

Proposed Multiple Residential Condo Development – 12148 Albion Vaughan Rd
• Town of Caledon

Functional Servicing and Stormwater Management Report

January 2023
MAEL Reference 17-849



FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT

**Multiple Residential Condo Development
12148 Albion Vaughan Rd**

Town of Caledon

January 2023

MAEL Project No: 17-849

MASONGSONG ASSOCIATES ENGINEERING LIMITED

7800 Kennedy Road, Unit 201

Markham, Ontario, L3R 2C7

T: (905) 944-0162 / F: (905) 944-0165

TABLE OF CONTENTS

1	INTRODUCTION.....	1
1.1	Study Objectives and Location.....	1
1.2	Existing Site Description.....	2
1.3	Proposed Development Plan	3
2	GRADING	3
2.1	Existing Topography.....	3
2.2	Proposed Roadway and Grading.....	4
3	WATER SERVICING	4
3.1	Existing Water Servicing.....	4
3.2	Proposed Water Servicing.....	4
3.3	Proposed Water Demands.....	5
3.4	Water Distribution System Modeling	5
4	SANITARY SERVICING	7
4.1	Existing Sanitary Servicing.....	7
4.2	Proposed Sanitary Servicing	7
4.3	Sanitary Sewage Flow Estimates.....	7
5	STORM DRAINAGE AND STORMWATER MANAGEMENT	9
5.1	Existing Storm Servicing.....	9
5.2	Water Balance.....	9
5.3	Stormwater Quality Control.....	13
5.3.1	TSS Removal.....	13
5.4	Quantity Controls.....	14
5.4.1	Allowable Peak Flow	14
5.4.2	Post-development Discharge.....	15
6	Erosion and Sediment Control.....	16
7	CONCLUSIONS AND SUMMARY RECOMMENDATIONS	18

APPENDICES

Appendix A:	General Plans
Appendix B:	Figures
Appendix C:	Tables
Appendix D:	Approved TRCA Submission 2021
Appendix E:	Engineering drawings

1 INTRODUCTION

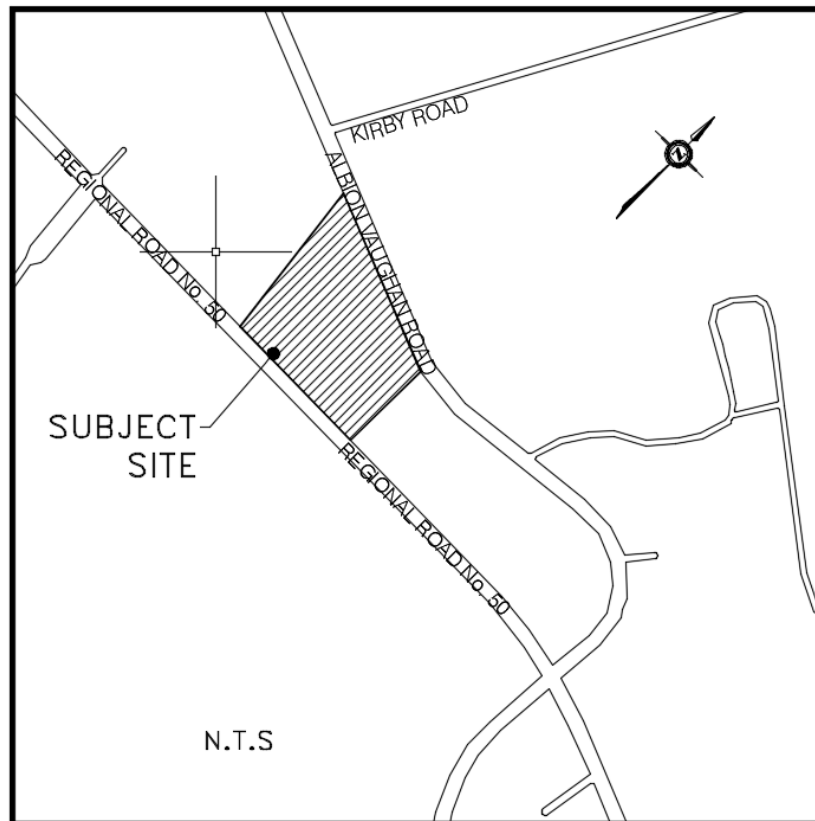
1.1 Study Objectives and Location

Masongsong Associates Engineering Limited has been retained by Aztec Restoration Inc. to prepare this Functional Servicing Plan (FSR), and Stormwater Management Report in support of a Site Plan Application for the development of a Multiple Residential comprising a total of 240 units and 10 Townhomes in the Town of Caledon

The subject site is located 370m North of Mayfield Road between Regional Road 50 and Albion-Vaughan Road in the south sector of Town of Caledon. Figure 1 below illustrates the location of the proposed development.

The existing site has an overall area of approximately 1.538 ha (3.80 ac), however road widening plans on Albion Vaughan Road, Highway 50 and 0.3m reserves further reduce the overall area by 0.1152 ha, 0.0812 ha, and 0.0079 ha respectively for a total area of 1.334 ha. There are 0.3078 ha at the west side are undevelopable floodplain lands, and instead will be slightly regraded to realign a portion of the Robinson creek inside the subject site which was improperly realigned by the previous landowner. for a final developable area of 1.026 ha (2.53 ac)

Figure 1 *Site Location Key Plan*



The objective of this report is to identify the requirements for the site servicing and stormwater management as it relates to current Town of Caledon criteria, and to demonstrate how this proposed site will function within the framework of existing infrastructure.

1.2 Existing Site Description

The subject site is part of Lot 1 Concession 7 Town of Caledon. Regional Municipality of Peel. Refer to Survey plan prepared by David B. Searles Surveying enclosed In Appendix A.

The site is identified with municipality address 12148 Albion Vaughan comprising of two brick dwellings and framed stucco pavilion with approximately 97% of the site covering with small vegetation and a few trees. The subject site is bounded by regional Road 50/Robinson Creek to the west, Commercial lands to the south, Albion-Vaughan Road to the east and a residential property to the North.

There is a portion of the existing channel running on the west site of the study which will be realigned as per the approved TRCA submission, attached in Appendix D.

The subject site is located partially within the Regulatory Flood Plain as identified on Humber River Floodplain mapping Sheet No.169 provided by the Toronto and Region Conservation Authority (TRCA), enclosed in Appendix A for reference.

1.3 Proposed Development Plan

The development proposal is to construct a 6-storey residential high-rise condominium tower A, 6-storey residential high-rise condominium tower B with a total of 240 units, 20 townhomes, 438 underground parking spaces and 15 parking spaces at grade.

Vehicular access to the site will be provided at the following three locations: one main driveway, and one service road for each tower all on Albion Vaughan Road.

The proposed architectural Site Plan Concept is included in Appendix A1.0 prepared by Fausto Cortese Architects.

The proposal to slightly modify the existing floodplain has been approved by TRCA and the required minimum 10m setback will be provided from the floodplain line to the development limit.

2 GRADING

2.1 Existing Topography

The existing topography indicates that the lands generally slope from the north to the south, with a 1.42m grade differential, ranging from a high of 230.08m to a low of 228.66m over 115.5m (a 1.2% gradient). The peak elevation runs along the furthest northwest corner of the existing site, while the low elevations are at the south of the subject site. A topographic survey plan prepared by David B. Searles Surveying Ltd. dated June 6, 2016 is included in Appendix A.

The pre-development drainage pattern indicates that the majority area currently sheet drains towards the existing channel located at the west site of the subject site, refer to Pre-development Drainage Plan, Figure 2 enclosed in Appendix B.

The west portion of site is bounded by an existing channel that runs south. Part of the existing channel will be regraded in accordance with TRCA policies; however, the pre-development drainage pattern and existing grade will be maintained at the south, east and majority of north property line. Refer to figure 3 for Post-development Master

storm drainage plan and grading plan drawing SG1 enclosed in appendix B and D respectively.

The subject site is currently accessible from one driveway on Albion Vaughan Road and one on Highway 50, leading to the front of the existing two houses.

The existing topography data was provided by prepared by David B. Searles Surveying Ltd. dated June 6, 2016 is included in Appendix A.

2.2 Proposed Roadway and Grading

As illustrated on the Conceptual grading plan enclosed in Appendix E, the internal road network will have three accesses off Albion Vaughan Road.

The western portion of the site, of approximately 0.376ha which represents about 27% of the entire site, has been identified as an Open Space area and will be regraded to match the original drainage pattern of the site prior to the improper creek realignment by the previous landowner. The remainder of the site, which consists of 1.042 ha of developable area, will be graded to ensure that the storm drainage is self contained. Driveways, road, and laneway drainage will be directed towards a local low point where a Low Impact Development (LID) measure will be located to capture and treat the storm drainage. There are 0.1067ha of uncontrolled area draining into the south west side of the site. Refer to post-development Master storm drainage plan, enclosed in Appendix B.

3 WATER SERVICING

3.1 Existing Water Servicing

The subject site will be serviced by an existing 300mm diameter PVC watermain located along the Albion Vaughn Road.

Refer to existing municipal infrastructure Figure 5 enclosed in Appendix B and drawing 51608-D enclosed in Appendix B for existing infrastructure.

3.2 Proposed Water Servicing

A 300 mm watermain lateral servicing as the fire line will be tapped into the existing 300mm PVC watermain running along Albion Vaughn Road. A 150mm diameter domestic cold-water supply will branch off the main service, both fire and domestic lines will contain shut-off valves at the streetline and water meters in accordance with Region Peel Standards.

Fire Protection for the subject site will be provided by one proposed private hydrant within the site and two existing hydrants located on Albion Vaughn Road.

For proposed watermain layout refer to figure 6 enclosed in Appendix B

3.3 Proposed Water Demands

The residential per capita demand is estimated based on the Region of Peel criteria of 280 L/c/d. with 707 persons for the residential area (as shown in sanitary section 4.3), the average-day domestic demand is **2.22 L/s**. The maximum day demand has a factor of 2.0, therefore yielding a max-day domestic consumption rate of **4.45L/s** or **267L/min**. The max peak hour demand has a factor of 3.0, therefore yielding a peak hour consumption rate of **6.67L/s** or **400.2 L/s**.

3.4 Water Distribution System Modeling

Hydraulic analysis of proposed water distribution system is conducted using EPANET 2 modeling software to ensure the system delivers desired pressures and flows for the proposed development under various demand scenarios. It was assumed a residential fire flow of 7000L/min or 116.67L/s

The summary of analysis result is provided in the following Table 3.3:

Table 3.3

No	Scenarios	EPANET Results	Region Criteria
1	Max. pressure during min. hour demand (kpa)	346	< 690 (Ok)
2	Min. pressure during max. hour demand (kpa)	345	> 275 (OK)
3	Min. pressure during max. day demand + fire (kpa)	270	> 140 (OK)

The above summary of EPANET modeling result shows that proposed watermain system meets Region standard criteria for required pressures for the noted scenarios.

Refer to table 3.3.1 and Epanet results for watermain calculations enclosed in Appendix C

Prior to detailed design, a flow test on the existing hydrants will be performed to confirm available pressures and supply, and to confirm the sizing of the internal watermain system.

▪ **The proposed 150 mm diameter will be tapped into the existing 300mm diameter municipal watermain running on Albion Vaughan Road to provide both fire and domestic water services for the subject site. Hydrant flow tests and analysis will be performed to confirm that there is adequate supply and pressure for firefighting purposes.**

4 SANITARY SERVICING

4.1 Existing Sanitary Servicing

Sanitary servicing is available from an existing 900m sanitary sewer running on Albion Vaughan Road; refer to existing municipal infrastructure Figure 5 and drawing 51608-D enclosed in Appendix B for existing infrastructure.

4.2 Proposed Sanitary Servicing

It is proposed to connect into the existing sanitary sewer system on Albion Vaughan Road, providing a 200 mm diameter PVC sanitary sewer connection to service the proposed multiple Residential Condo. The sanitary flow generated by the study area will discharge into the proposed sanitary control manhole MH2A to ultimately discharge into the existing sanitary manhole MH6A.

Refer to figure 6 enclosed in Appendix B for proposed sanitary connections details, respectively.

4.3 Sanitary Sewage Flow Estimates

The proposed development comprises 278 condo units, which is estimated with the current Region’s Peel Design, Specification & Procedures Manual as having an equivalent population of 707 persons as outlined in the following Table 4.3.

Table 4.3 Estimated *Population for Residential Development*

Unit type	Density	No. of Units	Total Population
Apartments smaller than 750 sqft	1.6p/unit	78	124.8
Apartments larger than 750 sqft	3.0p/unit	187	561
Total		278	686

In accordance with the Region’s requirements, the sanitary sewage flow estimates are calculated based on the STD. DWG. 2-5-2 and ground water infiltration flows. Using the

above population estimates, the future sanitary sewerage rate from the subject site is calculated as follow.

Proposed Site Design Flow:

Peak Flow Design Parameters

<i>Residential Population</i>	= 686 (Refer to Table2.2)
Total Population	= 686
If Population<1000 =	0.013 m ³ /s (STD. DWG. 2-5.2)

The sanitary discharge from the subject site will be accommodated with a proposed 200mm diameter PVC sanitary sewer, discharging to the existing 900mm diameter sanitary sewer on Albion Vaughn Road.

From the Region of Peel Drawing 51608-D Plan and Profile, enclosed in Appendix B, the existing sewer is at a depth of approximately 5.7 m from existing ground.

5 STORM DRAINAGE AND STORMWATER MANAGEMENT

The stormwater management plan for the subject site will be designed in accordance with the Town of Caledon Criteria in conjunction with the Best Management Practice guidelines in the MOE SWMPP Manual and Low Impact Development Guidelines by TRCA. Specific criteria to be applied in the stormwater management design are as follows:

- **Water Quality control** – Level 1 or Enhanced Protection
- **Water Balance** – a minimum 5 mm “first-flush” event retained for infiltration and water reuse
- **Water Quantity** – It is proposed to control the peak flows for each event (2 year, 5 year, 10 year, 25 year, 50 year and 100 years) to pre-developments levels in accordance with TRCA criteria for Humber River Storm Management Quantity Control

The following sections will detail the pre- and post-development conditions, and describe how the Low Impact Development targets can be achieved on site.

5.1 Existing Storm Servicing

There is an existing ditch running on the east of the subject site along Albion Vaughan Road and existing channel running on the west part of the subject site. There is no existing municipal storm sewer available for the subject site.

Refer to existing municipal infrastructure Figure 2 enclosed in Appendix B

5.2 Water Balance

On-site water balance to a minimum 5 mm retention, through infiltration, evapotranspiration and/or rainwater reuse; and

The volume of on-site water retention is estimated in the following Table 5.2

Table 5.2 5 mm Water Balance Volumes

Surface Area Component	Area	Initial Abstraction		Water Retention Target	Deficit Storage Required to meet Water Balance Target	
	(m ²)	(mm)	(m ³)	(mm)	(mm)	(m ³)
Roofs	2096.1	1	2.10	4	4	8.38
Green Roof	2335.6	5	11.68	0	0	0
Landscape	2277.4	5	11.39	0	0	0
Hard surface	3547.9	1	3.55	4	4	14.19
Undevelopable area (landscape)	3078	5	15.39	0	0	0
Total	13335		44.11			22.57

A total of **22.57 m³** of additional on-site storage is required to meet 5 mm site retention targets. This will be captured by a cistern located within the stormwater management tank, which will collect clean rainwater from the rooftops only, to be reused over 72 hours. Excess water will overflow into the stormwater management tank.

In conjunction with water quantity and quality mitigation to be imposed at the source control level, efforts shall be made to preserve the pre-development hydrology of the lands prior to development, through the implementation of water balance targets for new site plan developments.

Authority guidelines recommend the retention of runoff from frequent rainfall events - typically 5 mm.

It is recommended that this target be achieved through the application of infiltration measures where soil conditions permit, and through grey-water capture and re-use. Typically, grey-water recycling can be applied to landscape and lawn watering, and for sanitary applications such as toilet flushing. Grey-water capture is an environmentally sustainable practice which also provides water conservation benefits, in addition to the preservation of pre-development hydrology.

All new development including re-development projects are strongly encouraged to apply low impact development strategies and design techniques that are suitable and applicable to individual site conditions. Some lot level control strategies and techniques to be considered are outlined below:

Site Planning:

Incorporating stormwater management concepts during the site planning process is very important to overall site stormwater management measures as it can eliminate unnecessary increases in runoff and reduce sediment/erosion problems. Site planning techniques will minimize the creation of new runoff and provide removal of some suspended solids by reducing the size of hard, impervious surfaces within the site plan layout.

Retention of Roof Runoff:

It is recommended to separate roof runoff from street and parking lot runoff and retain it on the rooftops. One of the targets for water balance is that essentially all roof runoffs be infiltrated or undergo evapotranspiration as much as possible, leaving very little roof runoff that will discharge through overland pathways to surface waters. The rooftops will be designed to the most current Ontario Building Code (OBC) structural standards and will be capable of storing quantity of stormwater on its surface.

A primary roof drain design indicates that each roof can accommodate controlled flow and volumes with the use of control-flow drain; roof drain calculations based on a Zurn Control- Flo Model are given in appendix C.

To gain the necessary storage volume, we propose to implement flow control drains that will allow a total release rate of 42 L/s/ha., which is an industry standard. Roof controls are typically specified at the working-drawing stage of building designs as they necessarily need to be coordinated between the architect, mechanical and structural engineers. Roof scuppers will need to be provided for emergency overflow or for events exceeding the 100-year storms. In practice, the roof ponding areas will need to be determined by roof and column geometry at the time of building design.

$$\begin{aligned} \text{Release rate} &= 42 \text{ L/s/ha} \times \text{Area} \\ \text{Release rate} &= 42 \times 0.4432 = \mathbf{18.61 \text{ L/s}} \end{aligned}$$

Based on the above release rate, the roof drain notch configuration required for general compliance is: **10-Zurn105** units with a **465 notch area rating**, having **1 notch per drain**. The calculations are shown in table 5.2.2 in Appendix C.

The required storage on roof will be **151.9 m³**. Refer to table 5.2.1 enclosed In Appendix C. Assuming 90% of the rooftop area is usable for storage, and pyramidal storage to a depth of 0.1245m, the following storage volume is available:

$$\text{The provided storage on roof will be } \mathbf{165.5 \text{ m}^3} = ((4432/3) \text{ m}^2 * 0.1245\text{m} * 0.9).$$

It is noted that the calculation above is preliminary and need to be undertaken by the project's mechanical engineer at the detail design stage, in coordination with the architect and structural.

Use of Green Roof Technologies:

Green roofs can significantly reduce the volume and rate of runoff from building lots. A layer of absorbent soil and vegetation on top of building can retain rainfall and allow it to evaporate or transpire. Engineered green roofs may also provide heating or cooling savings by insulating buildings, as well as aesthetic benefits, air quality benefits, and reductions in the "urban heat island" effect, etc.

A total of 2335.6 m³ of green roof is proposed for this site, which is just over half of the total roof area and greatly reduces the water balance deficit.

Rainwater Harvesting:

Rainwater harvesting (re-use) can provide significant flow reduction benefits. Depending on the size of the water storage facility and the rate of use, a significant percentage of the annual runoff volume can be re-used. Where it is not feasible to meet a development site's full flow control obligation, rainwater harvesting can be used to manage a portion of the flow and lessen the overall flow control requirement. It also helps in reducing pollution. Some of the greywater use may include for toilet flushing, commercial carwash bays and site landscape irrigation.

5.3 Stormwater Quality Control

Long-term average removal of 80% of Total Suspended Solids (TSS) on an annual loading basis, based on the site discharge at post-development imperviousness

5.3.1 TSS Removal

The subject site will require Best Management Practices (BMP) of stormwater runoff to achieve 80% TSS removal. Storm runoff from the site consists of the landscape, roof, and pavement areas. Runoff from the roof areas is considered clean, while the landscape area runoff will attain an 80% TSS removal by natural filtration.

The overall baseline TSS removal efficiency is presented in the following Table 5.3.1

Table 5.3.1 *Baseline TSS Removal Rate and Average Runoff Coefficient*

Surface Area Component	Area	Percent Area	Baseline TSS Removal Rate	Weighted TSS Removal Rate
	(m ²)	(%)	(%)	
Roofs	4432	33.2	80%	26.6
Pavement	3548	26.6	0	0%
Landscape	2277	17.1	80%	13.7
Landscape area (non-developable area)	3078	23.1	80%	18.5
Totals	13335	100%		58.8%

The subject site will also require *best-practice* treatment of stormwater runoff to achieve 80% TSS removal.

Storm runoff from the site consists of the landscape, roof and pavement areas. Runoff from the roof areas is considered clean, while the landscape area runoff will attain an 80% TSS removal by natural filtration.

The baseline weight average TSS removal is 58.8%, which does not meet the targeted 80% long-term. Therefore, a Jellyfish system will be provided as a supplementary water quality treatment for the storm flow generated by the permanent drainage area (Pavement area)

A Jellyfish model JF6-4-1-27 model has been selected to treat an area of 0.4922ha at R=0.68, refer to detailed Jellyfish sizing report enclosed in Appendix C

5.4 Quantity Controls

5.4.1 Allowable Peak Flow

It is proposed to control the peak flows for each event (2-year, 5-year, 10 year, 25 year, 50 year and 100 years) to pre-developments levels in accordance with TRCA criteria for Humber River Storm Management Quantity Control Release Rates, therefore on site-controls are required as follows:

The site specifics indicate that the post-development runoff coefficient is R=0.50 in accordance with the development standards manual of Town of Caledon standards, refer to table 5.4 below for composite runoff coefficient, therefore on-site controls are required as follows:

$Q_{2yr Post}$ at Runoff coefficient of 0.50 to be controlled to $Q_{2yr Pre}$ at Runoff coefficient of 0.25
 $Q_{5yr Post}$ at Runoff coefficient of 0.50 to be controlled to $Q_{5yr Pre}$ at Runoff coefficient of 0.25
 $Q_{10yr Post}$ at Runoff coefficient of 0.50 to be controlled to $Q_{10yr Pre}$ at Runoff coefficient of 0.25
 $Q_{25yr Post}$ at Runoff coefficient of 0.50 to be controlled to $Q_{25yr Pre}$ at Runoff coefficient of 0.25
 $Q_{50yr Post}$ at Runoff coefficient of 0.50 to be controlled to $Q_{50yr Pre}$ at Runoff coefficient of 0.25
 $Q_{100yr Post}$ at Runoff coefficient of 0.50 to be controlled to $Q_{100yr Pre}$ at Runoff coefficient of 0.25

The allowable release rate for each storm event is calculated as follows:

$Q_{2yr} = 9.506 - 0.719 * \ln(A) = 9.299 \text{ L/s/ha}$
 $Q_{5yr} = 14.652 - 1.136 * \ln(A) = 14.325 \text{ L/s/ha}$
 $Q_{10yr} = 17.957 - 1.373 * \ln(A) = 17.562 \text{ L/s/ha}$
 $Q_{25yr} = 22.639 - 1.71 * \ln(A) = 22.147 \text{ L/s/ha}$
 $Q_{50yr} = 26.566 - 2.082 * \ln(A) = 25.967 \text{ L/s/ha}$
 $Q_{100yr} = 29.912 - 2.316 * \ln(A) = 29.245 \text{ L/s/ha}$

Q unit flow (L/s/ha- litres per second per hectare)

A = Area in hectares (ha) = 1.3335Ha

$Q_{2yr-allow} = 12.400 \text{ L/s}$
 $Q_{5yr-allow} = 19.102 \text{ L/s}$
 $Q_{10yr-allow} = 23.419 \text{ L/s}$
 $Q_{25yr-allow} = 29.533 \text{ L/s}$
 $Q_{50yr-allow} = 34.627 \text{ L/s}$
 $Q_{100yr-allow} = 38.999 \text{ L/s}$

Q unit flow (L/s/ha- litres per second per hectare)

Non developable Area = 0.3078 Ha, Uncontrolled Area = 0.903 Ha

Total uncontrolled area = 0.3981 Ha

$Q_{2\text{yr-allow}} = 3.702 \text{ L/s}$

$Q_{5\text{yr-allow}} = 5.703 \text{ L/s}$

$Q_{10\text{yr-allow}} = 6.991 \text{ L/s}$

$Q_{25\text{yr-allow}} = 8.817 \text{ L/s}$

$Q_{50\text{yr-allow}} = 10.337 \text{ L/s}$

$Q_{100\text{yr-allow}} = 11.642 \text{ L/s}$

Therefore, the net allowable release rated for the controlled areas of the site is calculate as follows:

$Q_{2\text{yr-allow}} = 12.400 \text{ L/s} - 4.465 \text{ L/s} = 8.698 \text{ L/s}$

$Q_{5\text{yr-allow}} = 19.102 \text{ L/s} - 6.877 \text{ L/s} = 13.399 \text{ L/s}$

$Q_{10\text{yr-allow}} = 23.419 \text{ L/s} - 8.431 \text{ L/s} = 16.428 \text{ L/s}$

$Q_{25\text{yr-allow}} = 29.533 \text{ L/s} - 10.633 \text{ L/s} = 20.716 \text{ L/s}$

$Q_{50\text{yr-allow}} = 34.627 \text{ L/s} - 12.465 \text{ L/s} = 24.290 \text{ L/s}$

$Q_{100\text{yr-allow}} = 38.999 \text{ L/s} - 14.039 \text{ L/s} = 27.357 \text{ L/s}$

Refer to figure 4 in Appendix B for Surface Composition Plan

All flows from the ground level of the subject site will be captured using area drains sized for the 100-year storm event, which will be directed into the Jellyfish Filter and stormwater management tank.

5.4.2 Post-development Discharge

To meet the stormwater quantity objectives, the subject site is proposed to provide on-site water quantity control up to the maximum allowable release rate. The required storage volume has been calculated using Modified Rational Method included as Table 5.4.2-F in Appendix C.

From Table 5.4.2-F including in Appendix C, the required total onsite storage is **181.26m³**, will be provided utilizing a storage tank.

A storm trap tank, or approval equal, is sized as follows:

Required Onsite storage volume = 181.26 m³

Tank Volume = Ax h

Tank Volume = 68m² x 3.1(h)x0.9

Tank Volume = 189.7 m³

Due to the depth of the cistern and the elevation of point of discharge of the proposed storm system the cistern outflow must be pumped, and the discharge will be set at a maximum rate for each storm event with a peak flow of **27.357 L/s** for the 100 year storm, with a high-level overflow for emergency spillover. Refer to tables 5.4.2-A to table 5.4.2-F for onsite storage calculation and release rates.

As the underground storage tanks involve coordination with architectural, structural and mechanical disciplines, the detailed design of the underground storage tanks are to be undertaken by the project architect and building-team at building design stage.

▪ In summary, the total post-development discharges are controlled to allowable release levels for all storms up to the 100-year events; therefore, the existing storm sewers can accommodate the site without imposing any detrimental effects downstream.

6 Erosion and Sediment Control

Erosion and sediment control should be implemented for all construction activities within the subject site, including topsoil stripping, parking lot construction, foundation excavation and stockpiling of materials. The basic principles considered to minimize erosion and sedimentation and resultant negative environmental impacts include:

- Minimize local disturbance activities (e.g. limit area-wide grading);
- Expose the smallest possible land area to erosion for the shortest possible time;
- Implement erosion and sediment control measures before the outset of construction activities; and,
- Carry out regular inspections of erosion and sediment control measures and repair or maintain as necessary.

