street have been calculated based on a standard 2% boulevard from the existing top-of-curb elevations.

Refer to **Drawing 201**, "*Site Grading Plan*".

Urbantech® Consulting, A Division of Leighton-Zec Ltd. | 3760 14th Avenue, Suite 301 • Markham • ON • L3R 3T7 | 905.946.9461

urbantech.com

3 STORM SERVICING AND STORMWATER MANAGEMENT

3.1. EXISTING STORM DRAINAGE

The site is located within the Conservation of Halton's jurisdiction, within the Sixteen Mile Creek Sub-watershed. There are no regulated features on the subject lands.

In the existing condition the site is undeveloped. There is an existing 975mm storm sewer located within the Wilson Avenue extension that conveys storm flows from Main Street and drains south to Nippissing Road. This site does not receive external flow, and the existing runoff coefficient of the site is 0.25.

Existing drainage patterns for the subject property are shown on **Drawing 301**, "*Pre-development Storm Drainage Plan*." Stormflow from the site area flows overland toward the CPR corridor.

Capacity of the existing downstream storm sewers has been analysed in the **Assessment of Stormwater Management Requirements Memo**, completed by Wood Environmental & Infrastructure Solutions (dated September 8, 2022). Refer to **Appendix C** for additional details**.**

3.2. PROPOSED STORM DRAINAGE

Under proposed conditions, there will be two distinct catchment areas. The majority of the site will drain internally and be captured by a system of area drains and storm sewers toward an underground stormwater tank. This portion of the site consists of two high-rise residential and commercial buildings that will be developed along with surface and underground parking, driveways, and landscaped areas. Stormwater flow will be captured by a system of area drains and storm sewers toward an underground cistern. The cistern will provide the quantity control storage that will enable the attenuation of post development runoff to the target release rate. A portion of the site located along the east perimeter will drain toward Main Street East and the Wilson Road extension, respectively. The safety berm on the southern limit of the property and a small portion of property at the southern limit of the site will continue to drain to the CPR lands as per the existing condition.

All captured storm flows are proposed to be directed to the existing 975mm Concrete Storm sewer located along the eastern limit of the Wilson Drive extension. Storm sewers for the subject lands have been sized according to the Town of Milton sewer design criteria.

The proposed drainage pattern is shown on **Drawing 302**, "*Post-Development Storm Drainage Plan*", provided in **Appendix B**.

Quantity Control

An underground storage cistern is proposed to provide quantity control storage for the proposed development. The **Assessment of Stormwater Management Requirements Memo** determined the storage volume of the stormwater management tank storage volume and allowable discharge rate through modelling iterations to mitigate the impact of increased peak flows and HGLs within the receiving sewers.

Refer to **Table 3-1** for the determined quantity control requirements. All drainage from the Wilson Road extension is proposed to be collected by catch basins and drain to the existing storm sewer without quantity control.

Table 1-2: Summary of Quantity Control Requirements

Site Storage Required (m^3)	650
Storm Tank Release Rate (m^3/s)	0.27

All storage is currently proposed to be contained within a Stormwater Tank located within the underground parking structure. Opportunities for rooftop storage will be evaluated at a later design stage.

Quality Control

The MECP quality control objective of *Enhanced Level 1* (80%) removal of total suspended solids (TSS) applies to the proposed development. An approved filtration system within the underground storage tank will be providing the required 80% TSS removal for the site plan portion, including the proposed parking areas. It is assumed that as the roof runoff is clean and does not require quality control. An OGS will be proposed within the Wilson Avenue extension to treat flows captured from the right-of-way. A conceptual OGS size for the entire site runoff has been provided in **Appendix A.**

Water Balance

The use of LIDs within the site plan area is limited due to the urban/high-density nature of the development. Opportunities for infiltration-based LID measures are not feasible due to the underground parking structure which spans across virtually the entire site area. Where possible, clean drainage will be directed to green/landscaped areas for filtration and evapo-transpiration. Where feasible, topsoil depth will be increased to 300mm minimum. Excess runoff on the landscaped areas will be collected through subdrains and directed to the underground parking drainage system. The use of a sump within the underground storage cistern will be investigated with the project team to provided water reuse for onsite landscaping to provide further water balance measures available to this development type.

A **Hydrogeological Investigation** was completed by RJ Burnside for the proposed development (report dated April 2021) that provides additional information regarding the water balance requirements for the proposed development.

3.3. EXISTING GROUNDWATER

There are four monitoring wells on site that have measured groundwater elevations ranging from 199.3 to 201.2 (1.3 to 3.0 mbgs), and samples concluded that the groundwater quality is suitable for discharge as per the Region of Halton's storm sewer by-law. Refer to the **Hydrogeological Investigation** completed by RJ Burnside for additional details.

Based on the depth of groundwater relative to the existing surface and the proposed FFE (refer to **Drawing 201**), short term discharge of groundwater to facilitate the construction of the underground parking structure and long-term discharge of groundwater is expected. Impacts of short-term and long-term dewatering, and feasibility to discharge to the municipal sewer system will be evaluated as part of future design stages.

4 SANITARY SERVICING

4.1. EXISTING SANITARY SERVICING

Existing wastewater infrastructure in and around the subject lands is outlined below:

- 600mm PVC sanitary sewer on the north side of Main Street flowing from east to west.

4.2. PROPOSED SANITARY SERVICING

Sanitary drainage for the two (2) proposed Towers will be conveyed via separate 300mm diameter service connections to the existing 600mm sanitary sewer located on Main Street, as shown on **Drawing 101** in **Appendix B**. The service for Tower A is to be connected directly to the existing SAN MH10A on Main Street. A new sanitary MH is proposed to be installed on the existing 600mm sanitary sewer located downstream of ex. MH10A for the service connection to Tower B.

Flowrates for the site have been calculated using the Region of Halton's Water and Wastewater Linear Design Manual.

The proposed sanitary flows are summarized in **Table 4-1**. Since the equivalent density of the development will be greater than 285/ha as per 2.3.2 of the Regions of Halton's Water and Wastewater Linear Design Manual, a conservative 2.7 persons per unit factor has been utilized for an estimated residential population. The commercial equivalent population is calculated using the Region of Halton's Linear Design Manual factor of 90 people/hectare.

Table 4-1: Summary of Sanitary Flows

Tower	A	B
Units	290	280
Commercial Floor Area (ha)	0.10	-
Equivalent Residential Population	783	756
Equivalent Commercial Population	9	-
Total Equivalent Population	792	756
Peak Sanitary Flow (l/s)	9.58	9.32
Infiltration (l/s)	0.18	0.17
Total Sanitary Flow (l/s)	**9.76**	**9.49**

Refer to the **Sanitary Sewer Design Sheet** in **Appendix A,** and **Drawings 101 & 303** for further details.

5 WATER DISTRIBUTION

5.1. EXISTING WATER SERVICING

The site is located within Halton Region Water Pressure Zone M5L. An existing 300 mm diameter PVC and 400 mm diameter PVC watermain is located on the north half of Main Steet East. There are no existing service connections provided for the subject site.

5.2. PROPOSED WATER SERVICING

A 300 mm water connection to the existing 300 mm diameter watermain in Main Street is proposed to service the development off the Wilson Drive extension as per **Drawing 101** in **Appendix B**.

Fire and domestic servicing will be provided in accordance with RH 409.010.

The Region of Halton's Water and Wastewater Linear Design Manual ('Halton WWLDM') states that the water demand used for watermain size selection should be sufficient to satisfy maximum day demand plus fire flow or the peak hour demand, whichever is greater. Fire demand was calculated as per the Fire Underwriter's Survey (FUS) guidelines (1999).

Refer to **Appendix A** for the supporting calculations of the domestic demands for the proposed development. The estimated population is considerably greater than the 285 people/ha factor as per Table 2-1 of the WWLDM (1.20 ha or 342 persons). Therefore, a factor of 2.7 people/unit is utilized as per section 4.2 of this report. Refer to **Table 5-1** for a summary of the Water Demand Calculations.

Table 5-1: Summary of Sanitary Flows

Population (incl. Commercial)	1,548
Fire Flow Demand	50.0 L/s
Maximum Day Demand	11.1 L/s
Peak Hour Demand	19.7 L/s
Domestic Flow Demand	19.7 L/s (312 USGMP)
Max Day + Fire Demand	61.1 L/s

A hydrant flow test will be completed to confirm that adequate fire flow is available on site. Refer to **Appendix A** for the supporting calculations of the fire demand for the proposed development and refer to **Drawing 101 – Site Servicing** for further details.

6 EROSION AND SEDIMENT CONTROL

The erosion and sediment control plan for the site will be designed in conformance with the Town of Milton guidelines and Conservation of Halton. The following erosion and sediment control measures will be installed and maintained during construction:

- A temporary sediment control fence will be placed prior to grading
- Temporary sediment traps will be provided at the
- Gravel mud mats will be provided at construction vehicle access points to minimize off-site tracking of sediments
- All temporary erosion and sediment control measures will be routinely inspected and repaired during construction. Temporary controls will not be removed until the areas they serve are restored and stable.

Refer to **Drawing 1001 - Erosion and Sediment Control Plan** in **Appendix B** for more details.

7 CONCLUSION

The proposed residential development at 560 Main Street East, which includes 570 units divided over two towers and a 961 m^2 commercial space, can be adequately serviced via the infrastructure and does not adversely impact any of the surrounding infrastructure or properties.

Stormwater quantity control is provided by an underground storage tank within the subsurface parking levels, with the potential for rooftop storage to be evaluated at later stages of design. Stormwater will discharge to the existing 975mm sewer located at the eastern limit of the Wilson Drive extension via proposed storm sewers within the right-of-way.

Stormwater quality control is provided by the underground tank with accompanying filtration system in the subsurface parking levels, and with the installation of an OGS unit to treat the Wilson Drive right-of-way.

Two sanitary service connections are provided for the development, connecting to the existing sanitary sewers on Main Street.

Water servicing is proposed to be connected at the existing infrastructure on Main Street and installed within the Wilson Drive extension. Commercial, domestic, and fire services will be provided to the development from the new watermain installed within the Wilson Drive extension.

Report Prepared by:

LICENSED PROFESSIONAL ENGINEER
A.M.R. MCLENNAN
100509390
2022-09-20
PROVINCE OF ONTARIO

Andrew McLennan, P. Eng.
Project Manager

Urbantech® Consulting, A Division of Leighton-Zec Ltd. | 3760 14th Avenue, Suite 301 · Markham · ON · L3R 3T7 | 905.946.9461

urbantech.com

APPENDIX A

DESIGN CALCULATIONS

- Storm Sewer Design Sheet
- Stormceptor EFO Sizing Report
- Sanitary Sewer Design Sheet
- Sanitary Demand Calculations
- Water Demand Calculations

Urbantech® Consulting, A Division of Leighton-Zec Ltd. | 3760 14th Avenue, Suite 301 · Markham · ON · L3R 3T7 | 905.946.9461
urbantech.com

urbantech

STORM SEWER DESIGN SHEET

5 Year Storm

560 Main Street

Town of Milton

PROJECT DETAILS

Project No: 21-672
Date: September 2022
Designed by: AM
Checked by: SR

DESIGN CRITERIA

Min. Diameter = 300 mm
Mannings 'n'= 0.013
Starting Tc = 10 min
Factor of Safety = 20 %

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

A = 959
B = 5.7
c = 0.8024

NOMINAL PIPE SIZE USED

STREET	FROM MH	TO MH	AREA (ha)	RUNOFF COEFFICIENT "R"	'AR'	ACCUM. 'AR'	RAINFALL INTENSITY (mm/hr)	FLOW (m3/s)	CONSTANT FLOW (m3/s)	ACCUM. CONSTANT FLOW (m3/s)	TOTAL FLOW (m3/s)	LENGTH (m)	SLOPE (%)	PIPE DIAMETER (mm)	FULL FLOW CAPACITY (m3/s)	FULL FLOW VELOCITY (m/s)	INITIAL Tc (min)	TIME OF CONCENTRATION (min)	ACC. TIME OF CONCENTRATION (min)	PERCENT FULL (%)
SITE	CTRL 1	3					105.3		0.270	0.270	0.270	22.10	2.50	450	0.451	2.83	10.00	0.13	10.13	60%
WILSON DR (EXTENSION)	2	3	0.50	0.90	0.45	0.45	105.3	0.132			0.132	24.40	1.00	450	0.285	1.79	10.00	0.23	10.23	46%
WILSON DR (EXTENSION)	DCB	3	0.12	0.90	0.11	0.11	105.3	0.032			0.032	23.70	4.40	250	0.125	2.54	10.00	0.16	10.16	25%
WILSON DR (EXTENSION)	3	OGS				0.56	104.0	0.161		0.270	0.431	5.10	1.00	600	0.614	2.17	10.23	0.04	10.27	70%
WILSON DR (EXTENSION)	OGS	4				0.56	103.8	0.161		0.270	0.431	15.60	1.00	600	0.614	2.17	10.27	0.12	10.39	70%

NOTE: REFER TO SWM REPORT FOR DETAILS OF 450mm OUTLET SIZING

Urbantech Consulting, A Division of Leighton-Zec Ltd.
3760 14th Avenue, Suite 301 Markham, Ontario L3R 3T7
TEL: 905.946.9461 FAX: 905.946.9595
www.urbantech.com

Stormceptor® EF Sizing Report

STORMCEPTOR®
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

04/23/2021

Province:	Ontario
City:	milton
Nearest Rainfall Station:	TORONTO CENTRAL
NCDC Rainfall Station Id:	0100
Years of Rainfall Data:	18
Site Name:	
Drainage Area (ha):	1.03
% Imperviousness:	100.00

Runoff Coefficient 'c': 0.90

Project Name:	Neatt Main street
Project Number:	21-672
Designer Name:	Ben Jackson
Designer Company:	urbantech
Designer Email:	bjackson@urbantech.com
Designer Phone:	416-984-0970
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0
Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	14.56
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	Yes
Upstream Orifice Control Flow Rate to Stormceptor (L/s):	124.00
Peak Conveyance (maximum) Flow Rate (L/s):	
Site Sediment Transport Rate (kg/ha/yr):	

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	73
EFO6	84
EFO8	88
EFO10	90
EFO12	92

Recommended Stormceptor EFO Model:	**EFO6**
Estimated Net Annual Sediment (TSS) Load Reduction (%):	**84**
Water Quality Runoff Volume Capture (%):	**> 90**

imbrium

THIRD-PARTY TESTING AND VERIFICATION

►**Stormceptor® EF and Stormceptor® EFO** are the latest evolutions in the Stormceptor® oil-grit separator (OGS) technology series, and are designed to remove a wide variety of pollutants from stormwater and snowmelt runoff. These technologies have been third-party tested in accordance with the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators** and performance has been third-party verified in accordance with the **ISO 14034 Environmental Technology Verification (ETV)** protocol.

PERFORMANCE

►**Stormceptor® EF and EFO** remove stormwater pollutants through gravity separation and floatation, and feature a patent-pending design that generates positive removal of total suspended solids (TSS) throughout each storm event, including high-intensity storms. Captured pollutants include sediment, free oils, and sediment-bound pollutants such as nutrients, heavy metals, and petroleum hydrocarbons. Stormceptor is sized to remove a high level of TSS from the frequent rainfall events that contribute the vast majority of annual runoff volume and pollutant load. The technology incorporates an internal bypass to convey excessive stormwater flows from high-intensity storms through the device without resuspension and washout (scour) of previously captured pollutants. Proper routine maintenance ensures high pollutant removal performance and protection of downstream waterways.

PARTICLE SIZE DISTRIBUTION (PSD)

►The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV ***Procedure for Laboratory Testing of Oil-Grit Separators*** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a wide range of particle sizes in the sand and silt fractions, and is considered reasonably representative of the particle size fractions found in typical urban stormwater runoff.

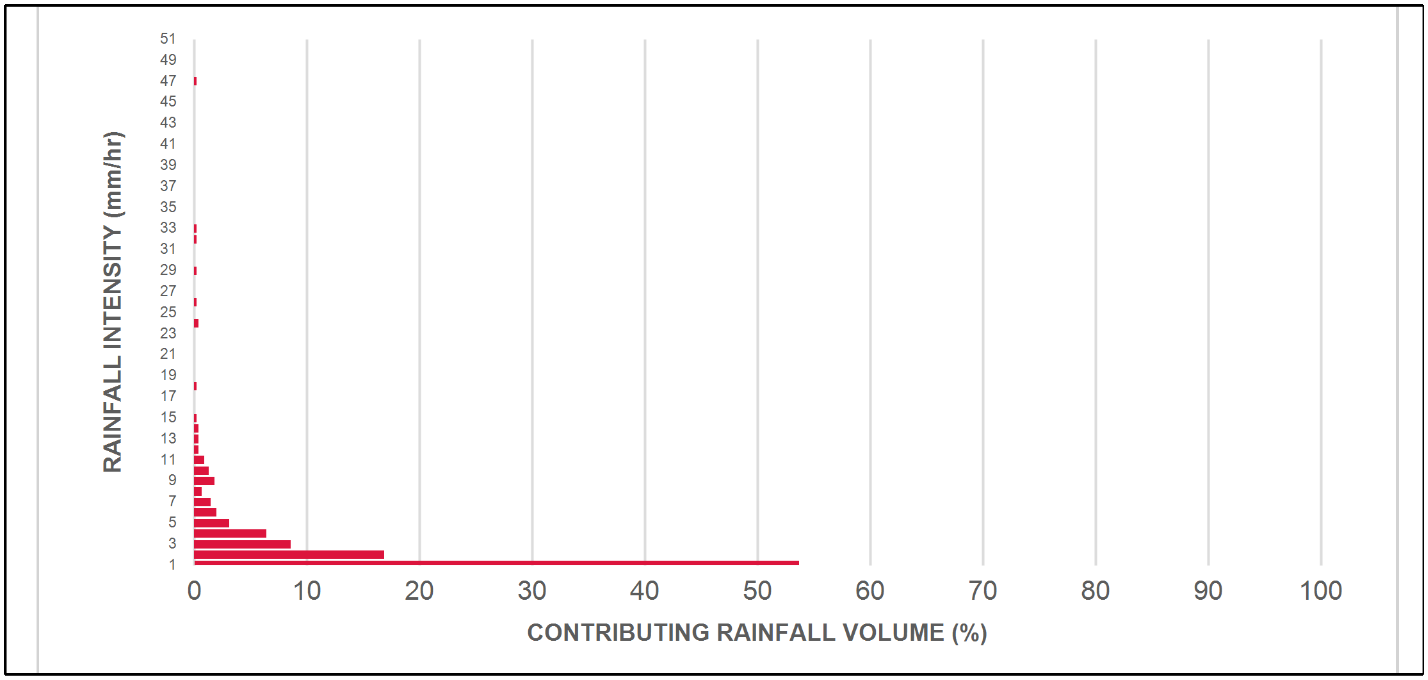
Particle Size (μm)	Percent Less Than	Particle Size Fraction (μm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

Upstream Flow Controlled Results

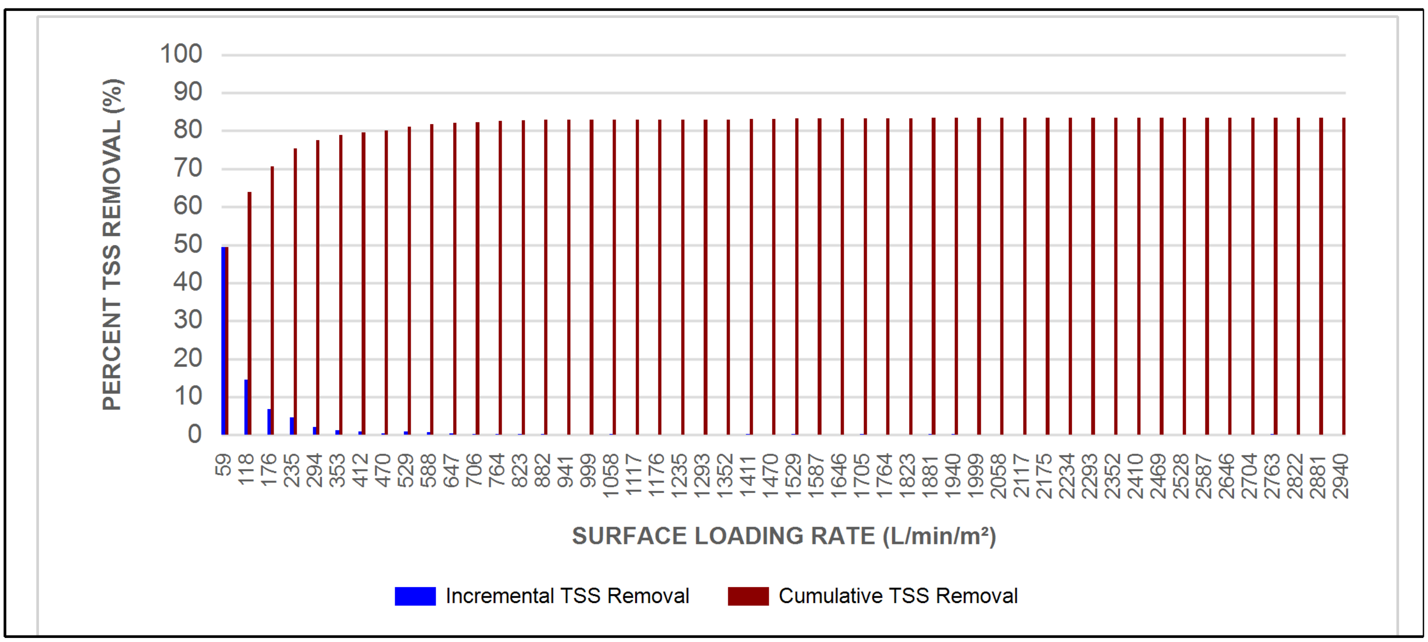
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
1	53.7	53.7	2.58	155.0	59.0	92	49.4	49.4
2	16.9	70.6	5.15	309.0	118.0	86	14.5	63.9
3	8.6	79.2	7.73	464.0	176.0	79	6.8	70.7
4	6.4	85.6	10.31	618.0	235.0	73	4.7	75.4
5	3.1	88.7	12.89	773.0	294.0	68	2.1	77.5
6	2.0	90.7	15.46	928.0	353.0	63	1.3	78.8
7	1.5	92.2	18.04	1082.0	412.0	58	0.9	79.6
8	0.7	92.9	20.62	1237.0	470.0	56	0.4	80.0
9	1.8	94.7	23.19	1392.0	529.0	54	1.0	81.0
10	1.3	96.0	25.77	1546.0	588.0	53	0.7	81.7
11	0.9	96.9	28.35	1701.0	647.0	52	0.5	82.1
12	0.4	97.3	30.92	1855.0	706.0	52	0.2	82.3
13	0.4	97.7	33.50	2010.0	764.0	51	0.2	82.5
14	0.4	98.1	36.08	2165.0	823.0	51	0.2	82.8
15	0.2	98.3	38.66	2319.0	882.0	51	0.1	82.9
16	1.7	100.0	41.23	2474.0	941.0	50	0.9	83.7
17	0.0	100.0	43.81	2629.0	999.0	50	0.0	83.7
18	0.2	100.2	46.39	2783.0	1058.0	50	0.1	83.8
19	-0.2	100.0	48.96	2938.0	1117.0	49	N/A	83.7
20	0.0	100.0	51.54	3092.0	1176.0	48	0.0	83.7
21	0.0	100.0	54.12	3247.0	1235.0	48	0.0	83.7
22	0.0	100.0	56.70	3402.0	1293.0	47	0.0	83.7
23	0.0	100.0	59.27	3556.0	1352.0	47	0.0	83.7
24	0.4	100.4	61.85	3711.0	1411.0	46	0.2	83.9
25	-0.4	100.0	64.43	3866.0	1470.0	44	N/A	83.7

Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
26	0.2	100.2	67.00	4020.0	1529.0	42	0.1	83.8
27	-0.2	100.0	69.58	4175.0	1587.0	41	N/A	83.7
28	0.0	100.0	72.16	4329.0	1646.0	39	0.0	83.7
29	0.2	100.2	74.73	4484.0	1705.0	38	0.1	83.8
30	-0.2	100.0	77.31	4639.0	1764.0	37	N/A	83.7
31	0.0	100.0	79.89	4793.0	1823.0	35	0.0	83.7
32	0.2	100.2	82.47	4948.0	1881.0	34	0.1	83.8
33	0.2	100.4	85.04	5103.0	1940.0	33	0.1	83.9
34	-0.4	100.0	87.62	5257.0	1999.0	32	N/A	83.7
35	0.0	100.0	90.20	5412.0	2058.0	31	0.0	83.7
36	0.0	100.0	92.77	5566.0	2117.0	31	0.0	83.7
37	0.0	100.0	95.35	5721.0	2175.0	30	0.0	83.7
38	0.0	100.0	97.93	5876.0	2234.0	29	0.0	83.7
39	0.0	100.0	100.51	6030.0	2293.0	28	0.0	83.7
40	0.0	100.0	103.08	6185.0	2352.0	27	0.0	83.7
41	0.0	100.0	105.66	6340.0	2410.0	27	0.0	83.7
42	0.0	100.0	108.24	6494.0	2469.0	26	0.0	83.7
43	0.0	100.0	110.81	6649.0	2528.0	26	0.0	83.7
44	0.0	100.0	113.39	6803.0	2587.0	25	0.0	83.7
45	0.0	100.0	115.97	6958.0	2646.0	25	0.0	83.7
46	0.0	100.0	118.54	7113.0	2704.0	25	0.0	83.7
47	0.2	100.2	121.12	7267.0	2763.0	25	0.1	83.8
48	-0.2	100.0	123.70	7422.0	2822.0	25	N/A	83.7
49	0.0	100.0	124.00	7440.0	2829.0	25	0.0	83.7
50	0.0	100.0	124.00	7440.0	2829.0	25	0.0	83.7
							Estimated Net Annual Sediment (TSS) Load Reduction =	**84 %**

RAINFALL DATA FROM TORONTO CENTRAL RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL
FOR THE RECOMMENDED STORMCEPTOR® MODEL



Stormceptor® EF Sizing Report

Maximum Pipe Diameter / Peak Conveyance

Stormceptor EF / EFO	Model Diameter (m)	Model Diameter (ft)	Min Angle Inlet / Outlet Pipes	Max Inlet Pipe Diameter (mm)	Max Inlet Pipe Diameter (in)	Max Outlet Pipe Diameter (mm)	Max Outlet Pipe Diameter (in)	Peak Conveyance Flow Rate (L/s)	Peak Conveyance Flow Rate (cfs)
EF4 / EFO4	1.2	4	90	609	24	609	24	425	15
EF6 / EFO6	1.8	6	90	914	36	914	36	990	35
EF8 / EFO8	2.4	8	90	1219	48	1219	48	1700	60
EF10 / EFO10	3.0	10	90	1828	72	1828	72	2830	100
EF12 / EFO12	3.6	12	90	1828	72	1828	72	2830	100

SCOUR PREVENTION AND ONLINE CONFIGURATION

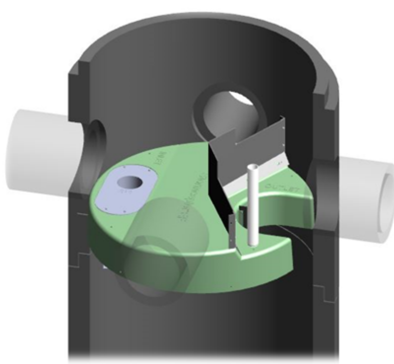
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test performance has been third-party verified in accordance with the ISO 14034 ETV protocol. As a result, Stormceptor EF and EFO are approved for online installation, eliminating the need for costly additional bypass structures, piping, and installation expense.

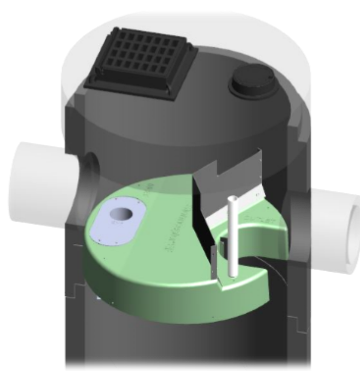
DESIGN FLEXIBILITY

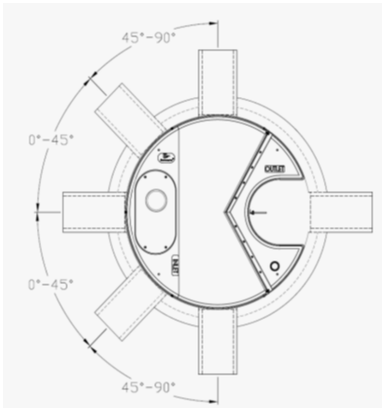
►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend angle, and can be modified to ensure performance in submerged conditions.

OIL CAPTURE AND RETENTION

►While Stormceptor® EF will capture and retain oil from dry weather spills and low intensity runoff, **Stormceptor® EFO** has demonstrated superior oil capture and greater than 99% oil retention in third-party testing according to the light liquid re-entrainment testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**. Stormceptor EFO is recommended for sites where oil capture and retention is a requirement.







INLET-TO-OUTLET DROP

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.

0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.

45° - 90° : The inlet pipe is 2-inches (50mm) higher than the outlet pipe.

HEAD LOSS

The head loss through Stormceptor EF is similar to that of a 60-degree bend structure. The applicable K value for calculating minor losses through the unit is 1.1. For submerged conditions the applicable K value is 3.0.

Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft³)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF6 / EFO6	1.8	6	1.93	6.3	610	160	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	1670	440	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

*Increased sump depth may be added to increase sediment storage capacity

** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft^3)

Feature	Benefit	Feature Appeals To
Patent-pending enhanced flow treatment and scour prevention technology	Superior, verified third-party performance	Regulator, Specifying & Design Engineer
Third-party verified light liquid capture and retention for EFO version	Proven performance for fuel/oil hotspot locations	Regulator, Specifying & Design Engineer, Site Owner
Functions as bend, junction or inlet structure	Design flexibility	Specifying & Design Engineer
Minimal drop between inlet and outlet	Site installation ease	Contractor
Large diameter outlet riser for inspection and maintenance	Easy maintenance access from grade	Maintenance Contractor & Site Owner

STANDARD STORMCEPTOR EF/EFO DRAWINGS

For standard details, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

For specifications, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD PERFORMANCE SPECIFICATION FOR “OIL GRIT SEPARATOR” (OGS) STORMWATER QUALITY TREATMENT DEVICE

PART 1 – GENERAL

1.1 WORK INCLUDED

This section specifies requirements for selecting, sizing, and designing an underground Oil Grit Separator (OGS) device for stormwater quality treatment, with third-party testing results and a Statement of Verification in accordance with ISO 14034 Environmental Management – Environmental Technology Verification (ETV).

1.2 REFERENCE STANDARDS & PROCEDURES

ISO 14034:2016 Environmental management – Environmental technology verification (ETV)

Canadian Environmental Technology Verification (ETV) Program’s **Procedure for Laboratory Testing of Oil-Grit Separators**

1.3 SUBMITTALS

1.3.1 All submittals, including sizing reports & shop drawings, shall be submitted upon request with each order to the contractor then forwarded to the Engineer of Record for review and acceptance. Shop drawings shall detail all OGS components, elevations, and sequence of construction.

1.3.2 Alternative devices shall have features identical to or greater than the specified device, including: treatment chamber diameter, treatment chamber wet volume, sediment storage volume, and oil storage volume.

1.3.3 Unless directed otherwise by the Engineer of Record, OGS stormwater quality treatment product substitutions or alternatives submitted within ten days prior to project bid shall not be accepted. All alternatives or substitutions submitted shall be signed and sealed by a local registered Professional Engineer, based on the exact same criteria detailed in Section 3, in entirety, subject to review and approval by the Engineer of Record.

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

The OGS device shall include a sump for sediment storage, and a protected volume for the capture and storage of petroleum hydrocarbons and buoyant gross pollutants. The minimum sediment & petroleum hydrocarbon storage capacity shall be as follows:

2.1.1	4 ft (1219 mm) Diameter OGS Units:	1.19 m^3 sediment / 265 L oil
	6 ft (1829 mm) Diameter OGS Units:	3.48 m^3 sediment / 609 L oil
	8 ft (2438 mm) Diameter OGS Units:	8.78 m^3 sediment / 1,071 L oil
	10 ft (3048 mm) Diameter OGS Units:	17.78 m^3 sediment / 1,673 L oil
	12 ft (3657 mm) Diameter OGS Units:	31.23 m^3 sediment / 2,476 L oil

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

The OGS stormwater quality treatment device shall be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV). The OGS stormwater quality treatment device shall remove oil, sediment and gross pollutants from stormwater runoff during frequent wet weather events, and retain these pollutants during less frequent high flow wet weather events below the insert within the OGS for later removal during maintenance. The Manufacturer shall have at least ten (10) years of local experience, history and success in engineering design, manufacturing and production and supply of OGS stormwater quality treatment device systems, acceptable to the Engineer of Record.

3.2 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in the sizing report for the specified device. Sizing shall be determined using historical rainfall data and a sediment removal performance curve derived from the actual third-party verified laboratory testing data. The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 2.1.

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of third-party scour testing conducted in accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.**

3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m^2.

3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators,** with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to assess whether light liquids captured after a spill are effectively retained at high flow rates.

3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m2 to 2600 L/min/m2) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.**However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.

urbantech

SANITARY SEWER DESIGN SHEET

Neatt Communities

TOWN OF MILTON / HALTON REGION

PROJECT DETAILS

Project No: 21-672
Date: 20-Sep-22
Designed by: AM
Checked by: SR

DESIGN CRITERIA

Min Diameter =	200	mm	Avg. Domestic Flow =	275.0	l/c/d
Mannings 'n'=	0.013		Infiltration =	0.260	l/s/ha
Min. Velocity =	0.6	m/s	Max. Peaking Factor =	4.00	
Max. Velocity =	3.0	m/s	Min. Peaking Factor=	2.00	
Factor of Safety =	15	%			

NOMINAL PIPE SIZE USED

			RESIDENTIAL							COMMERCIAL/INDUSTRIAL/INSTITUTIONAL						FLOW CALCULATIONS							PIPE DATA					
STREET	FROM MH	TO MH	AREA (ha)	ACC. AREA (ha)	UNITS (#)	DENSITY (P/ha)	DENSITY (P/unit)	POP	ACCUM. RES. POP.	AREA (ha)	ACC. AREA (ha)	EQUIV. POP. (p/ha)	FLOW RATE (l/s/ha)	EQUIV. POP.	ACCUM. EQUIV. POP.	INFILTRATION (l/s)	TOTAL ACCUM. POP.	PEAKING FACTOR	RES. FLOW (l/s)	COMM. FLOW (l/s)	ACCUM. COMM. FLOW (l/s)	TOTAL FLOW (l/s)	SLOPE (%)	PIPE DIAMETER (mm)	FULL FLOW CAPACITY (l/s)	FULL FLOW VELOCITY (m/s)	ACTUAL VELOCITY (m/s)	PERCENT FULL (%)
560 Main St	1A	Ex. 10A	0.62	0.62	290		2.7	783	783	0.10	0.10	90		9	9	0.2	792	3.86	9.7			9.9	1.00	300	96.7	1.4	0.9	10%
560 Main St	2A	3A	0.58	0.58	280		2.7	756	756							0.2	756	3.88	9.3			9.5	1.00	300	96.7	1.4	0.9	10%

Urbantech Consulting, A Division of Leighton-Zec Ltd.
3760 14th Avenue, Suite 301 Markham, Ontario L3R 3T7
TEL: 905.946.9461 FAX: 905.946.9595
www.urbantech.com

URBANTECH

SANITARY DEMAND CALCULATIONS

Project Name: 560 Main
Municipality: Region of Halton
Project No.: 21-672
Date: 16-Sep-22

Existing Site

Address	560 Main Street
Existing Land Use	Undeveloped
Site Area (ha)	1.20
Residential Unit Sewage Flow (L/p/s)	0.003183
Infiltration Allowance (L/ha/s)	0.286
Residential Population (ppl/unit)*	2.7
Light Commercial Population (ppl/hectare)	90
Light Commercial Unit Sewage Flow (L/ha/s)	0.28646
Residential Land Use Area (ha)	1.10

*All factors, densities, and caclulations are as per The Region of Halton Water and Wastewater Linear Design Manual Version 5, October 2019

**Residential population equivalency factor assumed conservatively to be 2.7 ppu as the density of the proposed development is larger than section 2.3.2. of the Linear Design Manual.*

Proposed Site Architectural Site Stats: 20-Jul-22

Average Dry Weather Flow

Building	**A**	**B**
Commercial Type	Light	-
Light Commercial Site GFA (ha)	0.10	0.00
Light Commercial Population (equiv.)	8.65	0.00
Light Commercial Sewage Flow (L/s)	0.03	0.00
Units	290	280
Residential Population	**783**	**756**
Residential Sewage Flow (L/s)	2.49	2.41
Total Sewer Flow (L/s)	**2.52**	**2.41**

Peaking Factor

Kav	0.98	1.00
Harmon Peaking Factor, M	3.80	3.88
Peak Sanitary Flow (L/s)	**9.58**	**9.32**

Proposed Infiltration

Site Area (ha)	0.62	0.58
Infiltration (L/s) (Infiltration Allowance 0.286 L/ha/s)	**0.18**	**0.17**

Total Flows

Commercial and Residential (L/s)	9.58	9.32
Infiltration (L/s)	0.18	0.17
Total Sanitary Flow (L/s)	**9.76**	**9.49**

urbantech west

WATER DEMAND CALCULATIONS

Project Name: 560 Main
Municipality: Region of Halton
Project No.: 21-672

Prepared by: AM
Checked by: SR
Date: 2022-09-14

Fire Flow Calculations

Based on the *Water Supply for Public Fire Protection, 1999* by Fire Underwriters Survey

1 Estimate of Fire Flow

F = 220 C (A)1/2

F = Fire Flow (L/min)
C = Construction Type Coefficient
= 0.6 fire resistive
A = Total flow area (m^2)

***Largest Floor + 25% of two adjoining floors (includes both Towers)**

Floor	Area (m^2)	%
Level 3	3,081	100%
Level 2	2,898	25%
Level 4	3,078	25%

= 4575 m^2

F = 8928 L/min
= 9000 L/min, rounded to the nearest 1000 L/min

Urbantech Consulting, A Division of Leighton-Zec Ltd.
2030 Bristol Circle, Suite 105 Oakville, Ontario L6H OH2
TEL: 905.946.2472 FAX: 905.829.4804
www.urbantech.com

urbantech west

WATER DEMAND CALCULATIONS

Project Name:	560 Main	**Prepared by:**	AM
Municipality:	Region of Halton	**Checked by:**	SR
Project No.:	21-672	**Date:**	2022-09-14

2 Occupancy Reduction

25% for low hazard occupancies (apartments)

F = 6750 L/min

3 Sprinkler Reduction

50%

F = 3375 L/min

4 Separation Charge

Direction	Separation	Charge	
North	60.0	0%	greater than 45
West	100.0	0%	greater than 45
South	90.0	0%	greater than 45
East	75.0	0%	greater than 45

Total Charge = 0%

F = 0 L/min

Required Fire Flow

F = 3375 L/min

= 3000 L/min, rounded to the nearest 1000 L/min

Fire Flow Demand = 50.0 L/s

= 793 USGPM

Urbantech Consulting, A Division of Leighton-Zec Ltd.
2030 Bristol Circle, Suite 105 Oakville, Ontario L6H OH2
TEL: 905.946.2472 FAX: 905.829.4804
www.urbantech.com

urbantech west

WATER DEMAND CALCULATIONS

Project Name:	560 Main	**Prepared by:**	AM
Municipality:	Region of Halton	**Checked by:**	SR
Project No.:	21-672	**Date:**	2022-09-14

Domestic Flow Calculations

Units =		570	
Population per unit =		2.7	(conservative estimate)
Population (incl. commercial) =		1548	(greater than 285 ppl/ha=342 ppl)
Average Day Demand =		275 L/person/day	(2.4.2, Region of Halton Design Manual)
=		4.9 L/s	

Use Peaking Factor the Greater of

Max Day Factor =		2.25	(2.4.2., Region of Halton Design Manual)
Max Daily Demand =		11.1 L/s	

or

Peak Hour Factor =	4.00		(Table 2-2, Region of Halton Design Manual)
Peak Hour Demand =		19.7 L/s	

Domestic Flow Demand =	19.7 L/s
=	312 USGPM

Max Day + Fire Demand =	61.1 L/s
=	968 USGPM

Urbantech Consulting, A Division of Leighton-Zec Ltd.
2030 Bristol Circle, Suite 105 Oakville, Ontario L6H OH2
TEL: 905.946.2472 FAX: 905.829.4804
www.urbantech.com

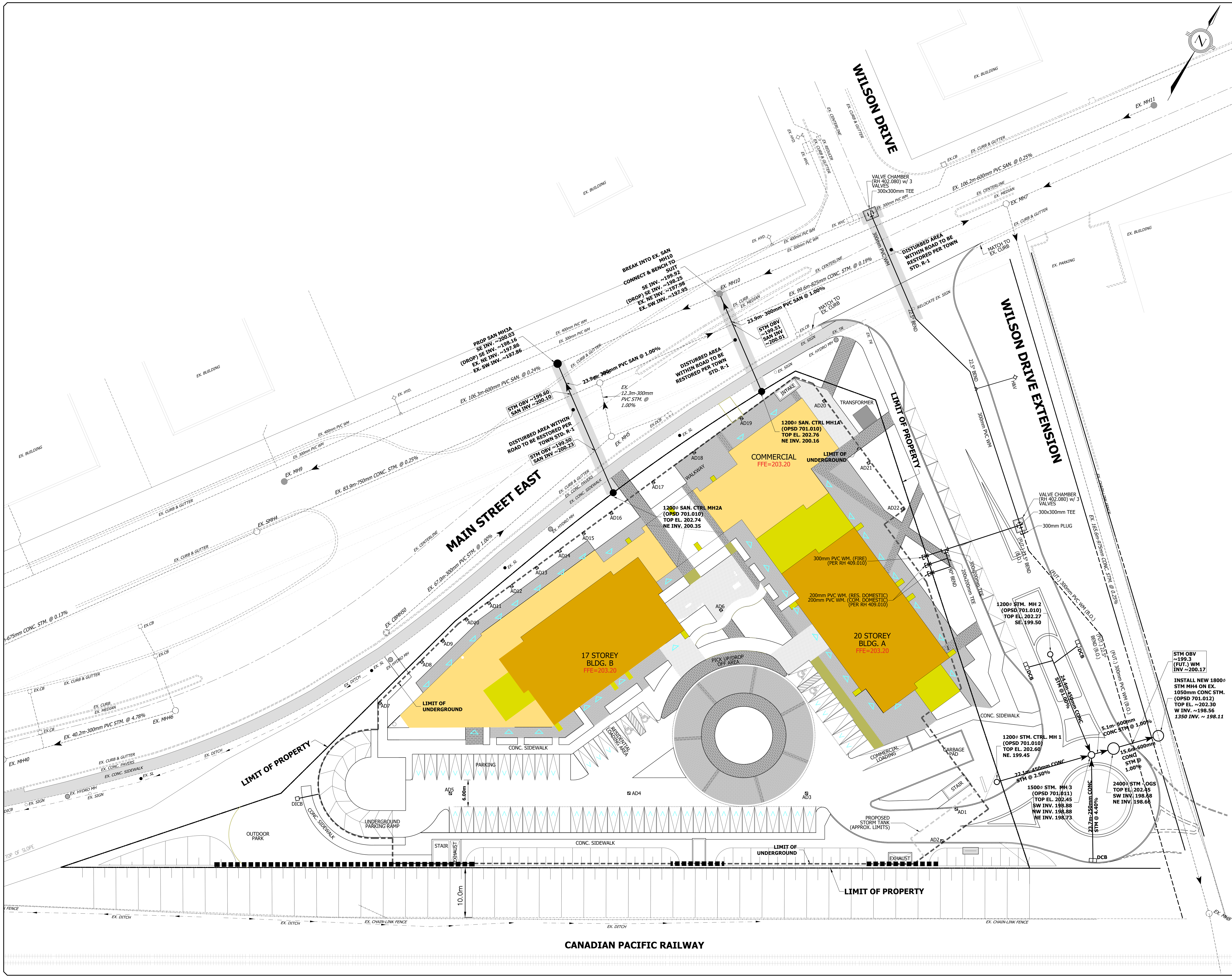
APPENDIX B

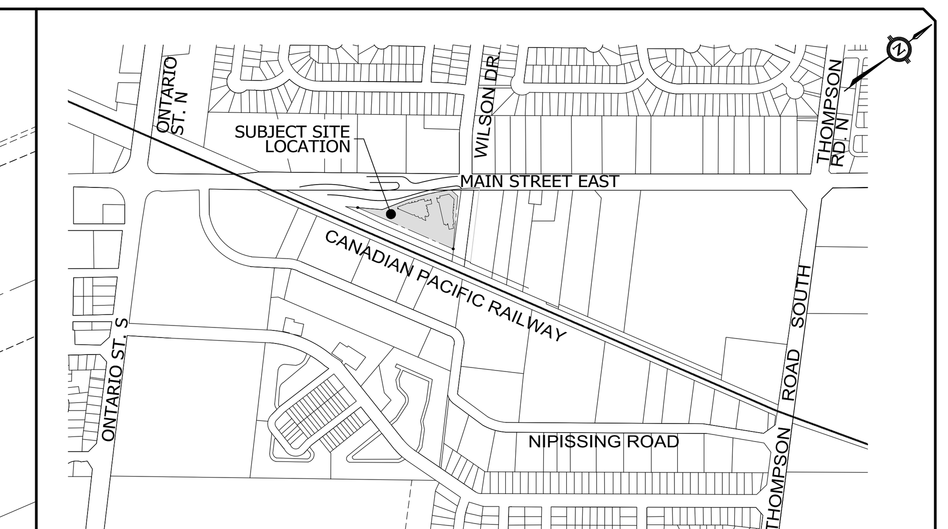
DRAWINGS

- Drawing 101 – Site Servicing
- Drawing 201 – Site Grading
- Drawing 301 – Pre-Development Storm Drainage
- Drawing 302 – Post-Development Storm Drainage
- Drawing 303 – Sanitary Drainage
- Drawing 1001 – Erosion and Sediment Control Plan

Urbantech® Consulting, A Division of Leighton-Zec Ltd. | 3760 14th Avenue, Suite 301 · Markham · ON · L3R 3T7 | 905.946.9461

urbantech.com





KEY PLAN
N.T.S.