The proposed grading, servicing and building construction should be carried out in such a manner that a minimum amount of erosion occurs and such that sedimentation facilities control any erosion that does occur. Erosion and sediment control measures should include but not be limited to the following:

- Erection of silt fences around all site perimeters.
- Provide sediment traps (e.g. rock check dams, straw bales, scour basins) along interceptor swales and points of swale discharge.
- Inlet controls at catchbasins, comprising filter cloth overlain with rip-rap;
- Implement a daily street sweeping and cleaning program for any mud tracking onto Albion Vaughan Road.
- Provide gravel “mud mats” at construction vehicle access points to minimize off-site tracking of sediments; and,
- Confine refueling/servicing equipment to areas well away from inlets to the minor system or major system elements.
- All waste and unused building materials (including garbage, cleaning wastes, wastewater, toxic materials, or hazardous materials) shall be properly disposed of and not allowed to be mixed with and carried off by runoff from the site into a receiving watercourse or storm sewer.

Erosion and sediment control measures outlined above should be implemented in consultation with the Construction Manager prior to any stage of construction.

Removal of the erosion and sediment controls should be done once construction is completed and sediment run-off from the construction activities has stabilized.

7 CONCLUSIONS AND SUMMARY RECOMMENDATIONS

This functional servicing and stormwater management report demonstrates that the proposed residential development has been accommodated by the existing local infrastructure. More specifically:

- **Water Service** will be provided by an existing 300 mm diameter municipal watermain located on Albion Vaughan Road. A proposed 150mm fire servicing with 100mm domestic branch will be used to service the subject site. A proposed private fire hydrant will be provided as per Fire Code requirements.
- **Sanitary Service** is accommodated by the existing 200 mm diameter sanitary sewer running on Albion Vaughan Road. A 200mm diameter service lateral is proposed to service the subject development.

Stormwater Quantity Controls will be provided for each storm event using an underground storage tank located on P1. The outlet will directly discharge into Robinson Creek.

- **Stormwater Quality Controls** A treatment train of LID devices (roof green, rainwater harvesting,) will provide on-site stormwater quality controls. Supplementary quality control and TSS removals will be provided by an Jellyfish Filter.
- **Water Balance** will be provided by storage roof green.
- **Quality control** for TSS removal meeting will be provide with 1 Jellyfish filter JF-6-4-1-27. The filter will provide pre-treatment ahead discharge on the existing channel.
- **Erosion and Sediment Controls** will need to be implemented during development until the site has been stabilized with groundcover.

Respectfully Submitted,
MASONGSONG ASSOCIATES ENGINEERING LIMITED



Tony Masongsong,
Principal

A handwritten signature in black ink, appearing to read "Isabel Strauch".

Isabel Strauch,
Municipal Designer

Appendix A

Topographical Survey Site Plan

SURVEYOR'S REAL PROPERTY REPORT
 PART 1, PLAN OF
 PART OF LOT 1
 CONCESSION 7
 (GEOGRAPHIC TOWNSHIP OF ALBION)
 TOWN OF CALEDON
 REGIONAL MUNICIPALITY OF PEEL

SCALE 1: 300



David B. Searles Surveying Ltd.
 ONTARIO LAND SURVEYORS

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

BEARING NOTE

BEARINGS ARE DERIVED FROM GPS OBSERVATIONS USING THE SMARTNET NETWORK, AND ARE REFERRED TO UTM ZONE 17, CENTRAL MERIDIAN 81°00' WEST LONGITUDE, MAG 83 (OSRS) (2010).
 BEARINGS ON INSTRUMENT R01179599 (0), PLAN 43R-3146 (P1), PLAN 43R-33446 (P2), PLAN 43R-33446 (P3) AND PLAN OF SURVEY BY JEMAP HOLDINGS LIMITED, DATED JANUARY 22, 2007 (REF NO: 2006-026)(P4) HAVE BEEN ROTATED 00°52'37" COUNTERCLOCKWISE TO MAKE COMPARISONS.
 BEARINGS ON PLAN 43R-33446 (P2) HAVE BEEN ROTATED 1°01'25" COUNTERCLOCKWISE TO MAKE COMPARISONS.

DISTANCE NOTE

DISTANCES SHOWN HEREON ARE GROUND DISTANCES AND CAN BE CONVERTED TO GRID DISTANCES BY MULTIPLYING BY A COMBINED SCALE FACTOR OF 0.9997046.

LEGEND

- DENOTES MONUMENT FOUND
- DENOTES MONUMENT SET
- IB DENOTES IRON BAR
- SB DENOTES STANDARD IRON BAR
- DU DENOTES ORIGIN UNKNOWN
- B65 DENOTES BOLLAN MOURMOUTH BRASSON, O.L.S.
- MTO DENOTES MINISTRY OF TRANSPORTATION
- JEMAP DENOTES JEMAP HOLDINGS LIMITED
- M DENOTES MEASURED
- P DENOTES TOPOGRAPHIC SURVEY BY J.D. BARNES LIMITED, DATED APRIL 3, 2003.
- P1 DENOTES PLAN 43R-3146
- P2 DENOTES PLAN 43R-33446
- P3 DENOTES PLAN 43R-33446
- P4 DENOTES PLAN OF SURVEY BY JEMAP HOLDINGS LIMITED, DATED JANUARY 22, 2007 (REF # 2006-026)
- D DENOTES DITCH
- ANC DENOTES ANCHOR
- BB DENOTES BELL BOX
- BC DENOTES BACK OF CURB
- BF DENOTES BOARD FENCE
- CB DENOTES CATCH BASIN
- CCUT DENOTES CURB CUT
- CLF DENOTES CHAIN LINK FENCE
- CP(H) DENOTES CONCRETE POLE (HYDRO)
- CP(H)LS DENOTES CONCRETE POLE (HYDRO) WITH LIGHT STANDARD
- CPF DENOTES CULVERT (PLASTIC PIPE)
- EP DENOTES EDGE OF PAVEMENT
- FH DENOTES FIRE HYDRANT
- GQR DENOTES QUADRANT
- GS DENOTES GARAGE SILL
- HM DENOTES HYDRO METER
- INV DENOTES INVERT
- IPS DENOTES INTERLOCKING PAVING STONES
- MBOX DENOTES MAILBOX
- MHC(SAN) DENOTES MAINTENANCE HOLE COVER (SANITARY)
- PWF DENOTES POST AND WIRE FENCE
- SP DENOTES SIGN POST
- WP(H) DENOTES WOODEN POLE (HYDRO)
- WFW DENOTES WOODEN RETAINING WALL
- WV DENOTES WATER VALVE
- Ø DENOTES DIAMETER
- DENOTES BOTTOM OF SLOPE
- DENOTES UNDERGROUND BELL CABLE
- DENOTES DITCH LINE
- DENOTES OVERHEAD WIRES
- DENOTES SWALE
- DENOTES TOP OF SLOPE
- DENOTES CONIFEROUS TREE
- DENOTES DECIDUOUS TREE
- DENOTES TREE LINE

BENCH MARK NOTE

ELEVATIONS ARE REFERRED TO THE CITY OF BRAMPTON BENCHMARK No. 042010221, BEING A BRASS CAP IN CONCRETE APPROX. 21 m SOUTH OF CENTRELINE OF NASHVILLE ROAD AND 11 m EAST OF CENTRELINE OF REGIONAL ROAD 50, IN FRONT OF GAS STATION/COFFEE SHOP, HAVING AN ELEVATION OF 220.967 m.

CAUTION

LOCATIONS OF ALL UTILITIES ARE APPROXIMATE. ALL UTILITIES SHOULD BE CONTACTED PRIOR TO ANY DIGGING OR CONSTRUCTION.

NOTE

PROPERTY LIMITS ARE NOT FENCED UNLESS OTHERWISE NOTED ON THE FACE OF THE PLAN.

THE REPRODUCTION, ALTERATION OR USE OF THIS PLAN, IN WHOLE OR IN PART, WITHOUT THE EXPRESS PERMISSION OF DAVID B. SEARLES SURVEYING LTD. IS STRICTLY PROHIBITED.

SURVEYOR'S CERTIFICATE

- I CERTIFY THAT:
1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT, AND THE REGULATIONS MADE UNDER THEM.
2. THE SURVEY WAS COMPLETED ON THE 19th DAY OF MAY 2016.

JUNE 6, 2016
 DATE
 ALISTER SANKEY
 ONTARIO LAND SURVEYOR

ASSOCIATION OF ONTARIO LAND SURVEYORS PLAN SUBMISSION FORM 1968767 THIS PLAN IS NOT VALID UNLESS IT IS AN EMBOSSED ORIGINAL COPY ISSUED BY THE SURVEYOR in accordance with Regulation 1926, Section 29(3).	THIS PLAN WAS PREPARED FOR ALBION-VAUGHAN (12148) INC. DAVID B. SEARLES SURVEYING LTD. IS NOT RESPONSIBLE FOR USE BY OTHER PARTIES	PART 2 THIS PLAN MUST BE READ IN CONJUNCTION WITH SURVEY REPORT DATED JUNE 6th, 2016
	David B. Searles Surveying Ltd. 4255 Sherwood Drive Blvd, Suite 206, Mississauga, Ont. L4Z 1Y3 Tel: (905) 273-6840 Fax: (905) 896-4410 Email: info@bsearles.com	Co-surveyor B.J./KR Drafter IV/KR Editor DAS Plan Index No. H.17



REGIONAL ROAD NO. 50
 (ORIGINAL ROAD ALLOWANCE BETWEEN CONCESSIONS 6 AND 7)
 PIN 14351-1856(LT)

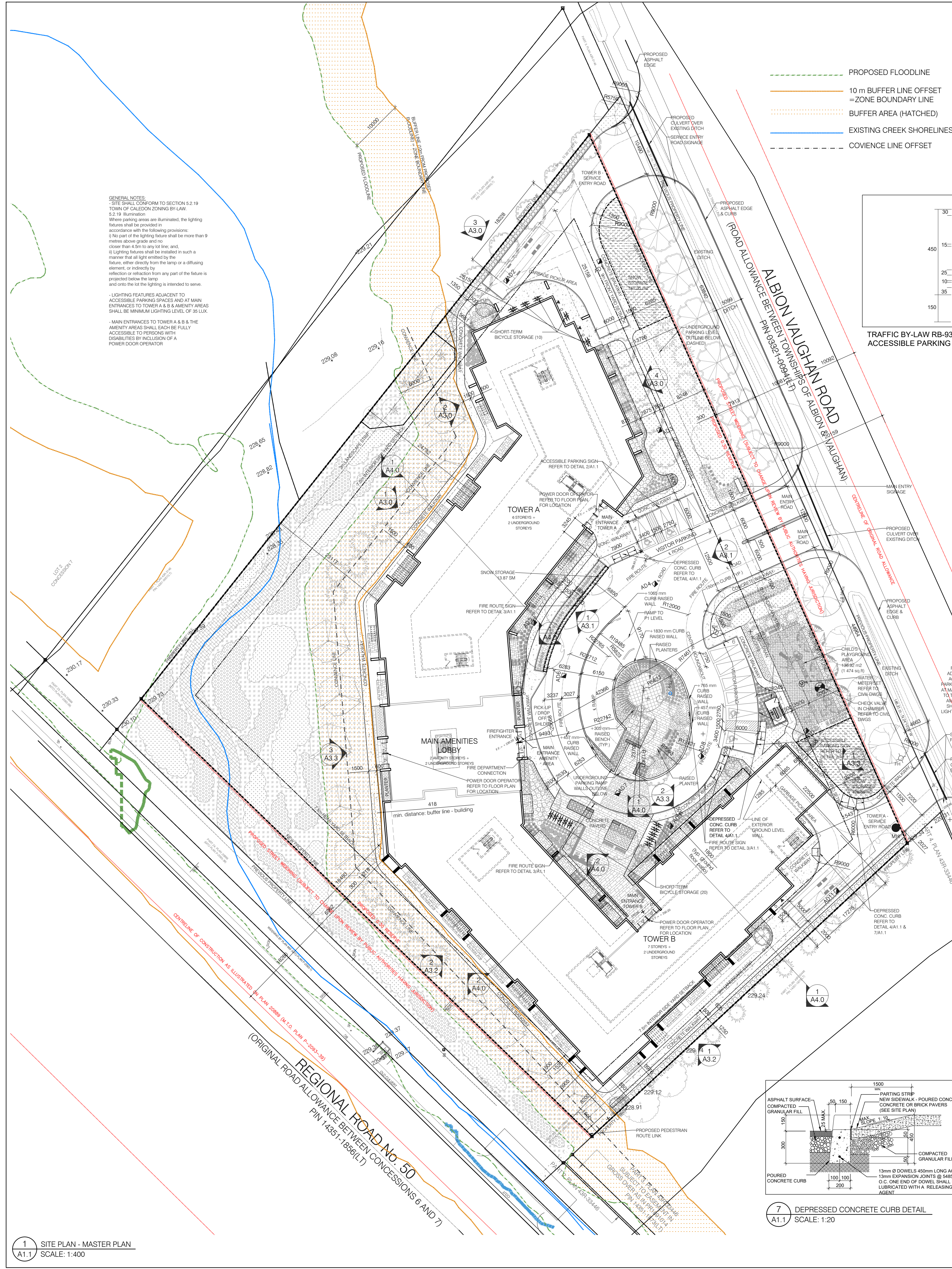
PART 2, PLAN 43R-33446 (P2)
 PART 3, PLAN 43R-33446 (P3)
 SUBJECT TO ASSUMPT
 PROVISIONS IN PREVIOUS
 PLANS AND INSTRUMENTS

PART 1, PLAN 43R-33446
 PIN 14351-1873(LT)

PART 2, PLAN 43R-3146 (P2)
 PIN 14351-0060(LT)

PART 1, PLAN 43R-3146
 PIN 14351-0057(LT)

PART 2, PLAN 43R-3146
 PIN 14351-0060(LT)

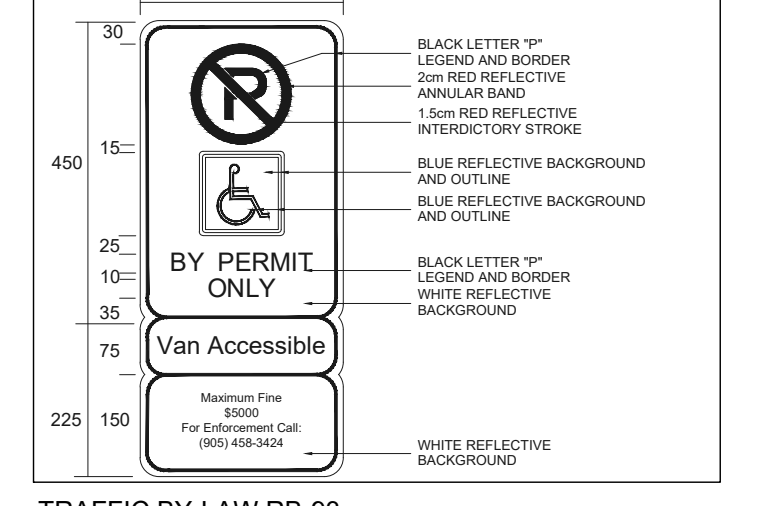
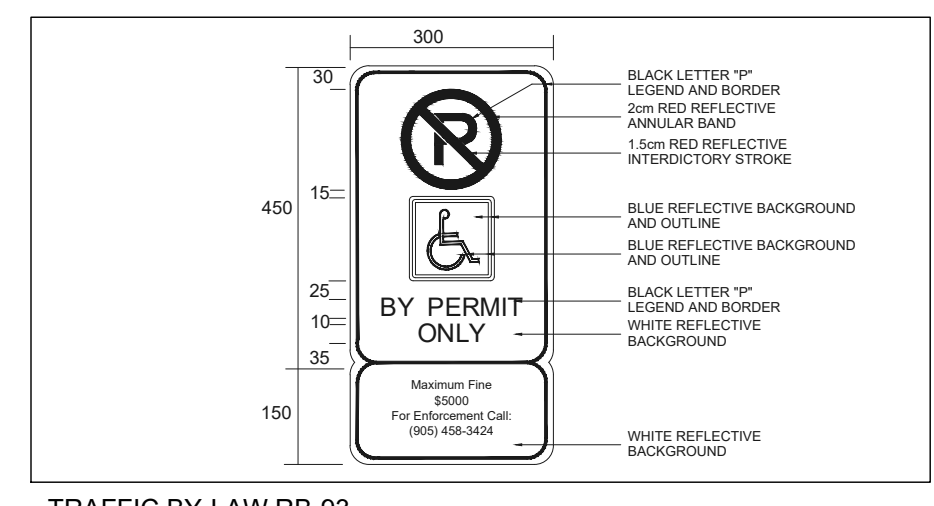
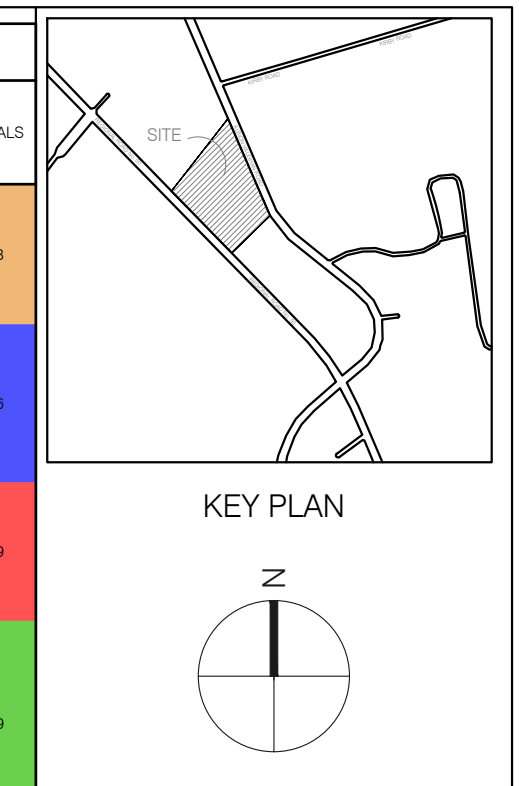


SITE STATISTICS:

GROSS SITE AREA (BEFORE ROAD WIDENING)	15,375.96 m ² (165,505 sq/ft) 1.54 ha
HWY 50 ROAD WIDENING ALBION/VAUGHAN ROAD WIDENING 0.3m RESERVES	811.65 m ² (8,737 sq/ft) 1,151.89 m ² (12,399 sq/ft) 78.59 m ² (846 sq/ft)
DEVELOPABLE SITE AREA (AFTER ROAD WIDENING & RESERVE DEDUCTIONS)	13,333.83 m ² (143,524 sq/ft) 1.33 ha
NATURAL HERITAGE/10m BUFFER AREA	3,077.84 m ² (33,130 sq/ft)
NET DEVELOPABLE AREA	10,255.99 m ² (110,394 sq/ft) 1.03 ha
NET DENSITY (UNIT/HECTARE)	264.24

TOWERS

STORIES	UNITS TYPE	TOWER A							TOWER B							TOTALS
		GROUND FLOOR	2ND FLOOR	3RD FLOOR	4TH FLOOR	5TH FLOOR	6TH FLOOR	7TH FLOOR	GROUND FLOOR	2ND FLOOR	3RD FLOOR	4TH FLOOR	5TH FLOOR	6TH FLOOR	7TH FLOOR	
1 BEDROOM	TYPE 1-A	6	7	6	6	6	6	5	6	6	6	6	6	6	6	76
1 BEDROOM + DEN	TYPE 1-B	5	5	3	3	3	3	2	2	2	2	2	2	2	2	96
2 BEDROOM	TYPE 1-C	6	5	5	5	5	5	12	11	9	9	9	9	9	9	99
3 BEDROOM + LARGE BALCONY	TYPE 1-D	0	2	4	4	4	4	0	1	4	4	4	4	4	4	38
3 BEDROOM	TYPE 1-E	1	1	1	1	1	1	1	1	1	1	1	1	1	1	13
PARTIAL UNITS PER TOWER		18							20							22
TOTAL UNITS		114							265							151



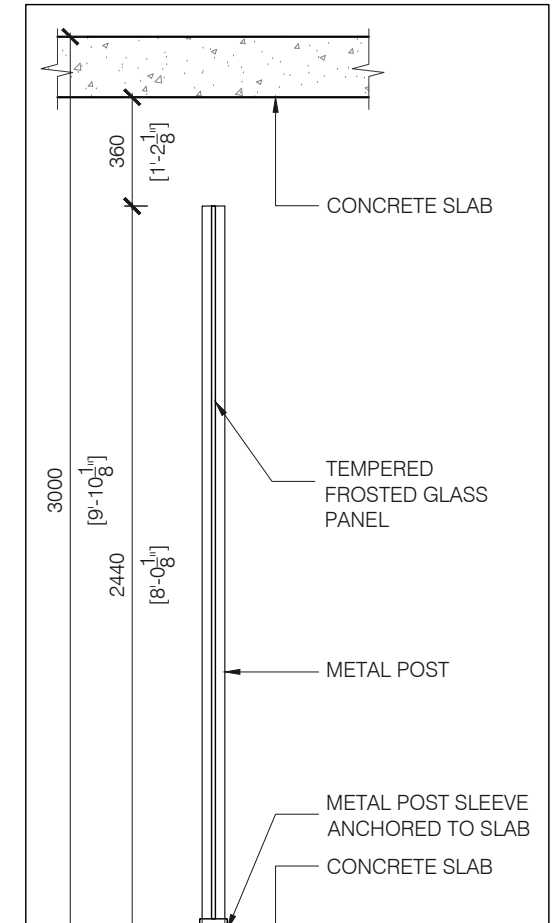
2 BY PERMIT ONLY ACCESSIBLE PARKING SIGN DETAILS SCALE: NTS



3 FIRE ROUTE SIGN DETAIL SCALE: NTS

* INCLUDES 40 BARRIER-FREE SUITES - (15% OF TOTAL SUITES OBC 3.8.2.1.(5))

FLOOR	TOWER A	TOWER B	TOTAL
1ST FLOOR	(2) - 1 BEDROOM + (1) 2 BEDROOM	(1) - 1 BEDROOM + (2) 2 BEDROOM	(6) - TOTAL
2ND FLOOR	(2) - 1 BEDROOM + (1) 2 BEDROOM	(1) - 1 BEDROOM + (2) 2 BEDROOM	(6) - TOTAL
3RD FLOOR	(2) - 1 BEDROOM + (1) 2 BEDROOM	(1) - 1 BEDROOM + (2) 2 BEDROOM	(6) - TOTAL
4TH FLOOR	(2) - 1 BEDROOM + (1) 2 BEDROOM	(1) - 1 BEDROOM + (2) 2 BEDROOM	(6) - TOTAL
5TH FLOOR	(2) - 1 BEDROOM + (1) 2 BEDROOM	(1) - 1 BEDROOM + (2) 2 BEDROOM	(6) - TOTAL
6TH FLOOR	(2) - 1 BEDROOM + (1) 2 BEDROOM	(1) - 1 BEDROOM + (2) 2 BEDROOM	(6) - TOTAL
7TH FLOOR	N/A	(1) - 1 BEDROOM + (3) 2 BEDROOM	(4) - TOTAL
TOTAL	(19) 1 BEDROOM + (21) 2 BEDROOM		(40) BARRIER-FREE SUITES

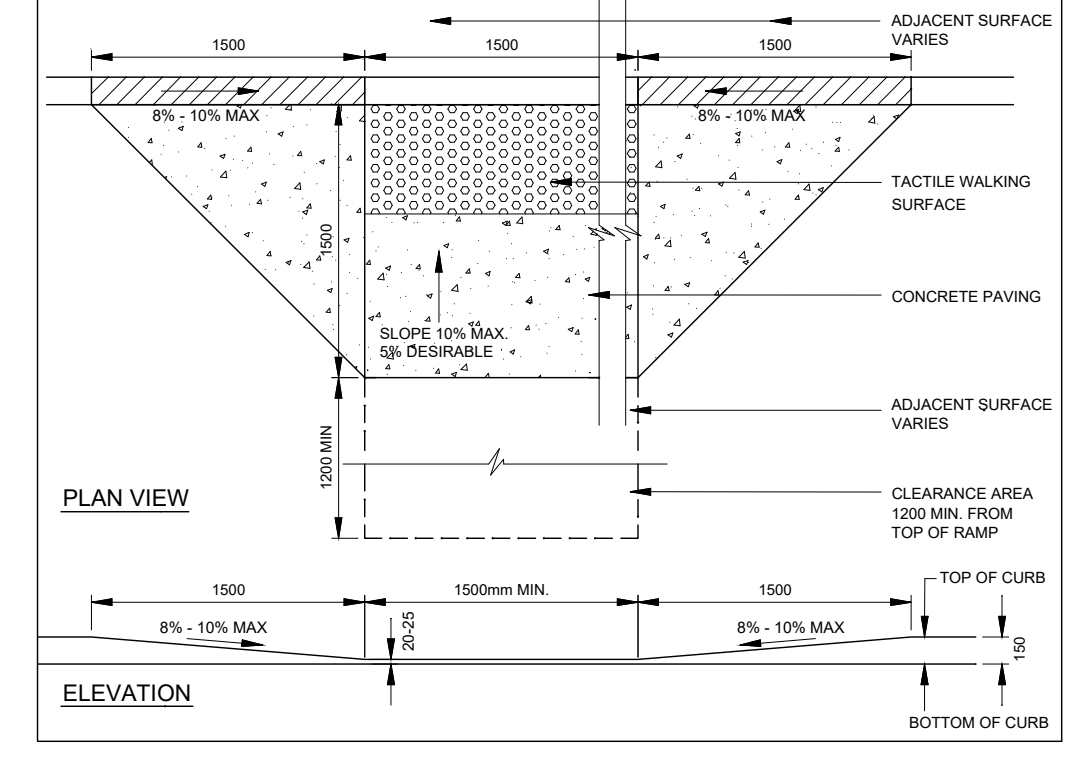


LUMINAIRE SCHEDULE

Symbol	Qty	Label	LLF	Description	Lum. Watts	Lum. Lumens
●	2	A	0.880	MRM-LED-07L-SIL-2-30-70CRI-IL	53	4167
●	6	B	0.880	MRM-LED-07L-SIL-3-30-70CRI-IL	53	5050
●	12	C	0.880	MRM-LED-07L-SIL-3-30-70CRI	53	6889
●	77	D	0.930	MRB-LED-25L-ACR-A-30	23	1633
●	12	E	0.930	MRB-LED-25L-ACR-S-30	30	2156

LEGEND

- PROPOSED NEW GRADE
- EXISTING GRADE
- PROPOSED CATCH BASINS
- MAN DOOR ENTRANCES
- DRIVE-IN DOOR LOCATIONS
- FENCING
- SIGNAGE
- GROUND LIGHTING REFER TO LUMINAIRE SCHEDULE
- WALL LIGHTING
- FIRE HYDRANT LOCATION
- SNOW STORAGE AREA
- CHILD'S PLAYGROUND AREA

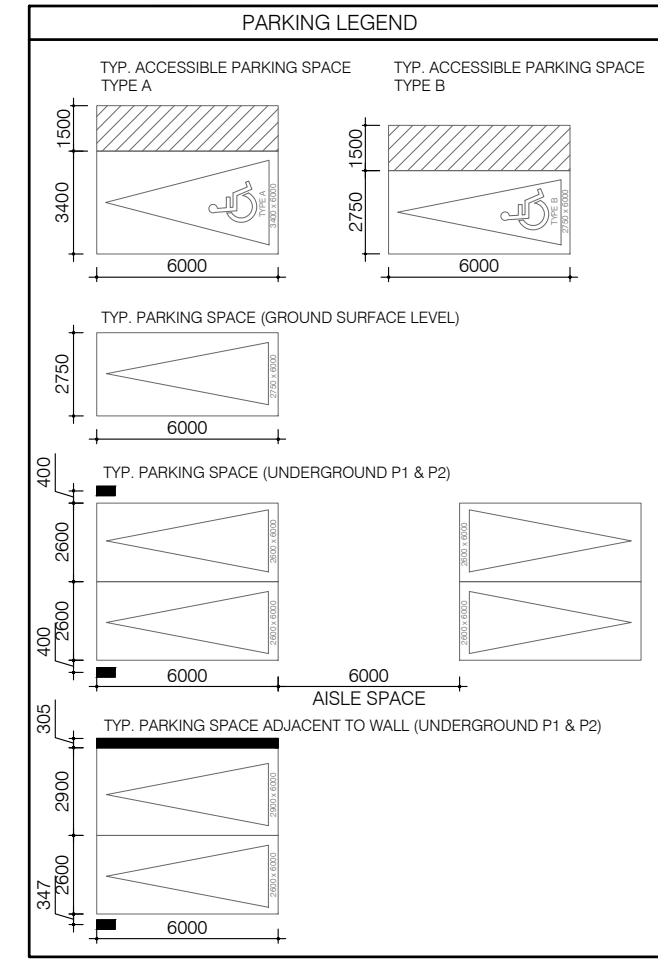
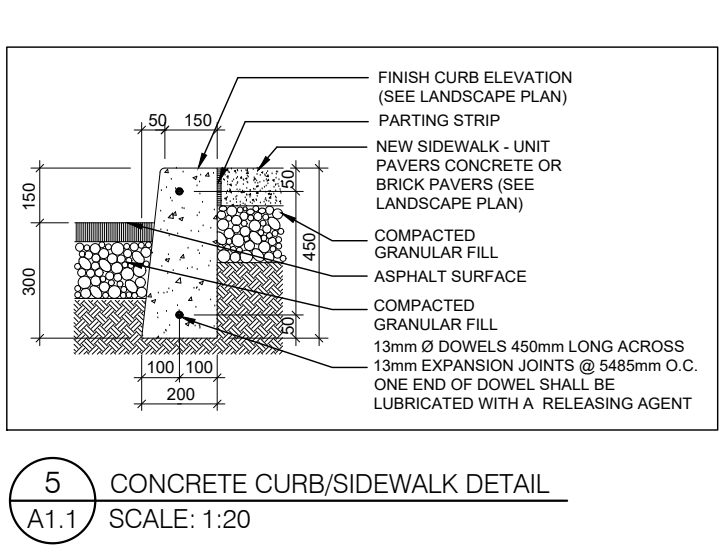
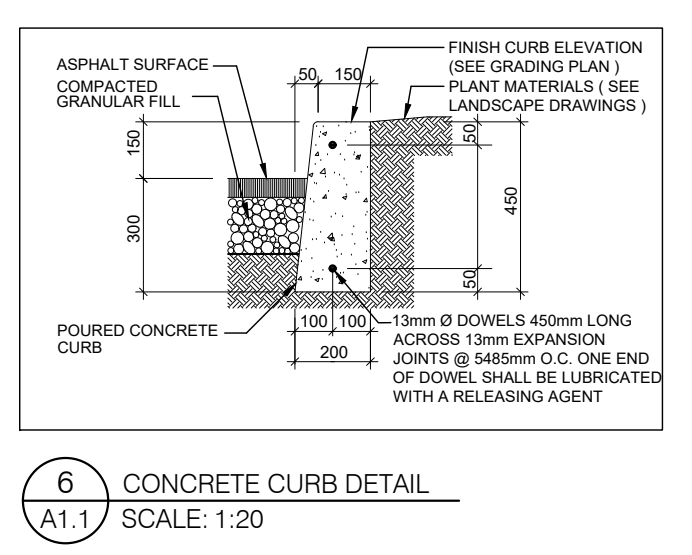
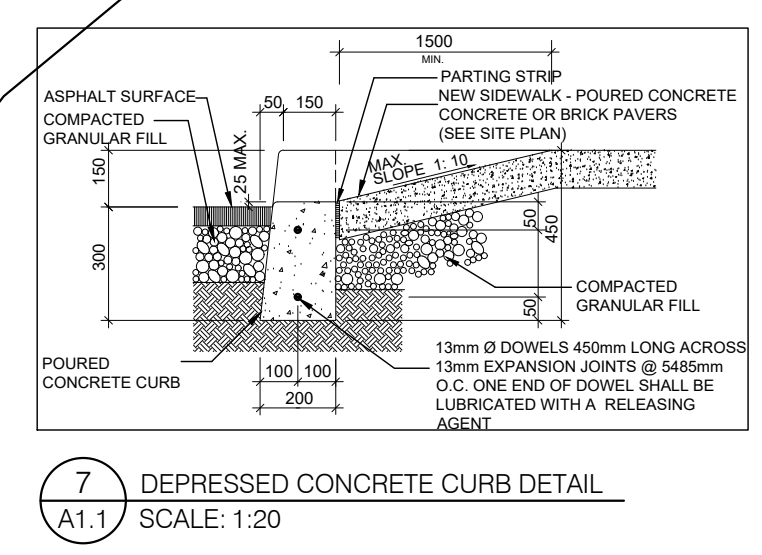


PARKING REQUIRED

CONDO UNITS	PARKING SPOTS PER DWELLING UNIT	398
VISITOR - CONDO UNITS DRIVING SPACE	0.50 PARKING SPACE PER UNIT FOR VISITOR PARKING IN DESIGNATED VISITOR PARKING AREA	66
ACCESSIBLE ADJACENT TO TOTAL # 3		11,240
GRAND TOTAL PARKING REQUIRED		463,750

PARKING PROVIDED

RESIDENT (ACCESSIBLE)	RESIDENT SPOTS	TOTAL
P1 LEVEL	8	213
P2 LEVEL	0	231
GROUND SURFACE LEVEL	4	6
GRAND TOTAL PARKING PROVIDED	12	450



BICYCLE STORAGE

GROUND SURFACE LEVEL	LONG TERM	SHORT TERM	TOTAL
P1 LEVEL	28	28	
P2 LEVEL	28	28	
GRAND TOTAL BICYCLE STORAGE SPOTS	56	56	142

1 SITE PLAN - MASTER PLAN SCALE: 1:400

REVISIONS

No.	DESCRIPTION	DATE
1	ISSUED FOR CONSTRUCTION	
2	ISSUED FOR BID	
3	ISSUED FOR BUILDING PERMIT	
4	ISSUED FOR SITE PLAN APPROVAL	
5	SUBMITTALS	

CONTRACTORS MUST CHECK AND VERIFY ALL DIMENSIONS AND CONDITIONS ON THE PROJECT AND MUST REPORT ANY DISCREPANCIES TO THE DESIGNER BEFORE PROCEEDING WITH CONSTRUCTION.
 THIS DRAWING MUST NOT BE USED FOR CONSTRUCTION PURPOSES UNTIL SEALED AND SIGNED BY THE DESIGNER.
 DO NOT SCALE DRAWINGS.

FCA

FAUSTO CORTESE ARCHITECTS
 3590 RUTHERFORD RD. UNIT 7
 VAUGHAN, ONTARIO, L4H 3T8
 416-806-7000
 FCORTESE@FCARCHITECTS.CA

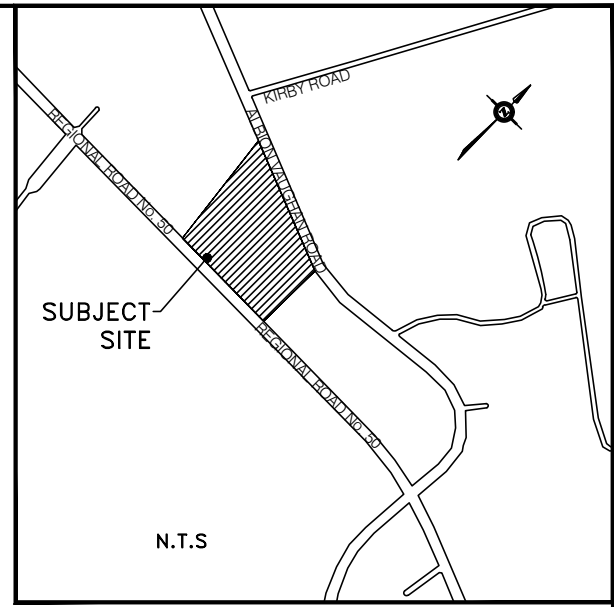
PROPOSED MIX-USE CONDO DEVELOPMENT
 12148 ALBION VAUGHAN RD.
 BOLTON
 TOWN OF CALEDON

SITE PLAN - MASTER PLAN

DATE: 08/12/2022 PROJECT NO: 2019-22
 SCALE: AS NOTED DRAWING NO: A1.1
 DRAWN BY: L.C. AS NOTED REVIEWED BY: F.C.

Appendix B

Figures



LEGEND

- EX. OVERLAND FLOW DIRECTION
- ID AREA
 A1 0.45 RUNOFF COEFFICIENT
 1.49 DRAINAGE AREA (HA)
- EX. DRAINAGE AREA BOUNDARY

REGIONAL ROAD No. 50
 (ORIGINAL ROAD ALLOWANCE BETWEEN CONCESSIONS 6 AND 7)
 PIN 14351-1856(LT)

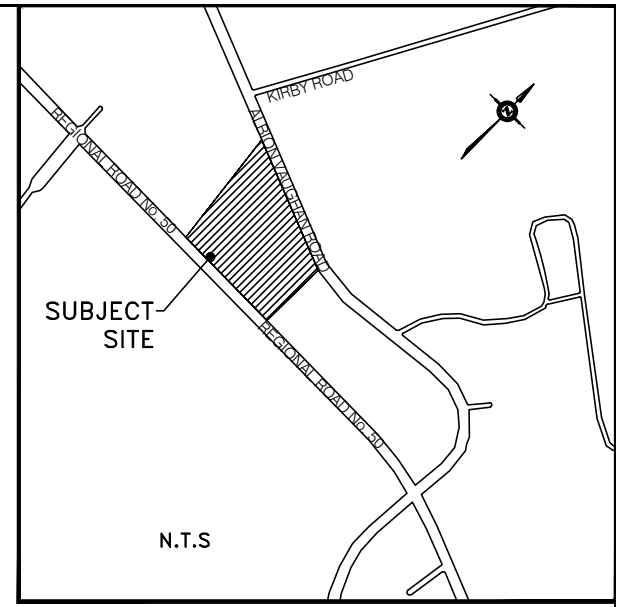


7800 KENNEDY ROAD
 SUITE 201
 MARKHAM, ONTARIO
 L3R 2C7
 T: (905) 944-0162
 www.maeng.ca









12148 ALBION VAUGHAN ROAD
 TOWN OF CALEDON

EXISTING DRAINAGE AREA

No.	DESCRIPTION	BY	DATE	DATE:	SCALE:	DESIGN BY:	DRAWN BY:	PROJECT No.	FIG. No.
1.				DEC. 2020	N.T.S		I.S	17-849	2
REVISIONS									



LEGEND

-  EX. OVERLAND FLOW DIRECTION
-  PROP. OVERLAND FLOW DIRECTION
-  SUBJECT SITE ONSITE CONTROL AREA
-  UNCONTROLLED AREA
-  NON-DEVELOPABLE AREA
-  ID AREA
-  RUNOFF COEFFICIENT
-  DRAINAGE AREA (HA)



7800 KENNEDY ROAD
SUITE 201
MARKHAM, ONTARIO
L3R 2C7
T: (905) 944-0162
www.maeng.ca

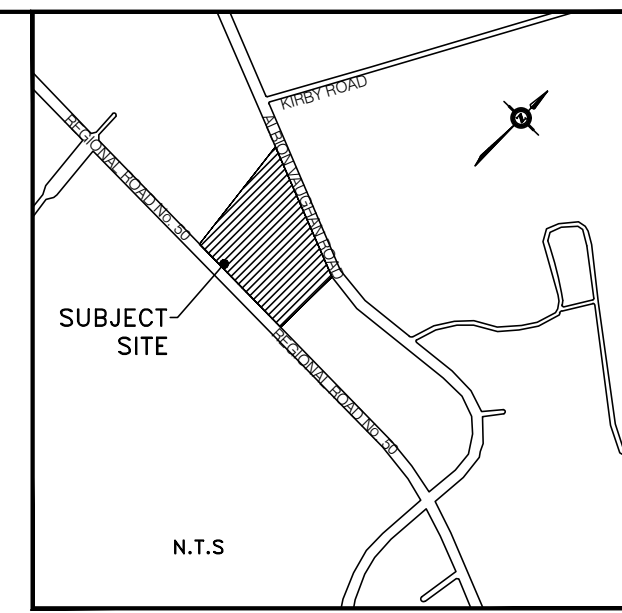
12148 ALBION VAUGHAN ROAD
TOWN OF CALEDON

POST-DEVELOPMENT MASTER STORM DRAINAGE PLAN


No.	DESCRIPTION	BY	DATE	DATE:	SCALE	DESIGN BY:	DRAWN BY:	PROJECT No.	FIG. No.
1.	REVISIONS			DEC. 2020	N.T.S		I.S	17-849	3



REGIONAL ROAD No. 50
(ORIGINAL ROAD ALLOWANCE BETWEEN CONCESSIONS 6 AND 7)
PIN 14351-1856(LT)



LEGEND

- LEGEND :
-  GREEN AREA
 -  HARD SURFACE
 -  NON-DEVELOPABLE AREA (GREEN)



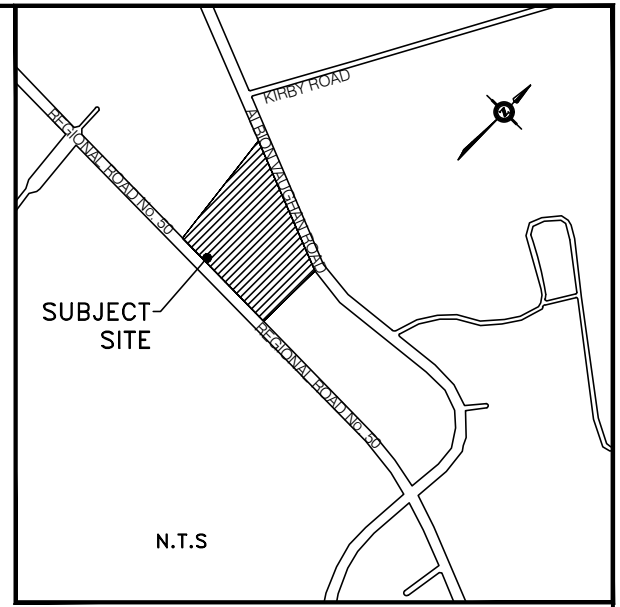
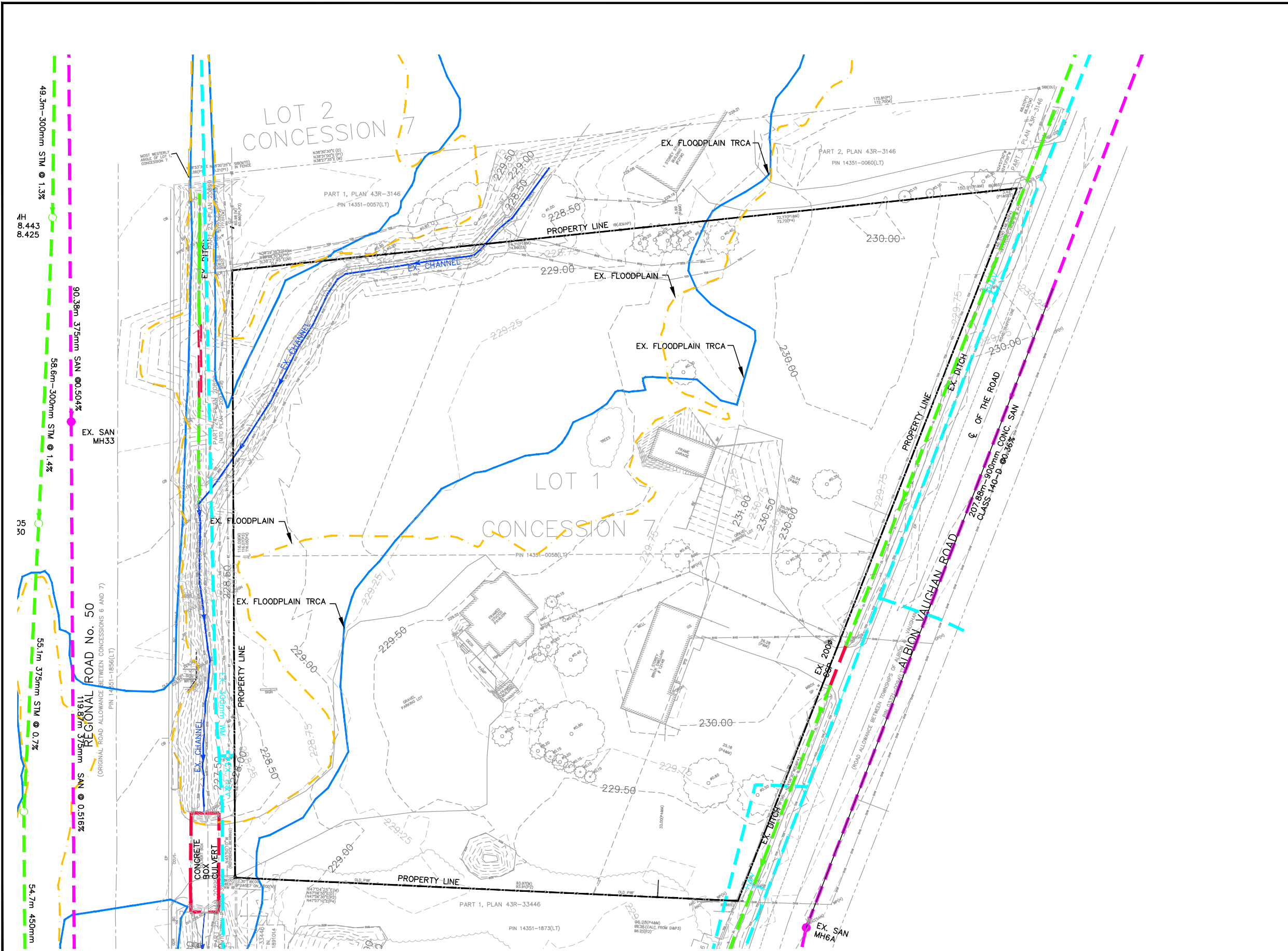
7800 KENNEDY ROAD
SUITE 201
MARKHAM, ONTARIO
L3R 2C7
T: (905) 944-0162
www.maeng.ca

12148 ALBION VAUGHAN ROAD
TOWN OF CALEDON

SURFACE COMPOSITION PLAN

No.	DESCRIPTION	BY	DATE
1.			
REVISIONS			

DATE:	SCALE:	DESIGN BY:	DRAWN BY:	PROJECT No.	FIG. No.
DEC. 2020	N.T.S		I.S	17-849	4



LEGEND

- EX. WATERMAIN
- EX. STORM SEWER
- EX. SANITARY SEWER
- EX. FLOODPLAIN
- EX. FLOODPLAIN TRCA
- PROPERTY LINE

49.3m - 300mm STM @ 1.3%

90.38m 375mm SAN @ 0.504%

58.6m - 300mm STM @ 1.4%

EX. SAN MH33

35 30

55.1m 375mm STM @ 0.7%

REGIONAL ROAD NO. 50
(ORIGINAL ROAD ALLOWANCE BETWEEN CONCESSIONS 6 AND 7)
PIN 14351-1856(LT)

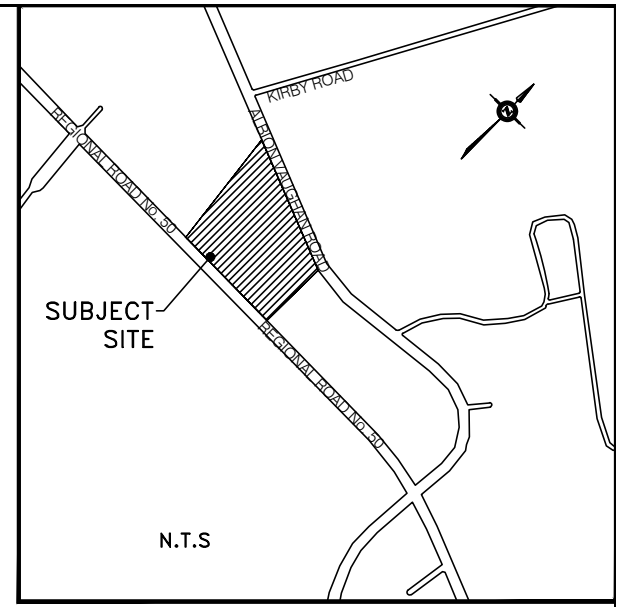
119.8m 375mm SAN @ 0.516%

54.7m 450mm

MASONGSONG ASSOCIATES
 7800 KENNEDY ROAD
 SUITE 201
 MARKHAM, ONTARIO
 L3R 2C7
 T: (905) 944-0162
 www.maeng.ca

No.	DESCRIPTION	BY	DATE
1.			
REVISIONS			

12148 ALBION VAUGHAN ROAD TOWN OF CALEDON					
EXISTING MUNICIPAL INFRASTRUCTURE					
DATE:	SCALE:	DESIGN BY:	DRAWN BY:	PROJECT No.	FIG. No.
DEC. 2020	N.T.S		I.S	17-849	5



LEGEND

- EX. WATERMAIN
- EX. STORM SEWER
- EX. SANITARY SEWER
- EX. FLOODPLAIN
- EX. FLOODPLAIN TRCA
- PROP. FLOODPLAIN
- PROP. FLOODPLAIN 10m SETBACK

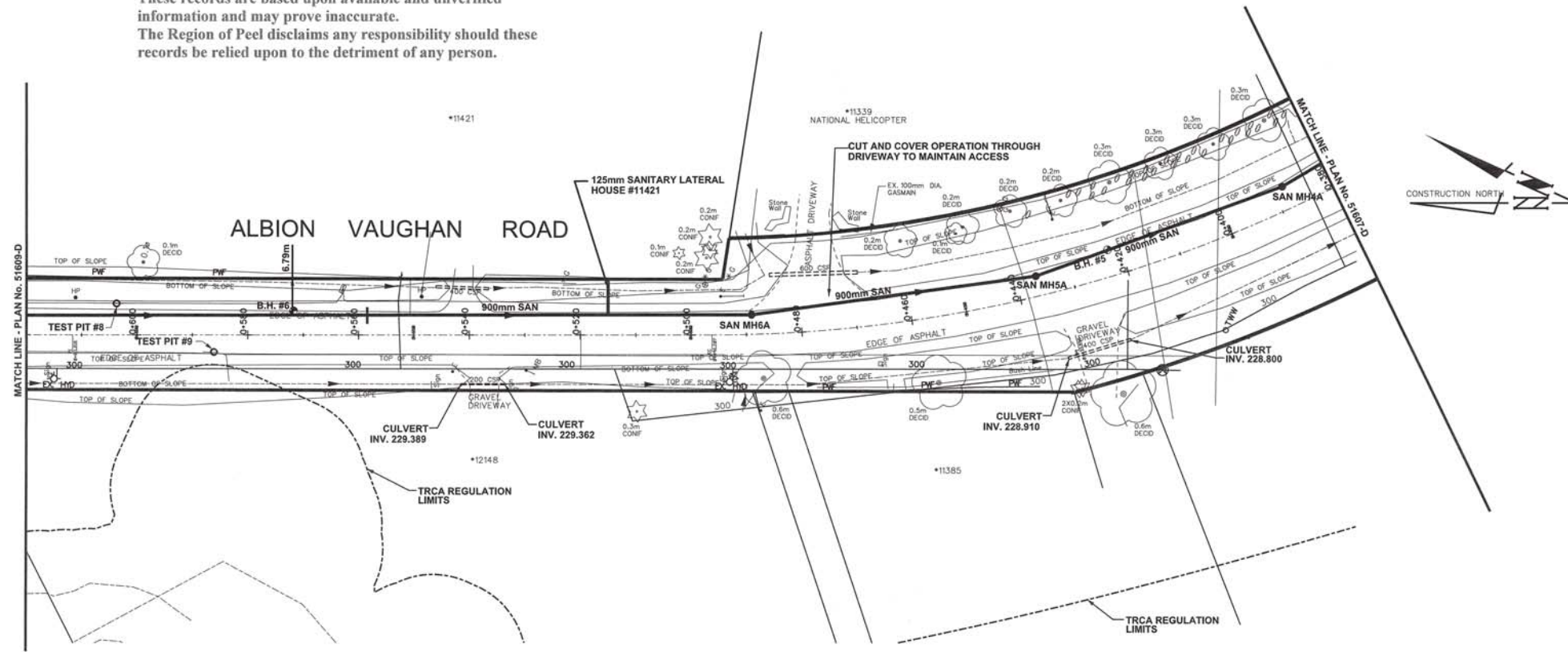
MASONGSONG ASSOCIATES
 7800 KENNEDY ROAD
 SUITE 201
 MARKHAM, ONTARIO
 L3R 2C7
 T: (905) 944-0162
 www.maeng.ca

No.	DESCRIPTION	BY	DATE
1.	REVISIONS		

12148 ALBION VAUGHAN ROAD TOWN OF CALEDON					
PROPOSED SERVICING PLAN					
DATE:	SCALE:	DESIGN BY:	DRAWN BY:	PROJECT No.	FIG. No.
NOV. 2020	N.T.S		I.S	17-849	6

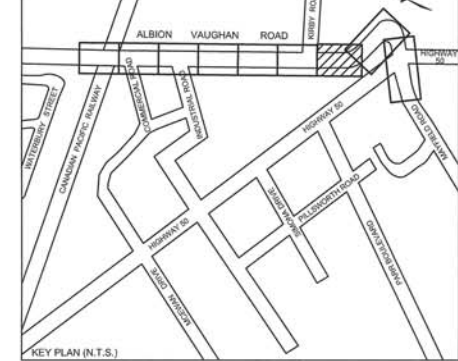
DISCLAIMER

These records are based upon available and unverified information and may prove inaccurate. The Region of Peel disclaims any responsibility should these records be relied upon to the detriment of any person.