LEGEND

- BLOCK LIMIT/PROPERTY LIMIT
- CONCRETE CURB, BARRIER (OPSD 600.040)
- CONCRETE CURB, MOUNTABLE (OPSD 600.040)
- STORM SEWER AND MANHOLE
- SANITARY SEWER AND MANHOLE
- EXISTING STORM MANHOLE
- EXISTING SANITARY MANHOLE
- AREA DRAIN
- SINGLE CATCH BASIN
- DOUBLE CATCH BASIN
- EXISTING SINGLE CATCHBASIN
- EXISTING DOUBLE CATCHBASIN
- HYDRANT & VALVE
- VALVE AND BOX
- FIRE DEPARTMENT CONNECTION
- TRANSFORMER
- STREET LIGHT
- LIMIT OF UNDERGROUND PARKING
- RETAINING WALL

BENCHMARK NO. 828158:

EXISTING ELEVATIONS ARE DERIVED FROM THE TOPOGRAPHIC SURVEY PREPARED BY WAHBA, DATED JANUARY 29, 2021.

NOTES:
IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THAT THE LOCAL BENCHMARK HAS NOT BEEN ALTERED OR DISTURBED AND THAT THE RELATIVE ELEVATION AND DESCRIPTION AGREE WITH THE INFORMATION SHOWN ON THIS SKETCH

BEFORE DIGGING, UNDERGOUND SERVICES HOULD BE LOCATED ON SITE BY THE RESPECTIVE AGENCIES.

ELEVATION NOTE:
ELEVATIONS SHOWN ON THIS PLAN ARE GEODETIC ARE REFERRED TO FIRST ORDER BENCHMARK NUMBER 828158: LOCATED ON A CONCRETE AND STEEL BRIDGE CARRYING CPR OVER HWY 25, 82.6M NORTH OF THE INTERSECTION OF HWY 25 AND MAIN ST. EAST AT MILTON, 230.0M SOUTH OF GEORGE ST. TABLET IS SET HORIZONTALLY IN SOUTH FACE OF CONCRETE COPING, 17.6M EAST OF CENTRELINE OF HWY 25, 2.57M SOUTH OF EDGE OF FIRST RAIL, 68 CM WEST OF S.E. END OF BRIDGE, 17 CM BELOW TOP OF COPING ELEVATION = 201.212

No.	REVISION	DATE	BY
3			
2	SECOND SUBMISSION	22-09-20	AM
1	FIRST SUBMISSION	21-04-23	BJ

APPROVED

560 MAIN STREET EAST MILTON INC.

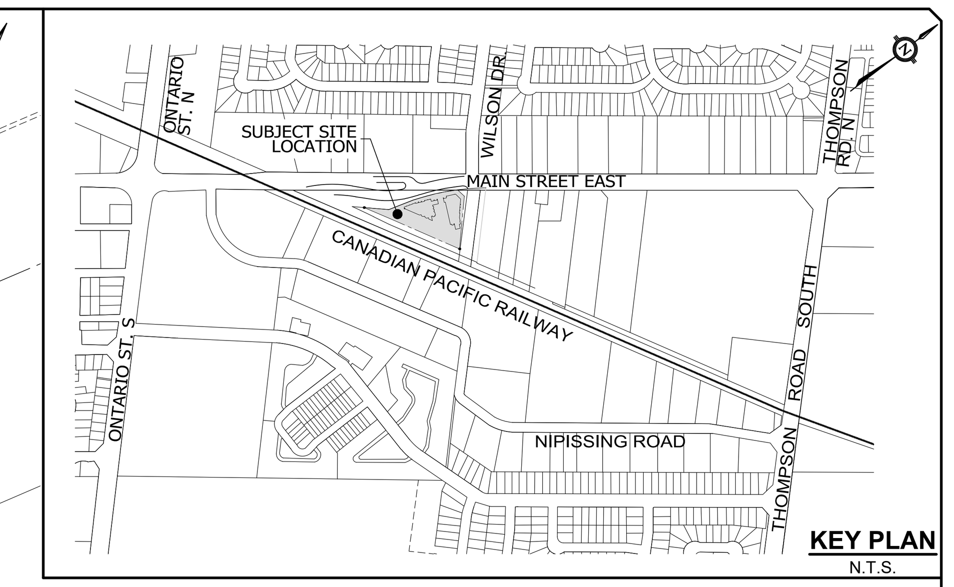
MILTON

URBANTECH®
Urbantech® Consulting
A Division of Leighton-Zec Ltd.
3760 14th Avenue, Suite 301,
Markham, ON. L3R 3T7
TEL 905.946.9461 • urbantech.com

LICENSED PROFESSIONAL ENGINEER
A.M.R. MCLENNAN
100509390
SEPT 20, 2022
PROVINCE OF ONTARIO

SITE SERVICING PLAN

DESIGNED: AM	CHECKED: SR	PROJECT No.: 21-672
DRAWN: AM	DATE: SEPTEMBER 2022	SHEET No.:
SCALE: 1:500		DRAWING No.: 101



KEY PLAN
N.T.S.

LEGEND

201.65	EXISTING CONTOUR AND ELEVATION
201.65	EXISTING ELEVATION
201.65	PROPOSED ELEVATION
201.65TC	PROPOSED TOP CURB ELEVATION
(201.65)	FUTURE ELEVATIONS
	STORM MANHOLE
	SINGLE CATCH BASIN MANHOLE
	SANITARY MANHOLE
	EXISTING STORM MANHOLE
	EXISTING SANITARY MANHOLE
	SINGLE CATCHBASIN
	DOUBLE CATCHBASIN
	EXISTING SINGLE/REARLOT CATCHBASIN
	EXISTING DOUBLE CATCHBASIN
	HYDRANT & VALVE (OPSD 1105.010)
	VALVE AND BOX
	FIRE DEPARTMENT CONNECTION
	STREET LIGHT
	TRANSFORMER
	EMERGENCY OVERLAND FLOW DIRECTION
	PROPOSED OVERLAND FLOW DIRECTION
	MAXIMUM 3:1 SLOPE (UNLESS OTHERWISE NOTED)
	CONCRETE CURB, BARRIER (OPSD 600.040)
	CONCRETE CURB, MOUNTABLE (OPSD 600.040)
	BLOCK LIMIT/LIMIT OF PROPERTY
	LIMIT OF UNDERGROUND PARKING
	RETAINING WALL

BENCHMARK NO. 828158:

EXISTING ELEVATIONS ARE DERIVED FROM THE TOPOGRAPHIC SURVEY PREPARED BY WAHBA, DATED JANUARY 29, 2021.

NOTES:
IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THAT THE LOCAL BENCHMARK HAS NOT BEEN ALTERED OR DISTURBED AND THAT THE RELATIVE ELEVATION AND DESCRIPTION AGREE WITH THE INFORMATION SHOWN ON THIS SKETCH

BEFORE DIGGING, UNDERGOUND SERVICES HOULD BE LOCATED ON SITE BY THE RESPECTIVE AGENCIES.

ELEVATION NOTE:
ELEVATIONS SHOWN ON THIS PLAN ARE GEODETIC ARE REFERRED TO FIRST ORDER BENCHMARK NUMBER 828158: LOCATED ON A CONCRETE AND STEEL BRIDGE CARRYING CPR OVER HWY 25, 82.6M NORTH OF THE INTERSECTION OF HWY 25 AND MAIN ST. EAST AT MILTON, 230.0M SOUTH OF GEORGE ST. TABLET IS SET HORIZONTALLY IN SOUTH FACE OF CONCRETE COPING, 17.6M EAST OF CENTRELINE OF HWY 25, 2.57M SOUTH OF EDGE OF FIRST RAIL, 68 CM WEST OF S.E. END OF BRIDGE, 17 CM BELOW TOP OF COPING ELEVATION = 201.212

No.	REVISION	DATE	BY
3			
2	SECOND SUBMISSION	22-09-20	AM
1	FIRST SUBMISSION	21-04-23	BJ

APPROVED

560 MAIN STREET EAST MILTON INC.

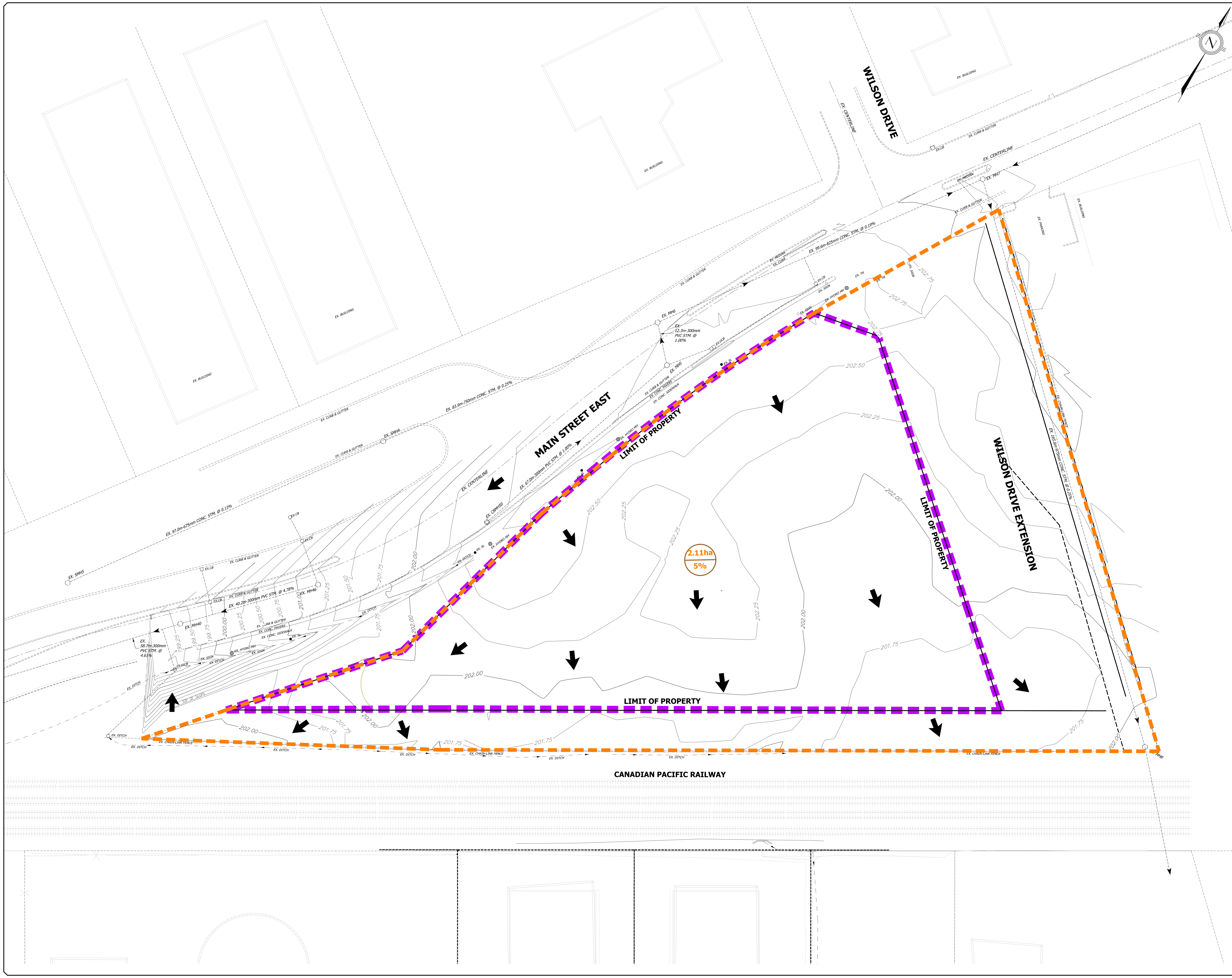
MILTON

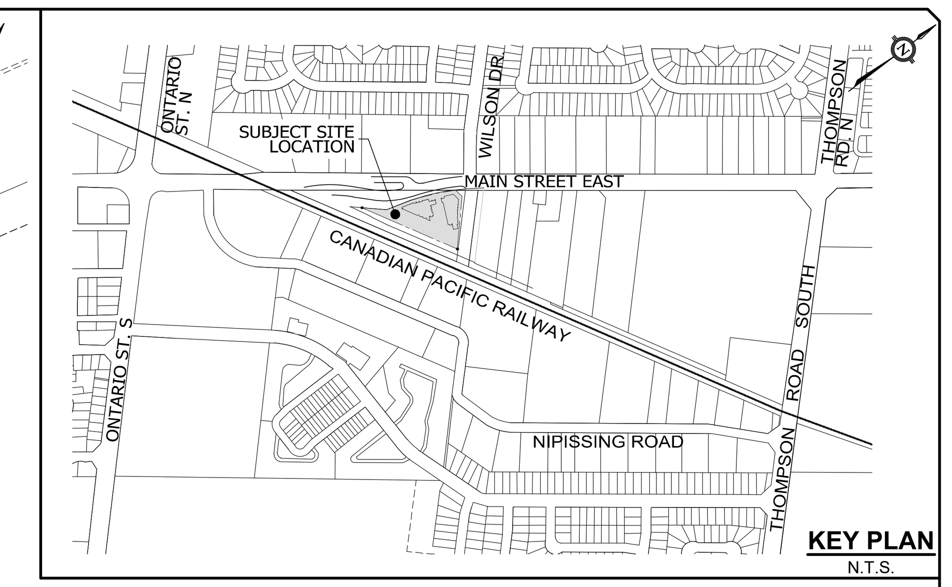
URBANTECH®
Urbantech® Consulting
A Division of Leighton-Zec Ltd.
3760 14th Avenue, Suite 301,
Markham, ON. L3R 3T7
TEL 905.946.9461 • urbantech.com

LICENSED PROFESSIONAL ENGINEER
A.M.R. MCLENNAN
100509390
SEPT 20, 2022
PROVINCE OF ONTARIO

GRADING PLAN

DESIGNED: AM	CHECKED: SR	PROJECT No.: 21-672
DRAWN: AM	DATE: SEPTEMBER 2022	SHEET No.:
SCALE: 1:500		DRAWING No.: 201





KEY PLAN
N.T.S.

LEGEND

LIMIT OF PROPERTY

EXISTING GROUND CONTOUR AND ELEVATION

EXISTING DRAINAGE AREA BOUNDARY

0.86 EXISTING DRAINAGE AREA (ha)
25% IMPERVIOUS AREA (%)

EXISTING OVERLAND FLOW DIRECTION

BENCHMARK NO. 828158:

EXISTING ELEVATIONS ARE DERIVED FROM THE TOPOGRAPHIC SURVEY PREPARED BY WAHBA, DATED JANUARY 29, 2021.

NOTES:
IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THAT THE LOCAL BENCHMARK HAS NOT BEEN ALTERED OR DISTURBED AND THAT THE RELATIVE ELEVATION AND DESCRIPTION AGREE WITH THE INFORMATION SHOWN ON THIS SKETCH

BEFORE DIGGING, UNDERGOUND SERVICES HOULD BE LOCATED ON SITE BY THE RESPECTIVE AGENCIES.

ELEVATION NOTE:
ELEVATIONS SHOWN ON THIS PLAN ARE GEODETIC ARE REFERRED TO FIRST ORDER BENCHMARK NUMBER 828158: LOCATED ON A CONCRETE AND STEEL BRIDGE CARRYING CPR OVER HWY 25, 82.6M NORTH OF THE INTERSECTION OF HWY 25 AND MAIN ST. EAST AT MILTON, 230.0M SOUTH OF GEORGE ST. TABLET IS SET HORIZONTALLY IN SOUTH FACE OF CONCRETE COPING, 17.6M EAST OF CENTRELINE OF HWY 25, 2.57M SOUTH OF EDGE OF FIRST RAIL, 68 CM WEST OF S.E. END OF BRIDGE, 17 CM BELOW TOP OF COPING ELEVATION = 201.212

No.	REVISION	DATE	BY
3			
2	SECOND SUBMISSION	22-09-20	AM
1	FIRST SUBMISSION	21-04-23	BJ

APPROVED

560 MAIN STREET EAST MILTON INC.

MILTON

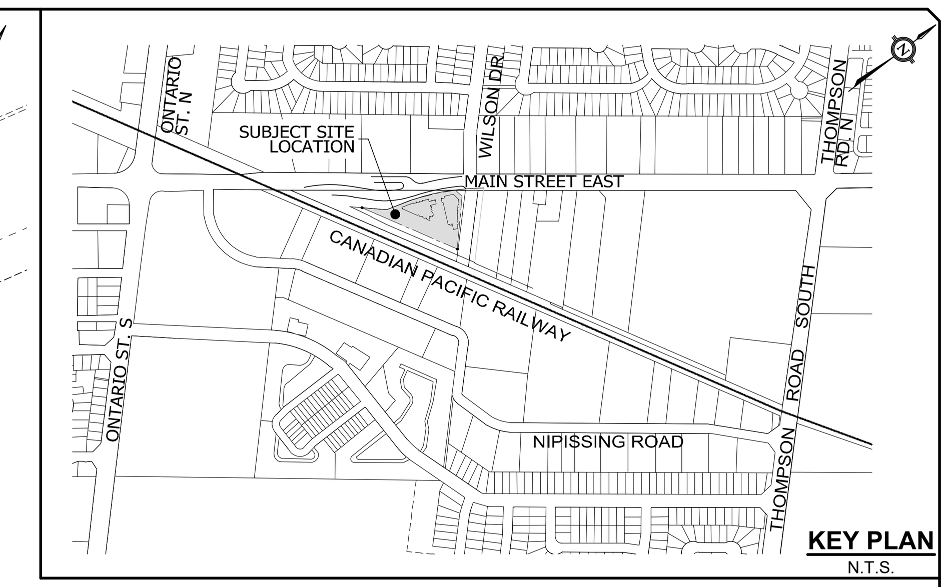
URBANTECH®

Urbantech® Consulting
A Division of Leighton-Zec Ltd.
3760 14th Avenue, Suite 301,
Markham, ON. L3R 3T7
TEL 905.946.9461 • urbantech.com

LICENSED PROFESSIONAL ENGINEER
A.M.R. MCLENNAN
100509390
SEPT 20, 2022
PROVINCE OF ONTARIO

PRE-DEVELOPMENT STORM DRAINAGE PLAN

DESIGNED: AM	CHECKED: SR	PROJECT No.:	21-672
DRAWN: AM	DATE: SEPTEMBER 2022	SHEET No.:	
SCALE: 1:500		DRAWING No.:	301



KEY PLAN
N.T.S.

LEGEND

- STORM MANHOLE AND FLOW DIRECTION
- EXISTING STORM MANHOLE AND FLOW DIRECTION
- CATCHBASIN
- AREA DRAIN
- 1.03 DRAINAGE AREA (ha)
- 50% IMPERVIOUS AREA (%)
- STORM DRAINAGE AREA BOUNDARY
- BLOCK LIMIT/PROPERTY LIMIT
- PROPOSED OVERLAND FLOW DIRECTION
- LIMIT OF UNDERGROUND PARKING

BENCHMARK NO. 828158:

EXISTING ELEVATIONS ARE DERIVED FROM THE TOPOGRAPHIC SURVEY PREPARED BY WAHBA, DATED JANUARY 29, 2021.

NOTES:
IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THAT THE LOCAL BENCHMARK HAS NOT BEEN ALTERED OR DISTURBED AND THAT THE RELATIVE ELEVATION AND DESCRIPTION AGREE WITH THE INFORMATION SHOWN ON THIS SKETCH

BEFORE DIGGING, UNDERGOUND SERVICES HOULD BE LOCATED ON SITE BY THE RESPECTIVE AGENCIES.

ELEVATION NOTE:
ELEVATIONS SHOWN ON THIS PLAN ARE GEODETIC ARE REFERRED TO FIRST ORDER BENCHMARK NUMBER 828158: LOCATED ON A CONCRETE AND STEEL BRIDGE CARRYING CPR OVER HWY 25, 82.6M NORTH OF THE INTERSECTION OF HWY 25 AND MAIN ST. EAST AT MILTON, 230.0M SOUTH OF GEORGE ST. TABLET IS SET HORIZONTALLY IN SOUTH FACE OF CONCRETE COPING, 17.6M EAST OF CENTRELINE OF HWY 25, 2.57M SOUTH OF EDGE OF FIRST RAIL, 68 CM WEST OF S.E. END OF BRIDGE, 17 CM BELOW TOP OF COPING ELEVATION = 201.212

No.	REVISION	DATE	BY
3			
2	SECOND SUBMISSION	22-09-20	AM
1	FIRST SUBMISSION	21-04-23	BJ

APPROVED

560 MAIN STREET EAST MILTON INC.

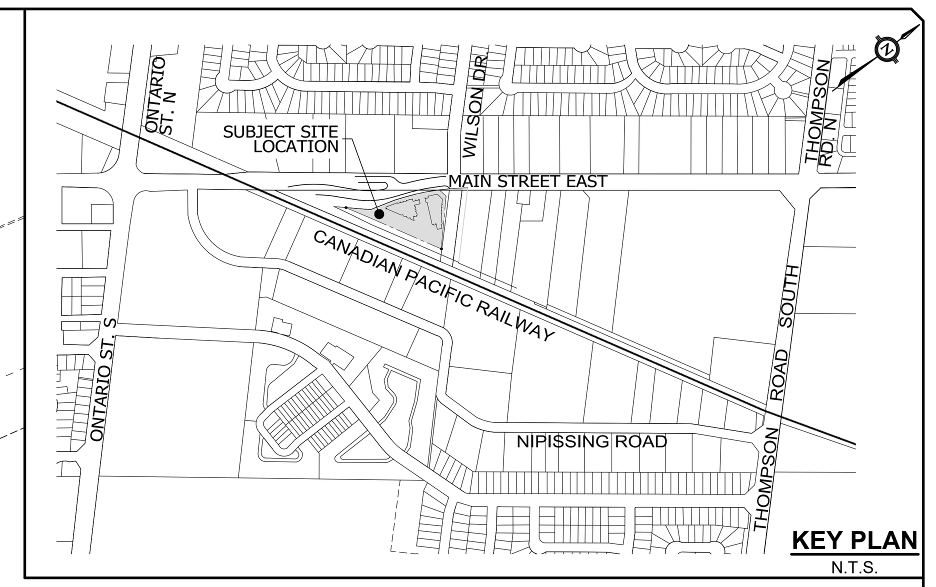
MILTON

URBANTECH®
Urbantech® Consulting
A Division of Leighton-Zec Ltd.
3760 14th Avenue, Suite 301,
Markham, ON. L3R 3T7
TEL 905.946.9461 • urbantech.com

LICENSED PROFESSIONAL ENGINEER
A.M.R. MCLENNAN
100509390
SEPT 20, 2022
PROVINCE OF ONTARIO

POST-DEVELOPMENT STORM DRAINAGE PLAN

DESIGNED: AM	CHECKED: SR	PROJECT No.: 21-672	
DRAWN: AM	DATE: SEPTEMBER 2022	SHEET No.:	
SCALE: 1:500		DRAWING No.: 302	



KEY PLAN
N.T.S.

LEGEND

STORM MANHOLE AND FLOW DIRECTION
EXISTING STORM MANHOLE AND FLOW DIRECTION
1.20ha / 570 1593 — DRAINAGE AREA IN HECTARES, POPULATION, UNITS
SANITARY DRAINAGE AREA BOUNDARY
BLOCK LIMIT/PROPERTY LIMIT
LIMIT OF UNDERGROUND PARKING

BENCHMARK NO. 828158:

EXISTING ELEVATIONS ARE DERIVED FROM THE TOPOGRAPHIC SURVEY PREPARED BY WAHBA, DATED JANUARY 29, 2021.

NOTES:
IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THAT THE LOCAL BENCHMARK HAS NOT BEEN ALTERED OR DISTURBED AND THAT THE RELATIVE ELEVATION AND DESCRIPTION AGREE WITH THE INFORMATION SHOWN ON THIS SKETCH

BEFORE DIGGING, UNDERGOUND SERVICES HOULD BE LOCATED ON SITE BY THE RESPECTIVE AGENCIES.

ELEVATION NOTE:
ELEVATIONS SHOWN ON THIS PLAN ARE GEODETIC ARE REFERRED TO FIRST ORDER BENCHMARK NUMBER 828158: LOCATED ON A CONCRETE AND STEEL BRIDGE CARRYING CPR OVER HWY 25, 82.6M NORTH OF THE INTERSECTION OF HWY 25 AND MAIN ST. EAST AT MILTON, 230.0M SOUTH OF GEORGE ST. TABLET IS SET HORIZONTALLY IN SOUTH FACE OF CONCRETE COPING, 17.6M EAST OF CENTRELINE OF HWY 25, 2.57M SOUTH OF EDGE OF FIRST RAIL, 68 CM WEST OF S.E. END OF BRIDGE, 17 CM BELOW TOP OF COPING ELEVATION = 201.212

No.	REVISION	DATE	BY
3			
2	SECOND SUBMISSION	22-09-20	AM
1	FIRST SUBMISSION	21-04-23	BJ

APPROVED

560 MAIN STREET EAST MILTON INC.

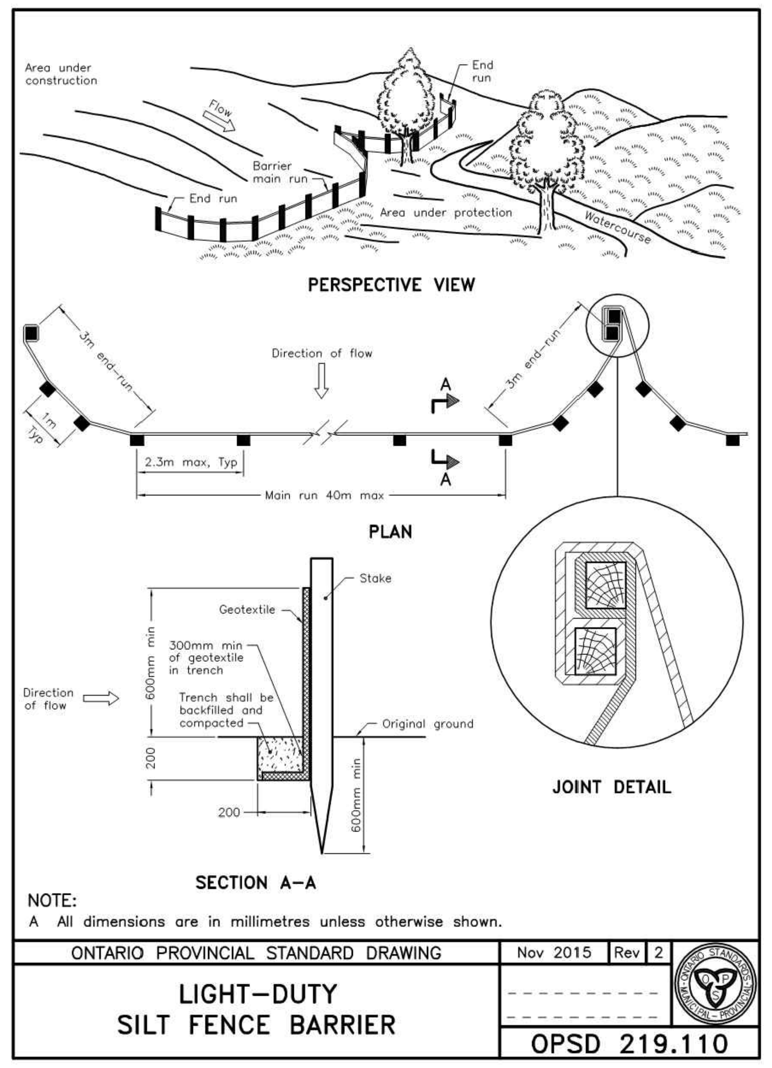
MILTON

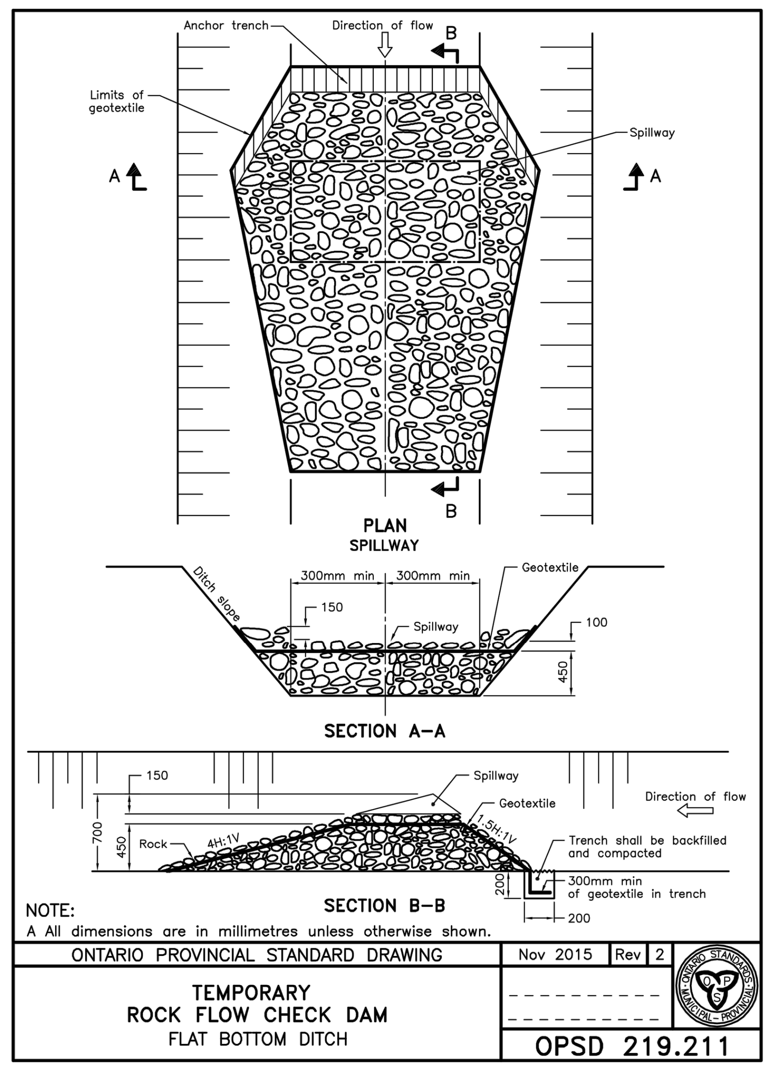
URBANTECH®
Urbantech® Consulting
A Division of Leighton-Zec Ltd.
3760 14th Avenue, Suite 301,
Markham, ON. L3R 3T7
TEL 905.946.9461 • urbantech.com

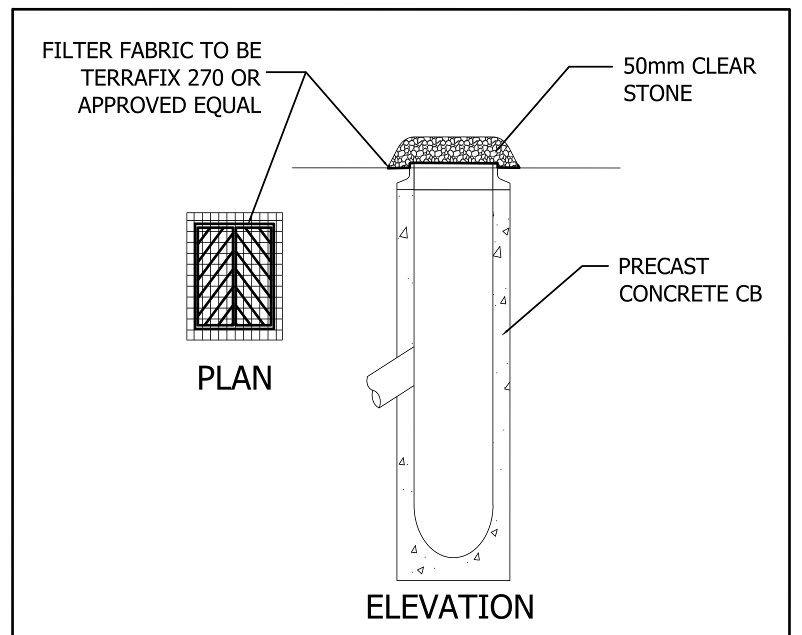
LICENSED PROFESSIONAL ENGINEER
A.M.R. MCLENNAN
100509390
SEPT 20, 2022
PROVINCE OF ONTARIO

SANITARY DRAINAGE PLAN

DESIGNED: AM	CHECKED: SR	PROJECT No.: 21-672
DRAWN: AM	DATE: SEPTEMBER 2022	SHEET No.:
SCALE: 1:500		DRAWING No.: 303

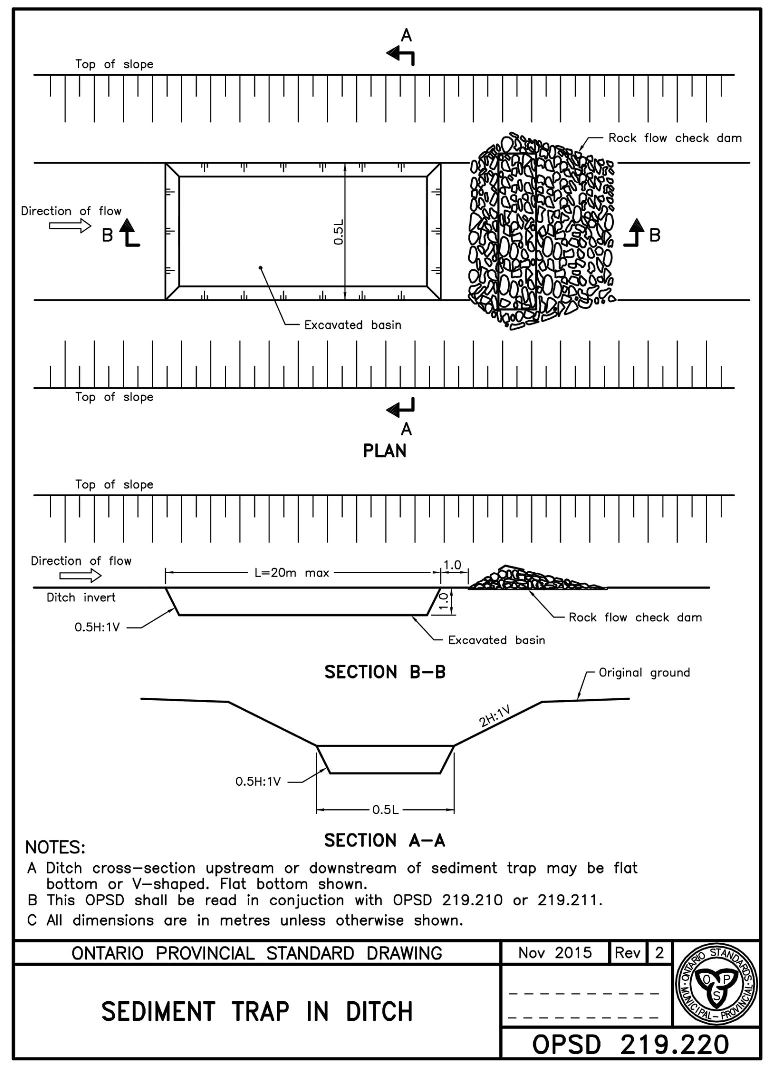


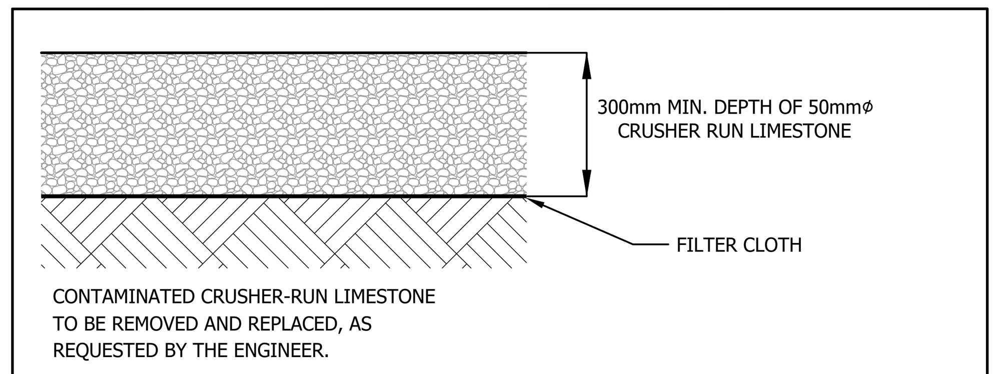




CATCHBASIN SILT PROTECTION

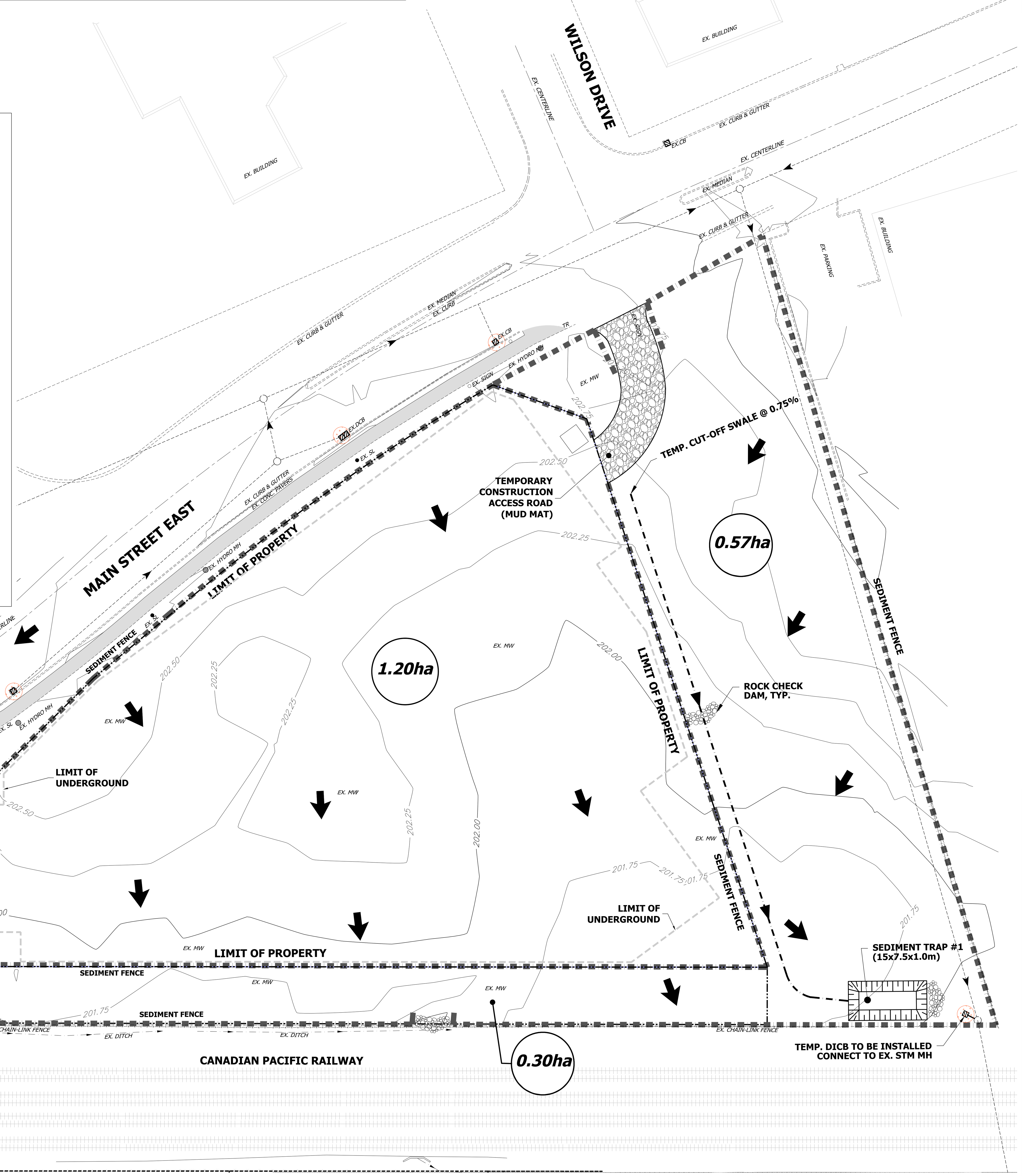
(N.T.S.)

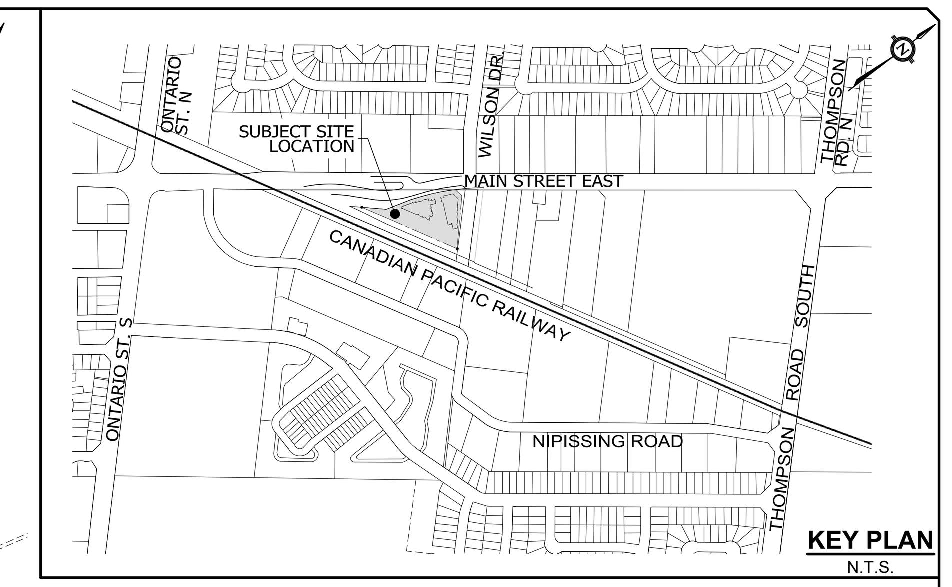




TEMPORARY CONSTRUCTION ACCESS ROAD (MUD MAT)

(N.T.S.)





KEY PLAN
N.T.S.