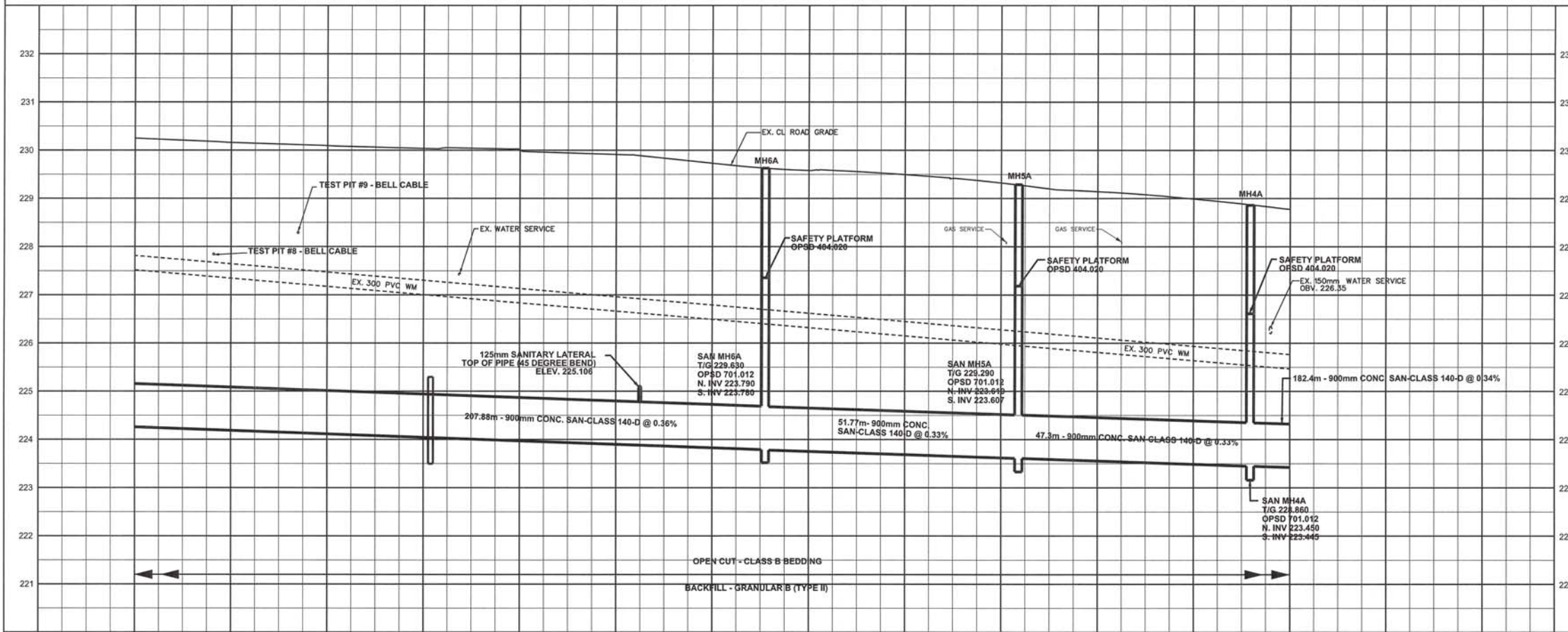
SERVICE DATA					
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL UIG CABLE		
WATERMANS			HYDRO UIG CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC			CTV		
CONT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS		
DATE	DETAILS	INIT.
AUGUST 2013	PRELIMINARY DESIGN SUBMISSION	K.A.
OCTOBER 2013	PRELIMINARY DESIGN - REVISED ALIGNMENT	S.M.
DECEMBER 2013	DETAILED DESIGN SUBMISSION	S.M.
MARCH 2014	90% SUBMISSION	S.M.
AUGUST 2014	ISSUED FOR CONSTRUCTION	J.C.
FEBRUARY 2015	AS RECORDED	T.C.



- LEGEND**
- OPSD 911.140
 - PROPOSED SANITARY SEWER
 - PROPOSED SANITARY MH
 - EXISTING SANITARY SEWER
 - EXISTING SANITARY MH
 - TRCA REGULATION LIMIT
 - 2.4m HIGH HOARDING COMPLETE WITH SILT FILTER CLOTH REFER TO PLAN No. 51616-D
 - HEAVY DUTY SILT FENCE PER OPSD 219.130
 - ⊗ BOREHOLE
 - *—* SNOW FENCE

Chisholm, Fleming and Associates
consulting engineers



General Notes

All Driveways Are ASPHALT Unless Otherwise Noted

All Existing Water And Sanitary Service Locations Are Approximate And Must Be Located Accurately In The Field

All Pipes Size In mm

200 Existing Water Service, Size In mm

B.M. No. 37 Elev. 227.150m

Description

Location: North face at the east corner of a red insul. brick house # 11970 located on the west side of Highway 50 approx. 0.30 km south of Mayfield Road

The Contractor Is Responsible For Locating And Protecting All Existing Utilities Prior To And During Construction. Location Of Existing Utilities Approximate Only. To Be Verified In Field By Contractor.

Confirm all the existing connection and maintenance holes/sewer inverts prior to the start of any construction and notify the contract administrator immediately of any discrepancies with the contract drawings.

Designed by: _____

Checked by: _____

Approved by: _____

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL

CITY OF VAUGHAN

TOWN OF CALEDON WORKS DEPT.

BELL CANADA

ENBRIDGE INCORPORATED-GAS DISTRIBUTION

HYDRO ONE NETWORKS

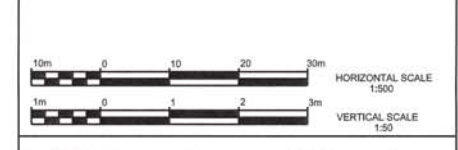
CABLE TELEVISION/FIBROPTIC PROVIDERS:

BELL CANADA

HYDRO ONE TELECOM

ROGERS CABLE

ALLSTREAM

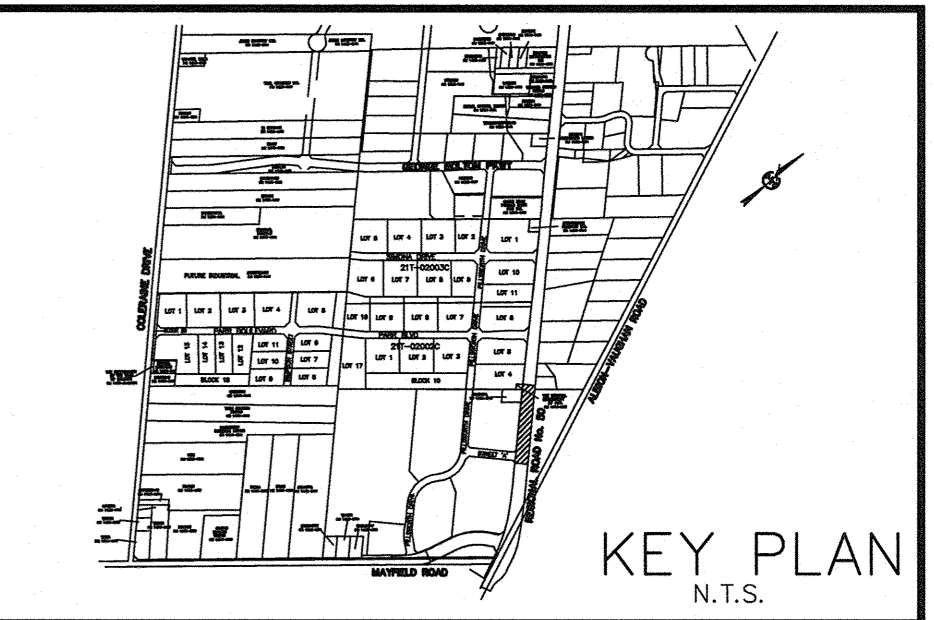
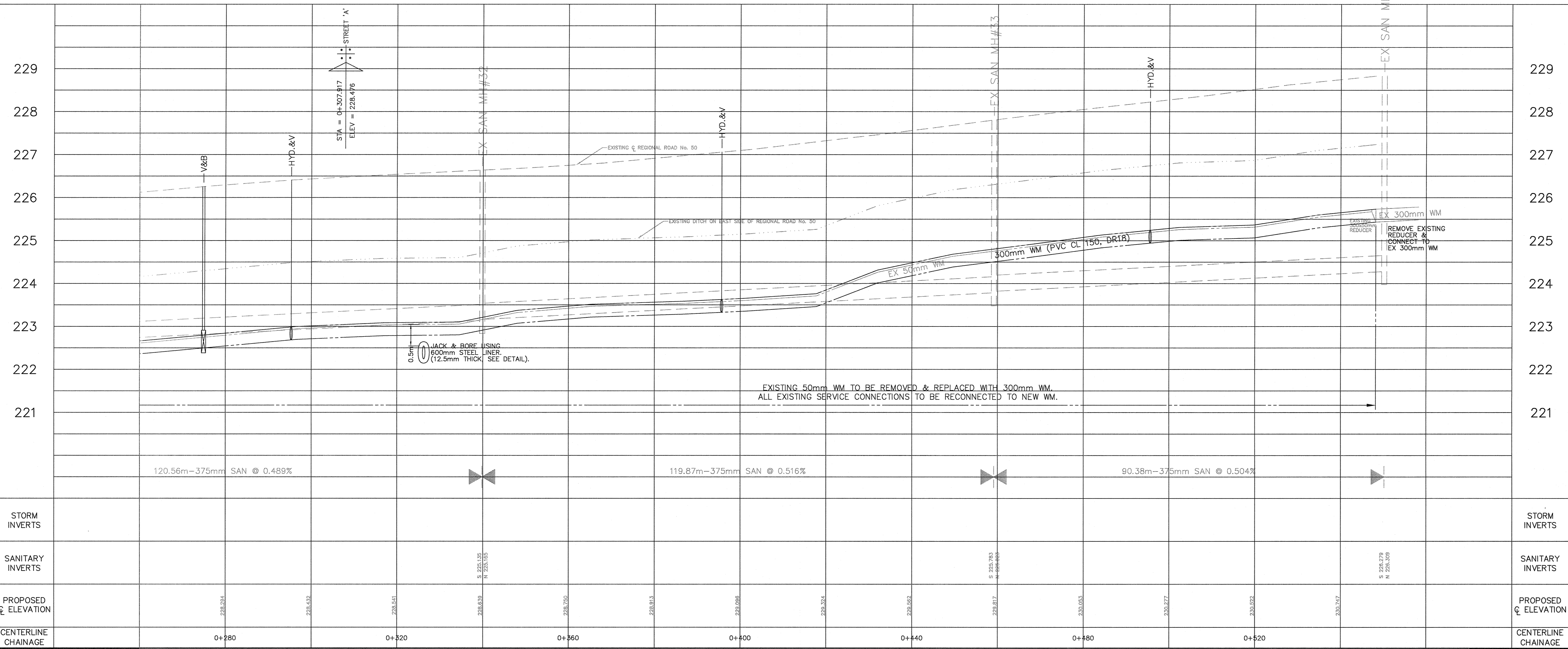
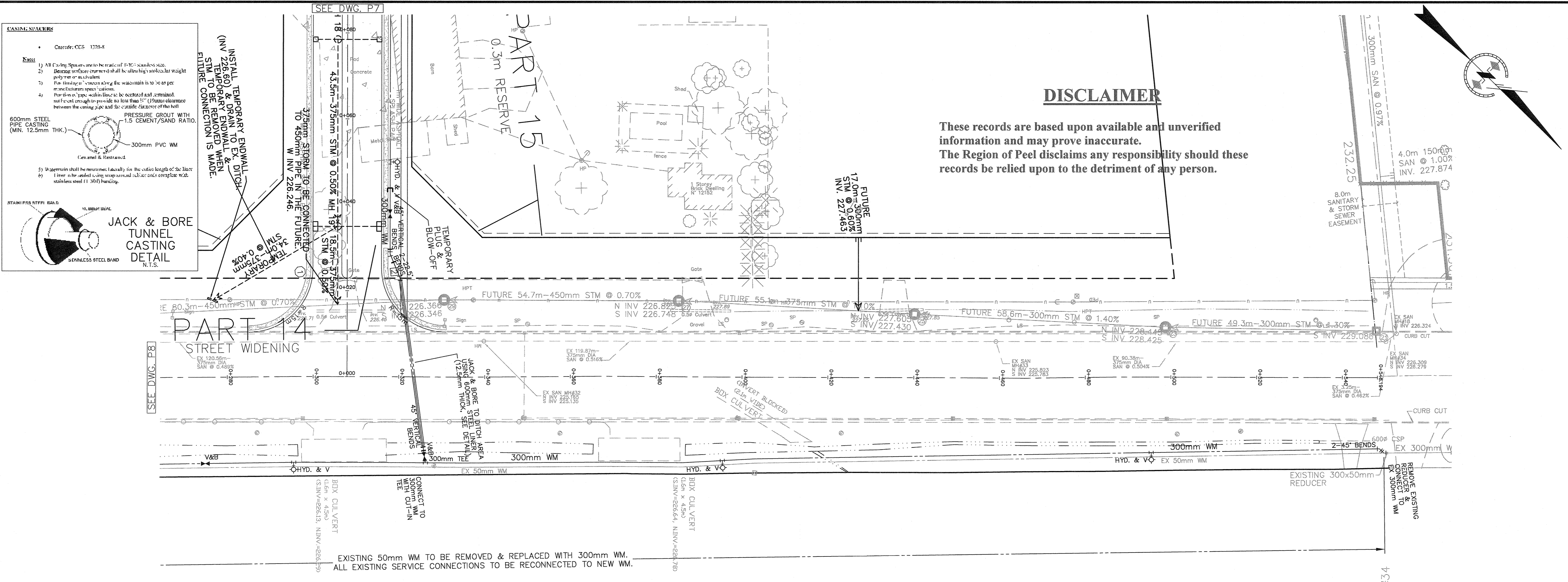


Region of Peel
Working for you

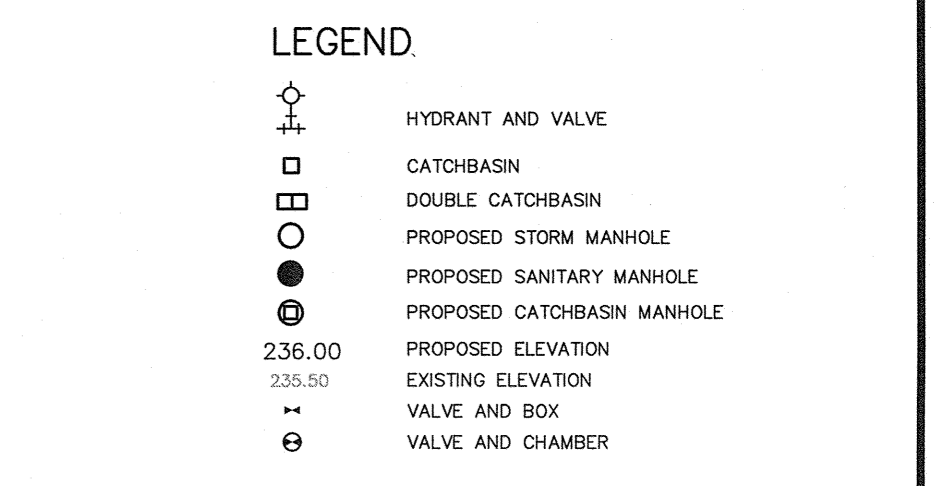
ALBION-VAUGHAN ROAD
(FROM HIGHWAY 50 TO ALBION-VAUGHAN SPS)
PROP. 900mm DIA. TRUNK SANITARY SEWER

STA.	0+620	0+600	0+580	0+560	0+540	0+520	0+500	0+480	0+460	0+440	0+420	0+400	0+380	EX. ROAD ELEV.	ROAD CHAINAGE
	230.30	230.20	230.13	230.04	230.00	229.91	229.73	229.58	229.50	229.32	229.14	228.99	228.77		

STA. 0+380		TO STA. 0+620	
CAD Area	Area C-01	Project No.	12-2210
Checked by	S.M.	Drawn by	R.S./G.S.
Date	JULY 2013	Sheet	4 of 18
Plan No.	51608-D		



FOR GENERAL NOTES REFER TO DWG C3



TOWN OF CALEDON
APPROVED AS NOTED
 THIS APPROVAL CONSTITUTES A GENERAL REVIEW AND DOES NOT CERTIFY DIMENSIONAL ACCURACY.
 THIS APPROVAL IS SUBJECT TO THE FURTHER CERTIFICATION OF THE "AS CONSTRUCTED" WORKS BY A REGISTERED PROFESSIONAL ENGINEER OF THE PROVINCE OF ONTARIO.
 DATE: _____
 APPROVED BY: _____
 C.A. CAMPBELL, C.E.T.
 DIRECTOR OF PUBLIC WORKS & ENGINEERING

CONTRACTOR TO BE RESPONSIBLE FOR VERIFYING THE LOCATIONS OF ALL EXISTING UNDERGROUND AND ABOVE UTILITIES AND SERVICES. THE CONTRACTOR SHALL ADVISE THE ENGINEER OF ANY DISCREPANCIES PRIOR TO PROCEEDING WITH CONSTRUCTION. VARIOUS UTILITIES CONCERNED TO BE GIVEN REQUIRED ADVANCED NOTICE PRIOR TO ANY DIGGING, FOR STAKE OUT. A.M. CANDARAS ASSOCIATES INC. ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THE LOCATION OF EXISTING UTILITIES AS INDICATED ON THIS DRAWING.

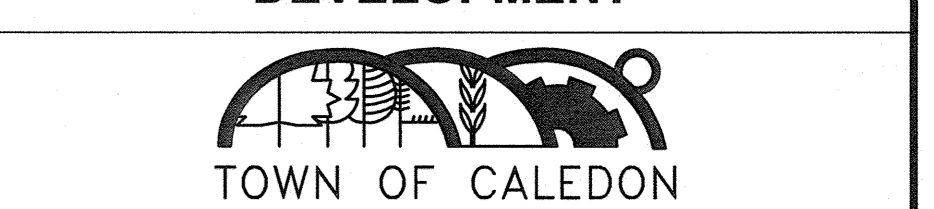
PLAN OF SUBDIVISION OF PART OF THE EAST HALF OF LOT 1, CONCESSION 6, TOWN OF CALEDON REGIONAL MUNICIPALITY OF PEEL

BENCH MARK
 REGION OF PEEL #37 ELEV. 227.187m
 ON THE NORTH FACE AT THE EAST CORNER OF A RED INSUL. BRICK HOUSE LOCATED ON THE SOUTH WEST CORNER OF SEVENTEENTH SIDEROAD (REGION ROAD #14) AND HIGHWAY #50

No.	Date	By	REVISIONS
7	08/28/06	M.F.S.	FINAL SUBMISSION, PHASE II FOR REGION
6	02/21/06	M.F.S.	4th SUBMISSION, PHASE II FOR TOWN
5	12/18/07	M.F.S.	3rd SUBMISSION, PHASE II FOR TOWN
4	07/18/07	M.F.S.	3rd SUBMISSION, PHASE II FOR REGION
3	06/28/07	M.F.S.	2nd SUBMISSION, PHASE II FOR TOWN
2	06/22/07	M.F.S.	2nd SUBMISSION, PHASE II FOR REGION
1	07/07/06	M.F.S.	1st SUBMISSION



21T-06001Ca (PHASE II)
GIFFELS ENTERPRISES
REGIONAL ROAD No. 50 & MAYFIELD ROAD DEVELOPMENT



REGIONAL ROAD No. 50
0+280.000 TO 0+548.194

SCALE: HORIZ 1:500 VERT 1:50	DATE: APRIL 2006	PROJ No. 0496
DRAWN: M.F.S.	CHK'D: A.M.C.	PLAN No. 56548-D
DESIGNED: M.F.S.	SHEET 9 OF 9	

FILENAME: C:\VAPRO\0496-02\PHASE II\0496.dwg
 PLOTTED BY: M.F.S.
 DATE: 04/14/2006 11:49am

Appendix C

Tables

Table 5.2.1

**PRELIMINARY Calculation of Roof Drain
Sizing
Multiple Residential Condo Development**

Notch Area m ²	Rise					
	51		102		152	
	Discharge LPM	Water Depth mm	Discharge LPM	Water Depth mm	Discharge LPM	Water Depth mm
232	66	73.5	82	91.5	97.5	109
465	77.5	86.5	93	104	111.5	124.5
697	84	94	100	112	120.5	134.5
929	86.5	96.5	104.5	117	127.5	142
	LPS		LPS		LPS	
232	1.10		1.37		1.63	
465	1.29		1.55		1.86	
697	1.40		1.67		2.01	
929	1.44		1.74		2.13	

Allowable Release Rate

Roof Area 0.4332 ha
 *Release Rate 42 L/s/ha

Allowable Release Rate	18.19	L/s
------------------------	--------------	-----

Roof Drain Sizing

Drain Type 465
 Depth of Ponding 0.1245 m (Standard Max. ponding depth
 Number of Drains 10 for roof storage)
 Number of Notches per Drain 1
 Flow Rating per Notch 1.86 L/m

Flow from Each Drain Type 465 1.86 L/s
Total Flow from Drain Type 465 18.19 L/s
Total Number of Drains 10

Table 5.4.2-A



On-Site Storage
Calculator

Project: Multiple Residential Condo
Development

TOWN OF CALEDON 2-Year

Project No.: 17-849

By: I.S

Date: 11-Dec-20

Location: **TOWN OF CALEDON**

$A = 0.492$ ha Area= Area total- Uncontrolled area-Roof Area
Composite C = 0.68
 $i_{-2y} \text{ (Allowable)} = 85.72$ mm/hr $i_2 = 1070(t_c + 7.85)^{-0.8759}$
 $Q_{\text{Allowable}} = 0.0087$ m³/s
 $Q_{\text{Actual}} = 0.0087$ m³/s Q2= including roof control rate of 15.8L/s

t_c (min)	I (mm/hr)	Q_2 (m ³ /s)	Q_{stored} (m ³ /s)	Peak Volume (m ³)
1	158.473	0.163	0.154	9.266
2	144.289	0.150	0.141	16.950
3	132.572	0.139	0.130	23.464
4	122.720	0.130	0.121	29.087
5	114.313	0.122	0.113	34.014
6	107.050	0.115	0.107	38.386
7	100.709	0.109	0.101	42.308
8	95.121	0.104	0.096	45.858
9	90.158	0.100	0.091	49.098
10	85.718	0.095	0.087	52.077
11	81.722	0.092	0.083	54.833
12	78.104	0.088	0.080	57.396
13	74.813	0.085	0.077	59.792
14	71.806	0.083	0.074	62.043
15	69.045	0.080	0.071	64.165
16	66.503	0.078	0.069	66.173
17	64.153	0.075	0.067	68.081
18	61.974	0.073	0.065	69.898
19	59.948	0.072	0.063	71.633
20	58.058	0.070	0.061	73.295
21	56.291	0.068	0.059	74.890
22	54.636	0.067	0.058	76.425
23	53.082	0.065	0.056	77.905
24	51.619	0.064	0.055	79.334
25	50.240	0.063	0.054	80.716
26	48.938	0.061	0.053	82.056
27	47.705	0.060	0.051	83.356
28	46.538	0.059	0.050	84.620
29	45.430	0.058	0.049	85.849
30	44.377	0.057	0.048	87.047
31	43.375	0.056	0.047	88.216
32	42.420	0.055	0.047	89.357
33	41.509	0.054	0.046	90.473
34	40.639	0.054	0.045	91.564
35	39.807	0.053	0.044	92.633
36	39.011	0.052	0.043	93.680 ***
37	38.248	0.051	0.043	94.708
38	37.516	0.051	0.042	95.717
39	36.814	0.050	0.041	96.708
40	36.139	0.049	0.041	97.682

Table 5.4.2-B



On-Site Storage
Calculator

Project: Multiple Residential Condo
Development

TOWN OF CALEDON 5-Year

Project No.: 17-849

By: I.S

Date: 11-Dec-20

Location: **TOWN OF CALEDON**

A = 0.492 ha Area= Area total- Uncontrolled area-Roof Area
 Composite C = 0.68
 i-5y (Allowable) = 109.68 mm/hr $i_2 = 1593(t_c + 11)^{-0.8789}$
 Q Allowable = 0.0134 m³/s
 Q Actual = 0.0134 m³/s Q5= including roof control rate of 15.8L/s

t _c (min)	I (mm/hr)	Q ₅ (m ³ /s)	Q _{stored} (m ³ /s)	Peak Volume (m ³)
1	179.359	0.183	0.169	10.149
2	167.175	0.171	0.158	18.939
3	156.633	0.161	0.148	26.644
4	147.418	0.153	0.139	33.470
5	139.288	0.145	0.132	39.570
6	132.061	0.139	0.125	45.065
7	125.590	0.133	0.119	50.049
8	119.762	0.127	0.114	54.598
9	114.483	0.122	0.109	58.772
10	109.677	0.118	0.104	62.622
11	105.284	0.114	0.100	66.188
12	101.250	0.110	0.097	69.504
13	97.532	0.106	0.093	72.601
14	94.095	0.103	0.090	75.501
15	90.907	0.100	0.087	78.226
16	87.941	0.098	0.084	80.794
17	85.174	0.095	0.082	83.220
18	82.587	0.093	0.079	85.518
19	80.163	0.090	0.077	87.700
20	77.886	0.088	0.075	89.775
21	75.742	0.086	0.073	91.753
22	73.721	0.084	0.071	93.642
23	71.812	0.083	0.069	95.449
24	70.006	0.081	0.067	97.180
25	68.294	0.079	0.066	98.842
26	66.669	0.078	0.064	100.439
27	65.124	0.076	0.063	101.976
28	63.654	0.075	0.062	103.457
29	62.254	0.074	0.060	104.885
30	60.917	0.072	0.059	106.266
31	59.641	0.071	0.058	107.600
32	58.420	0.070	0.057	108.892
33	57.251	0.069	0.056	110.144
34	56.132	0.068	0.055	111.358
35	55.058	0.067	0.054	112.536
36	54.027	0.066	0.053	113.681 ***
37	53.036	0.065	0.052	114.795
38	52.084	0.064	0.051	115.878
39	51.167	0.063	0.050	116.934
40	50.284	0.063	0.049	117.962

Table 5.4.2-C



On-Site Storage
Calculator

Project: Multiple Residential Condo
Development

TOWN OF CALEDON 10-Year

Project No.: 17-849

By: I.S

Date: 11-Dec-20

Location: **TOWN OF CALEDON**

A = 0.492 ha Area= Area total- Uncontrolled area-Roof Area
 Composite C = 0.68
 i-10y (Allowable) = 134.16 mm/hr $i_{10} = 2221(t_c + 12)^{-0.9080}$
 Q Allowable = 0.0164 m³/s
 Q Actual = 0.0164 m³/s Q10= including roof control rate of 15.8L/s

t _c (min)	I (mm/hr)	Q10 (m ³ /s)	Q _{stored} (m ³ /s)	Peak Volume (m ³)
1	216.316	0.217	0.200	12.029
2	202.239	0.204	0.187	22.487
3	189.958	0.192	0.176	31.676
4	179.146	0.182	0.166	39.822
5	169.551	0.173	0.157	47.102
6	160.976	0.165	0.149	53.652
7	153.264	0.158	0.142	59.583
8	146.290	0.152	0.135	64.982
9	139.950	0.146	0.129	69.922
10	134.162	0.141	0.124	74.462
11	128.855	0.136	0.119	78.652
12	123.970	0.131	0.115	82.532
13	119.459	0.127	0.110	86.139
14	115.280	0.123	0.107	89.501
15	111.396	0.119	0.103	92.644
16	107.778	0.116	0.100	95.591
17	104.398	0.113	0.096	98.360
18	101.233	0.110	0.093	100.969
19	98.263	0.107	0.091	103.431
20	95.471	0.105	0.088	105.759
21	92.841	0.102	0.086	107.966
22	90.358	0.100	0.083	110.060
23	88.011	0.098	0.081	112.051
24	85.788	0.096	0.079	113.947
25	83.680	0.094	0.077	115.755
26	81.678	0.092	0.075	117.482
27	79.774	0.090	0.074	119.133
28	77.961	0.088	0.072	120.714
29	76.233	0.087	0.070	122.229
30	74.583	0.085	0.069	123.682
31	73.006	0.084	0.067	125.079
32	71.498	0.082	0.066	126.421
33	70.054	0.081	0.065	127.714
34	68.670	0.080	0.063	128.958
35	67.342	0.078	0.062	130.159
36	66.067	0.077	0.061	131.317 ***
37	64.841	0.076	0.060	132.435
38	63.663	0.075	0.059	133.516
39	62.528	0.074	0.058	134.562
40	61.435	0.073	0.056	135.574