LEGEND

	LIGHT DUTY SEDIMENT FENCE AS PER OPSD 219.110
242.00	EXISTING GROUND CONTOUR AND ELEVATION
	FILTER CLOTH PROTECTION ON EXISTING CB'S AND CBMH'S
	CATCHBASIN SILT PROTECTION (REFER TO DETAIL ON THIS DWG.)
1.20ha	CAPTURED DRAINAGE AREA
	EXISTING OVERLAND FLOW DIRECTION
	CUT-OFF SWALE
	ROCK CHECK DAM
	PROPOSED SEDIMENT TRAP

NOTES (FOR SEDIMENT CONTROL):

1. TEMPORARY ACCESS ROAD AND SEDIMENT FENCE TO BE INSTALLED BEFORE THE START OF STRIPPING OPERATIONS. FENCES SHOWN ON THIS PLAN TO BE PLACED 1.0m INSIDE THE PROPERTY LINE WHERE POSSIBLE.
2. ACCUMULATED SILT IN THE SEDIMENT TRAPS TO BE REMOVED WHEN IT REACHES 50% OF THEIR CAPACITY.
3. SILTATION CONTROL MEASURES SHALL NOT BE REMOVED UNTIL THE ENTIRE SITE IS STABILIZED AND ROADS ARE ON BASE COURSE ASPHALT.
4. TEMPORARY CONSTRUCTION ACCESS SHALL BE MINIMUM 300mm DEPTH OF 50mm CLEAR STONE.
5. THE CONTRACTOR SHALL ENDEAVOUR TO PREVENT MUD TRACKING ONTO EXISTING RIGHTS-OF WAY AND SHALL PROVIDE FOR CLEAN UP AT HIS OWN EXPENSE AS DIRECTED BY THE ENGINEER AND THE TOWN. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE TO CONTROL DUST AND HE SHALL PROVIDE, AT THEIR OWN EXPENSE, CONTROLLING MEASURES AS DIRECTED BY THE ENGINEER AND THE TOWN.
6. ALL EXTERNAL AREAS DISTURBED DUE TO CONSTRUCTION SHALL BE RESTORED TO THEIR ORIGINAL CONDITION OR BETTER TO THE SATISFACTION OF THE TOWN.
7. ALL TOPSOIL STOCKPILES THAT REMAIN UNRESTORED FOR MORE THAN 30 DAYS SHALL BE SEEDED.
8. TEMPORARY CONSTRUCTION ACCESS TO BE INSTALLED PRIOR TOPSOIL STRIPPING, AND REMOVAL OF ANY TOPSOIL.
9. PRIOR TO ISSUANCE OF THE TOPSOIL REMOVAL PERMIT, A WRITTEN CONFIRMATION REQUIRED FROM THE LANDSCAPE ARCHITECT THAT ALL TREE PRESERVATION FENCING HAS BEEN CORRECTLY INSTALLED.
10. PRIOR TO THE COMMENCEMENT OF TOPSOIL STRIPPING, ALL SILTATION CONTROL DEVICES SHALL BE INSTALLED AND OPERATIONAL. THE EXACT LOCATION TO BE DETERMINED IN THE FIELD AND APPROVED BY THE TOWN OF MILTON. THE CONTRACTOR SHALL MAINTAIN ALL WORKS UNTIL SERVICING CONSTRUCTION IS COMPLETED TO THE SATISFACTION OF THE ENGINEER AND THE TOWN OF MILTON.
11. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE ROUTINELY INSPECTED AND MAINTAINED IN PROPER WORKING ORDER AND CLEANED PERIODICALLY AS REQUIRED BY THE COMMISSIONER OF ENGINEERING. CONTROL MEASURES WILL BE MODIFIED AS REQUIRED IF THEY ARE DETERMINED TO NOT BE PERFORMING AS INTENDED.
12. ALL CONSTRUCTION VEHICLES SHALL EXIT THE SITE VIA THE TEMPORARY CONSTRUCTION ACCESS.
13. ALL STREET CATCH BASINS TO BE PROVIDED WITH TERRAFIX 270R OR APPROVED EQUAL UNDER GRATE, TO BE KEPT IN PLACE UNTIL SITE IS STABILIZED.
14. THE LOCATION AND ELEVATION OF ALL EXISTING SERVICES AND UTILITIES ARE TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR AT THEIR EXPENSE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE RESTORATION AND / OR REPAIR OF EXISTING UTILITIES DISTURBED DURING CONSTRUCTION.
15. ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE "OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS." THE GENERAL CONTRACTOR SHALL BE DESIGNATED AS THE CONSTRUCTOR AS IN THE ACT.
16. IF ANY AREA OF THE SITE IS SCHEDULED TO REMAIN UNTOUCHED FOR THE MORE THAN 30 DAYS, IT SHOULD BE SEEDED IMMEDIATELY.
17. ALL WORKS TO BE IN ACCORDANCE WITH TOWN OF MILTON.

BENCHMARK NO. 828158:

EXISTING ELEVATIONS ARE DERIVED FROM THE TOPOGRAPHIC SURVEY PREPARED BY WAHBA, DATED JANUARY 29, 2021.

NOTES:
IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THAT THE LOCAL BENCHMARK HAS NOT BEEN ALTERED OR DISTURBED AND THAT THE RELATIVE ELEVATION AND DESCRIPTION AGREE WITH THE INFORMATION SHOWN ON THIS SKETCH

BEFORE DIGGING, UNDERGOUND SERVICES HOULD BE LOCATED ON SITE BY THE RESPECTIVE AGENCIES.

ELEVATION NOTE:
ELEVATIONS SHOWN ON THIS PLAN ARE GEODETIC ARE REFERRED TO FIRST ORDER BENCHMARK NUMBER 828158: LOCATED ON A CONCRETE AND STEEL BRIDGE CARRYING CPR OVER HWY 25, 82.6M NORTH OF THE INTERSECTION OF HWY 25 AND MAIN ST. EAST AT MILTON, 230.0M SOUTH OF GEORGE ST. TABLET IS SET HORIZONTALLY IN SOUTH FACE OF CONCRETE COPING, 17.6M EAST OF CENTRELINE OF HWY 25, 2.57M SOUTH OF EDGE OF FIRST RAIL, 68 CM WEST OF S.E. END OF BRIDGE, 17 CM BELOW TOP OF COPING ELEVATION = 201.212

No.	REVISION	DATE	BY
3			
2	SECOND SUBMISSION	22-09-20	AM
1	FIRST SUBMISSION	21-04-23	BJ

APPROVED

560 MAIN STREET EAST MILTON INC.

MILTON

URBANTECH®
Urbantech® Consulting
A Division of Leighton-Zec Ltd.
3760 14th Avenue, Suite 301,
Markham, ON. L3R 3T7
TEL 905.946.9461 • urbantech.com

LICENSED PROFESSIONAL ENGINEER
A.M.R. MCLENNAN
100509390
SEPT 20, 2022
PROVINCE OF ONTARIO

EROSION AND SEDIMENT CONTROL PLAN

DESIGNED: AM	CHECKED: SR	PROJECT No.:	21-672
DRAWN: AM	DATE: SEPTEMBER 2022	SHEET No.:	
SCALE: 1:500		DRAWING No.:	1001

APPENDIX C

REPORTS

- Assessment of Stormwater Management Requirements Memo, by Wood Environmental & Infrastructure Solutions (September 8, 2022)

Urbantech® Consulting, A Division of Leighton-Zec Ltd. | 3760 14th Avenue, Suite 301 • Markham • ON • L3R 3T7 | 905.946.9461

urbantech.com

Wood Environment & Infrastructure Solutions
a Division of Wood Canada Limited
3450 Harvester Road, Suite 100
T: 905-335-2353
www.woodplc.com

Memo

To:	Andrew Mclennan, Urbantch Consulting Scott Riemer, Urbantech Consulting Colin Rauscher, NEATT Communites	**Date:**	**8 September 2022**
From:	Allison Zhang/Amin Azarkhish/Aaron Farrell		
CC:	Andrew Mclennan		
Ref:	WW21011090 – 560 Main Street SWM Investigation		
Re:	**560 Main Street East of Town of Milton Post Development STM Drainage Plan – Assessment of Stormwater Management Requirements**		

1. INTRODUCTION

Urban tech Consulting on behalf of Neatt Communities (Neatt) has requested a Stormwater Management (SWM) assessment for the proposed development located at 560 Main Street in Town of Milton.

The subject site is an infill development within the historic urban center of the Town, which is proposed to be developed to provide a mixture of commercial and high-density residential development with underground parking (ref. attached). The drainage from the subject site is to be accommodated primarily by existing storm sewers along the east limit of the site, which connect with the sewer network along Main Street.

This Technical Memorandum has been prepared to summarize the assessment of potential impacts due to the development proposed by Neatt, and to determine stormwater management requirements for the subject property and provide guidance for developing the corresponding detailed stormwater management plan.

2. BACKGROUND INFORMATION REVIEW

Wood has conducted a field reconnaissance with Urbantech Consulting and Neatt on November 11, 2021 to review the drainage system on the subject site. In particular, the existing storm infrastructure (i.e. manholes and catch basins) along the east limit of the subject property was visually verified from the surface. A geodetic survey was subsequently completed by Urbantech in March 2022 to collect information on additional drainage infrastructure in the area.

Upon review of the available information, residual gaps in the information were identified, related to incomplete data for the storm sewers and manholes within the property south of the railway through which the storm sewers extend. In particular, it was noted that the survey was unable to determine the sewer connections through the south property and toward Nipissing Drive. Consequently, through subsequent discussions with Urbantech, the data gaps have been filled using as-built drawings and supplemental site visits by Urbantech (ref. Appendix A).

The field survey has been used in combination with the contour mapping, soil mapping, aerial imagery photos, and storm sewer data provided for the Town of Milton Storm Drainage Master Plan. The site is currently an open field with a relatively flat slope of approximately 0.9%. The soils within the site have been identified largely consisted of clay and silt which has low permeability and high runoff potential. In general, the topographic survey for the site has been found consistent with the contour mapping utilized for the Town of Milton Storm Drainage Master Plan at a finer resolution. Through review of the survey information, it has been noted that a 0.25 ha portion of the site would flow northward toward the Main Street sewer system rather than southward through the subject site and toward the railway.

The sewer along the east limit of the property from Main Street to the rail tracks measure 975 mm diameter with a slope of +/-0.2% based, on the information collected for the Town of Milton Storm Drainage Master Plan (Wood, March 2020). Currently, this 975 mm storm sewer would not receive storm runoff from the site. Storm runoff from the majority of the site currently drains southerly to a culvert crossing under the railway tracks, and is then conveyed southerly toward the Nipissing Road storm sewers via ditches. The span of the crossing culvert has been estimated at 4.5 m +/- based on imagery photo and observations from field reconnaissance (ref. Appendix A).

The information provided in the as-built drawings furnished for this assessment indicate that the 975 mm sewer along the east limit of the subject property would collect drainage from the neighbouring property located immediately east of the subject development (i.e. 579 Main Street). The sewer then crosses under the railway tracks, and connects to the sewer system at Nipissing Road via 1050 mm sewers at a slope of +/- 0.25%. The as-built drawings further indicate that the connecting 1350 mm sewer at Nipissing Road includes a bend on the east side of 180 Nipissing Square, and then extends southernly, connecting to the 1500 – 1650 mm trunk sewers on Child Drive and Satak Crescent.

3. EXISTING CONDITIONS ASSESSMENT

The dual drainage PCSWMM model developed for the Town of Milton Storm Drainage Master Plan has been used as the base model for the hydrologic and hydraulic modelling of the subject site. The subcatchments and the major/minor drainage systems in the parent model have been reviewed and refined to incorporate the observations from the field reconnaissance and information from the geodetic survey and supplemental as-built information. The refined subcatchment boundary plan representing the subject site and adjacent lands under existing land use conditions is shown on Drawing 1. Under the existing land use conditions, the subject land, i.e. Subcatchments S37_551, S37_52, and S37_53, is approximately 2.11 ha in size.

Subcatchment parameters of Manning's roughness coefficient, depression storage, and Green-Ampt infiltration parameters have been retained from the parament PCSWMM model prepared for the Town of Milton Storm Drainage Master Plan. The parameters of the relevant subcatchments under the existing land use conditions are summarized in Table 3.1.

Table 3.1 Subcatchment Parameters – Existing Conditions

Subcatchment	Description	Area (ha)	Impervious Coverage	Flow Length (m)	Slope
S37_551	property	1.24	5%	80	0.9%
S37_52	future Wilson Drive Extension	0.57	5%	36	0.9%
S37_53	south of property limit	0.30	5%	20	0.9%
-	**Subject Site**	**2.11**	**5%**	-	-
S37_2	Main Street ROW	0.13	14%	14	6.0%
S37_7	Main Street ROW	0.12	14%	19	9.0%
S192_1	Main Street ROW	0.82	83%	40	3.8%

Peak flows at key locations for the 2 to 100 year return period storms have been simulated using the 24-hour Chicago synthetic design storm distribution based upon the Town's IDF relationships. IDF relationships are summarized in Table 3.2.

Table 3.2 Town of Milton, Rainfall Intensity Equation Coefficients

Return Period (Year)	A	B	C
2	779	6	0.8206
5	959	5.7	0.8024
10	1089	5.7	0.7955
25	1234	5.5	0.7863
50	1323	5.3	0.7786
100	1435	5.2	0.7755
$I = A/(t_c + b)^c$, where I = Rainfall Intensity (mm/hr) t_c = Duration (hr) A, b, and c are constants			

The simulated peak flows at key locations surrounding the subject property under the existing conditions are summarized in Table 3.3.

Table 3.3 2 to 100 Year Peak Flows - Existing Condition of the Subject Site (m^3/s)

Subcatchment	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
S37_551	0.04	0.08	0.11	0.16	0.18	0.21
S37_52	0.03	0.06	0.08	0.11	0.13	0.15
S37_53	0.02	0.04	0.06	0.07	0.09	0.10

The hydraulic grade lines (HGLs) along the 975 mm sewer have been assessed for 5 year and 100 year storm events to ensure there would be no hydraulic impact on the downstream major and minor drainage systems. Plan and profile view of the existing conditions hydraulic grade lines (HGLs) for the assessed conduits are included in Appendix B. The results of the hydraulic analyses for the existing storm sewers in the vicinity of the subject property are presented in Table 3.4 and 3.5 for the 5 year and 100 year design storms accordingly.

.

Table 3.4 Major/Minor System Performance - Existing Condition 5 Year Design Storm Event

Conduit ID	Location	Size (mm)	Inv Elev (m)	Obv Elev (m)	Rim Elev (m)	Full Flow Cap (m^3/s)	Peak Flow (m^3/s)	HGL (m)	% full flow	% full depth	Surcharge Condition
18373	Between Main Street and the tracks	975	198.24	199.22	203.04	0.97	1.03	199.05	106	83	Within Pipe
C61	crossing the tracks	1050	197.86	198.91	203.03	1.38	1.02	198.57	74	67	Within Pipe
C22	Between the tracks and Nipissing Rd	1050	197.76	198.81	202.42	1.44	1.00	198.47	69	68	Within Pipe
C23-1	Nipissing Rd	1350	197.41	198.76	201.81	3.81	1.81	198.12	48	52	Within Pipe
10284-1	Between Nipissing Rd and Childs Dr	1500	196.96	198.46	200.68	2.32	1.82	197.96	78	67	Within Pipe

Table 3.5 Major/Minor System Performance - Existing Condition 100 Year Design Storm Event

Conduit ID	Location	Size (mm)	Inv Elev (m)	Obv Elev (m)	Rim Elev (m)	Full Flow Cap (m^3/s)	Peak Flow (m^3/s)	HGL (m)	% full flow	% full depth	Surcharge Condition
18373	Between Main Street and the tracks	975	198.24	199.22	203.04	0.97	1.62	199.91	167	171	Surcharged ; Below Rim
C61	crossing the tracks	1050	197.86	198.91	203.03	1.38	1.62	199.01	117	110	Surcharged ; Below Rim
C22	Between the tracks and	1050	197.76	198.81	202.42	1.44	1.62	198.88	113	107	Surcharged ; Below Rim

Conduit ID	Location	Size (mm)	Inv Elev (m)	Obv Elev (m)	Rim Elev (m)	Full Flow Cap (m^3/s)	Peak Flow (m^3/s)	HGL (m)	% full flow	% full depth	Surcharge Condition
	Nipissing Rd										
C23-1	Nipissing Rd	1350	197.41	198.76	201.81	3.81	2.49	198.33	65	68	Within Pipe
10284-1	Between Nipissing Rd and Childs Dr	1500	196.96	198.46	200.68	2.32	2.46	198.18	106	82	Within Pipe

The results in Tables 3.4 and 3.5 indicate that the existing 975 mm storm sewer along the east property limit would be 83% full during the 5 year storm event, with the peak flow of 1.03 m^3/s slightly exceeding the maximum theoretical flow capacity of 0.97 m^3/s. As the pipe would not flow full, it has been determined that the 975 mm sewer would provide sufficient capacity to convey the peak flow for the 5 year storm event without surcharging. The downstream sewers between the railway tracks and Childs Drive have been estimated to be 52-68% full during the 5 year storm event and would have sufficient capacity to receive flows from the subject site.

The results indicate that the sewer would be surcharged during the 100 year storm event to a surcharge depths ranging from of 0.07 m to 0.69 m above obvert m, however the 100 year HGL would remain between 3.13 m and 4.02 m below the ground (i.e. no flooding would occur). Consequently, under existing conditions, the existing 975 mm sewer along the east property limit and the downstream receiving minor system would provide sufficient capacity to convey peak flows for all events up to and including the 100 year design storm without flooding.

4. PROPOSED CONDITIONS ASSESSMENT

The existing conditions PCSWMM model has been modified to reflect the proposed development on the subject property per the site plan provided by Urbantech (ref. Appendix C). Under proposed conditions, the site would be developed to provide commercial and high-density residential development with surface and underground parking. Based upon discussions with Urbantech, it is understood that all drainage from the site is proposed to be conveyed easterly toward the 975 mm storm sewer. The crash berm on the south limit of the property and the land outside of the berm would continue to drain to the CPR lands as per the existing condition.

Based on the provided site plan, the development footprint would be approximately 2.01 ha with 77% of impervious coverage. However, based upon discussion with Urbantech, the drainage area to the 975 mm storm sewer has conservatively been simulated at 2.11 ha at 77% imperviousness, and an impervious coverage of 85% has been conservatively assumed to represent the future construction of the Wilson Drive Extension. The area south of the berm has been assumed with an impervious coverage of 5% as per the existing condition, which is slightly higher than the impervious coverage of 0% as shown in the site plan. The future conditions subcatchment parameters are summarized in Table 4.1.

Table 4.2 Future Conditions Subcatchment Parameters

Subcatchment	Description	Area (ha)	Pre Imp	Post Imp	Drainage Direction
S37_551	property	1.24	5%	93%	SWM and east sewer
S37_52	Wilson Drive Extension	0.57	5%	85%	east sewer
S37_53	south of property limit	0.30	5%	5%	South Outlet (maintaining Existing)
sum	**-**	**2.11**	**5%**	**85%**	**-**

The PCSWMM hydrologic model representing the proposed development of the site has been used to determine the hydrologic and hydraulic impacts of the proposed development in the absence of stormwater management. Consistent with the approach applied for the hydrologic and hydraulic assessment for existing conditions, the analyses for future uncontrolled land use conditions have applied the 2 through 100 year 25 hour Chicago design storm distribution. The simulated peak flows at key locations are summarized in Table 4.1, and the change in peak flow under future uncontrolled land use conditions compared to existing conditions are summarized in Table 4.2.

Table 4.1 Simulated 2 to 100 Year Peak Flows - Future Uncontrolled Land Use Conditions (m^3/s)

Subcatchment	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
S37_551	0.29	0.41	0.49	0.59	0.66	0.74
S37_52	0.15	0.21	0.24	0.29	0.33	0.36
S37_53	0.02	0.04	0.06	0.07	0.09	0.10

Table 4.2 Difference in Simulated 2 to 100 Year Peak Flows Under Future Uncontrolled Land Use Conditions Compared to Existing Land Use Conditions

Description	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
Absolute Difference (m^3/s)						
S37_551	0.25	0.33	0.38	0.43	0.48	0.53
S37_52	0.12	0.15	0.16	0.18	0.2	0.21
S37_53	0	0	0	0	0	0
Percentage Difference						
S37_551	625%	413%	345%	269%	267%	252%
S37_52	400%	250%	200%	164%	154%	140%
S37_53	0%	0%	0%	0%	0%	0%

The results indicate that the future development of the site, in the absence of stormwater management, would increase the 2 to 100 year peak flows for the property by between 140% and 625% (i.e. absolute changes of between 0.12 to 0.53 m^3/s) due to the additional impervious coverage. The area between the south property limit and CNR tracks would maintain the existing condition without increases in peak flows.

The HGLs have been assessed for the receiving storm sewers for the 5 year and 100 year storm events assuming no stormwater management measures would be implemented. The results are summarized in Tables 4.3 and 4.4. The HGLs and peak flows within the storm sewers have been compared with the existing condition and summarized in Table 4.5.

Table 4.3 Minor System Performance – Proposed Condition 5 Year Storm Event (Without Control)

Conduit ID	Location	Size (mm)	Inv Elev (m)	Obv Elev (m)	Rim Elev (m)	Full Flow Cap (m^3/s)	Peak Flow (m^3/s)	HGL (m)	% full flow	% full depth	Surcharge Condition
18373_1	Between Main Street and the tracks	0.975	198.24	199.22	203.04	0.97	1.01	199.22	104%	101%	surcharged
18373_2	Between Main Street and the tracks	0.975	198.02	199.00	203.03	0.97	1.37	198.99	141%	99%	within pipe
C61	crossing the tracks	1.05	197.86	198.91	203.03	1.38	1.36	198.78	98%	87%	within pipe
C22	Between the tracks and Nipissing Rd	1.05	197.76	198.81	202.42	1.44	1.36	198.68	95%	87%	within pipe
C23-1	Nipissing Road	1.35	197.41	198.76	201.81	2.93	2.08	198.20	71%	59%	within pipe
10284-1	Between Nipissing Rd and Childs Dr	1.5	196.96	198.46	200.68	2.32	2.10	198.06	90%	73%	within pipe
10282	Childs Drive	1.5	196.83	198.33	200.33	14.45	2.62	197.65	18%	55%	within pipe
10281	Satok Crescent	1.65	196.45	198.10	200.25	4.72	2.78	197.50	59%	64%	within pipe
10277	Satok Crescent	1.65	196.17	197.82	199.87	4.13	3.11	197.37	75%	73%	within pipe
10278	Satok Crescent	1.8	196.02	197.82	200.22	6.68	3.72	196.97	56%	53%	within pipe
C181	East of Ontario St	1.8	195.82	197.62	199.22	8.20	3.72	196.67	45%	47%	within pipe
10280	East of Ontario St	1.8	194.99	196.79	197.29	4.38	3.92	196.54	89%	86%	within pipe
10237	Ontario St	1.8	194.70	196.50	196.60	5.64	5.06	196.16	90%	81%	within pipe
10238_1	Ontario St	1.8	194.60	196.40	196.50	5.68	5.31	196.03	94%	79%	within pipe
10238_3	Ontario St	1.8	194.24	196.04	196.14	6.43	5.55	195.62	86%	77%	within pipe
10238_4	Ontario St	1.8	194.18	195.98	196.08	6.44	6.15	195.50	95%	73%	within pipe
C5	Outfall	1.2(h) x 3.6(w)	193.52	194.72	195.42	10.65	7.00	194.47	66%	79%	within pipe

Table 4.4 Minor System Performance – Proposed Condition 100 Year Storm Event (Without Control)

Conduit ID	Location	Size (mm)	Inv Elev (m)	Obv Elev (m)	Rim Elev (m)	Full Flow Cap (m^3/s)	Peak Flow (m^3/s)	HGL (m)	% full flow	% full depth	Surcharge Condition
18373_1	Between Main Street and the tracks	0.975	198.24	199.22	203.04	0.97	1.47	201.41	151%	325%	surcharged
18373_2	Between Main Street and the tracks	0.975	198.02	199.00	203.03	0.97	2.40	200.84	248%	289%	surcharged
C61	crossing the tracks	1.05	197.86	198.91	203.03	1.38	2.40	200.12	173%	215%	surcharged
C22	Between the tracks and Nipissing Rd	1.05	197.76	198.81	202.42	1.44	2.40	199.78	167%	192%	surcharged
C23-1	Nipissing Road	1.35	197.41	198.76	201.81	2.93	3.18	198.60	108%	88%	within pipe
10284-1	Between Nipissing Rd and Childs Dr	1.5	196.96	198.46	200.68	2.32	2.93	198.38	126%	94%	within pipe
10282	Childs Drive	1.5	196.83	198.33	200.33	14.45	3.66	198.00	25%	78%	within pipe
10281	Satok Crescent	1.65	196.45	198.10	200.25	4.72	3.95	197.89	84%	87%	within pipe
10277	Satok Crescent	1.65	196.17	197.82	199.87	4.13	4.27	197.73	103%	95%	within pipe
10278	Satok Crescent	1.8	196.02	197.82	200.22	6.68	4.86	197.39	73%	76%	within pipe
C181	East of Ontario St	1.8	195.82	197.62	199.22	8.20	4.77	197.26	58%	80%	within pipe
10280	East of Ontario St	1.8	194.99	196.79	197.29	4.38	5.09	197.05	116%	114%	surcharged
10237	Ontario St	1.8	194.70	196.50	196.60	5.64	6.14	196.47	109%	98%	within pipe
10238_1	Ontario St	1.8	194.60	196.40	196.50	5.68	6.38	196.31	112%	95%	within pipe
10238_3	Ontario St	1.8	194.24	196.04	196.14	6.43	6.64	195.83	103%	88%	within pipe
10238_4	Ontario St	1.8	194.18	195.98	196.08	6.44	7.33	195.68	114%	83%	within pipe
C5	Outfall	1.2(h) x 3.6(w)	193.52	194.72	195.42	10.65	8.21	194.60	77%	89%	within pipe