Table 5.4.2-D



On-Site Storage
Calculator

Project: Multiple Residential Condo
Development

TOWN OF CALEDON 25-Year

Project No.: 17-849

By: I.S

Date: 11-Dec-20

Location: **TOWN OF CALEDON**

A = 0.492 ha Area= Area total- Uncontrolled area-Roof Area
 Composite C = 0.68
 i-25y (Allowable) = 156.47 mm/hr $i_{10} = 3158(t_c + 15)^{-0.9335}$
 Q Allowable = 0.0207 m³/s
 Q Actual = 0.0207 m³/s Q25= including roof control rate of 15.8L/s

t _c (min)	I (mm/hr)	Q25 (m ³ /s)	Q _{stored} (m ³ /s)	Peak Volume (m ³)
1	237.337	0.236	0.216	12.944
2	224.279	0.224	0.204	24.432
3	212.625	0.213	0.193	34.698
4	202.160	0.204	0.183	43.928
5	192.708	0.195	0.174	52.274
6	184.128	0.187	0.166	59.857
7	176.303	0.180	0.159	66.778
8	169.137	0.173	0.152	73.120
9	162.549	0.167	0.146	78.952
10	156.471	0.161	0.141	84.334
11	150.846	0.156	0.135	89.316
12	145.624	0.151	0.130	93.940
13	140.764	0.147	0.126	98.244
14	136.227	0.142	0.122	102.258
15	131.983	0.139	0.118	106.011
16	128.005	0.135	0.114	109.528
17	124.267	0.131	0.111	112.828
18	120.748	0.128	0.107	115.932
19	117.429	0.125	0.104	118.856
20	114.294	0.122	0.101	121.614
21	111.328	0.119	0.099	124.219
22	108.517	0.117	0.096	126.684
23	105.848	0.114	0.093	129.020
24	103.313	0.112	0.091	131.234
25	100.900	0.110	0.089	133.337
26	98.600	0.107	0.087	135.336
27	96.407	0.105	0.085	137.238
28	94.313	0.103	0.083	139.049
29	92.310	0.102	0.081	140.776
30	90.394	0.100	0.079	142.423
31	88.558	0.098	0.077	143.996
32	86.798	0.096	0.076	145.499
33	85.109	0.095	0.074	146.937
34	83.486	0.093	0.073	148.312
35	81.926	0.092	0.071	149.629
36	80.426	0.091	0.070	150.891 ***
37	78.981	0.089	0.069	152.100
38	77.589	0.088	0.067	153.260
39	76.247	0.087	0.066	154.374
40	74.952	0.085	0.065	155.443

Table 5.4.2-E



On-Site Storage
Calculator

Project: Multiple Residential Condo
Development

TOWN OF CALEDON 50-Year

Project No.: 17-849

By: I.S

Date: 11-Dec-20

Location: **TOWN OF CALEDON**

A = 0.492 ha Area= Area total- Uncontrolled area-Roof Area
 Composite C = 0.68
 i-50y (Allowable) = 176.19 mm/hr $i_{50} = 3886(t_c + 16)^{-0.9495}$
 Q Allowable = 0.0243 m³/s
 Q Actual = 0.0243 m³/s Q150= including roof control rate of 15.8L/s

t _c (min)	I (mm/hr)	Q50 (m ³ /s)	Q _{stored} (m ³ /s)	Peak Volume (m ³)
1	263.749	0.261	0.237	14.203
2	249.817	0.248	0.224	26.852
3	237.316	0.236	0.212	38.186
4	226.035	0.226	0.202	48.398
5	215.802	0.216	0.192	57.643
6	206.477	0.208	0.183	66.051
7	197.944	0.200	0.176	73.727
8	190.104	0.193	0.168	80.761
9	182.877	0.186	0.162	87.228
10	176.192	0.180	0.155	93.190
11	169.990	0.174	0.150	98.704
12	164.220	0.168	0.144	103.815
13	158.839	0.163	0.139	108.563
14	153.807	0.159	0.135	112.985
15	149.092	0.154	0.130	117.110
16	144.665	0.150	0.126	120.966
17	140.499	0.146	0.122	124.576
18	136.573	0.143	0.118	127.962
19	132.865	0.139	0.115	131.141
20	129.358	0.136	0.112	134.131
21	126.036	0.133	0.109	136.946
22	122.885	0.130	0.106	139.600
23	119.891	0.127	0.103	142.104
24	117.043	0.125	0.100	144.470
25	114.331	0.122	0.098	146.707
26	111.745	0.120	0.095	148.825
27	109.276	0.117	0.093	150.830
28	106.916	0.115	0.091	152.731
29	104.659	0.113	0.089	154.534
30	102.498	0.111	0.087	156.246
31	100.426	0.109	0.085	157.871
32	98.438	0.107	0.083	159.416
33	96.530	0.106	0.081	160.885
34	94.696	0.104	0.080	162.281
35	92.932	0.102	0.078	163.611
36	91.234	0.101	0.076	164.876 ***
37	89.599	0.099	0.075	166.081
38	88.023	0.098	0.073	167.228
39	86.502	0.096	0.072	168.322
40	85.035	0.095	0.071	169.363

Table 5.4.2-F



On-Site Storage
Calculator

Project: Multiple Residential Condo
Development

TOWN OF CALEDON 100-Year

Project No.: 17-849

By: I.S

Date: 11-Dec-20

Location: **TOWN OF CALEDON**

A = 0.492 ha Area= Area total- Uncontrolled area-roof Area
 Composite C = 0.68
 -100y (Allowable) = 196.54 mm/hr $i_{100} = 4688(t_c + 17)^{-0.9624}$
 $Q_{Allowable} = 0.0274 \text{ m}^3/\text{s}$
 $Q_{Actual} = 0.0274 \text{ m}^3/\text{s}$ **Q100= including roof control rate of 15.8L/s**

t_c (min)	I (mm/hr)	Q_{100} (m^3/s)	Q_{stored} (m^3/s)	Peak Volume (m^3)
1	290.344	0.286	0.258	15.503
2	275.623	0.272	0.245	29.363
3	262.347	0.260	0.232	41.823
4	250.313	0.249	0.221	53.079
5	239.354	0.238	0.211	63.292
6	229.330	0.229	0.202	72.595
7	220.126	0.220	0.193	81.101
8	211.646	0.213	0.185	88.902
9	203.806	0.205	0.178	96.079
10	196.536	0.199	0.171	102.699
11	189.777	0.192	0.165	108.821
12	183.475	0.186	0.159	114.495
13	177.585	0.181	0.154	119.766
14	172.068	0.176	0.148	124.670
15	166.890	0.171	0.144	129.243
16	162.020	0.166	0.139	133.512
17	157.432	0.162	0.135	137.505
18	153.100	0.158	0.131	141.245
19	149.005	0.154	0.127	144.751
20	145.128	0.151	0.123	148.044
21	141.450	0.147	0.120	151.138
22	137.958	0.144	0.117	154.049
23	134.637	0.141	0.114	156.791
24	131.475	0.138	0.111	159.375
25	128.461	0.135	0.108	161.812
26	125.585	0.133	0.105	164.113
27	122.837	0.130	0.103	166.286
28	120.209	0.128	0.100	168.340
29	117.693	0.125	0.098	170.282
30	115.282	0.123	0.096	172.119
31	112.969	0.121	0.093	173.858
32	110.750	0.119	0.091	175.504
33	108.617	0.117	0.089	177.063
34	106.567	0.115	0.088	178.540
35	104.594	0.113	0.086	179.939
36	102.694	0.111	0.084	181.264 ***
37	100.863	0.110	0.082	182.521
38	99.097	0.108	0.081	183.711
39	97.394	0.106	0.079	184.839
40	95.749	0.105	0.077	185.908

Table 3.3.1. Nodal Demand Summary

12149 Albion Vaugh Rd
Town of Caledon

Node	Elev	No. of Units	Demand	Average Daily Demand Flow	Min Hourly Demand (Res.)	Peak Daily Demand-Res.	Peak hourly Demand Res.
			Pop	(280L/capita/day)	(Res.)	Demand-Res.	Demand Res.
			1.6 ppu (< 750 sqft)		0.7X280L/c/d	2.0X280 L/c/d	3.0X280 L/c/d
			3.0 ppu (> 750 sqft)	L/s	L/s	L/s	L/s
1.00	180.28	78	125	0.405	0.284	0.81	1.215
		187	561	1.818	1.273	3.64	5.454
				-	-	-	-
Total			686.00	2.22	1.56	4.45	6.67

Reservoir	VSB
Elevation (m)	229.82
Pressure (Kpa)	344.74
Pressure (m)	35.16
Total Head (m)	264.98

Total required fire flow L/s 116.67
At Node 1 Fire demand and max day L/s 121.11

Analysis Results

Region of Peel Criteria

Type of Scenarios

Pressure (Node 1)	27.50 m	269.61 39.10	kPA psi	140 kPA min 20 psi	Peak Daily Flow Plus Fire Scenario
Pressure (Node 1)	35.27 m	345.79 50.15	kPA psi	690 kPA max 100 psi	Minimum Hourly Demand Scenario
Pressure (Node 1)	35.21 m	345.20 50.07	kPA psi	275 kPA min 40 psi	Peak Hourly Demand Scenario

```

*****
*                               E P A N E T                               *
*                               Hydraulic and Water Quality                 *
*                               Analysis for Pipe Networks                   *
*                               Version 2.2                                 *
*****

```

Input File: 17-849wmmminhourly.net

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	VS-B-R	1	17.7	150

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality
1	2.29	264.98	35.27	0.00
VS-B-R	-2.29	264.98	0.00	0.00 Reservoir

Link Results:

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
1	2.29	0.13	0.28	Open

```

*****
*                               E P A N E T                               *
*                               Hydraulic and Water Quality                 *
*                               Analysis for Pipe Networks                   *
*                               Version 2.2                                 *
*****
  
```

Input File: 17-849wmpeakdaily+fire.net

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	VSBR	1	17.7	150

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality
1	121.25	257.25	27.50	0.00
VSBR	-121.25	264.98	0.00	0.00 Reservoir

Link Results:

Link ID	Flow LPS	Velocity m/s	Headloss m/km	Status
1	121.25	6.86	436.79	Open

```

*****
*                               E P A N E T                               *
*                               Hydraulic and Water Quality                 *
*                               Analysis for Pipe Networks                   *
*                               Version 2.2                                *
*****

```

Input File: 17-849wmpeakhourly.net

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	VS-B-R	1	17.7	150

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality
1	4.58	264.96	35.21	0.00
VS-B-R	-4.58	264.98	0.00	0.00 Reservoir

Link Results:

Link ID	Flow LPS	Velocity m/s	Headloss m/km	Status
1	4.58	0.26	1.01	Open



STANDARD OFFLINE Jellyfish Filter Sizing Report

Project Information

Date	Friday, December 09, 2022
Project Name	12148 Albion Vaughan Rd.
Project Number	17-849
Location	Caledon

Jellyfish Filter Design Overview

This report provides information for the sizing and specification of the Jellyfish Filter. When designed properly in accordance to the guidelines detailed in the Jellyfish Filter Technical Manual, the Jellyfish Filter will exceed the performance and longevity of conventional horizontal bed and granular media filters.

Please see www.ImbriumSystems.com for more information.

Jellyfish Filter System Recommendation

The Jellyfish Filter model JF6-4-1-27 is recommended to meet the water quality objective by treating a flow of 11.3 L/s, which meets or exceeds 90% of the average annual rainfall runoff volume based on 18 years of TORONTO CENTRAL rainfall data for this site. This model has a sediment capacity of 126 kg, which meets or exceeds the estimated average annual sediment load.

Jellyfish Model	Number of High-Flo Cartridges	Number of Draindown Cartridges	Manhole Diameter (m)	Treatment Flow Rate (L/s)	Sediment Capacity (kg)
JF6-4-1-27	4	1	1.8	11.3	126

The Jellyfish Filter System

The patented Jellyfish Filter is an engineered stormwater quality treatment technology featuring unique membrane filtration in a compact stand-alone treatment system that removes a high level and wide variety of stormwater pollutants. Exceptional pollutant removal is achieved at high treatment flow rates with minimal head loss and low maintenance costs. Each lightweight Jellyfish Filter cartridge contains an extraordinarily large amount of membrane surface area, resulting in superior flow capacity and pollutant removal capacity.

Maintenance

Regular scheduled inspections and maintenance is necessary to assure proper functioning of the Jellyfish Filter. The maintenance interval is designed to be a minimum of 12 months, but this will vary depending on site loading conditions and upstream pretreatment measures. Quarterly inspections and inspections after all storms beyond the 5-year event are recommended until enough historical performance data has been logged to comfortably initiate an alternative inspection interval.

Please see www.ImbriumSystems.com for more information.

Thank you for the opportunity to present this information to you and your client.

Performance

Jellyfish efficiently captures a high level of Stormwater pollutants, including:

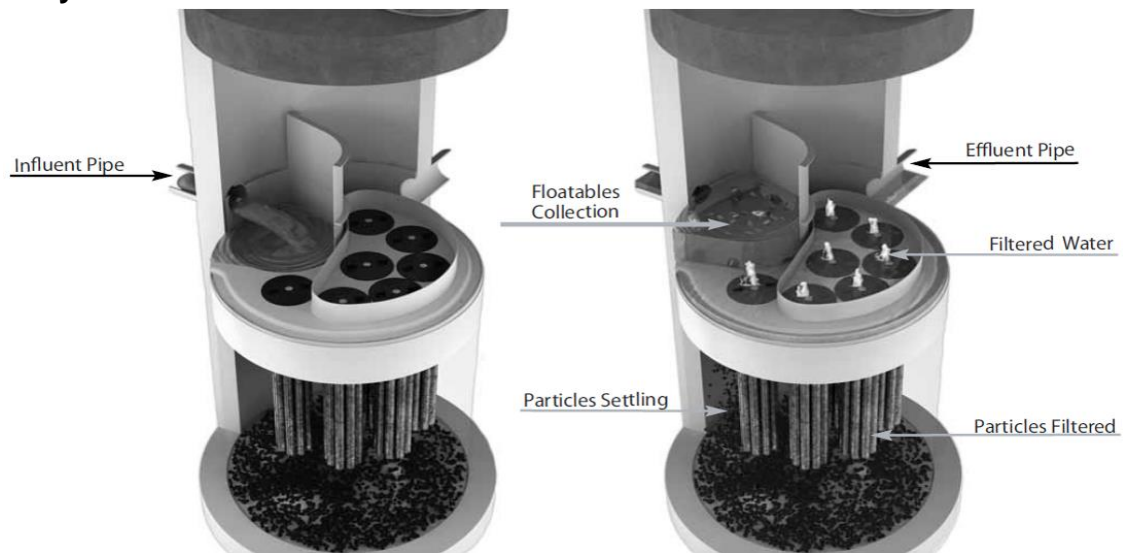
- ☑ 89% of the total suspended solids (TSS) load, including particles less than 5 microns
- ☑ 77% TP removal & 51% TN removal
- ☑ 90% Total Copper, 81% Total Lead, 70% Total Zinc
- ☑ Particulate-bound pollutants such as nutrients, toxic metals, hydrocarbons and bacteria
- ☑ Free oil, Floatable trash and debris

Field Proven Performance

The Jellyfish filter has been field-tested on an urban site with 25 TARP qualifying rain events and field monitored according to the TARP field test protocol, demonstrating:

- A median TSS removal efficiency of 89%, and a median SSC removal of 99%;
- The ability to capture fine particles as indicated by an effluent d50 median of 3 microns for all monitored storm events, and a median effluent turbidity of 5 NTUs;
- A median Total Phosphorus removal of 77%, and a median Total Nitrogen removal of 51%.

Jellyfish Filter Treatment Functions



Pre-treatment and Membrane Filtration

Project Information

Date:	Friday, December 09, 2022
Project Name:	12148 Albion Vaughan Rd.
Project Number:	17-849
Location:	Caledon

Designer Information

Company:	Masongsong Associates Engineering Ltd.
Contact:	Isabel Strauch
Phone #:	

Notes

--

Design System Requirements

Flow Loading	90% of the Average Annual Runoff based on 18 years of TORONTO CENTRAL rainfall data:	9.6 L/s
Sediment Loading	Treating 90% of the average annual runoff volume, 1984 m ³ , with a suspended sediment concentration of 60 mg/L.	119 kg

Recommendation

The Jellyfish Filter model JF6-4-1-27 is recommended to meet the water quality objective by treating a flow of 11.3 L/s, which meets or exceeds 90% of the average annual rainfall runoff volume based on 18 years of TORONTO CENTRAL rainfall data for this site. This model has a sediment capacity of 126 kg, which meets or exceeds the estimated average annual sediment load.

Jellyfish Model	Number of High-Flo Cartridges	Number of Draindown Cartridges	Manhole Diameter (m)	Wet Vol Below Deck (L)	Sump Storage (m ³)	Oil Capacity (L)	Treatment Flow Rate (L/s)	Sediment Capacity (kg)
JF4-1-1-27	1	1	1.2	2313	0.34	379	3.8	42
JF4-2-1-27	2	1	1.2	2313	0.34	379	6.3	70
JF6-3-1-27	3	1	1.8	5205	0.79	848	8.8	98
JF6-4-1-27	4	1	1.8	5205	0.79	848	11.3	126
JF6-5-1-27	5	1	1.8	5205	0.79	848	13.9	154
JF6-6-1-27	6	1	1.8	5205	0.79	848	16.4	182
JF8-6-2-27	6	2	2.4	9252	1.42	1469	17.6	196
JF8-7-2-27	7	2	2.4	9252	1.42	1469	20.2	224
JF8-8-2-27	8	2	2.4	9252	1.42	1469	22.7	252
JF8-9-2-27	9	2	2.4	9252	1.42	1469	25.2	280
JF8-10-2-27	10	2	2.4	9252	1.42	1469	27.7	308
JF10-11-3-27	11	3	3.0	14456	2.21	2302	31.5	350
JF10-12-3-27	12	3	3.0	14456	2.21	2302	34.0	378
JF10-12-4-27	12	4	3.0	14456	2.21	2302	35.3	392
JF10-13-4-27	13	4	3.0	14456	2.21	2302	37.8	420
JF10-14-4-27	14	4	3.0	14456	2.21	2302	40.3	448
JF10-15-4-27	15	4	3.0	14456	2.21	2302	42.8	476
JF10-16-4-27	16	4	3.0	14456	2.21	2302	45.4	504
JF10-17-4-27	17	4	3.0	14456	2.21	2302	47.9	532
JF10-18-4-27	18	4	3.0	14456	2.21	2302	50.4	560
JF10-19-4-27	19	4	3.0	14456	2.21	2302	52.9	588
JF12-20-5-27	20	5	3.6	20820	3.2	2771	56.7	630
JF12-21-5-27	21	5	3.6	20820	3.2	2771	59.2	658
JF12-22-5-27	22	5	3.6	20820	3.2	2771	61.7	686
JF12-23-5-27	23	5	3.6	20820	3.2	2771	64.3	714
JF12-24-5-27	24	5	3.6	20820	3.2	2771	66.8	742
JF12-25-5-27	25	5	3.6	20820	3.2	2771	69.3	770
JF12-26-5-27	26	5	3.6	20820	3.2	2771	71.8	798
JF12-27-5-27	27	5	3.6	20820	3.2	2771	74.3	826

Rainfall

Name:	TORONTO CENTRAL
State:	ON
ID:	100
Record:	1982 to 1999
Co-ords:	45°30'N, 90°30'W

Drainage Area

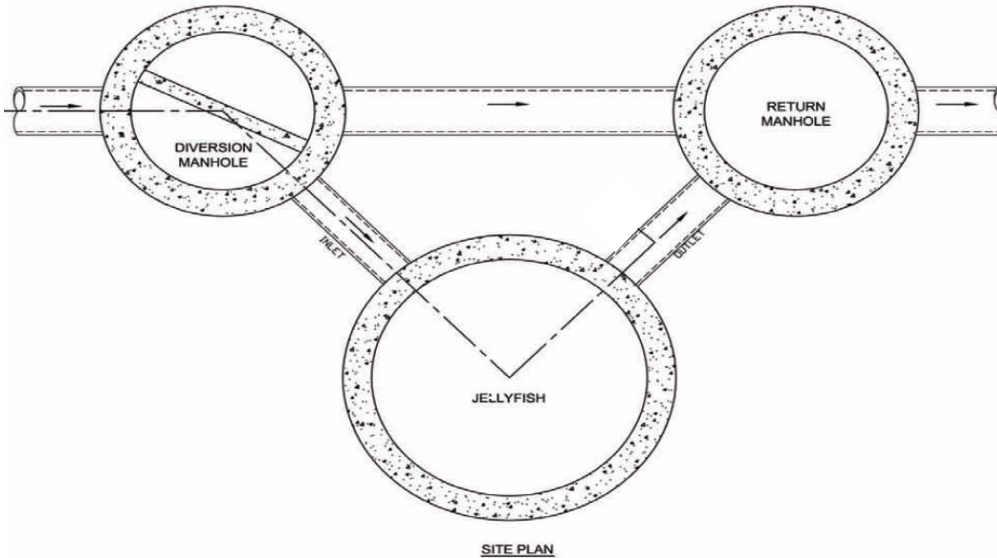
Total Area:	0.4922 ha
Runoff Coefficient:	0.67

Upstream Detention

Peak Release Rate:	n/a
Pretreatment Credit:	n/a

Jellyfish Filter Design Notes

- Typically the Jellyfish Filter is designed in an offline configuration, as all stormwater filter systems will perform for a longer duration between required maintenance services when designed and applied in off-line configurations. Depending on the design parameters, an optional internal bypass may be incorporated into the Jellyfish Filter, however note the inspection and maintenance frequency should be expected to increase above that of an off-line system. Speak to your local representative for more information.



Jellyfish Filter Typical Layout

- Typically, 18 inches (457 mm) of driving head is designed into the system, calculated as the difference in elevation between the top of the diversion structure weir and the invert of the Jellyfish Filter outlet pipe. Alternative driving head values can be designed as 12 to 24 inches (305 to 610mm) depending on specific site requirements, requiring additional sizing and design assistance.
- Typically, the Jellyfish Filter is designed with the inlet pipe configured 6 inches (150 mm) above the outlet invert elevation. However, depending on site parameters this can vary to an optional configuration of the inlet pipe entering the unit below the outlet invert elevation.
- The Jellyfish Filter can accommodate multiple inlet pipes within certain restrictions.
- While the optional inlet below deck configuration offers 0 to 360 degree flexibility between the inlet and outlet pipe, typical systems conform to the following:

Model Diameter (m)	Minimum Angle Inlet / Outlet Pipes	Minimum Inlet Pipe Diameter (mm)	Minimum Outlet Pipe Diameter (mm)
1.2	62°	150	200
1.8	59°	200	250
2.4	52°	250	300
3.0	48°	300	450
3.6	40°	300	450

- The Jellyfish Filter can be built at all depths of cover generally associated with conventional stormwater conveyance systems. For sites that require minimal depth of cover for the stormwater infrastructure, the Jellyfish Filter can be applied in a shallow application using a hatch cover. The general minimum depth of cover is 36 inches (915 mm) from top of the underslab to outlet invert.
- If driving head calculations account for water elevation during submerged conditions the Jellyfish Filter will function effectively under submerged conditions.
- Jellyfish Filter systems may incorporate grated inlets depending on system configuration.
- For sites with water quality treatment flow rates or mass loadings that exceed the design flow rate of the largest standard Jellyfish Filter manhole models, systems can be designed that hydraulically connect multiple Jellyfish Filters in series or alternatively Jellyfish Vault units can be designed.

STANDARD SPECIFICATION STORMWATER QUALITY – MEMBRANE FILTRATION TREATMENT DEVICE

PART 1 – GENERAL

1.1 WORK INCLUDED

Specifies requirements for construction and performance of an underground stormwater quality membrane filtration treatment device that removes pollutants from stormwater runoff through the unit operations of sedimentation, floatation, and membrane filtration.

1.2 REFERENCE STANDARDS

ASTM C 891: Specification for Installation of Underground Precast Concrete Utility Structures
ASTM C 478: Specification for Precast Reinforced Concrete Manhole Sections
ASTM C 443: Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets
ASTM D 4101: Specification for Copolymer steps construction

CAN/CSA-A257.4-M92

Joints for Circular Concrete Sewer and Culvert Pipe, Manhole Sections and Fittings Using Rubber Gaskets

CAN/CSA-A257.4-M92

Precast Reinforced Circular Concrete Manhole Sections, Catch Basins and Fittings

Canadian Highway Bridge Design Code

1.3 SHOP DRAWINGS

Shop drawings for the structure and performance are to be submitted with each order to the contractor. Contractor shall forward shop drawing submittal to the consulting engineer for approval. Shop drawings are to detail the structure's precast concrete and call out or note the fiberglass (FRP) internals/components.

1.4 PRODUCT SUBSTITUTIONS

No product substitutions shall be accepted unless submitted 10 days prior to project bid date, or as directed by the engineer of record. Submissions for substitutions require review and approval by the Engineer of Record, for hydraulic performance, impact to project designs, equivalent treatment performance, and any required project plan and report (hydrology/hydraulic, water quality, stormwater pollution) modifications that would be required by the approving jurisdictions/agencies. Contractor to coordinate with the Engineer of Record any applicable modifications to the project estimates of cost, bonding amount determinations, plan check fees for changes to approved documents, and/or any other regulatory requirements resulting from the product substitution.

1.5 HANDLING AND STORAGE

Prevent damage to materials during storage and handling.

PART 2 – PRODUCTS

2.1 GENERAL

- 2.1.1 The device shall be a cylindrical or rectangular, all concrete structure (including risers), constructed from precast concrete riser and slab components or monolithic precast structure(s), installed to conform to ASTM C 891 and to any required state highway, municipal or local specifications; whichever is more stringent. The device shall be watertight.
- 2.1.2 Cartridge Deck The cylindrical concrete device shall include a fiberglass deck. The rectangular concrete device shall include a coated aluminum deck. In either instance, the insert shall be bolted and sealed watertight inside the precast concrete chamber. The deck shall serve as: (a) a horizontal divider between the lower treatment zone and the upper treated effluent zone; (b) a deck for attachment of filter cartridges such that the membrane filter elements of each cartridge extend into the lower treatment zone; (c) a platform for maintenance workers to service the filter cartridges (maximum manned weight = 450 pounds (204 kg)); (d) a conduit for conveyance of treated water to the effluent pipe.
- 2.1.3 Membrane Filter Cartridges Filter cartridges shall be comprised of reusable cylindrical membrane filter elements connected to a perforated head plate. The number of membrane filter elements per cartridge shall be a minimum of eleven 2.75-inch (70-mm) diameter elements. The length of each filter element shall be a minimum 15 inches (381 mm). Each cartridge shall be fitted into the cartridge deck by insertion into a cartridge receptacle that is permanently mounted into the cartridge deck. Each cartridge shall be secured by a cartridge lid that is threaded onto the receptacle, or similar mechanism to secure the cartridge into the deck. The maximum treatment flow rate of a filter cartridge shall be controlled by an orifice in the cartridge lid, or on the individual cartridge itself, and based on a design flux rate (surface loading rate) determined by the maximum treatment flow rate per unit of filtration membrane surface area. The maximum design flux rate shall be 0.21 gpm/ft² (0.142 lps/m²).