Table 4.5 Comparison of Minor System Performance (Uncontrolled Proposed Conditions vs. Existing Condition)

Conduit ID	Location	Size (mm)	5 year Differences		100 year Differences	
			Peak Flow (m^3/s)	HGL (m)	Peak Flow (m^3/s)	HGL (m)
18373_1	Between Main Street and the tracks	0.975	-0.02	0.17	-0.16	1.50
18373_2	Between Main Street and the tracks	0.975	-0.02	0.17	-0.16	1.50
C61	crossing the tracks	1.05	0.34	0.21	0.78	1.10
C22	Between the tracks and Nipissing Rd	1.05	0.36	0.20	0.78	0.90
C23-1	Nipissing Road	1.35	0.28	0.09	0.68	0.27
10284-1	Between Nipissing Rd and Childs Dr	1.5	0.28	0.10	0.47	0.19
10282	Childs Drive	1.5	0.29	0.08	0.53	0.19
10281	Satok Crescent	1.65	0.31	0.09	0.52	0.19
10277	Satok Crescent	1.65	0.32	0.08	0.53	0.17
10278	Satok Crescent	1.8	0.34	0.05	0.49	0.21
C181	East of Ontario St	1.8	0.36	0.05	0.41	0.29
10280	East of Ontario St	1.8	0.35	0.10	0.40	0.19
10237	Ontario St	1.8	0.33	0.06	0.34	0.10
10238_1	Ontario St	1.8	0.26	0.05	0.31	0.09
10238_3	Ontario St	1.8	0.26	0.04	0.32	0.06
10238_4	Ontario St	1.8	0.26	0.04	0.29	0.05
C5	Outfall	1.2(h) x 3.6(w)	0.26	0.03	0.27	0.03

The results indicated that the surcharge conditions for majority of the receiving sewers would remain unchanged (i.e. below the ground) compared to the existing condition, with the exception that the 975 mm sewer along the east property limit would become surcharged during both the 5 year and 100 year storm events due to increased peak flows. However, the flows within the receiving sewers would increase by 0.26 to 0.36 m^3/s during the 5 year storm event and 0.27 to 0.78 m^3/s during the 100 year storm event. The HGLs within the receiving sewers would increase by 0.03 to 0.21 m during the 5 year storm event and 0.03 to 1.5 m during the 100 year storm event. The increases in HGLs would potentially impact the adjacent properties particularly if basement connections exist. At the outfall to the Sixteen Mile Creek Tributary, the 0.27 m^3/s of increases in peak flow would represent 3% increases in the discharge flow rate, which would potentially increase the flood risk in the proximity of the watercourse.

5. STORMWATER MANAGEMENT (SWM) ASSESSMENT

5.1. STORMWATER QUANTITY CONTROL

Additional analyses have been completed to determine the stormwater management facility sizing required to mitigate the impacts resulting from the future development of the subject property. It has been proposed to direct the runoff from the property and future Wilson Drive Extension, i.e. Subcatchments S37_51 and S37_52, to the storm sewer along the east limit, utilizing the available capacity of the sewer in combination of a storage unit. Based upon discussions with Urbantech, it is understood that drainage from the property area would be controlled via a SWM tank prior to discharge to the 975 mm storm sewer at the east limit of the site. For the purpose of this assessment, it has been assumed that all drainage from the future Wilson Drive Extension would be collected by catch basins and drain to the east sewer without quantity control.

The storage volume of the SWM tank and the allowable discharge rage have been determined through modelling iterations to mitigate the impact of the increased peak flows and HGLs within the receiving sewers. Based upon these analyses, it has been determined that a tank providing 650 m^3 of storage volume with a release rate of 0.27 m^3/s would be required for the subject land. The performance of the receiving sewers during the 5 year and 100 year storm events, with the suggested storage tank is summarized in Tables 5.5 and 5.6. The HGLs and peak flows within the storm sewers have been compared with the existing condition and summarized in Table 5.7.

Table 5.5 Minor System Performance – Proposed Condition 5 Year Storm Event (With Control)

Conduit ID	Location	Size (mm)	Inv Elev (m)	Obv Elev (m)	Rim Elev (m)	Full Flow Cap (m^3/s)	Peak Flow (m^3/s)	HGL (m)	% full flow	% full depth	Surcharge Condition
18373_1	Between Main Street and the tracks	0.975	198.24	199.22	203.04	0.97	1.04	199.08	107%	86%	within pipe
18373_2	Between Main Street and the tracks	0.975	198.02	199.00	203.03	0.97	1.18	198.85	122%	85%	within pipe
C61	crossing the tracks	1.05	197.86	198.91	203.03	1.38	1.17	198.65	84%	75%	within pipe
C22	Between the tracks and Nipissing Rd	1.05	197.76	198.81	202.42	1.44	1.16	198.56	81%	76%	within pipe
C23-1	Nipissing Road	1.35	197.41	198.76	201.81	2.93	1.93	198.16	66%	55%	within pipe
10284-1	Between Nipissing Rd and Childs Dr	1.5	196.96	198.46	200.68	2.32	1.94	198.00	84%	70%	within pipe
10282	Childs Drive	1.5	196.83	198.33	200.33	14.45	2.46	197.61	17%	52%	within pipe
10281	Satok Crescent	1.65	196.45	198.10	200.25	4.72	2.61	197.45	55%	61%	within pipe
10277	Satok Crescent	1.65	196.17	197.82	199.87	4.13	2.94	197.32	71%	70%	within pipe
10278	Satok Crescent	1.8	196.02	197.82	200.22	6.68	3.53	196.95	53%	51%	within pipe
C181	East of Ontario St	1.8	195.82	197.62	199.22	8.20	3.52	196.64	43%	46%	within pipe
10280	East of Ontario St	1.8	194.99	196.79	197.29	4.38	3.73	196.48	85%	83%	within pipe
10237	Ontario St	1.8	194.70	196.50	196.60	5.64	4.86	196.13	86%	79%	within pipe
10238_1	Ontario St	1.8	194.60	196.40	196.50	5.68	5.17	196.00	91%	78%	within pipe
10238_3	Ontario St	1.8	194.24	196.04	196.14	6.43	5.41	195.60	84%	75%	within pipe
10238_4	Ontario St	1.8	194.18	195.98	196.08	6.44	6.01	195.47	93%	72%	within pipe
C5	Outfall	1.2(h) x 3.6(w)	193.52	194.72	195.42	10.65	6.86	194.46	64%	78%	within pipe

Table 5.6 Minor System Performance – Proposed Condition 100 Year Storm Event (With Control)

Conduit ID	Location	Size (mm)	Inv Elev (m)	Obv Elev (m)	Rim Elev (m)	Full Flow Cap (m^3/s)	Peak Flow (m^3/s)	HGL (m)	% full flow	% full depth	Surcharge Condition
18373_1	Between Main Street and the tracks	0.975	198.24	199.22	203.04	0.97	1.61	200.00	166%	181%	surcharged
18373_2	Between Main Street and the tracks	0.975	198.02	199.00	203.03	0.97	1.79	199.41	185%	142%	surcharged
C61	crossing the tracks	1.05	197.86	198.91	203.03	1.38	1.68	199.10	121%	118%	surcharged
C22	Between the tracks and Nipissing Rd	1.05	197.76	198.81	202.42	1.44	1.68	198.95	117%	113%	surcharged
C23-1	Nipissing Road	1.35	197.41	198.76	201.81	2.93	2.55	198.37	87%	71%	within pipe
10284-1	Between Nipissing Rd and Childs Dr	1.5	196.96	198.46	200.68	2.32	2.56	198.22	110%	84%	within pipe
10282	Childs Drive	1.5	196.83	198.33	200.33	14.45	3.25	197.84	22%	67%	within pipe
10281	Satok Crescent	1.65	196.45	198.10	200.25	4.72	3.53	197.73	75%	78%	within pipe
10277	Satok Crescent	1.65	196.17	197.82	199.87	4.13	3.84	197.59	93%	86%	within pipe
10278	Satok Crescent	1.8	196.02	197.82	200.22	6.68	4.45	197.21	67%	66%	within pipe
C181	East of Ontario St	1.8	195.82	197.62	199.22	8.20	4.43	197.03	54%	67%	within pipe
10280	East of Ontario St	1.8	194.99	196.79	197.29	4.38	4.79	196.89	109%	105%	surcharged
10237	Ontario St	1.8	194.70	196.50	196.60	5.64	5.88	196.39	104%	94%	within pipe
10238_1	Ontario St	1.8	194.60	196.40	196.50	5.68	6.15	196.24	108%	91%	within pipe
10238_3	Ontario St	1.8	194.24	196.04	196.14	6.43	6.40	195.79	99%	86%	within pipe
10238_4	Ontario St	1.8	194.18	195.98	196.08	6.44	7.12	195.65	110%	81%	within pipe
C5	Outfall	1.2(h) x 3.6(w)	193.52	194.72	195.42	10.65	7.99	194.57	75%	88%	within pipe

Table 5.7 Minor System Performance – Proposed vs. Existing

Conduit ID	Location	Size (mm)	5 year Differences		100 year Differences	
			Peak Flow (m^3/s)	HGL (m)	Peak Flow (m^3/s)	HGL (m)
18373_1	Between Main Street and the tracks	0.975	1.04	0.03	-0.01	0.09
18373_2	Between Main Street and the tracks	0.975	1.04	0.03	-0.01	0.09
C61	crossing the tracks	1.05	0.15	0.09	0.06	0.09
C22	Between the tracks and Nipissing Rd	1.05	0.16	0.08	0.06	0.07
C23-1	Nipissing Road	1.35	0.13	0.04	0.06	0.03
10284-1	Between Nipissing Rd and Childs Dr	1.5	0.12	0.04	0.09	0.03
10282	Childs Drive	1.5	0.14	0.04	0.12	0.03
10281	Satok Crescent	1.65	0.14	0.04	0.10	0.03
10277	Satok Crescent	1.65	0.15	0.04	0.10	0.03
10278	Satok Crescent	1.8	0.16	0.02	0.08	0.04
C181	East of Ontario St	1.8	0.15	0.02	0.07	0.06
10280	East of Ontario St	1.8	0.16	0.04	0.10	0.04
10237	Ontario St	1.8	0.14	0.03	0.08	0.02
10238_1	Ontario St	1.8	0.11	0.02	0.08	0.02
10238_3	Ontario St	1.8	0.12	0.02	0.08	0.01
10238_4	Ontario St	1.8	0.12	0.02	0.07	0.01
C5	Outfall	1.2(h) x 3.6(w)	0.12	0.01	0.05	0.01

The results show that under the proposed condition with suggested stormwater management, the sewers would be 51% to 86% full during the 5 year storm event condition and 66% to 181% full during the 100 year storm event. The 975 mm diameter and the 1050 mm diameter sewer would be surcharged as per the existing conditions. The surcharge conditions for all the receiving sewers would remain unchanged (i.e. below the ground) compared to the existing condition. The flows within the receiving sewers would increase by 0.01 to 0.16 m^3/s during the 5 year storm event and 0.01 to 0.12 m^3/s during the 100 year storm event. The HGLs within the receiving sewers would increase by 0.01 to 0.09 m during the 5 year storm event and 0.01 to 0.09 m during the 100 year storm event. The larger increases in HGLs would occur at the most upstream end of the connection, i.e. the sewer along the east property limit. As the 100 year HGLs along the downstream receiving sewers would be maintained within the pipe without surcharging, The residual increases of 0.01 to 0.06 m in HGLs have been considered attributable to the uncontrolled future Wilson Drive extension without negatively impacting on the adjacent properties.

The 0.18 m^3/s of increases in the 5 year peak flow at the outfall to the Sixteen Mile Creek Tributary would represent a 1.8% increases in the discharge flow rate. For the 100 year storm event, the minor increase of

0.05 m^3/s (0.1%) of discharge rate at the outfall has been considered negligible without the increasing the flood risk within the proximity of the watercourse.

The proposed conditions hydraulic grade lines (HGLs) for the assessed conduits are included in Appendix B. The assessment indicates that the storm sewer along the east limit of the subject property would have the capacity to convey the controlled 100 year peak flow from the site without negative hydraulic impact on the downstream receiving sewers and the adjacent properties.

5.2. STORMWATER QUALITY CONTROL

Due to the increases in the impervious coverage under the proposed condition, an Enhanced Standard of treatment (i.e. 80% TSS removal) would be required for the additional impervious area of 1.09 ha of the site. Various SWM practices are available to achieve the water quality requirements such as LID infiltration BMPs, vegetated technologies, oil/grit separators (OGS), and treatment-train approach. It is recommended that pre-treatment such as vegetation strips to be applied prior to infiltration components to maximize the TSS removal efficiency, and that a treatment train approach be applied for the stormwater quality management plan. Table 5.8 summarizes the available practices and the corresponding functions..

Table 5.8. Summary of Stormwater Management Practices and Corresponding Functions

Practice	Erosion Control	Quality Control	Water Balance	Evapotranspiration	Groundwater Recharge
Amended Topsoil	X	X	X	X	X
Green Roofs	X	X	X	X	
Tree Trench Boxes	X	X	X	X	X
Oil/Grit Separators		X			
Pervious Pipes	X	X	X		X
Permeable Pavement	X	X	X		X
Soakaway Pits	X	X	X		X
Infiltration Trenches	X	X	X		X
Bioretention Bumpouts	X	X	X	X	X
Grassed Swales		X			
Biofilters/Bioswales	X	X	X	X	X

5.3. WATER BALANCE

Based on the MECP Draft LID Stormwater Management Guidance Manual (January 2022), runoff volumes generated from the geographically specific 90th percentile precipitation event from all surfaces on the entire site are targeted for control. The pre-development water balance should be maintained or resorted. As such, it is recommended to retain the water balance volume through combined measures of infiltration, evapotranspiration, and runoff abstraction. Examples of the practices are summarized in Table 5.8.

5.4. EROSION CONTROL

Based on the stormwater management unitary criteria established in the South Milton Urban Expansion Area Subwatershed Study (SWS) Phase 2: Impact Assessment/Phase 3: Management Strategies (Wood, 2018), the unitary storage volume criteria for erosion control would be 300 m^3/impervious hectare and the unitary discharge criteria for erosion control would be 0.0004 m^3/s/hectare, for discharge directly to the Sixteen Mile Creek Branch. It is understood that erosion control are not prescribed for infill development and extended storage within the tank is not recommended, particularly given that the site has a small size of area. In addition, the preceding assessment indicates that there would be no hydraulic impact on the downstream receiving systems. The controlled peak flows would be conveyed through storm sewers and discharge to the watercourse at the existing conditions level. Therefore, the water quality and water balance measures promoting infiltration would be anticipated to contribute to address the erosion control requirement.

6. SUMMARY AND CONCLUSION

The subject site, along with the minor and major system in the proximity have been assessed for the existing and future conditions. Under proposed conditions, the drainage from the development site would be redirected easterly toward the existing 985 mm storm sewer. If unmitigated, this redirected runoff would increase peak flows and the hydraulic grade line within the receiving storm sewer under both the 5 year and 100 year storm events.

A storage tank is proposed to be provided to mitigate the increased peak flows and hydraulic impacts along the receiving storm sewer It has been determined that runoff from the site to be attenuated in a storage unit with 650 m^3 of volume and a discharge rate of 0.27 m^3/s.

Various SWM practices are available to achieve the water quality requirement for Enhanced treatment, such as LID infiltration BMPs, vegetated technologies, oil/grit separators (OGS), and treatment-train approach. It is recommended that pre-treatment such as vegetation strips to be applied prior to infiltration components to maximize the TSS removal efficiency, and a treatment train approach be applied for stormwater quality treatment.

It is recommended to retain the water balance volume through combined measures of infiltration, evapotranspiration, and runoff abstraction. The recommended practices include LID infiltration BMPs and vegetated technologies.

Erosion Control is not prescribed for the site considering the small size of the area and minimal impact on the downstream receiving systems. The water quality and water balance measures would be considered to contribute to address the erosion control requirement.

We trust the preceding to be satisfactory. Please do not hesitate to contact our office should you wish to discuss further.

Yours truly,

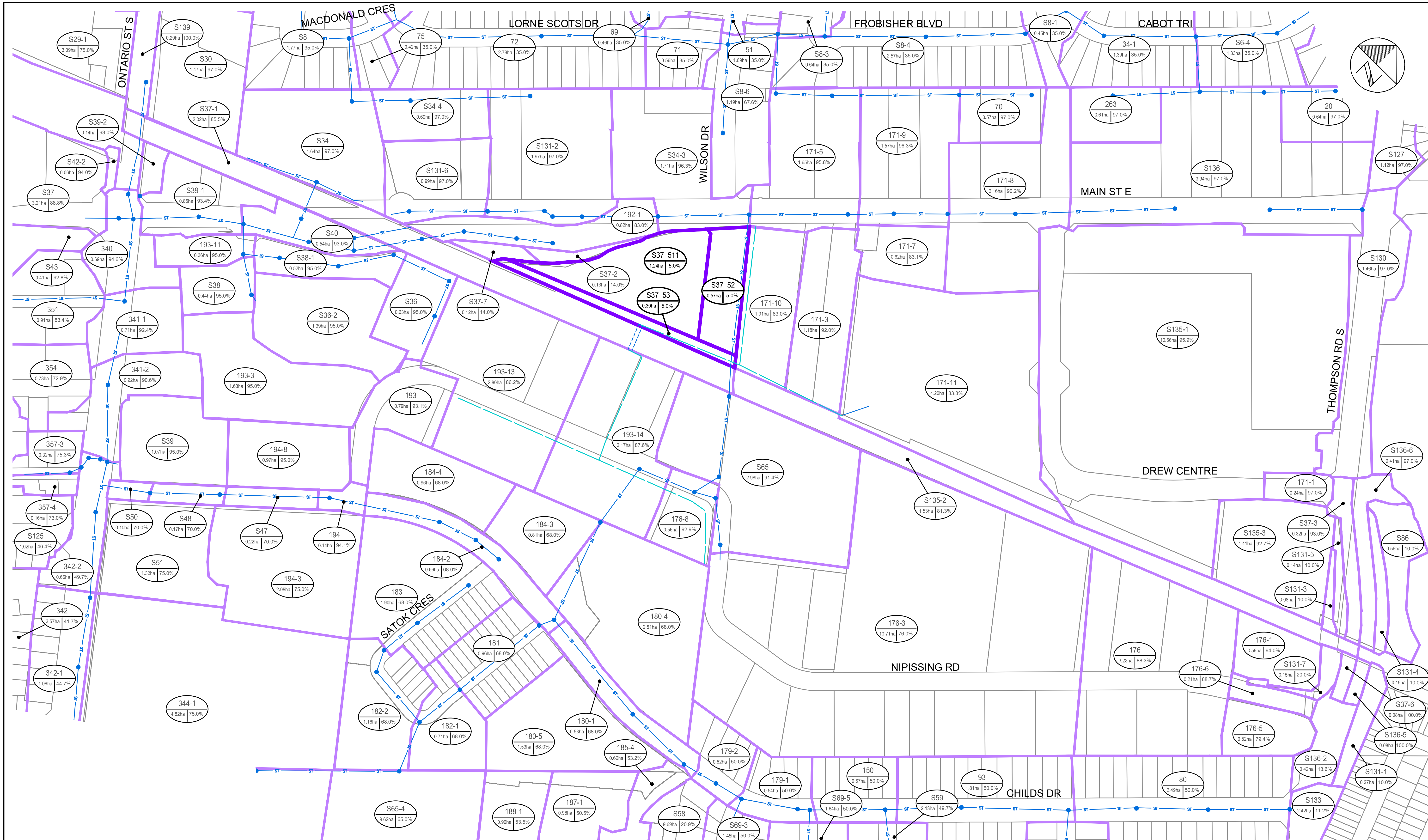
Wood Environment & Infrastructure Solutions
a Division of Wood Canada Limited

Attached

Drawing 1 – Existing Conditions Subcatchment Plan
Drawing 2 – Proposed Conditions Subcatchment Plan

Appendix A – Survey and As-Built Drawings
Appendix B – Post-Development STM Drainage Plan
Appendix C – Existing and Proposed Conditions Minor/Major System Performance

Drawings



LEGEND

PARCEL FABRIC

EXISTING CULVERT

EXISTING DITCHES

STORM SEWER SYSTEM

EXTERNAL SUBCATCHMENT BOUNDARY

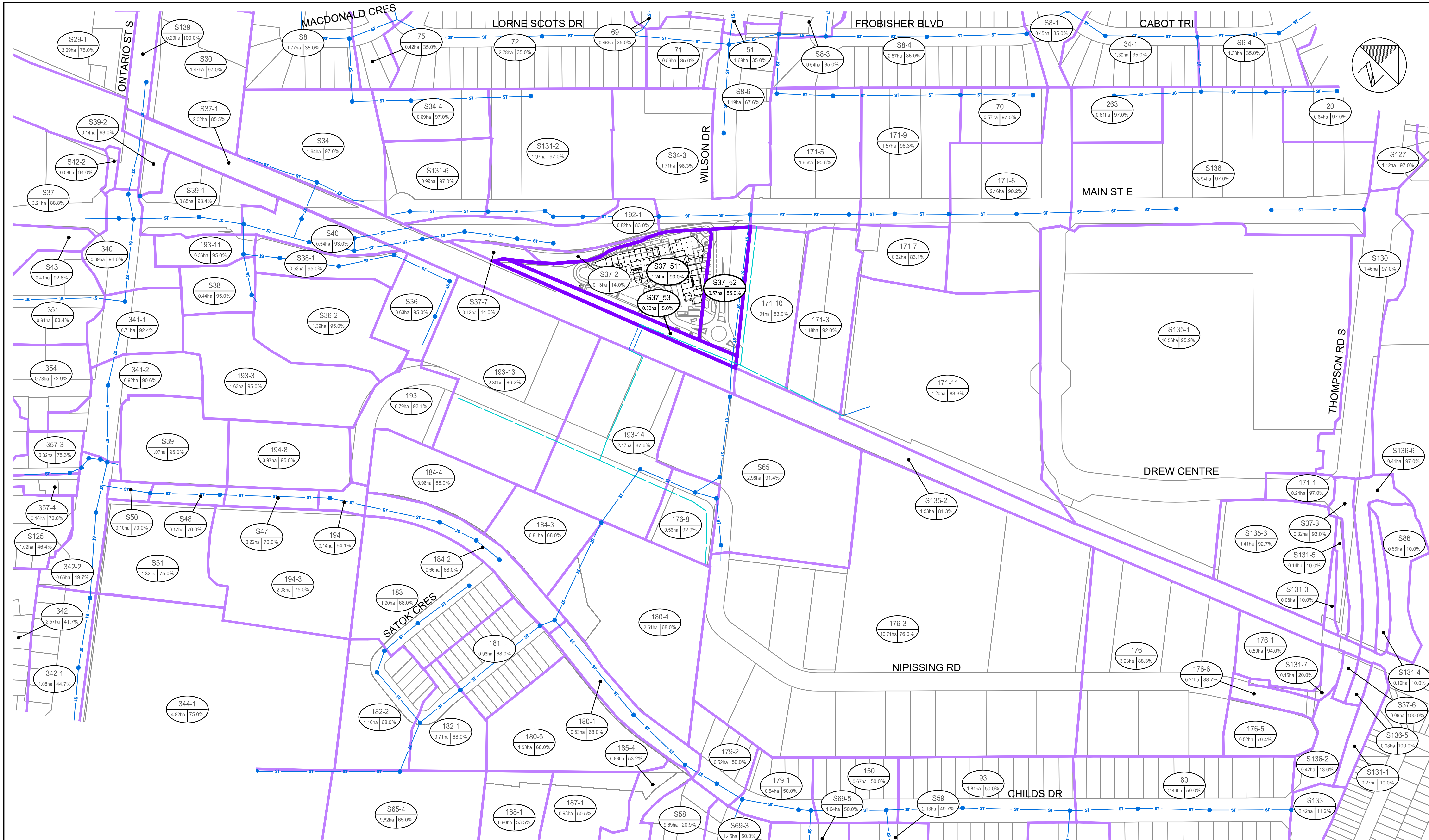
STUDY AREA SUBCATCHMENT BOUNDARY

S13-3-LS — SUBCATCHMENT ID#

73.4% — PERCENTAGE OF IMPERVIOUS AREA

0.75ha — SUBCATCHMENT AREA

560 MAIN STREET SWM INVESTIGATION URBANTECH CONSULTING AND NEATT COMMUNITIES INC.	SUBCATCHMENT PLAN (EXISTING CONDITION)	wood.	Scale 1:2000 0 20 40 80 Consultant File No. WW21011090 Drawing No. WR1



LEGEND

PARCEL FABRIC

EXISTING CULVERT

EXISTING DITCHES

STORM SEWER SYSTEM

EXTERNAL SUBCATCHMENT BOUNDARY

STUDY AREA SUBCATCHMENT BOUNDARY

S13-3-LS 0.75ha 73.4%

SUBCATCHMENT ID#

PERCENTAGE OF IMPERVIOUS AREA

SUBCATCHMENT AREA

SCALE VALID ONLY FOR 24"x36" VERSION

560 MAIN STREET
SWM INVESTIGATION
URBANTECH CONSULTING AND
NEATT COMMUNITIES INC.

SUBCATCHMENT PLAN
(FUTURE CONDITION)

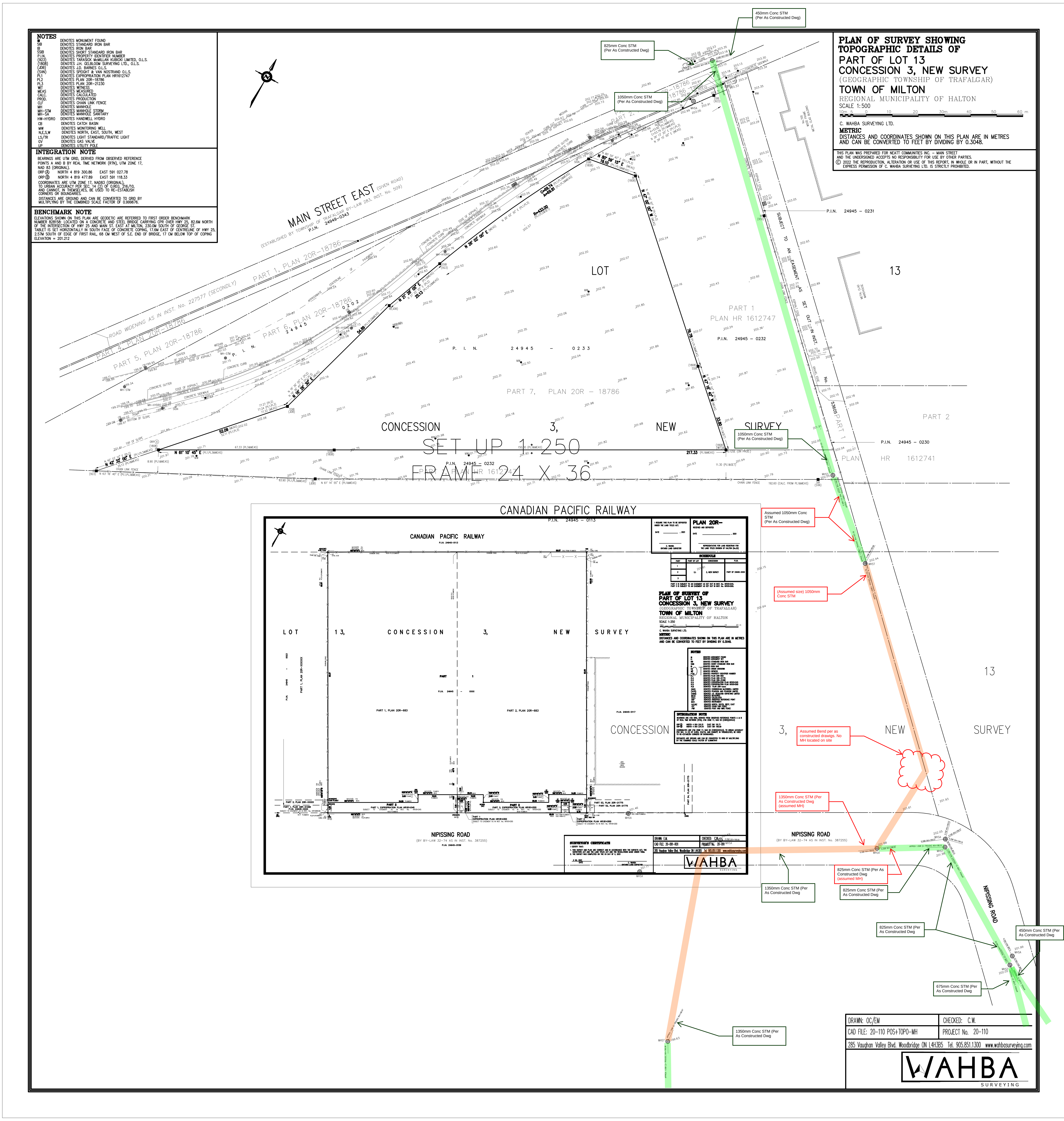
wood.

Scale 1:2000
0 20 40 80

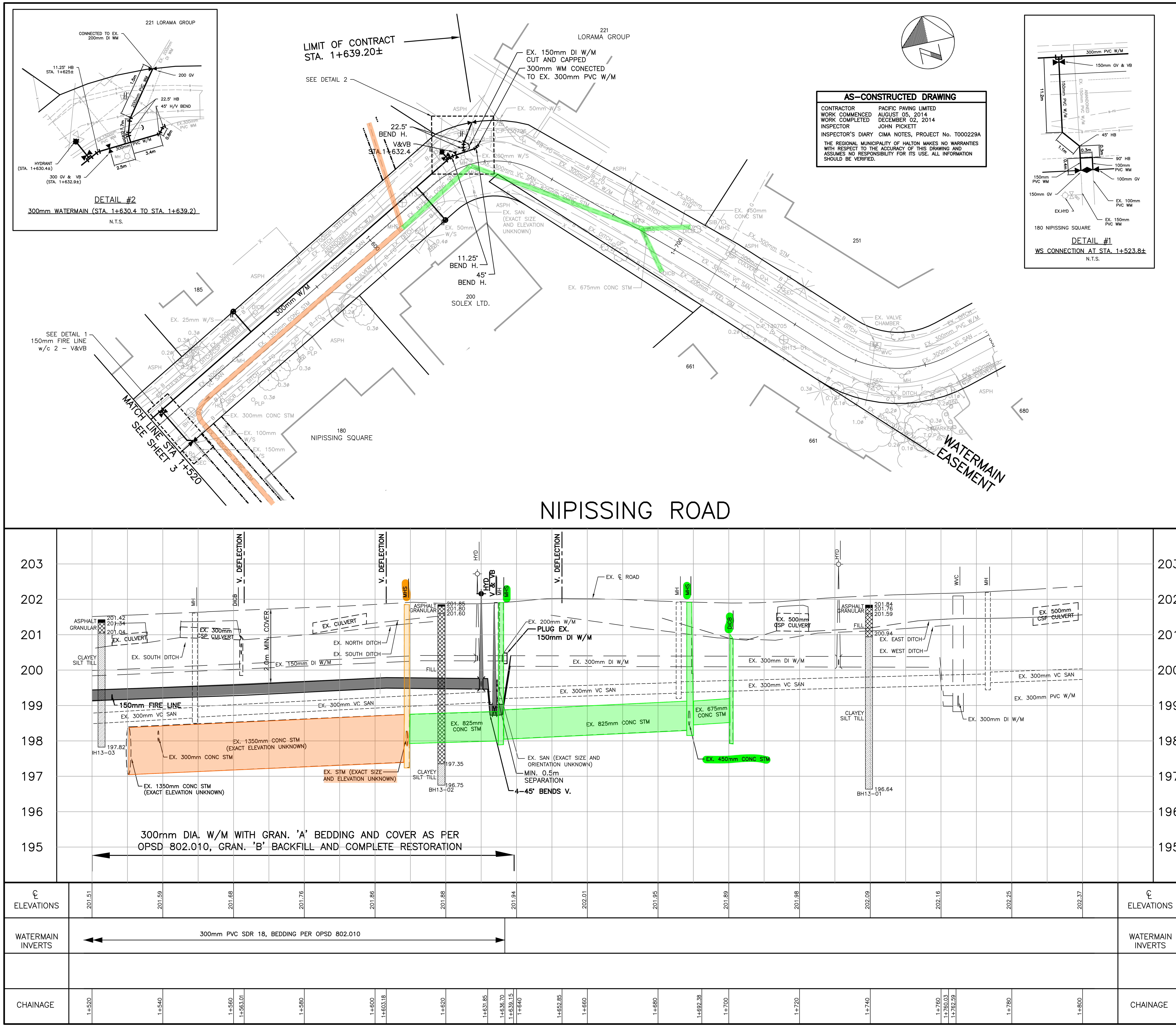
Consultant File No.
WW21011090

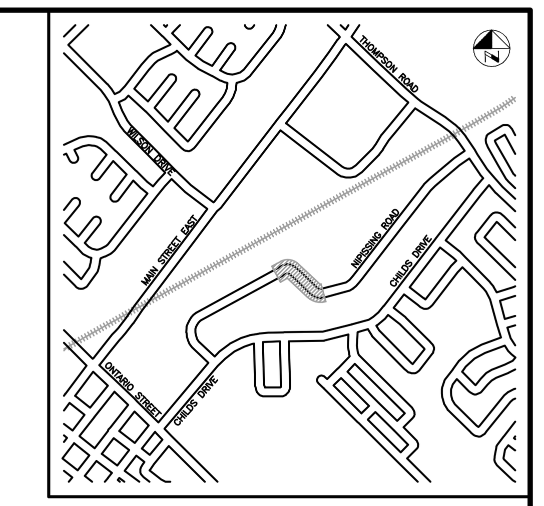
Drawing No.
WR2

Appendix A
Survey and As-Built Drawings



PLAN OF SURVEY SHOWING
TOPOGRAPHIC DETAILS OF
PART OF LOT 13
CONCESSION 3, NEW SURVEY
(GEOGRAPHIC TOWNSHIP OF TRAFALGAR)
TOWN OF MILTON
REGIONAL MUNICIPALITY OF HALTON
SCALE 1:500
C. WAHBA SURVEYING LTD.
METRIC
DISTANCES AND COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.
THIS PLAN WAS PREPARED FOR NEATT COMMUNITIES INC. – MAIN STREET AND THE UNDERSIGNED ACCEPTS NO RESPONSIBILITY FOR USE BY OTHER PARTIES.
© 2022 THE REPRODUCTION, ALTERATION OR USE OF THIS REPORT, IN WHOLE OR IN PART, WITHOUT THE EXPRESS PERMISSION OF C. WAHBA SURVEYING LTD. IS STRICTLY PROHIBITED.
NOTES
INTEGRATION NOTE
BENCHMARK NOTE
MAIN STREET EAST
450mm Conc STM (Per As Constructed Dwg)
825mm Conc STM (Per As Constructed Dwg)
1050mm Conc STM (Per As Constructed Dwg)
P.I.N. 24945 – 0231
LOT
13
PART 1 PLAN HR 1612747
P.I.N. 24945 – 0232
P.I.N. 24945 – 0233
PART 7, PLAN 20R – 18786
CONCESSION 3, NEW SURVEY
SET UP 1:250
FRAME 24 X 36
P.I.N. 24945 – 0230
PART 2
PLAN HR 1612741
CANADIAN PACIFIC RAILWAY
P.I.N. 24945 – 0113
Assumed 1050mm Conc STM (Per As Constructed Dwg)
(Assumed size) 1050mm Conc STM
Assumed Bend per as constructed drawigs. No MH located on site
1350mm Conc STM (Per As Constructed Dwg (assumed MH)
NIPISSING ROAD
(BY BY-LAW 32-74 AS IN INST. No. 387255)
825mm Conc STM (Per As Constructed Dwg (assumed MH)
1350mm Conc STM (Per As Constructed Dwg
825mm Conc STM (Per As Constructed Dwg
825mm Conc STM (Per As Constructed Dwg
450mm Conc STM (Per As Constructed Dwg
675mm Conc STM (Per As Constructed Dwg
1350mm Conc STM (Per As Constructed Dwg
DRAWN: OC/EM
CHECKED: C.W.
CAD FILE: 20-110 POS+TOPO-MH
PROJECT No. 20-110
285 Vaughan Valley Blvd. Woodbridge ON L4H3B5 Tel. 905.851.1300 www.wahbasurveying.com
WAHBA SURVEYING





LEGEND

- BOREHOLES – REFER TO SPL CONSULTANTS LIMITED FOR GEOTECHNICAL INVESTIGATION
- WATER BOXES
- EX. HYDRANT REMOVAL
- EX. VALVE BOX REMOVAL
- EX. WVC OR MH REMOVAL
- CAP
- PROPOSED HYDRANT
- PROPOSED VALVE
- EXISTING WATERMAIN
- PROPOSED WATERMAIN
- EASEMENT
- CHAINAGE

THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDER GROUND AND ABOVE GROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND, WHERE SHOWN, THE ACCURACY OF THE POSITION 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 ANY DAMAGE DONE TO THEM.

Nº	Date	By	REVISIONS	MANU	CAD
4	5/07/15		AS CONSTRUCTED		X
3	5/26/14		ISSUED FOR CONSTRUCTION		X
2	3/12/14		REVISED PER ADDENDUM No. 1		X
1	3/11/14		ISSUED FOR TENDER		X

Design	S.M.	Ch'kd	M.N.B.
Drawn	S.M.	Ch'kd	Z.T.

Date: DECEMBER 2013

Scale: Horiz. 1:500, Vert. 1:50

References

Regional: ACCEPTED FOR CONSTRUCTION OF REGIONAL INFRASTRUCTURE
Reviewed For Compliance With Regional Standards Only.

SEE SHEET 01 FOR ORIGINAL SIGNATURE
Director

SEE SHEET 01 FOR ORIGINAL SIGNATURE
Manager

Field Notes: REGION SURVEY

Gamsby and Mannerow ENGINEERS

Halton REGION

200m WATERMAIN REPLACEMENT ON NIPISSING ROAD
FROM 430m NORTH OF CHILDS DRIVE TO 710m NORTH OF CHILDS DRIVE
IN THE CITY OF MILTON

Consultant File Nº 113-125

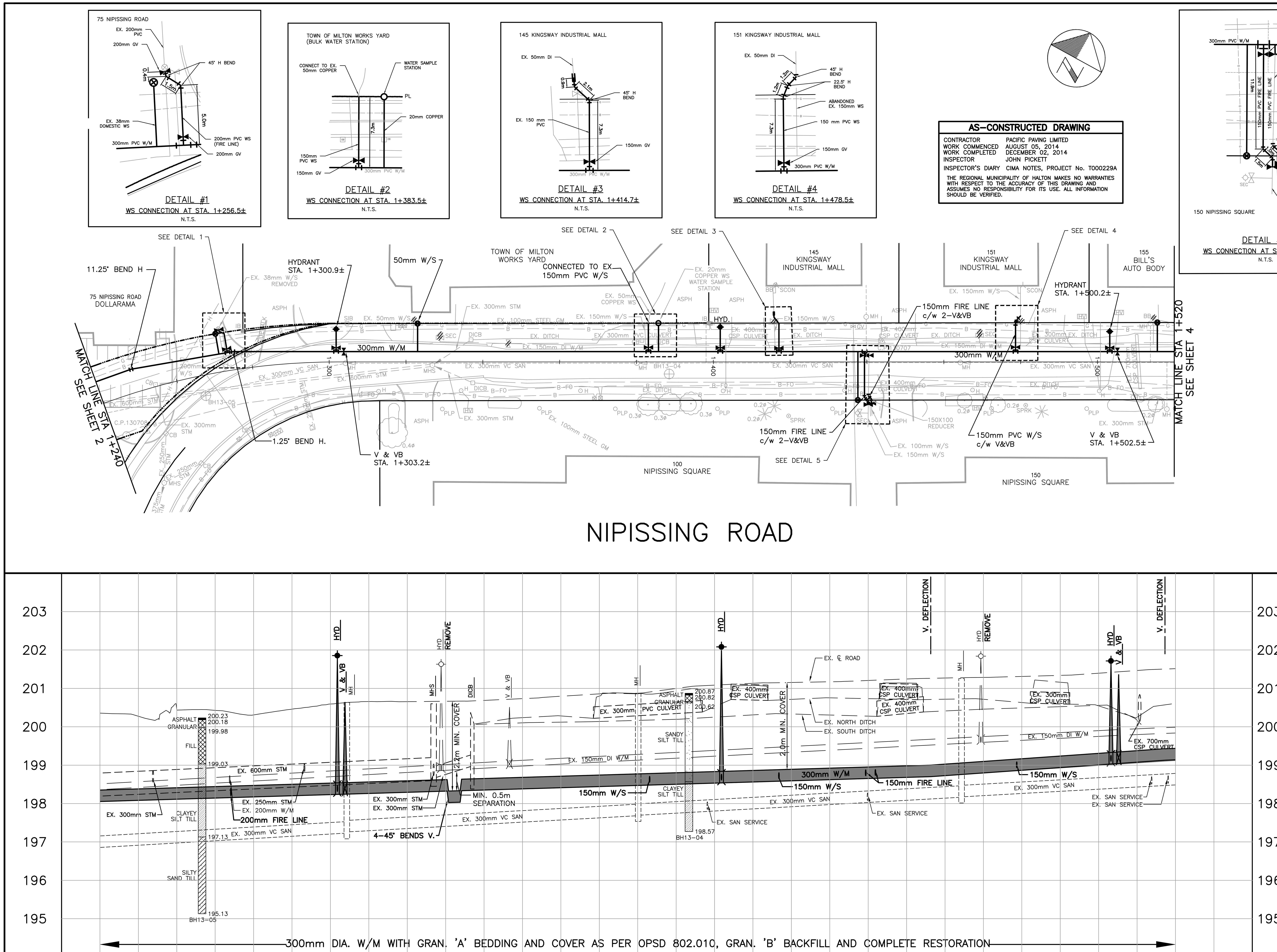
Regional Drawing Nº

CONTRACT Nº W-2974A-PART 1-14

Drawing Nº SHEET 04 OF 04

W-2974A-PART 1-14

Drawing: \\NIGEL\SHARED WORK AREAS\300035637 HALTON CAD SERVICES\PROJECT 8 - W-2974A-PART 1-14 (CHILDS AND NIPISSING)\CAD ASBUILTS\NIPISSIN
Layout Tab: 04 SHT Time: 12:57:19 PM
Date: 06/04/2015



℄ ELEVATIONS	200.45	200.31	200.59	200.65	200.69	200.79	200.87	201.08	201.15	201.21	201.27	201.31	201.40	201.51
WATERMAIN INVERTS	300mm PVC SDR 18, BEDDING PER OPSD 802.010													
CHAINAGE	1+260	1+280	1+300	1+320	1+340	1+360	1+380	1+400	1+420	1+440	1+456.28 / 1+460	1+480	1+500	1+517.27 / 1+520

AS-CONSTRUCTED DRAWING

CONTRACTOR: PACIFIC PAVING LIMITED
WORK COMMENCED: AUGUST 05, 2014
WORK COMPLETED: DECEMBER 02, 2014
INSPECTOR: JOHN PICKETT
INSPECTOR'S DIARY: CIMA NOTES, PROJECT No. T000229A

THE REGIONAL MUNICIPALITY OF HALTON MAKES NO WARRANTIES WITH RESPECT TO THE ACCURACY OF THIS DRAWING AND ASSUMES NO RESPONSIBILITY FOR ITS USE. ALL INFORMATION SHOULD BE VERIFIED.

LEGEND

- BH13-01 — BOREHOLES – REFER TO SPL CONSULTANTS LIMITED FOR GEOTECHNICAL INVESTIGATION
- WATER BOXES
- EX. HYDRANT REMOVAL
- EX. VALVE BOX REMOVAL
- EX. WVC OR MH REMOVAL
- CAP
- PROPOSED HYDRANT
- PROPOSED VALVE
- EXISTING WATERMAIN
- PROPOSED WATERMAIN
- EASEMENT
- CHAINAGE

THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDER GROUND AND ABOVE GROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND, WHERE SHOWN, THE ACCURACY OF THE POSITION 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 ANY DAMAGE DONE TO THEM.