Each membrane filter cartridge shall allow for manual installation and removal. Each filter cartridge shall have filtration membrane surface area and dry installation weight as follows (if length of filter cartridge is between those listed below, the surface area and weight shall be proportionate to the next length shorter and next length longer as shown below):

Filter Cartridge Length (in / mm)	Minimum Filtration Membrane Surface Area (ft ² / m ²)	Maximum Filter Cartridge Dry Weight (lbs / kg)
15	106 / 9.8	10.5 / 4.8
27	190 / 17.7	15.0 / 6.8
40	282 / 26.2	20.5 / 9.3
54	381 / 35.4	25.5 / 11.6

- 2.1.4 Backwashing Cartridges The filter device shall have a weir extending above the cartridge deck, or other mechanism, that encloses the high flow rate filter cartridges when placed in their respective cartridge receptacles within the cartridge deck. The weir, or other mechanism, shall collect a pool of filtered water during inflow events that backwashes the high flow rate cartridges when the inflow

event subsides. All filter cartridges and membranes shall be reusable and allow for the use of filtration membrane rinsing procedures to restore flow capacity and sediment capacity; extending cartridge service life.

- 2.1.5 Maintenance Access to Captured Pollutants The filter device shall contain an opening(s) that provides maintenance access for removal of accumulated floatable pollutants and sediment, removal of and replacement of filter cartridges, cleaning of the sump, and rinsing of the deck. Access shall have a minimum clear vertical clear space over all of the filter cartridges. Filter cartridges shall be able to be lifted straight vertically out of the receptacles and deck for the entire length of the cartridge.
- 2.1.6 Bend Structure The device shall be able to be used as a bend structure with minimum angles between inlet and outlet pipes of 90-degrees or less in the stormwater conveyance system.
- 2.1.7 Double-Wall Containment of Hydrocarbons The cylindrical precast concrete device shall provide double-wall containment for hydrocarbon spill capture by a combined means of an inner wall of fiberglass, to a minimum depth of 12 inches (305 mm) below the cartridge deck, and the precast vessel wall.
- 2.1.8 Baffle The filter device shall provide a baffle that extends from the underside of the cartridge deck to a minimum length equal to the length of the membrane filter elements. The baffle shall serve to protect the membrane filter elements from contamination by floatables and coarse sediment. The baffle shall be flexible and continuous in cylindrical configurations, and shall be a straight concrete or aluminum wall in rectangular configurations.
- 2.1.9 Sump The device shall include a minimum 24 inches (610 mm) of sump below the bottom of the cartridges for sediment accumulation, unless otherwise specified by the design engineer. Depths less than 24 inches may have an impact on the total performance and/or longevity between cartridge maintenance/replacement of the device.

2.2 PRECAST CONCRETE SECTIONS

All precast concrete components shall be manufactured to a minimum live load of HS-20 truck loading or greater based on local regulatory specifications, unless otherwise modified or specified by the design engineer, and shall be watertight.

2.3 JOINTS All precast concrete manhole configuration joints shall use nitrile rubber gaskets and shall meet the requirements of ASTM C443, Specification C1619, Class D or engineer approved equal to ensure oil resistance. Mastic sealants or butyl tape are not an acceptable alternative.

2.4 GASKETS Only profile neoprene or nitrile rubber gaskets in accordance to CSA A257.3-M92 will be accepted. Mastic sealants, butyl tape or Con Seal CS-101 are not acceptable gasket materials.

2.5 FRAME AND COVER Frame and covers must be manufactured from cast-iron or other composite material tested to withstand H-20 or greater design loads, and as approved by the

local regulatory body. Frames and covers must be embossed with the name of the device manufacturer or the device brand name.

- 2.6 DOORS AND HATCHES If provided shall meet designated loading requirements or at a minimum for incidental vehicular traffic.
- 2.7 CONCRETE All concrete components shall be manufactured according to local specifications and shall meet the requirements of ASTM C 478.
- 2.8 FIBERGLASS The fiberglass portion of the filter device shall be constructed in accordance with the following standard: ASTM D-4097: Contact Molded Glass Fiber Reinforced Chemical Resistant Tanks.
- 2.9 STEPS Steps shall be constructed according to ASTM D4101 of copolymer polypropylene, and be driven into preformed or pre-drilled holes after the concrete has cured, installed to conform to applicable sections of state, provincial and municipal building codes, highway, municipal or local specifications for the construction of such devices.
- 2.10 INSPECTION All precast concrete sections shall be inspected to ensure that dimensions, appearance and quality of the product meet local municipal specifications and ASTM C 478.

PART 3 – PERFORMANCE

3.1 GENERAL

- 3.1.1 Verification – The stormwater quality filter must be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV).
- 3.1.2 Function - The stormwater quality filter treatment device shall function to remove pollutants by the following unit treatment processes; sedimentation, floatation, and membrane filtration.
- 3.1.3 Pollutants - The stormwater quality filter treatment device shall remove oil, debris, trash, coarse and fine particulates, particulate-bound pollutants, metals and nutrients from stormwater during runoff events.
- 3.1.4 Bypass - The stormwater quality filter treatment device shall typically utilize an external bypass to divert excessive flows. Internal bypass systems shall be equipped with a floatables baffle, and must avoid passage through the sump and/or cartridge filtration zone.
- 3.1.5 Treatment Flux Rate (Surface Loading Rate) – The stormwater quality filter treatment device shall treat 100% of the required water quality treatment flow based on a maximum design treatment flux rate (surface loading rate) across the membrane filter cartridges of 0.21 gpm/ft² (0.142 lps/m²).

3.2 FIELD TEST PERFORMANCE

At a minimum, the stormwater quality filter device shall have been field tested and verified with a minimum 25 TARP qualifying storm events and field monitoring shall have been conducted according to the TARP 2009 NJDEP TARP field test protocol, and have received NJCAT verification.

- 3.2.1 Suspended Solids Removal - The stormwater quality filter treatment device shall have demonstrated a minimum median TSS removal efficiency of 85% and a minimum median SSC removal efficiency of 95%.
- 3.2.2 Runoff Volume – The stormwater quality filter treatment device shall be engineered, designed, and sized to treat a minimum of 90 percent of the annual runoff volume determined from use of a minimum 15-year rainfall data set.
- 3.2.3 Fine Particle Removal - The stormwater quality filter treatment device shall have demonstrated the ability to capture fine particles as indicated by a minimum median removal efficiency of 75% for the particle fraction less than 25 microns, an effluent d_{50} of 15 microns or lower for all monitored storm events.
- 3.2.4 Turbidity Reduction - The stormwater quality filter treatment device shall have demonstrated the ability to reduce the turbidity from influent from a range of 5 to 171 NTU to an effluent turbidity of 15 NTU or lower.
- 3.2.5 Nutrient (Total Phosphorus & Total Nitrogen) Removal - The stormwater quality filter treatment device shall have demonstrated a minimum median Total Phosphorus removal of 55%, and a minimum median Total Nitrogen removal of 50%.
- 3.2.6 Metals (Total Zinc & Total Copper) Removal - The stormwater quality filter treatment device shall have demonstrated a minimum median Total Zinc removal of 55%, and a minimum median Total Copper removal of 85%.

3.3 INSPECTION and MAINTENANCE

The stormwater quality filter device shall have the following features:

- 3.3.1 Durability of membranes are subject to good handling practices during inspection and maintenance (removal, rinsing, and reinsertion) events, and site specific conditions that may have heavier or lighter loading onto the cartridges, and pollutant variability that may impact the membrane structural integrity. Membrane maintenance and replacement shall be in accordance with manufacturer's recommendations.
- 3.3.2 Inspection which includes trash and floatables collection, sediment depth determination, and visible determination of backwash pool depth shall be easily conducted from grade (outside the structure).
- 3.3.3 Manual rinsing of the reusable filter cartridges shall promote restoration of the flow capacity and sediment capacity of the filter cartridges, extending cartridge service life.

- 3.3.4 The filter device shall have a minimum 12 inches (305 mm) of sediment storage depth, and a minimum of 12 inches between the top of the sediment storage and bottom of the filter cartridge tentacles, unless otherwise specified by the design engineer. Variances may have an impact on the total performance and/or longevity between cartridge maintenance/replacement of the device.
- 3.3.5 Sediment removal from the filter treatment device shall be able to be conducted using a standard maintenance truck and vacuum apparatus, and a minimum one point of entry to the sump that is unobstructed by filter cartridges.
- 3.3.6 Maintenance access shall have a minimum clear height that provides suitable vertical clear space over all of the filter cartridges. Filter cartridges shall be able to be lifted straight vertically out of the receptacles and deck for the entire length of the cartridge.
- 3.3.7 Filter cartridges shall be able to be maintained without the requirement of additional lifting equipment.

PART 4 – EXECUTION

4.1 INSTALLATION

4.1.1 PRECAST DEVICE CONSTRUCTION SEQUENCE

The installation of a watertight precast concrete device should conform to ASTM C 891 and to any state highway, municipal or local specifications for the construction of manholes, whichever is more stringent. Selected sections of a general specification that are applicable are summarized below.

4.1.1.1 The watertight precast concrete device is installed in sections in the following sequence:

- aggregate base
- base slab
- treatment chamber and cartridge deck riser section(s)
- bypass section
- connect inlet and outlet pipes
- concrete riser section(s) and/or transition slab (if required)
- maintenance riser section(s) (if required)
- frame and access cover

4.1.2 The precast base should be placed level at the specified grade. The entire base should be in contact with the underlying compacted granular material. Subsequent sections, complete with joint seals, should be installed in accordance with the precast concrete manufacturer's recommendations.

4.1.3 Adjustment of the stormwater quality treatment device can be performed by lifting the upper sections free of the excavated area, re-leveling the base, and re-installing the sections. Damaged sections and gaskets should be repaired or replaced as necessary to restore original condition and watertight seals. Once the stormwater quality treatment device has been constructed, any/all lift holes must be plugged watertight with mortar or non-shrink grout.

- 4.1.4 Inlet and Outlet Pipes Inlet and outlet pipes should be securely set into the device using approved pipe seals (flexible boot connections, where applicable) so that the structure is watertight, and such that any pipe intrusion into the device does not impact the device functionality.
- 4.1.5 Frame and Cover Installation Adjustment units (e.g. grade rings) should be installed to set the frame and cover at the required elevation. The adjustment units should be laid in a full bed of mortar with successive units being joined using sealant recommended by the manufacturer. Frames for the cover should be set in a full bed of mortar at the elevation specified.

4.2 MAINTENANCE ACCESS WALL

In some instances the Maintenance Access Wall, if provided, shall require an extension attachment and sealing to the precast wall and cartridge deck at the job site, rather than at the precast facility. In this instance, installation of these components shall be performed according to instructions provided by the manufacturer.

4.3 FILTER CARTRIDGE INSTALLATION Filter cartridges shall be installed in the cartridge deck only after the construction site is fully stabilized and in accordance with the manufacturer's guidelines and recommendations. Contractor to contact the manufacturer to schedule cartridge delivery and review procedures/requirements to be completed to the device prior to installation of the cartridges and activation of the system.

PART 5 – QUALITY ASSURANCE

5.1 FILTER CARTRIDGE INSTALLATION Manufacturer shall coordinate delivery of filter cartridges and other internal components with contractor. Filter cartridges shall be delivered and installed complete after site is stabilized and unit is ready to accept cartridges. Unit is ready to accept cartridges after it has been cleaned out and any standing water, debris, and other materials have been removed. Contractor shall take appropriate action to protect the filter cartridge receptacles and filter cartridges from damage during construction, and in accordance with the manufacturer's recommendations and guidance. For systems with cartridges installed prior to full site stabilization and prior to system activation, the contractor can plug inlet and outlet pipes to prevent stormwater and other influent from entering the device. Plugs must be removed during the activation process.

5.2 INSPECTION AND MAINTENANCE

5.2.1 The manufacturer shall provide an Owner's Manual upon request.

5.2.2 After construction and installation, and during operation, the device shall be inspected and cleaned as necessary based on the manufacturer's recommended inspection and maintenance guidelines and the local regulatory agency/body.

5.3 REPLACEMENT FILTER CARTRIDGES When replacement membrane filter elements and/or other parts are required, only membrane filter elements and parts approved by the manufacturer for use with the stormwater quality filter device shall be installed.

END OF SECTION

STANDARD PERFORMANCE SPECIFICATION STORMWATER QUALITY – MEMBRANE FILTRATION TREATMENT DEVICE

PART 1 – GENERAL

1.1 WORK INCLUDED

This section specifies requirements for selecting, sizing, and designing an underground stormwater quality membrane filtration treatment device that removes pollutants from stormwater runoff through the unit operations of sedimentation, floatation, and membrane filtration.

1.2 REFERENCE STANDARDS & PROCEDURES

ISO 14034:2016 Environmental Management – Environmental Technology Verification (ETV)

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: filtration surface area, 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, filtration treatment device 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 GENERAL

- 2.1.1 Maintenance Access to Captured Pollutants The filter device shall contain an opening(s) that provides maintenance access for removal of accumulated floatable pollutants and sediment, removal of and replacement of filter cartridges, cleaning of the sump, and rinsing of the internal components. Access shall have a minimum clear vertical clear space over all of the filter cartridges. Filter cartridges shall be able to be lifted straight vertically out of their installed placement for the entire length of the cartridge.
- 2.1.2 Pollutant Storage: The Filter device shall include a sump for sediment storage, and a protected volume for the capture and storage of petroleum hydrocarbons and buoyant gross pollutants.

PART 3 – PERFORMANCE

3.1 GENERAL

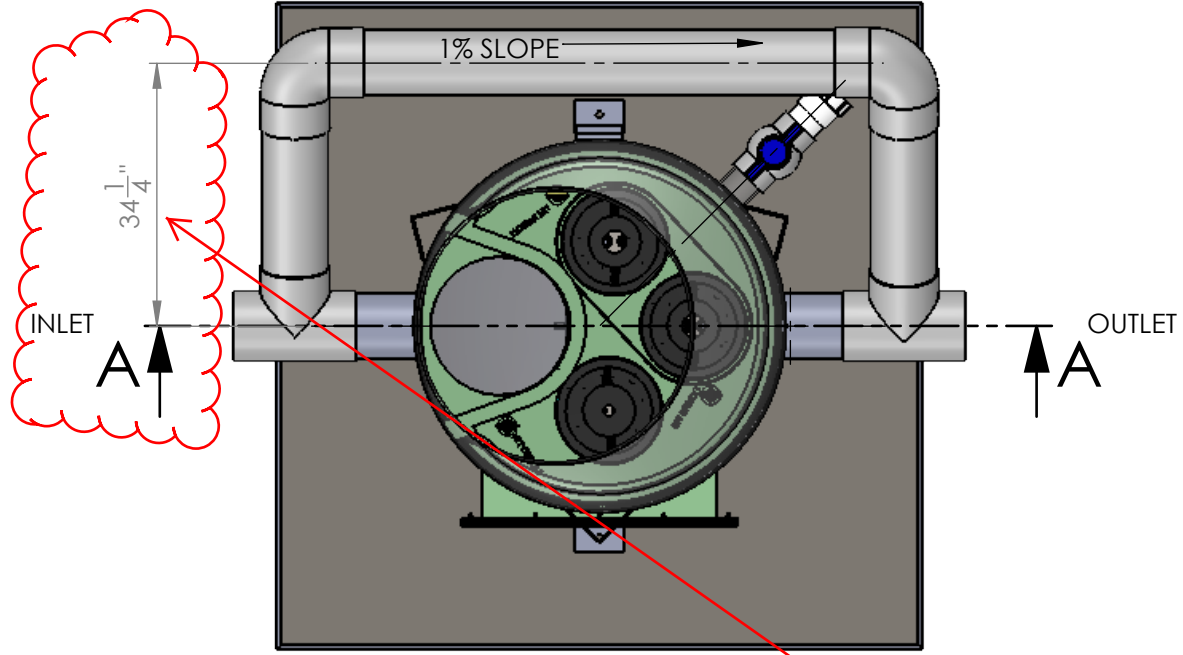
- 3.1.1 Verification – The stormwater quality filter treatment device shall have been field tested in accordance with either TARP Tier II Protocol (TARP, 2003) and New Jersey Tier II Stormwater Test Requirements – Amendments to TARP Tier II Protocol (NJDEP, 2009) or Washington State Technology Assessment Protocol – Ecology (TAPE), 2011 or later version. The field test shall have been verified in accordance with ISO 14034:2016 Environmental Management – Environmental Technology Verification (ETV). See Section 3.2 of this specification for field test performance requirements.

3.2 FIELD TEST PERFORMANCE

The field test (as specified in section 3.1.1) shall have monitored a minimum of twenty (20) TARP or TAPE qualifying storm events, and report at **minimum** the following results:

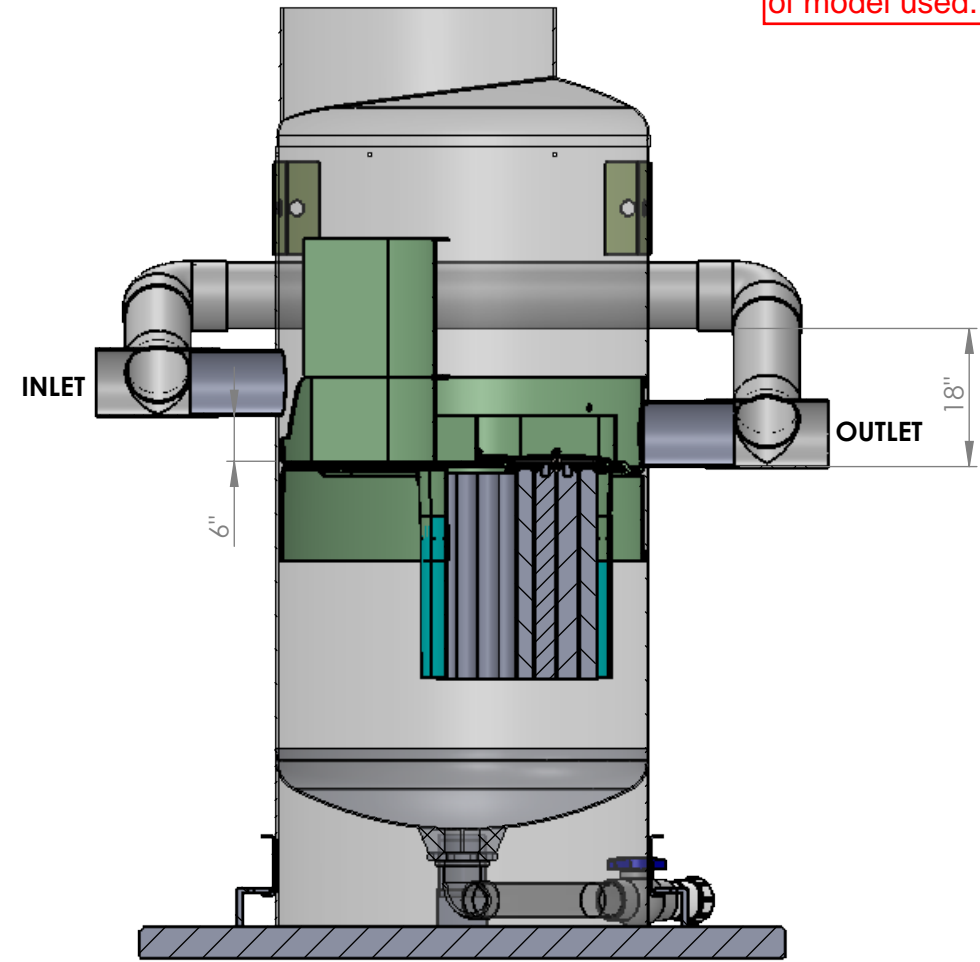
- 3.2.1 Suspended Solids Removal - The stormwater quality filter treatment device shall have ISO 14034 ETV verified load based median TSS removal efficiency of at least 85% and load based median SSC removal efficiency of at least 98%.
- 3.2.2 Runoff Volume – The stormwater quality filter treatment device shall be engineered, designed, and sized to treat a minimum of 90 percent of the annual runoff volume determined from use of a minimum 15-year rainfall data set.
- 3.2.3 Fine Particle Removal - The stormwater quality filter treatment device shall have demonstrated the ability to capture fine particles as indicated by a minimum median removal efficiency of 75% for the particle fraction less than 25 microns, and an effluent d_{50} of 15 microns or lower for all monitored storm events.
- 3.2.4 Turbidity Reduction - The stormwater quality filter treatment device shall have demonstrated the ability to reduce turbidity such that effluent turbidity is 15 NTU or lower.
- 3.2.5 Nutrients & Metals – The stormwater quality filter treatment device shall have ISO 14034 ETV Verified minimum load based removal efficiencies for the following:
- 3.2.5.1 Total Phosphorus (TP) Removal - Median TP removal efficiency of at least 49%.
- 3.2.5.2 Total Nitrogen (TN) Removal - Median TN removal efficiency of at least 39%.
- 3.2.5.3 Total Zinc (Zn) Removal - Median Zn removal efficiency of at least 69%.
- 3.2.5.4 Total Copper (Cu) Removal - Median Cu removal efficiency of at least 91%.

END OF SECTION

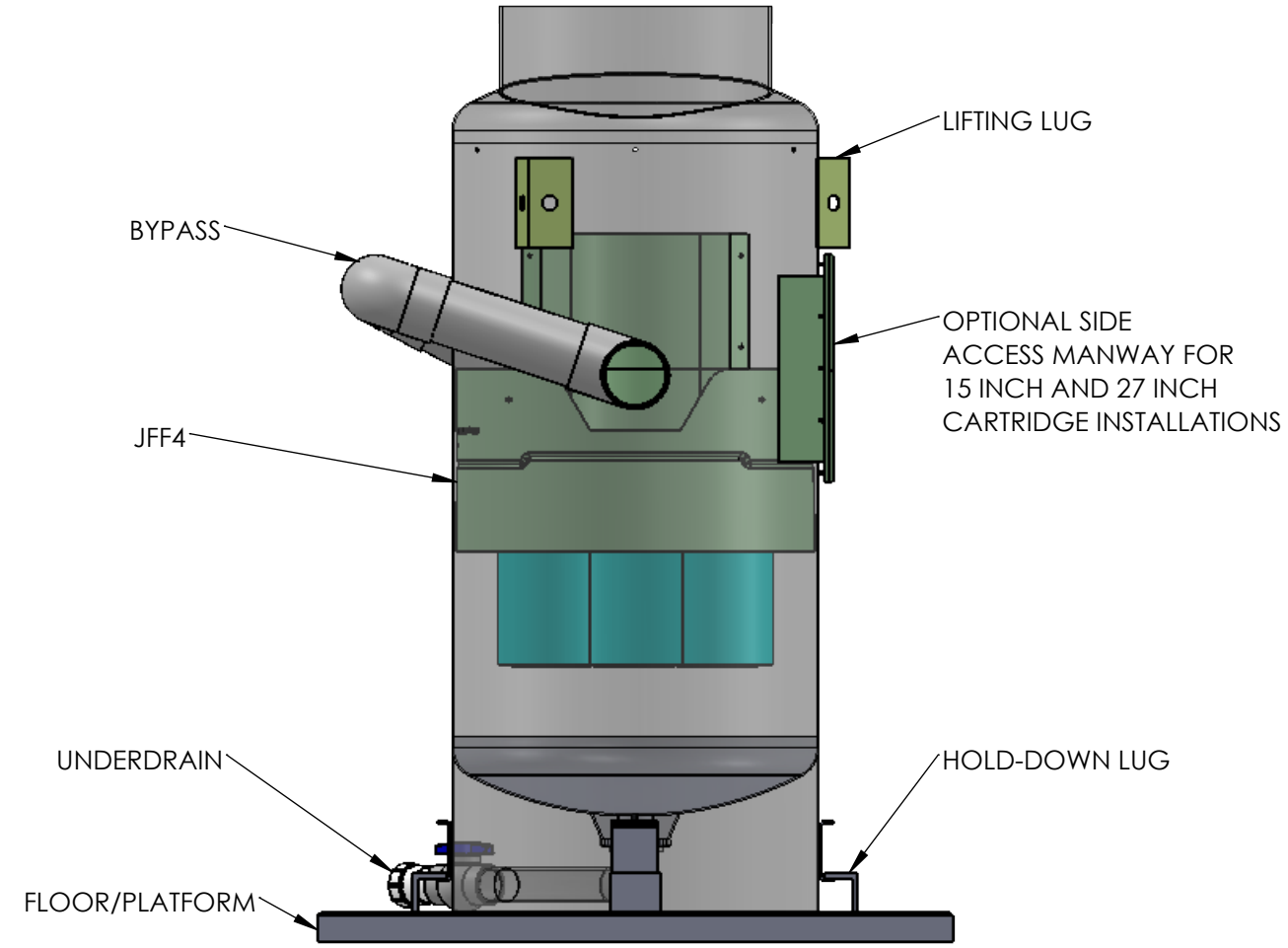
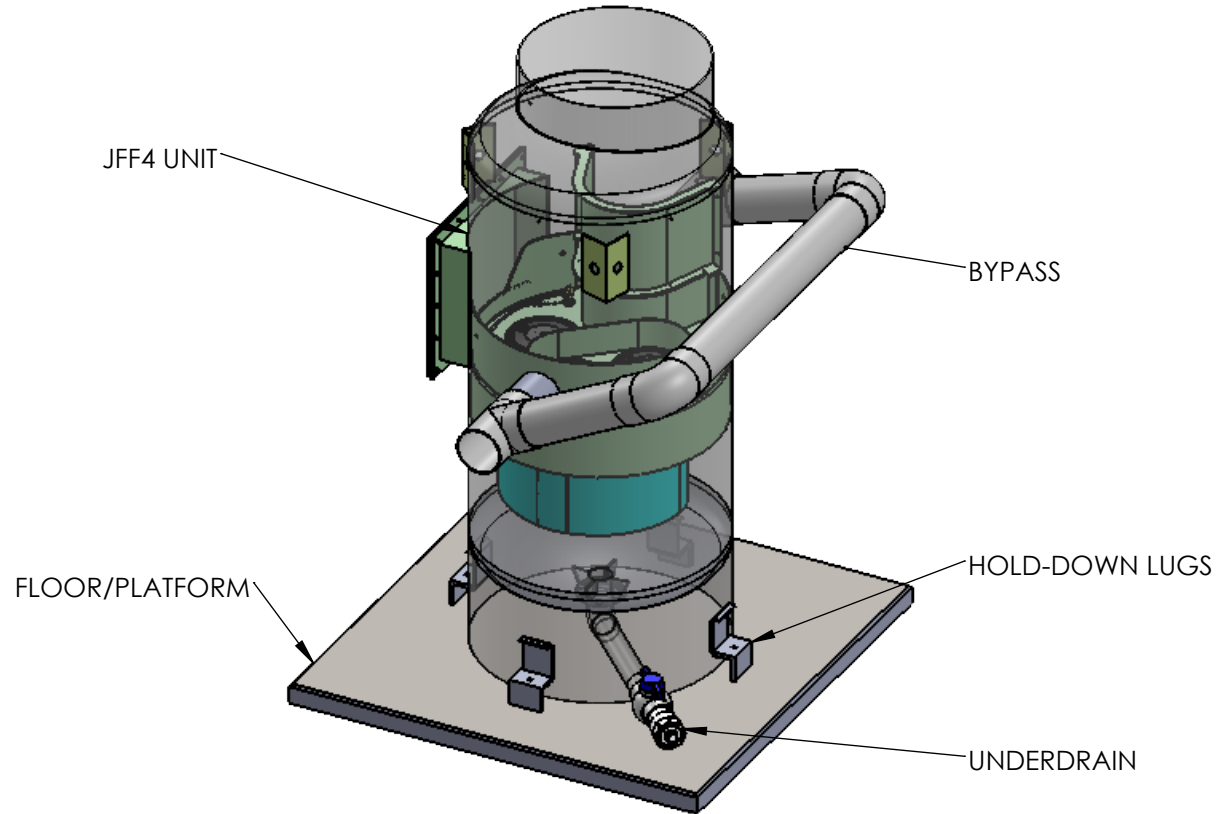


PLAN VIEW

distance varies based on diameter of model used.