Nº	Date	By	REVISIONS	MANU	CAD
3	5/07/15		AS CONSTRUCTED		X
2	5/26/14		ISSUED FOR CONSTRUCTION		X
1	3/11/14		ISSUED FOR TENDER		X

Design	S.M.	Ch'kd	M.N.B.	Date DECEMBER 2013
Drawn	S.M.	Ch'kd	Z.T.	

Scale: Horiz. 1:500, Vert. 1:50
References
Regional
Field Notes: REGION SURVEY

ACCEPTED FOR CONSTRUCTION OF REGIONAL INFRASTRUCTURE
Reviewed For Compliance With Regional Standards Only.

SEE SHEET 01 FOR ORIGINAL SIGNATURE
Director

SEE SHEET 01 FOR ORIGINAL SIGNATURE
Manager

Gamsby and Mannerow ENGINEERS

Halton REGION

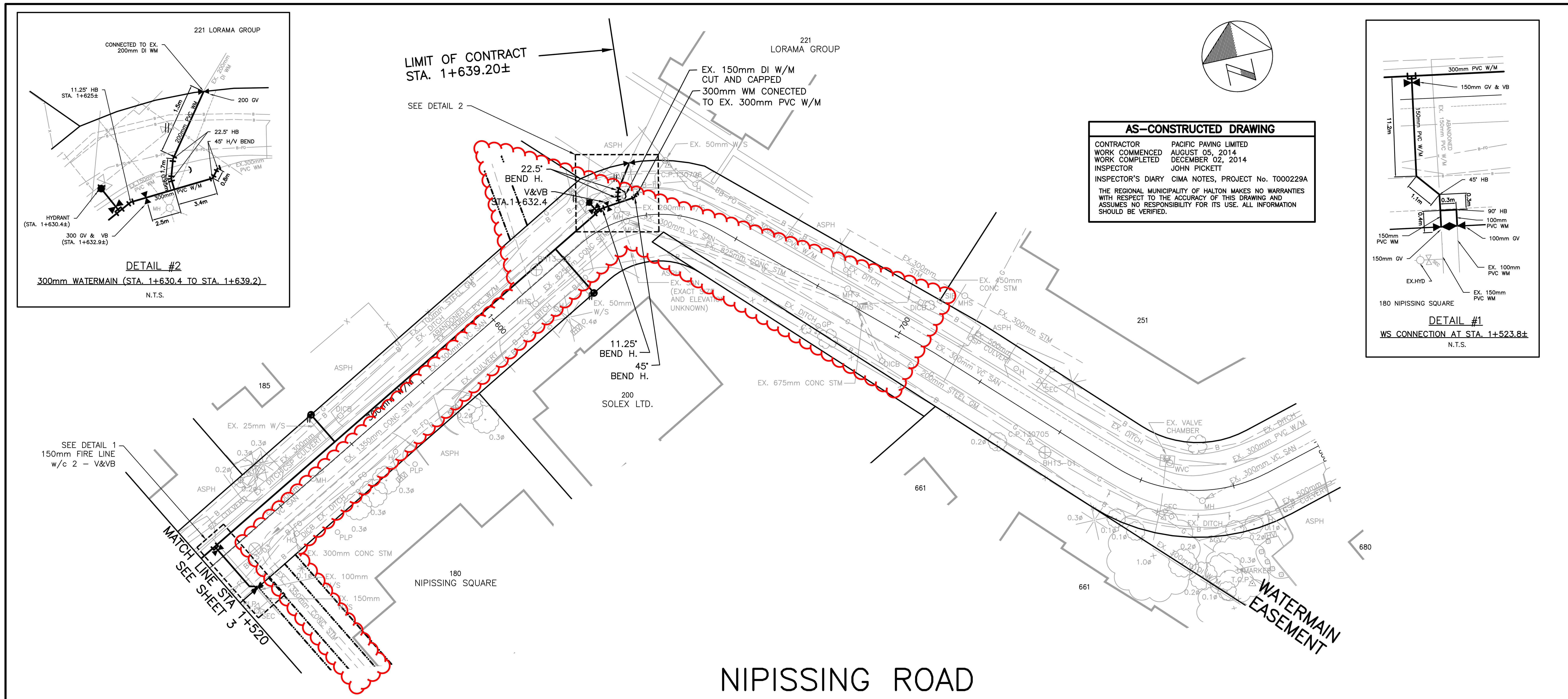
200m WATERMAIN REPLACEMENT ON NIPISSING ROAD

FROM 150m NORTH OF CHILDS DRIVE TO 430m NORTH OF CHILDS DRIVE
IN THE CITY OF MILTON

Consultant File Nº: 113-125
Regional Drawing Nº
CONTRACT Nº: W-2974A-PART 1-14
Drawing Nº: SHEET 03 OF 04

W-2974A-PART 1-14

Drawing: \\NIGEL\SHARED WORK AREAS\300035637 HALTON CAD SERVICES\PROJECT 8 – W-2974A-PART 1-14 (CHILDS AND NIPISSING)\CAD ASBUILTS\NIPISSIN
Layout Tab: 03 SHT Time: 12:57:13 PM
Date: 06/04/2015



AS-CONSTRUCTED DRAWING

CONTRACTOR	PACIFIC PAVING LIMITED
WORK COMMENCED	AUGUST 05, 2014
WORK COMPLETED	DECEMBER 02, 2014
INSPECTOR	JOHN PICKETT
INSPECTOR'S DIARY	CIMA NOTES, PROJECT No. T000229A

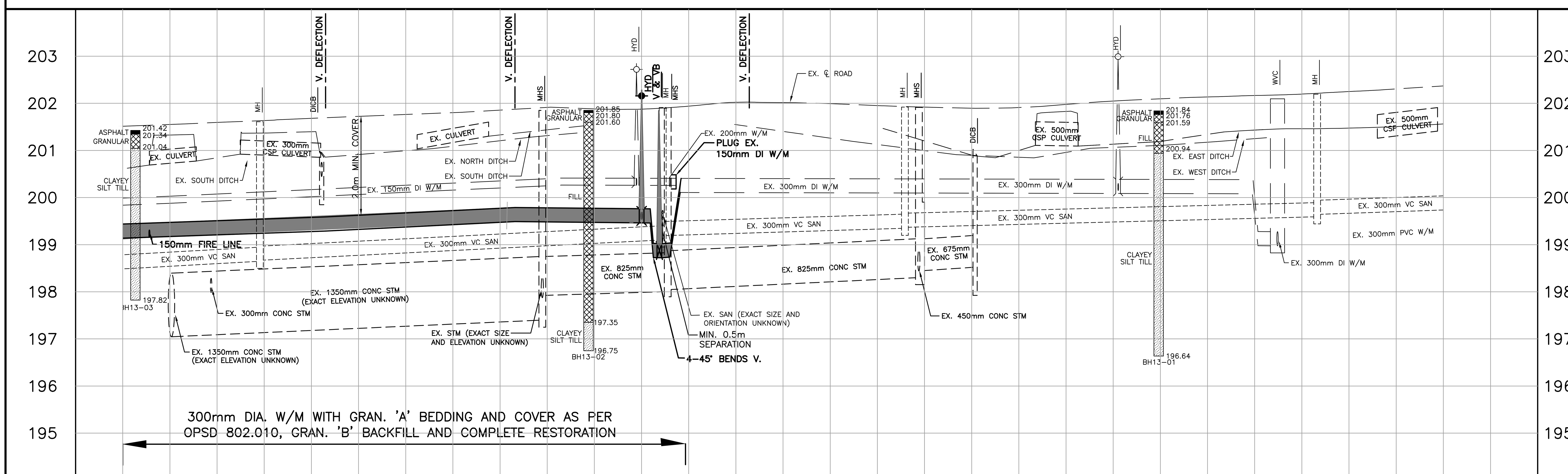
THE REGIONAL MUNICIPALITY OF HALTON MAKES NO WARRANTIES WITH RESPECT TO THE ACCURACY OF THIS DRAWING AND ASSUMES NO RESPONSIBILITY FOR ITS USE. ALL INFORMATION SHOULD BE VERIFIED.

LEGEND

- BH13-01 — BOREHOLES – REFER TO SPL CONSULTANTS LIMITED FOR GEOTECHNICAL INVESTIGATION
- WATER BOXES
- EX. HYDRANT REMOVAL
- EX. VALVE BOX REMOVAL
- EX. WVC OR MH REMOVAL
- CAP
- PROPOSED HYDRANT
- PROPOSED VALVE
- EXISTING WATERMAIN
- PROPOSED WATERMAIN
- EASEMENT
- CHAINAGE

THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDER GROUND AND ABOVE GROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND, WHERE SHOWN, THE ACCURACY OF THE POSITION 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 ANY DAMAGE DONE TO THEM.



℄ ELEVATIONS	201.51	201.59	201.68	201.76	201.86	201.88	201.94	202.01	201.95	201.89	201.98	202.09	202.16	202.25	202.37

WATERMAIN INVERTS: 300mm PVC SDR 18, BEDDING PER OPSD 802.010

CHAINAGE: 1+520, 1+540, 1+560, 1+563.01, 1+580, 1+600, 1+603.18, 1+620, 1+631.85, 1+636.70, 1+639.15, 1+640, 1+652.85, 1+660, 1+680, 1+692.38, 1+700, 1+720, 1+740, 1+760, 1+760.03, 1+762.59, 1+780, 1+800

No	Date	By	REVISIONS	MANU	CAD
4	5/07/15		AS CONSTRUCTED		X
3	5/26/14		ISSUED FOR CONSTRUCTION		X
2	3/12/14		REVISED PER ADDENDUM No. 1		X
1	3/11/14		ISSUED FOR TENDER		X

Design	S.M.	Ch'kd	M.N.B.	Date: DECEMBER 2013
Drawn	S.M.	Ch'kd	Z.T.	

Scale: Horiz. 1:500, Vert. 1:50 — References

Regional: ACCEPTED FOR CONSTRUCTION OF REGIONAL INFRASTRUCTURE
Reviewed For Compliance With Regional Standards Only.
SEE SHEET 01 FOR ORIGINAL SIGNATURE — Director
SEE SHEET 01 FOR ORIGINAL SIGNATURE — Manager

Field Notes: REGION SURVEY

Gamsby and Mannerow ENGINEERS

Halton REGION

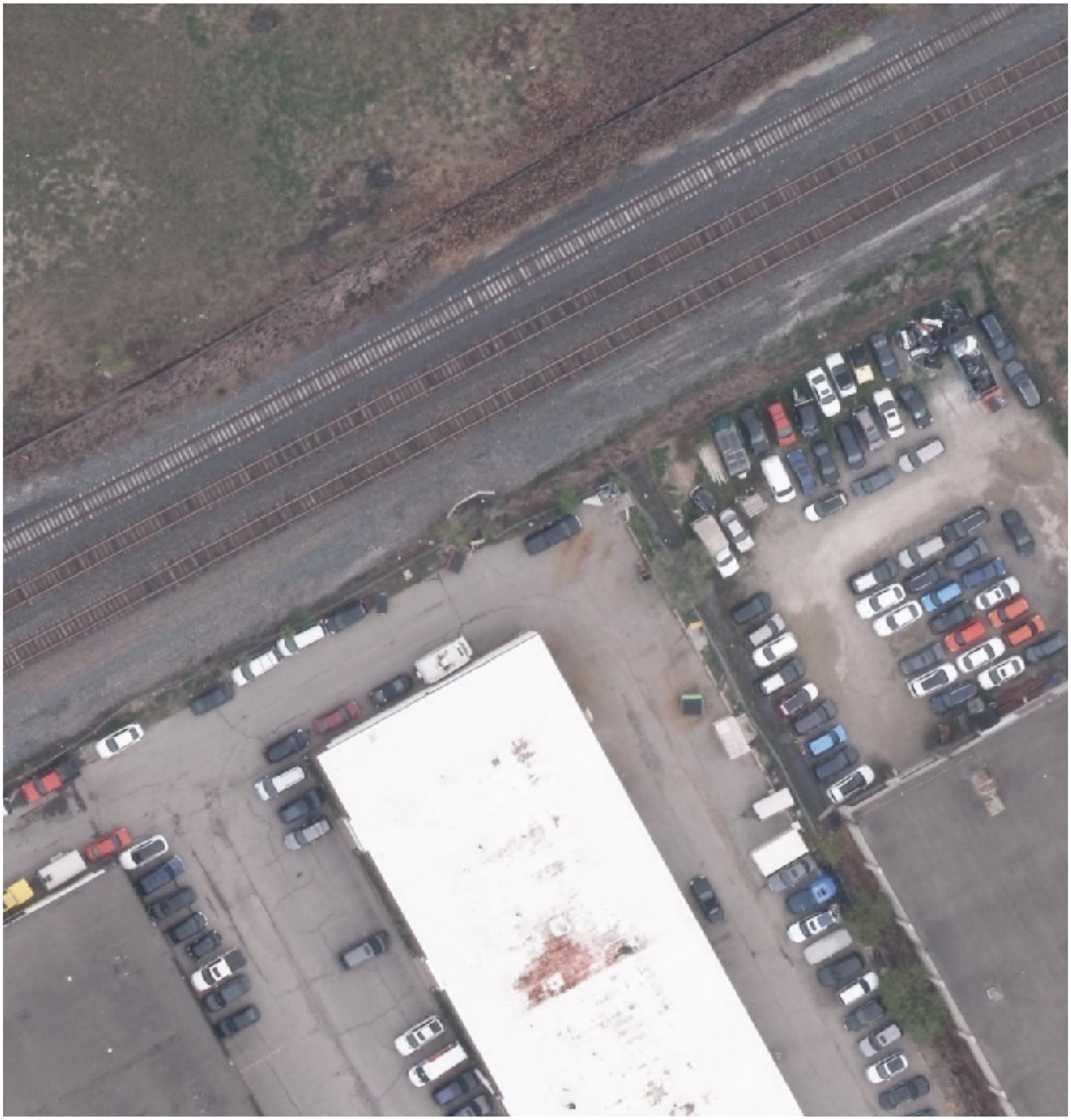
200m WATERMAIN REPLACEMENT ON NIPISSING ROAD
FROM 430m NORTH OF CHILDS DRIVE TO 710m NORTH OF CHILDS DRIVE
IN THE CITY OF MILTON

Consultant File No 113-125 — Regional Drawing No

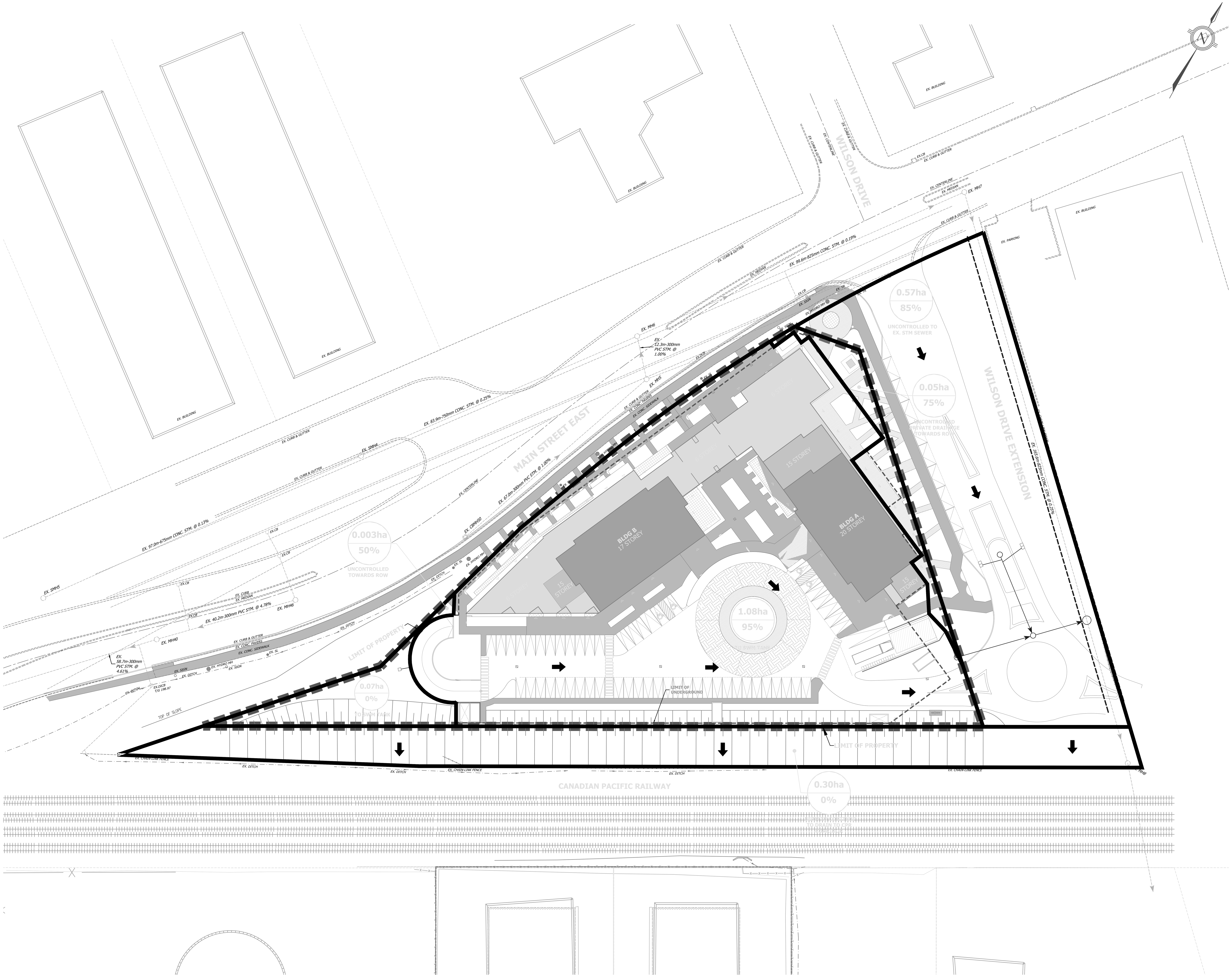
CONTRACT No W-2974A-PART 1-14 — Drawing No SHEET 04 OF 04

W-2974A-PART 1-14

Drawing: \\NIGEL\SHARED WORK AREAS\300035637 HALTON CAD SERVICES\PROJECT 8 - W-2974A-PART 1-14 (CHILDS AND NIPISSING)\CAD ASBUILTS\NIPISSIN
Layout Tab: 04 SHT Time: 12:57:19 PM
Date: 06/04/2015



Appendix B
Post-Development STM Drainage Plan



LEGEND

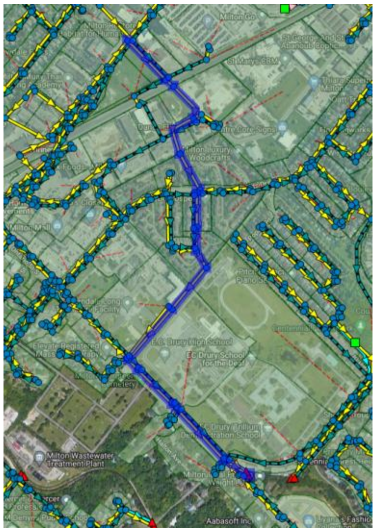
- STORM MANHOLE AND FLOW DIRECTION
- EXISTING STORM MANHOLE AND FLOW DIRECTION
- CATCHBASIN
- AREA DRAIN
- 1.03 DRAINAGE AREA (ha)
- 50% IMPERVIOUS AREA (%)
- STORM DRAINAGE AREA BOUNDARY
- BLOCK LIMIT/PROPERTY LIMIT
- PROPOSED OVERLAND FLOW DIRECTION
- LIMIT OF UNDERGROUND PARKING

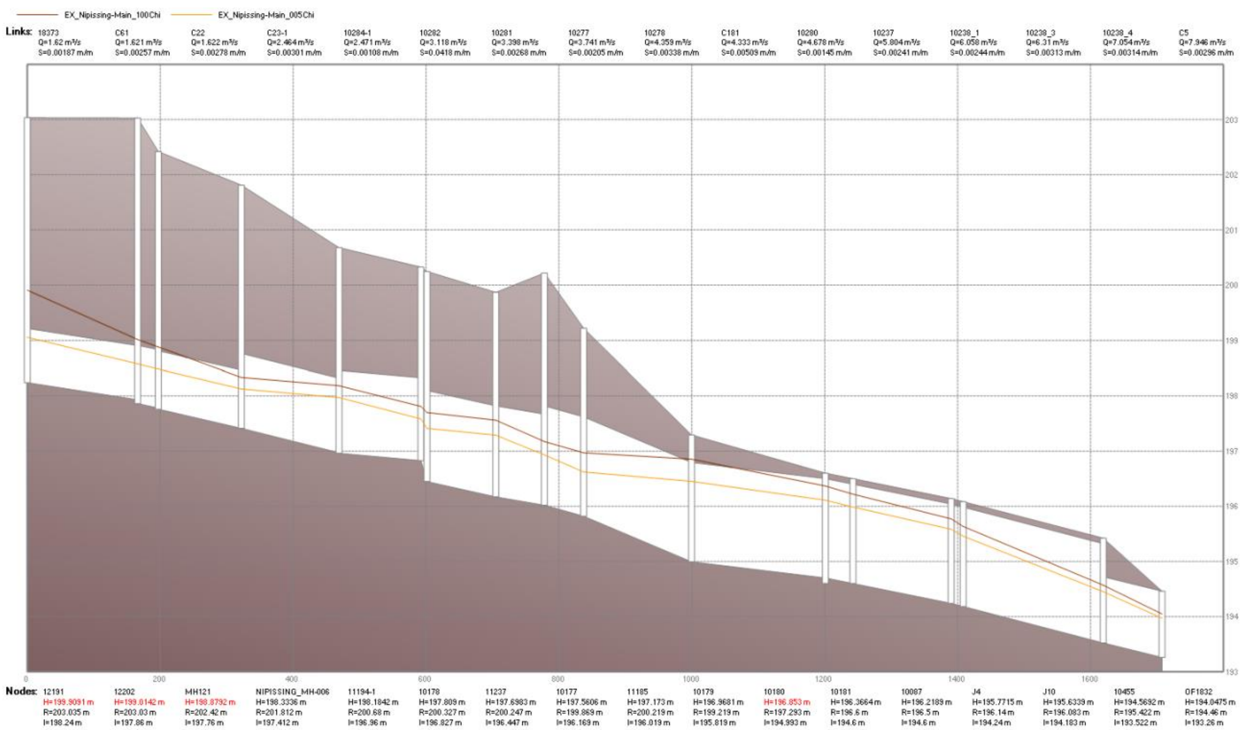
POST-DEVELOPMENT STORM DRAINAGE PLAN

STM-2

Appendix C
Existing and Proposed Conditions
Minor/Major System Performance

Major/Minor System Performance – Existing Condition





Major/Minor System Performance – Proposed Condition