SECTION VIEW A-A



OUTLET SIDE VIEW

The design information provided in this drawing is for informational purposes only. It is not intended to be used as a substitute for a contract or other legal document. The user of this information assumes all liability for any use of this information. Imbrrium is not responsible for any errors or omissions in this drawing. Imbrrium is not responsible for any damage or injury resulting from the use of this information. Imbrrium is not responsible for any damage or injury resulting from the use of this information. Imbrrium is not responsible for any damage or injury resulting from the use of this information.

MARK	DATE	REVISION DESCRIPTION	BY

JFF4 WITH PLUMBED BYPASS

Jellyfish® Filter



7037 RIDGE ROAD, SUITE 350, HANOVER, MD, 21076
866-740-3318 410-796-5505 866-376-8511 FAX

DATE	6/29/2017		
DESIGNED	JSK	DRAWN	TL
CHECKED	JSK	APPROVED	JSK
PACKAGE NO.		PART NO.	XXX-XXXXXX
SHEET	1 OF 1		

Appendix D

Approved TRCA Creek Realignment Submission and Drawings (2021)

MEMORANDUM

Date: January 15, 2020

MA-Project No: 2017-849

To: Sameer Dhalla
Director, Development and Engineering Services
Toronto and Region Conservation Authority

From: David Hoover
Masongsong Associates Engineering Limited

Subject: Rainbow Creek Channel Re-Alignment
12148 Albion Vaughan Road, Bolton
Town of Caledon, Ontario

Masongsong Associates Engineering Limited (MAEL) has been retained by Aztec Restoration to prepare this technical memorandum in support of the channel re-alignment at Reach 1 of Rainbow Creek, a tributary to the Humber River. The purpose of this memo is to identify the existing hydraulic conditions and to demonstrate how the proposed alignment will preserve and enhance the function of the watercourse to the satisfaction of the Toronto and Region Conservation Authority (TRCA).

The proposed re-alignment is located entirely within the property of 12148 Albion Vaughan Road and characterized by proposed site grading in support a new building. The requirement for this re-alignment was identified during the zoning by-law and site plan application process when it was discovered that the previous land use had significantly altered the site topography resulting in negative impacts to regulatory floodplain. Therefore, channel re-alignment is necessary to restore and enhance the function of the watercourse while supporting the proposed development.

The areas of concerns for Rainbow Creek is identified as Reach 1 starting from River Station 2223.1 to River Station 2223.16. The lands tributary to this length of Rainbow Creek is limited to the subject property.

1. BACKGROUND

The subject property is approximately 1.3 ha (3.2 acres), bound by Highway 50 (a Peel Regional arterial roadway) to the west, and bound by Albion Vaughan Road (the designated “frontage”) to the east. Directly to the north is existing rural residential and to the south is a commercial site with outdoor storage provisions. The legal description of the property is Part 1 of Lot 1, Concession 7 in the Town of Caledon. Refer to FIGURE 1 for the Site Plan Location.

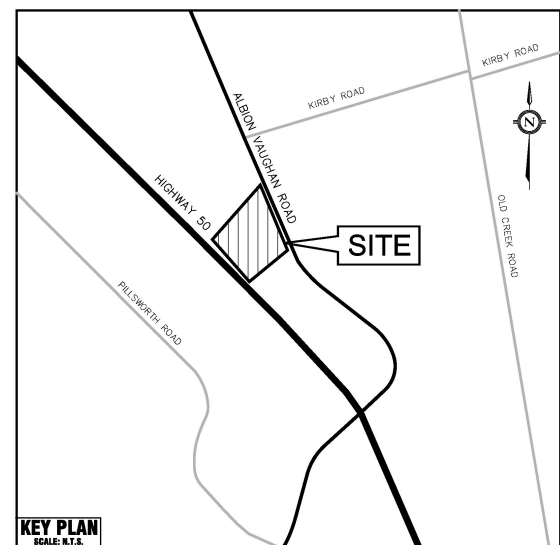


Figure 1: Site Plan Location

2. HYDRAULIC MODELLING (GEOHEC-RAS) RESULTS

The hydraulic modelling results presented herein describes the channel hydraulics based on the details of the TRCA 2015 HEC RAS model, existing topography and site design where applicable. The following tasks were undertaken:

- Update the relevant cross sections for each modelling scenario based on available topographic data.
- Determine regional flood elevations for the pre-existing (PEX), existing (EX) and proposed (PR) scenarios
- Evaluate the results of the proposed (PR) channel re-alignment with the pre-existing (PEX) and existing (EX) scenarios

METHODOLOGY

To achieve the modelling objectives described in the preceding section, the U.S. Army Corps of Engineers' River Analysis System (HEC-RAS) was utilized. HEC-RAS is designed to perform one-dimensional steady and unsteady flow river hydraulics calculations, sediment transport-mobile bed modelling, and water temperature analysis. The HEC-RAS software supersedes the HEC-2 river hydraulics package.

The modelling system calculates water surface profiles for steady gradually varied flow. The system can handle a full network of channels, a dendritic system, or a single river reach. The steady flow component is capable of modelling subcritical, supercritical, and mixed flow regime water surface profiles.

The basic computational procedure is based on the solution of the one-dimensional energy equation. Energy losses are evaluated by friction (Manning's equation) and contraction/expansion (coefficient multiplied by the change in velocity head). The momentum equation is utilized in situations where the water surface profile is rapidly varied. These situations include mixed flow regime calculations (i.e., hydraulic jumps), hydraulics of bridges, and evaluating profiles at river confluences (stream junctions).

This model has the ability to consider the effects of various obstructions, such as bridges, culverts, dams, weirs, and other structures in the floodplain on water levels. The steady flow system is designed for application in floodplain management, estimation of floodplain storage, and for assessing the change in water surface profiles due to channel modifications.

The model requires the following input:

- Channel geometry (low flow centerline profile and cross-sections; culvert crossing details);
- Manning's roughness for main channel and overbank areas;
- Cumulative flow; and,
- Downstream boundary conditions.



PRE-EXISTING CONDITIONS (PEX)

The Rainbow Creek HEC-RAS was obtained from the TRCA and has been used to establish the original floodline conditions for our site, 12148 Albion Vaughan Road. The following outlines the measures taken when analyzing the pre-existing hydraulic model:

- Uses flow data from the provided TRCA HEC-RAS model ([Table 1](#))

Table 1: TRCA Flows

Storm Event	XS 2223.18 Flow (m ³ /s)	XS2223.12 Flow (m ³ /s)
2-Year	5.47	5.69
5-Year	7.78	8.09
10-Year	9.36	9.73
25-Year	11.54	11.99
50-Year	13.25	13.77
100-Year	15.21	15.81
Regional	17.88	18.59

- Uses original geometry from the provided TRCA 2015 HEC-RAS model

The resultant water surface elevations (W.S.E.) for regional storm event in the pre-existing model are summarized in [Table 2](#). The floodplain mapping complete with river station locations and flood line for this scenario can be found on [Drawing PEX](#).

EXISTING CONDITIONS (EX)

The existing condition model was established by updating the relevant cross sections of the Rainbow Creek HEC-RAS obtained from the TRCA. The update is based on the data from a topographic survey of the existing grades which were found to be significantly altered from the original geometry in the pre-existing (PEX) scenario above. The following outlines the measures taken when analyzing the existing hydraulic model:

- Uses flow data from the provided TRCA 2015 HEC-RAS model ([Table 1](#))
- Uses existing geometry and sections from the provided TRCA 2015 HEC-RAS model and then updated with the topographical survey (see below):
 - Section 2223.15
 - Section 2223.14
 - Section 2223.134
 - Section 2223.133
 - Section 2223.132
 - Section 2223.131
 - Section 2223.112
 - Section 2223.11
- Additional cross sections have been provided to increase the accuracy across the site (see below):
 - Section 2223.156
 - Section 2223.152



- Section 2223.148
- Section 2223.146
- Section 2223.145
- Section 2223.143
- Section 2223.141
- Section 2223.125

The resultant water surface elevations (W.S.E.) for regional storm event in the existing model are summarized in [Table 2](#). The floodplain mapping complete with river station locations and flood line for this scenario can be found on [Drawing EX](#).

PROPOSED CONDITIONS (PR)

The proposed conditions model includes the projected grading for our site. The following outlines the measures taken when analyzing the proposed hydraulic model:

- Uses flow data from the provided TRCA 2013 HEC-RAS model (Table 1)
- Uses existing geometry from the Baseline Model HEC-RAS model with modifications which are as follows:
 - Section 2223.105 which represents a culvert structure has been removed from the model which as the existing culvert that serviced the driveway access is no longer required in the proposed condition.
- Uses existing geometry and sections from the provided TRCA 2015 HEC-RAS model and then updated with the proposed site grading design (see below):
 - Section 2223.15
 - Section 2223.14
 - Section 2223.134
 - Section 2223.133
 - Section 2223.132
 - Section 2223.131
 - Section 2223.112
 - Section 2223.11
- Additional cross sections have been provided to increase the accuracy across the site (see below):
 - Section 2223.156
 - Section 2223.152
 - Section 2223.148
 - Section 2223.146
 - Section 2223.145
 - Section 2223.143
 - Section 2223.141
 - Section 2223.125

The resultant water surface elevations (W.S.E.) for regional storm event in the proposed model are summarized



in [Table 2](#). The floodplain mapping complete with river station locations and flood line for this scenario can be found on [Drawing PR](#).

Table 2: Regional W.S.E. For Various Scenarios

River Station	Regional W.S.E. (m)		
	PEX	EX	PR
2223.16	230.20	230.20	230.20
2223.156		229.92	229.93
2223.152		229.76	229.68
2223.15	229.60	229.80	229.38
2223.148		229.78	229.37
2223.146		229.79	229.36
2223.145		229.79	229.36
2223.143		229.78	229.35
2223.141		229.77	229.26
2223.14	229.23	229.70	229.26
2223.134	229.20	229.56	228.96
2223.133	229.19	229.45	229.02
2223.132	229.18	229.44	229.01
2223.131	229.17	229.36	228.96
2223.13	229.09	228.87	228.86
2223.125		228.84	228.75
2223.12	229.05	228.94	228.67
2223.11	228.69	228.68	228.63
2223.105	CULVERT	CULVERT	CULVERT REMOVED
2223.1	228.44	228.41	228.57
2223.09	228.60	228.56	228.56
2223.08	227.91	227.88	227.88
2223.075	CULVERT	CULVERT	CULVERT
2223.07	227.73	227.71	227.71
2223.06	227.63	227.61	227.61
2223.05	226.71	226.69	226.69
2223.04	226.27	226.24	226.24
2223.03	226.00	225.99	225.99
2223.025	CULVERT	CULVERT	CULVERT
2223.02	225.61	225.61	225.61



DISCUSSION

The regional water surface elevation for the pre-existing and the proposed condition is shown in **Table 3** below. The proposed channel re-alignment that only consists of site grading changes within the subject property restores and enhances the original (PEX) condition by significantly reducing the regional water surface elevation within this length of Rainbow Creek

Table 3: Regional W.S.E. For Various Scenarios

River Station	Regional W.S.E. (m)		
	PEX	PR	Difference
2223.16	230.20	230.20	0.00
2223.15	229.60	229.38	-0.22
2223.14	229.23	229.26	0.03
2223.134	229.20	228.96	-0.24
2223.133	229.19	229.02	-0.17
2223.132	229.18	229.01	-0.17
2223.131	229.17	228.96	-0.21
2223.13	229.09	228.86	-0.23
2223.12	229.05	228.67	-0.38
2223.11	228.69	228.63	-0.06
2223.105	CULVERT	CULVERT REMOVED	-
2223.1	228.44	228.57	0.13
2223.09	228.60	228.56	-0.04
2223.08	227.91	227.88	-0.03
2223.075	CULVERT	CULVERT	-
2223.07	227.73	227.71	-0.02
2223.06	227.63	227.61	-0.02
2223.05	226.71	226.69	-0.02
2223.04	226.27	226.24	-0.03
2223.03	226.00	225.99	-0.01
2223.025	CULVERT	CULVERT	-
2223.02	225.61	225.61	0.00

Formatting -
Update table lines
to be consistent

Based on **Table 3** above, the water surface elevations increase under proposed conditions at Station 2223.14 and Station 2223.1, both outliers are clarified as follows:

Station 2223.14 – The 0.03m increase in WSE is caused by different topographic data between the two conditions. Under the pre-existing condition, the channel is significantly wider at this cross section while the updated topographic survey under the proposed condition shows that this section and immediately upstream is steep and narrow. Therefore, the WSE in the pre-existing condition did not reflect actual ground conditions and should not be used to compare with the proposed model. Instead the existing condition (using the updated geometry and original flow rates) should be used for comparison with the proposed model. This comparison yields a WSE reduction of 0.44m which significantly reduces the flood area.

Station 2223.1 – The 0.13m increase in WSE is the result of the removal of the culvert that was facilitating



the existing driveway access. Under the pre-existing condition, the low WSE at this station caused by the culvert changing the flow regime from subcritical to super critical as the water passes the driveway access. The WSE at the following station is 0.16m higher which demonstrates that the flows transition from supercritical back to subcritical flows. Under the proposed conditions, the WSE remains constant and is lower in the stations immediately upstream and downstream compared the pre-existing condition. Therefore, an increase of 0.13m is negligible given an the WSE reduction between 0.01m to 0.38m across the subject area of study including the stations immediately upstream and downstream.

In additional, the 0.13m increase in WSE is also caused by different topographic data between the two conditions. Under the pre-existing conditions, the WSE is shown to spill onto Highway 50 at the approximate centerline elevation of 228.51m. In the proposed conditions, an updated topographic survey shows an approximate centerline elevation of 228.79m. The 0.28m centerline elevation difference prevents any overland spill to occur on Highway 50 which would result in an increase of WSE. This is further substantiated by the WSE at the downstream station, Station 2223.09 where in the pre-existing condition, the WSE increases by 0.16m to 227.63m when overland spill and storage does not occur.

With the outliers clarified, there is no actual impacts caused by th2e proposed channel re-alignment. The detailed HEC-RAS summary output can be found as attached. The existing and proposed HEC-RAS cross-sections can be found in the appendix.

3. FLUVIAL MORPHOLOGY

An Erosion Hazard Assessment dated May 2017 was prepared by Palmer to delineate the existing erosion hazard zone (meander belt). This zone was delineated following TRCA's Belt Width Delineation Procedures which identified potential risks to infrastructure and property limits due to fluvial geomorphologic processes. To address the concerns, PECG proposes to establish a 13m wide meander belt including a 10% factor of safety for potential future changes in the hydrological regime. In addition to the proposed channel re-alignment, PECG recommends implementing the following best management practices and mitigation measures:

RIFFLE AND POOL SEQUENCE

Riffles and pools will be implemented to dissipate energy by alternating shallow and deep waters along the channel. The sequence should include the following characteristics:

- Riffle
 - Formed with embedded keystones
 - Filled with coarse stones sized based on channel flows
 - V-notch shaper along the center line to direct erosive energy away from the banks.
 - Extend up to the bank-full width level to prevent outflanking
 - Live Stakes
 - Brush Layer
- Pool
 - Consist of native bed material.
 - Vegetated Rock Buttresses
 - Embedded wood and other softscapes
 - Live stakes
 - Brush Layer

Formatting - Add space

For further detail, refer to PECG's report as attached.

4. CHANNEL RE-ALIGNMENT CONSTRUCTION SEQUENCING



The channel re-alignment will be completed in three stages and are detailed in the Erosion and Sediment Control Drawings attached. This section will briefly summarize principles of the three stages of the construction which are, erosion and sediment control, earthworks and realignment, and restoration.

STAGE 1 - EROSION AND SEDIMENT CONTROL

The first stage in the construction sequence is erosion and sediment control. These control measures will be implemented for all construction activities related to the channel re-alignment within and around the subject property and for all phases and stages of construction.

The general principles considered to minimize erosion and sedimentation and resultant negative environmental impacts include:

- Erection of silt fences around all site perimeters;
- Provide gravel “mud mats” at construction vehicle access points to minimize off-site tracking of sediments;
- Provide sediment traps (e.g. rock check dams, straw bales, scour basins) along interceptor swales and points of swale discharge;
- Minimize local disturbance activities (e.g. grading);
- Expose the smallest possible land area to erosion for the shortest possible time;
- Implement erosion and sediment control measures before the outset of construction activities; and,
- Carry out regular inspections of erosion and sediment control measures and repair or maintain as necessary.
- Implement a weekly street sweeping and cleaning program for any mudtracking onto the adjacent municipal roadways;

The removal of the erosion and sediment controls should be done once construction is completed and sediment run-off from the construction activities has stabilized.

STAGE 2 – EARTHWORKS AND CHANNEL RE-ALIGNMENT

The second stage in the construction sequence is earthworks and channel re-alignment. This stage implements dams upstream of the proposed channel re-alignment and pumps the water past the proposed re-alignment area. The purpose of this bypass is to provide a dry work area for the earthworks and channel re-alignment while maintaining the flows of the existing channel.

The general timing for the bypass is between July 1 and September 15 which is an anticipated period of low to no flow in Rainbow Creek. In addition to this timing window, no rain is permitted in the 24-hour forecast from construction commencement and the pumping rate cannot exceed the 25mm rainfall flow rate. In the event flow greater than the 25mm rainfall flow rate occur, the dams will be designed to allow the flows to overtop and flow into the channel. Temporary rock check dams and temporary bank stabilization measures must be in place prior to overtopping.

The general sequencing is as follows:

- Install Dam in the roadside ditch upstream of confluence
- Install Dam in the channel upstream of the confluence within the subject property.
- Install temporary dewatering pumping system complete with filter bag and place outlet downstream of the existing driveway access.



- Conduct earthworks operations and channel realignment
- Install temporary Rock check dams and stabilize bank slopes
- Remove existing driveway access and culvert.
- Install Riffles, Revetments and all other BMPs or mitigation measures.
- Final grading and stabilization

STAGE 3 – RESTORATION

The third stage in the construction sequence is restoration which aims to restore all areas affected by the earthworks and channel re-alignment. The restoration recommendations shall be implemented after the completion of the works and in accordance with the restoration drawing as attached and design brief prepared by Palmer. Different restoration measures are specified for each region and delineated within the Restoration Plan which are the in-channel region, flood/erosion access setback and natural feature setback. The restoration principles and recommendations for these regions are as follows:

- All Regions
 - Decompaction of subsoil to a depth of 25 cm, by tilling or scarifying the soil in a perpendicular direction to the realigned watercourse
 - Incorporation of 7 cm of compost into the soils during tilling.
 - Application of 20 - 30 cm of uncompacted imported topsoil with 15% organic matter by dry weight.
- In-channel Region
 - Live Stakes are recommended at channel bends and revetments. Implementation is limited to July 1 to September 15.
 - Planting species in accordance with Restoration Plan
- Flood/Erosion Access Setback
 - Planting species in accordance with Restoration Plan
- Natural Feature Setback
 - Planting species in accordance with Restoration Plan
- Timing and Tending
 - Planting and seeding should be completed in the spring or fall. the spring season planting window is April to mid-May and the fall season window is mid-September to late October.
 - The assessment of plant stock should be conducted upon delivery to ensure that the material consists of appropriate native species in proper quantities.
 - Seeding should be completed immediately after the planting of woody vegetation but not during drought-prone summer months (Toronto and Region Conservation Authority, 2004).
 - Restoration plantings will require regular watering to facilitate the establishment of young trees, which are typically highly susceptible to water stress.
 - At a minimum, watering should occur when trees show signs of stress and during periods of natural drought conditions (e.g. if there is less than 25 mm of rain over a 30-day period during late spring to the end of summer).



5. CONCLUSIONS

In summary, the proposed channel re-alignment will reduce the floodplain on the subject property without having any negative impact to the upstream or downstream water surface elevation. The newly re-alignment channel will be designed using BMP and erosion mitigation measures to maintain the meander belt and prevent negative effects to infrastructure and property limits. Erosion and sediment control strategies are in place to perform the channel re-alignment and satisfy both TRCA and the local municipal criteria.

I trust that this memorandum is complete and to the satisfaction of the TRCA. If you have any questions or concerns, please do not hesitate to contact the undersigned at 905-944-0162 ext. 230.

Respectfully Submitted,
MASONGSONG ASSOCIATES ENGINEERING LIMITED

David Hoover, P.Eng
Senior Project Engineer

H:\PROJECTS\17\849\Design\17-849_Memo TRCA - Rainbow Creek Channel Re-Alignment - 20201123.doc

Attachments:

- Detailed Profile Output (Pre- Existing Model)
- Detailed Profile Output (Existing Model)
- Detailed Profile Output (Proposed Model)
- Pre-Existing Condition Plan (PEX)
- Existing Condition Plan (EX)
- Proposed Condition Plan (PR)
- Composite Plan (CP)
- Erosion Hazard Assessment
- Restoration Plan
- Tree Preservation Plan
- Channel Design Plan and Profile
- Channel Section
- Erosion and Sediment Control Plans
- USB Key containing modelling files



ESC STAGE 1 NOTES:

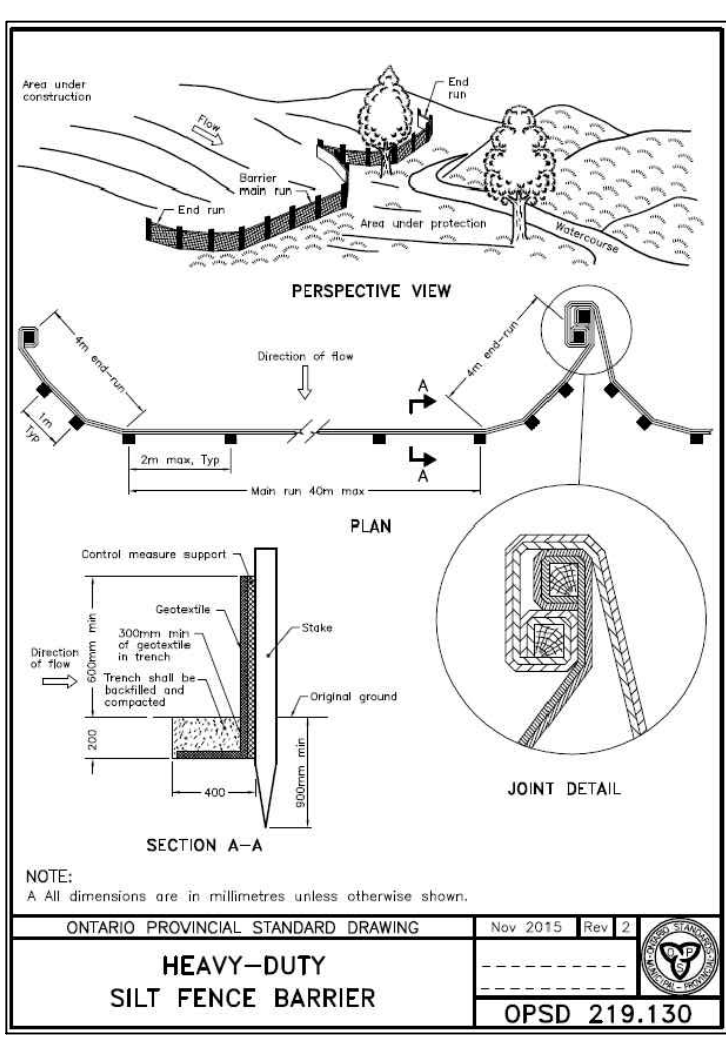
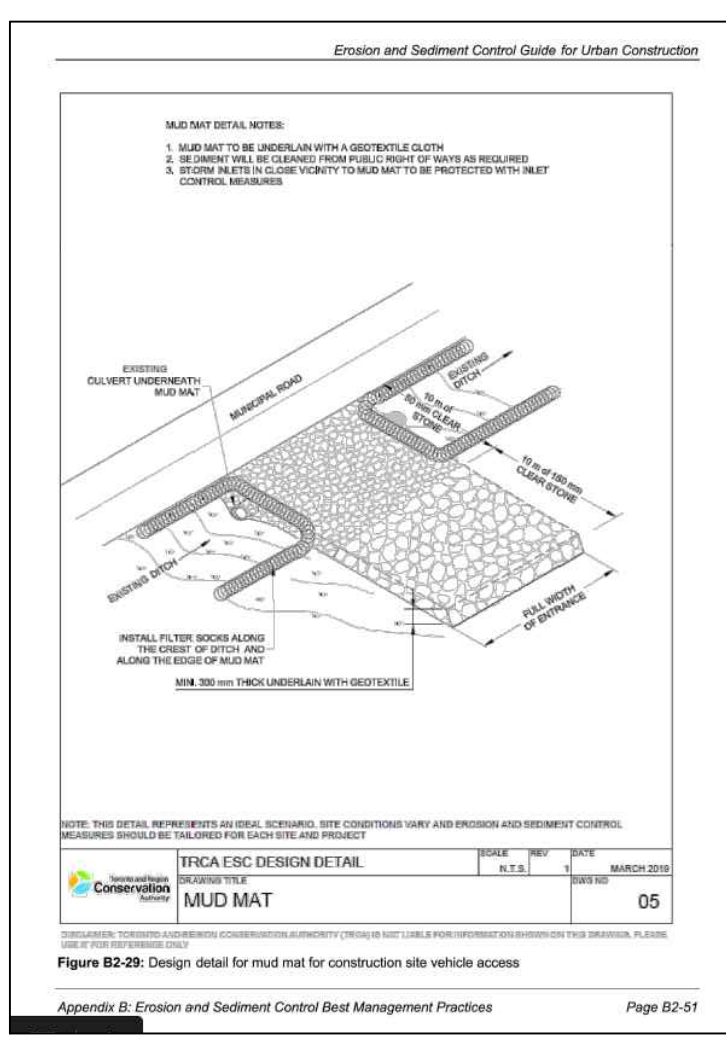
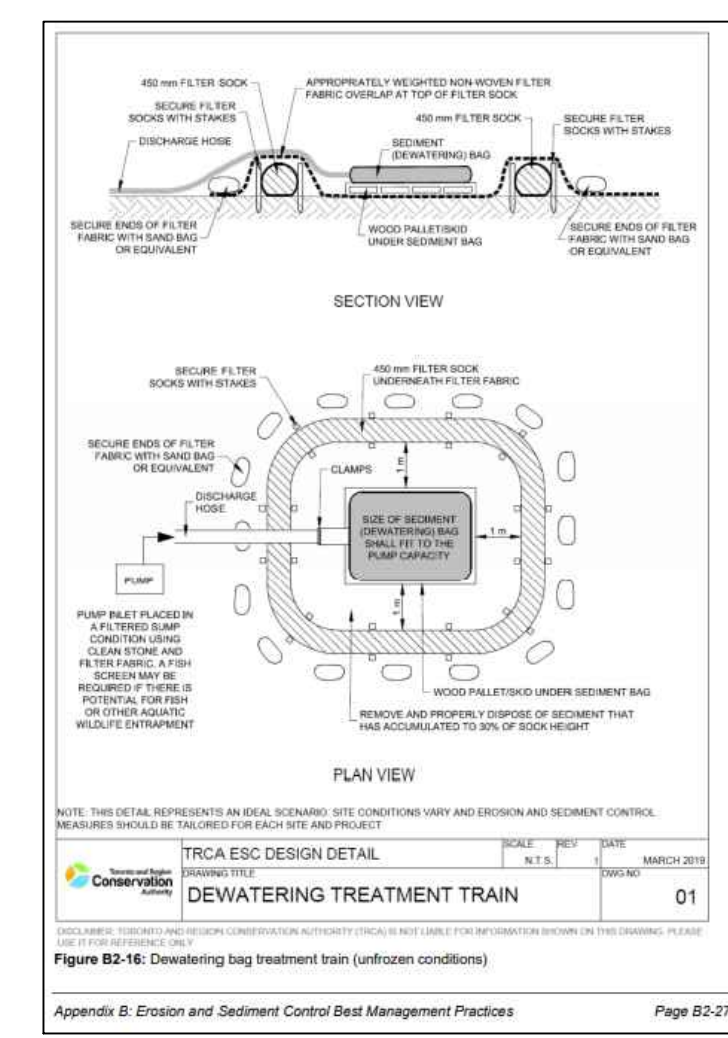
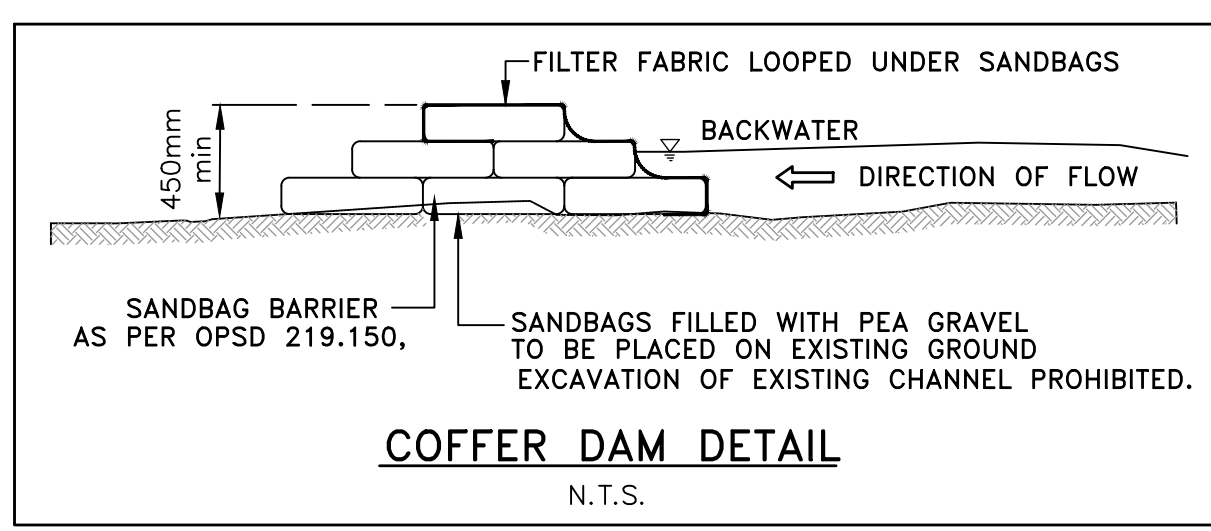
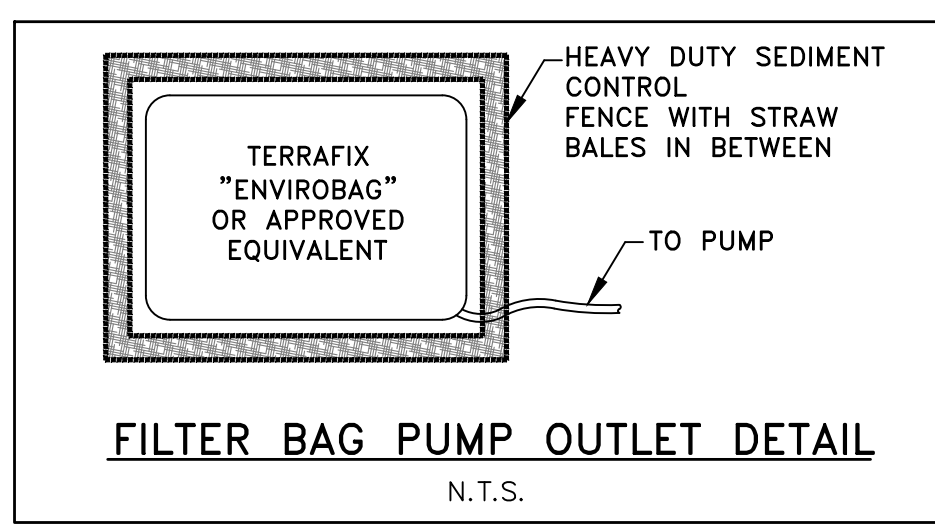
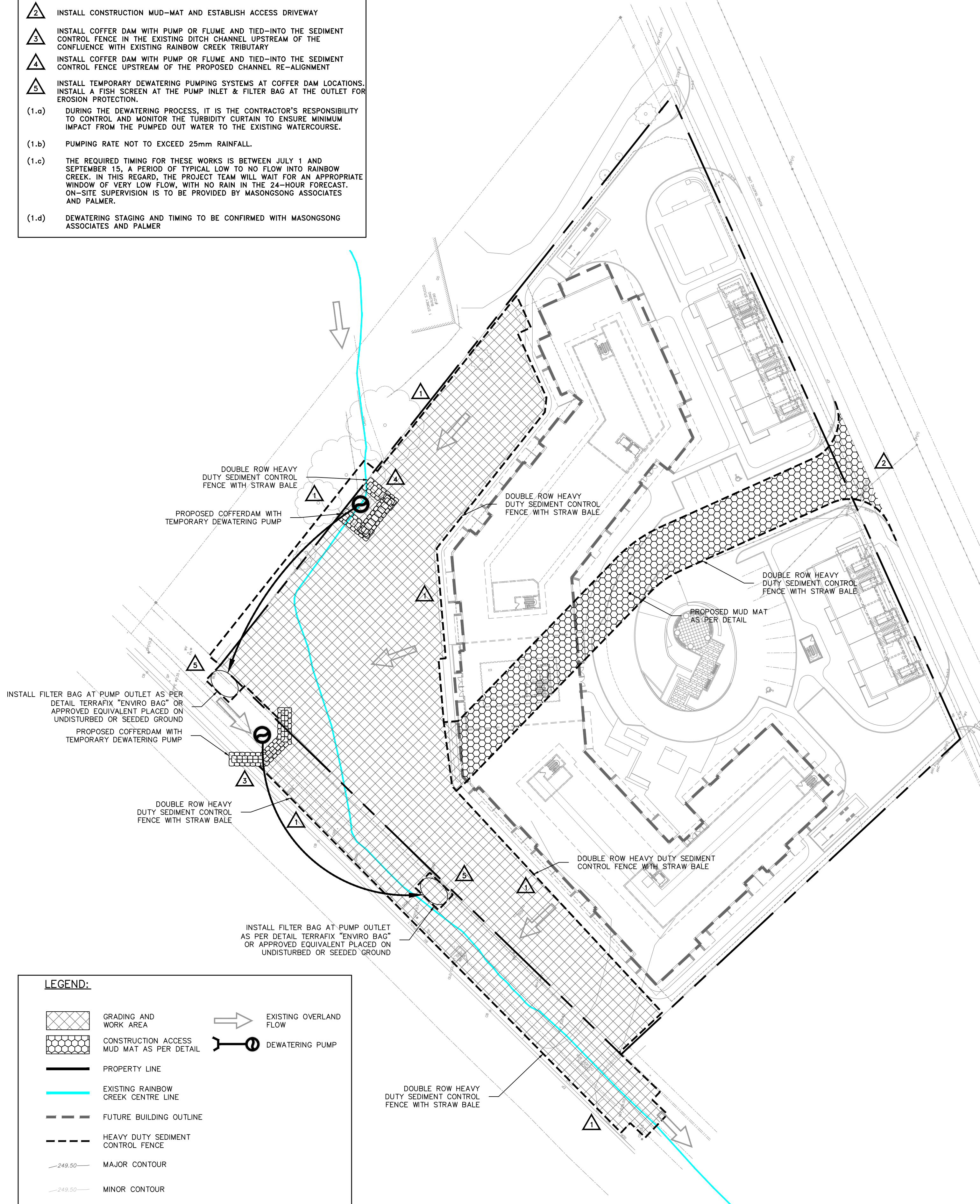
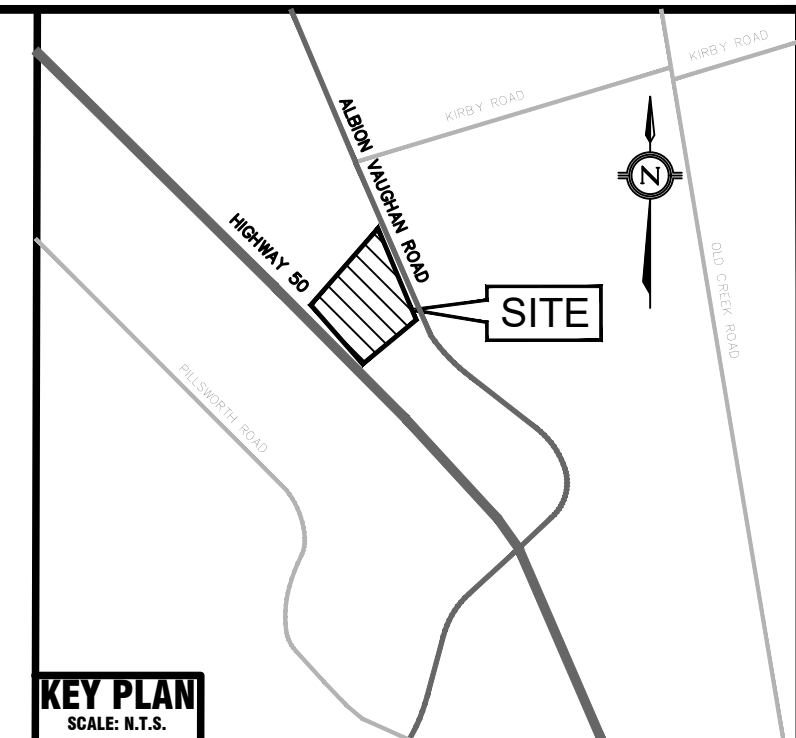
- ▲ INSTALL DOUBLE ROW HEAVY DUTY SEDIMENT CONTROL FENCE WITH STRAW BALES IN BETWEEN AROUND SITE WORK AREA AND THE PROPERTY LINE.
- (1.a) THE TORONTO REGION CONSERVATION AUTHORITY, THE DEPARTMENT OF FISHERIES AND OCEANS, THE CITY OF MARKHAM, AND OTHER INTERESTED PUBLIC AGENCIES, WILL BE NOTIFIED OF SCHEDULED SITE MEETINGS. THE PROJECT TEAM WILL MAKE ITSELF AVAILABLE TO MEET ON SITE WITH THESE AGENCIES TO REVIEW CONSTRUCTION PROGRESS THROUGHOUT THE PROJECT.
- (1.b) DETAILED PHOTOGRAPHIC RECORDS WILL BE KEPT THROUGHOUT THE CONSTRUCTION PROCESS.
- ▲ INSTALL CONSTRUCTION MUD-MAT AND ESTABLISH ACCESS DRIVEWAY
- ▲ INSTALL COFFER DAM WITH PUMP OR FLUME AND TIED-INTO THE SEDIMENT CONTROL FENCE IN THE EXISTING DITCH CHANNEL UPSTREAM OF THE CONFLUENCE WITH EXISTING RAINBOW CREEK TRIBUTARY
- ▲ INSTALL COFFER DAM WITH PUMP OR FLUME AND TIED-INTO THE SEDIMENT CONTROL FENCE UPSTREAM OF THE PROPOSED CHANNEL RE-ALIGNMENT
- ▲ INSTALL TEMPORARY DEWATERING PUMPING SYSTEMS AT COFFER DAM LOCATIONS. INSTALL A FISH SCREEN AT THE PUMP INLET & FILTER BAG AT THE OUTLET FOR EROSION PROTECTION.
- (1.a) DURING THE DEWATERING PROCESS, IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONTROL AND MONITOR THE TURBIDITY CURTAIN TO ENSURE MINIMUM IMPACT FROM THE PUMPED OUT WATER TO THE EXISTING WATERCOURSE.
- (1.b) PUMPING RATE NOT TO EXCEED 25mm RAINFALL.
- (1.c) THE REQUIRED TIMING FOR THESE WORKS IS BETWEEN JULY 1 AND SEPTEMBER 15, A PERIOD OF TYPICAL LOW TO NO FLOW INTO RAINBOW CREEK. IN THIS REGARD, THE PROJECT TEAM WILL WAIT FOR AN APPROPRIATE WINDOW OF VERY LOW FLOW, WITH NO RAIN IN THE 24-HOUR FORECAST. ON-SITE SUPERVISION IS TO BE PROVIDED BY MASONGSONG ASSOCIATES AND PALMER.
- (1.d) DEWATERING STAGING AND TIMING TO BE CONFIRMED WITH MASONGSONG ASSOCIATES AND PALMER

EROSION AND SEDIMENTATION CONTROL GENERAL NOTES

- 1. PROVIDE SILT FENCES AROUND THE PERIMETER OF THE SITE TO REDUCE SILT FROM LEAVING THE SITE.
- 2. PROVIDE SILT TRAPS AT CATCHBASINS UPON THEIR INSTALLATION TO REDUCE THE AMOUNT OF SILT ENTERING THE SEWER SYSTEM DURING CONSTRUCTION.
- 3. USE OF A "MUD MAD" OR TEMPORARY TRACKING CONTROL AT THE ENTRANCE OF THE SITE TO MINIMIZE MUD TRACKING FROM THE SITE. (OWNER SHALL CLEAN ADJACENT ROADS ON A REGULAR BASIS).
- 4. CONSTRUCT BULKHEADS IN THE DOWNSTREAM MANHOLE TO REDUCE SILT ENTERING THE STORM SEWER.
- 5. STABILIZE SITE AS SOON AS POSSIBLE BY RE-ESTABLISHING VEGETATIVE GROUND COVER AND AVOIDING BARE SOIL AREAS. ALL AREAS (INCLUDING STOCKPILES) WHILE SITE IMPROVEMENTS ARE NOT EXPECTED TO OCCUR IMMEDIATELY SHALL BE REVEGETATED WITH 100mm OF TOPSOIL AND HYDROSEEDING IN ACCORDANCE WITH O.P.S.D. 570 & 572
- 6. ALL DRAINAGE WORKS REQUIRE EROSION/SEDIMENT CONTROL SATISFACTORY TO THE APPROVAL AGENCIES DURING CONSTRUCTION PERIOD AND MUST BE MONITORED AND MAINTAINED ON A REGULAR BASIS TO ENSURE MAXIMUM BENEFIT AND MINIMUM SILT MIGRATION OFF-SITE.
- 7. ALL CONSTRUCTION VEHICLES TO ENTER AND LEAVE THE SITE AT APPROVED LOCATION ONLY AS INDICATED ON THIS PLAN.
- 8. ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES MAY BE REQUIRED AND SHALL BE INSTALLED AS DETERMINED BY THE CONSULTANT.
- 9. THE CONSTRUCTION PROCESS WILL BE REVIEWED AND APPROVED BY DEVELOPMENT ENGINEERING & OPERATIONS CENTRE AS PART OF THE ROAD OCCUPANCY PERMIT.

STANDARD ENVIRONMENTAL NOTES

- 1. SEDIMENT AND EROSION CONTROL MEASURES WILL BE IMPLEMENTED PRIOR TO, AND MAINTAINED DURING THE CONSTRUCTION PHASES, TO PREVENT ENTRY OF SEDIMENT INTO THE WATER.
- 2. THE EROSION AND SEDIMENT CONTROL STRATEGIES OUTLINED ON THE PLANS ARE NOT STATIC AND MAY NEED TO BE UPGRADED/AMENDED AS SITE CONDITIONS CHANGE TO PREVENT SEDIMENT RELEASES TO THE NATURAL ENVIRONMENT. THE TRCA ENFORCEMENT OFFICER SHOULD BE IMMEDIATELY CONTACTED SHOULD THE EROSION AND SEDIMENT CONTROL PLANS CHANGE FROM THE APPROVED PLANS.
- 3. ALL EROSION AND SEDIMENT CONTROL MEASURES SHOULD BE INSPECTED WEEKLY, AFTER EVERY RAINFALL AND SIGNIFICANT SNOW MELT EVENT, AND DAILY DURING PERIODS OF EXTENDED RAIN OR SNOWMELT.
- 4. ALL DAMAGED EROSION AND SEDIMENT CONTROL MEASURES SHOULD BE REPAIRED AND/OR REPLACED WITHIN 48 HOURS OF THE INSPECTION.
- 5. ALL ACTIVITIES, INCLUDING MAINTENANCE PROCEDURES, WILL BE CONTROLLED TO PREVENT THE ENTRY OF PETROLEUM PRODUCTS, DEBRIS, RUBBLE, CONCRETE OR OTHER DELETERIOUS SUBSTANCES INTO THE WATER. VEHICULAR REFUELING AND MAINTENANCE WILL BE CONDUCTED 30 METRES FROM THE WATER.
- 6. ALL DISTURBED AREAS WILL BE STABILIZED AND RESTORED WITH NATIVE/NON-INVASIVE SPECIES UPON COMPLETION OF THE WORK.
- 7. A REHABILITATION PLAN IS TO BE IMPLEMENTED TO RESTORE THE CONSTRUCTION SITE BACK TO ITS PRE-CONSTRUCTION STATE, OR BETTER.
- 8. ALL EXISTING GRADES WITHIN THE REGIONAL STORM FLOODPLAIN WILL BE MAINTAINED. ALL EXCESS FILL WILL BE REMOVED FROM THE REGIONAL STORM FLOODPLAIN.
- 9. THE CONTRACTOR SHALL MONITOR THE WEATHER SEVERAL DAYS IN ADVANCE OF THE ONSET OF THE PROJECT TO ENSURE THAT THE WORKS WILL BE CONDUCTED DURING FAVOURABLE WEATHER CONDITIONS. SHOULD AN UNEXPECTED STORM ARISE, THE CONTRACTOR WILL REMOVE ALL UNFIXED ITEMS FROM THE REGIONAL STORM FLOODPLAIN AND SLOPE THAT WOULD HAVE THE POTENTIAL TO CAUSE A SPILL/POLLUTION (I.E., FUEL TANKS, PORTA-POTTIES, MACHINERY) OR AN OBSTRUCTION TO FLOW (I.E. MACHINERY, EQUIPMENT). PRIOR TO FORECASTED PRECIPITATION EVENT, ALL ESC MEASURES TO BE INSPECTED AND CONFIRMED TO BE IN GOOD CONDITION.
- 10. AN ENVIRONMENTAL MONITOR WILL ATTEND THE SITE TO INSPECT ALL NEW CONTROLS, AS WELL AS ON A REGULAR BASIS OR FOLLOWING RAIN/SNOWMELT EVENT, TO MONITOR ALL WORKS, AND IN PARTICULAR WORKS RELATED TO EROSION AND SEDIMENT CONTROLS, DEWATERING OR UNWATERING, RESTORATION AND IN- OR NEAR- WATER WORK. SHOULD CONCERNS ARISE ON SITE THE ENVIRONMENTAL MONITOR WILL CONTRACT THE TRCA ENFORCEMENT OFFICER AS WELL AS THE PROPONENT.
- 11. ALL DEWATERING/UNWATERING SHALL BE TREATED AND RELEASED TO THE ENVIRONMENT AT LEAST 30 METRES FROM A WATER COURSE OR WETLAND AND ALLOWED TO DRAIN ONTO DISTURBED SOILS WITHIN THE WORK AREA. THESE CONTROL MEASURES SHALL BE MONITORED FOR EFFECTIVENESS AND MAINTAINED OR REVISED TO MEET THE OBJECTIVE OF PREVENTING THE RELEASE OF SEDIMENT LADEN WATER.



UTILITY NOTES:
THE POSITION OF POLE LINES, CONDUITS, WATERMANS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWING, 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 DAMAGE.

BENCHMARKS:
ELEVATIONS ARE REFERRED TO THE CITY OF BRAMPTON BENCHMARK No. 042010221, BEING A BRASS CAP IN CONCRETE APPROX. 21 m SOUTH OF CENTRELINE OF HAVSHOLE ROAD AND 11 m EAST OF CENTRELINE OF REGIONAL ROAD 50, IN FRONT OF GAS STATION/COFFEE SHOP, HAVING AN ELEVATION OF 220.967 m.

No.	DATE	ISSUED TO	REVISIONS	D.H.
1	01/14/21	ISSUED TO TRCA		

PROJECT: MULTIPLE RESIDENTIAL CONDO DEVELOPMENT
12148 ALBION VAUGHAN ROAD, TOWN OF CALEDON

CONSULTANT: MASONGSONG ASSOCIATES

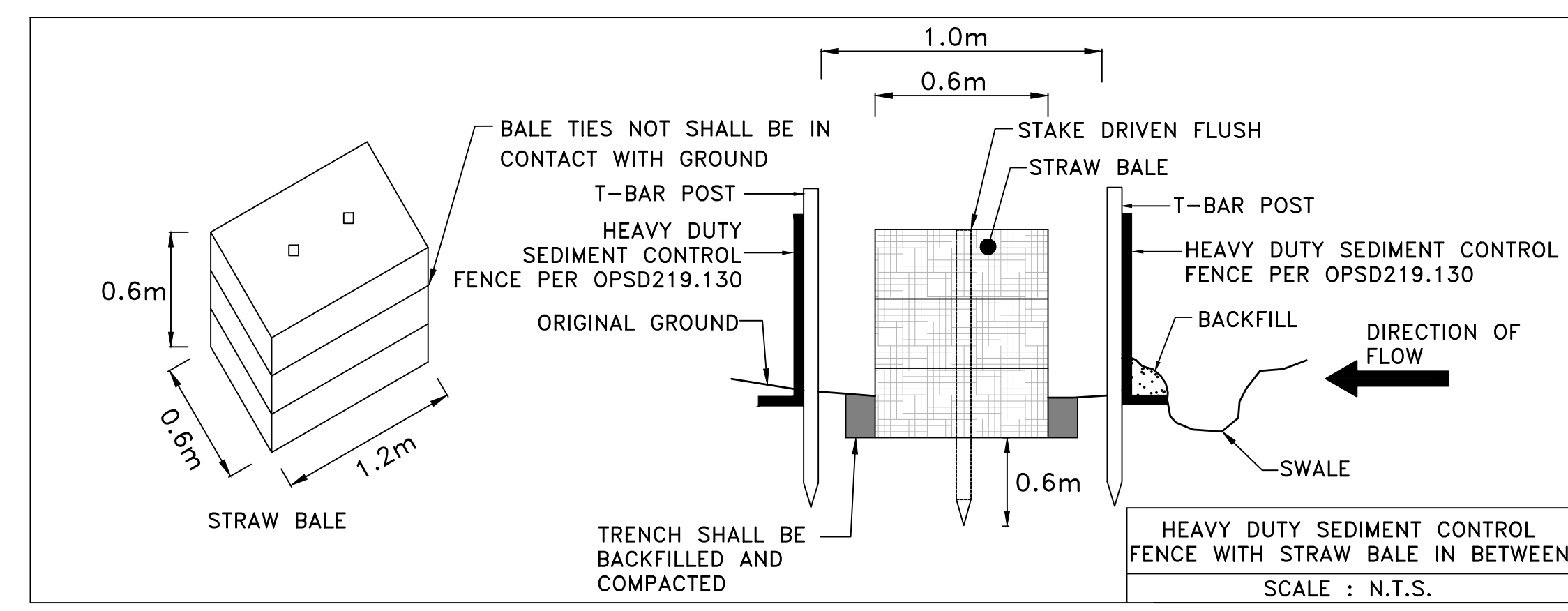
CONTRIBUTOR: Conservation for The Living City

TITLE: STAGE 1: EROSION AND SEDIMENT CONTROL

DESIGN: W.A. | **CHECKED:** D.H. | **CONTRACT No.:** 17-849

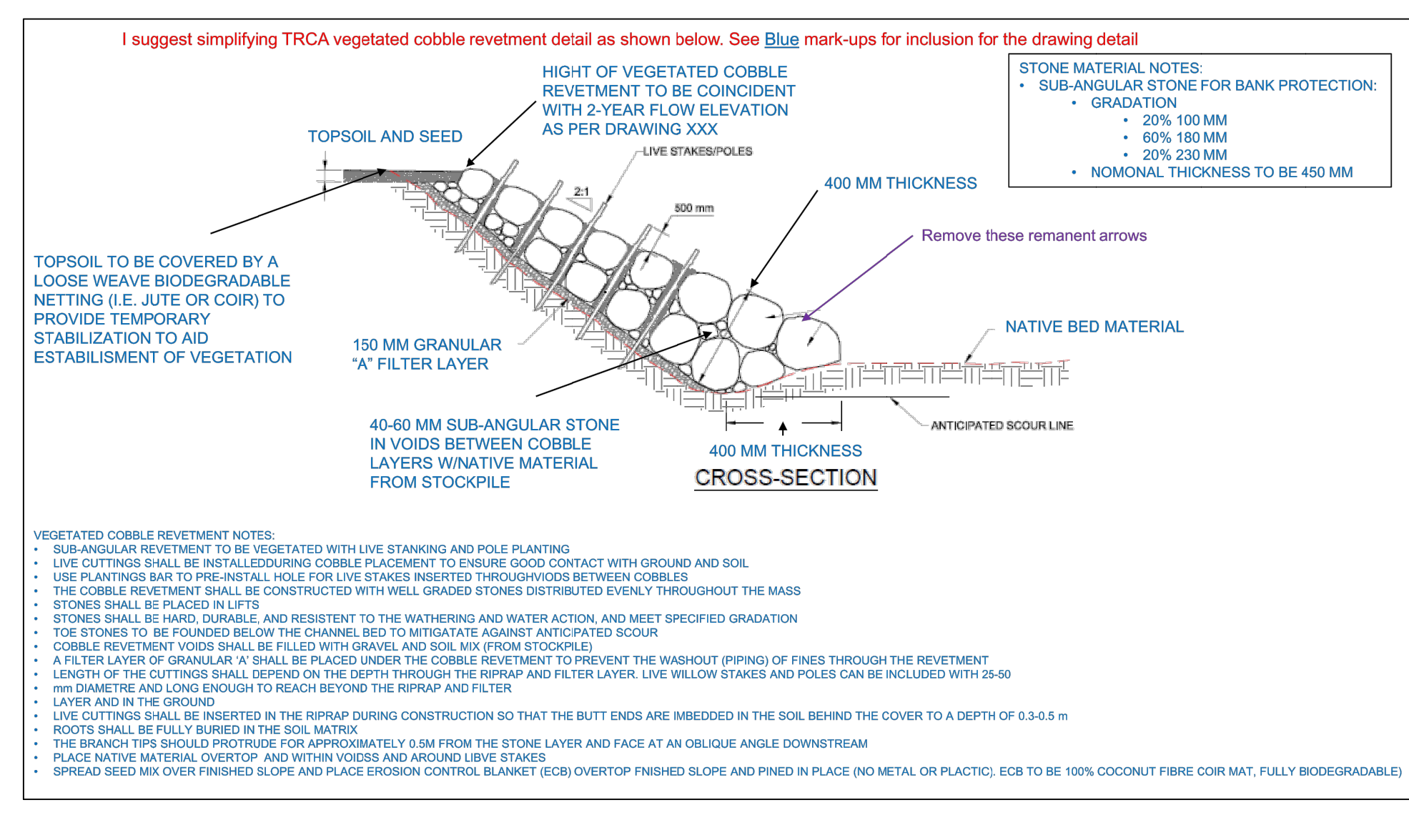
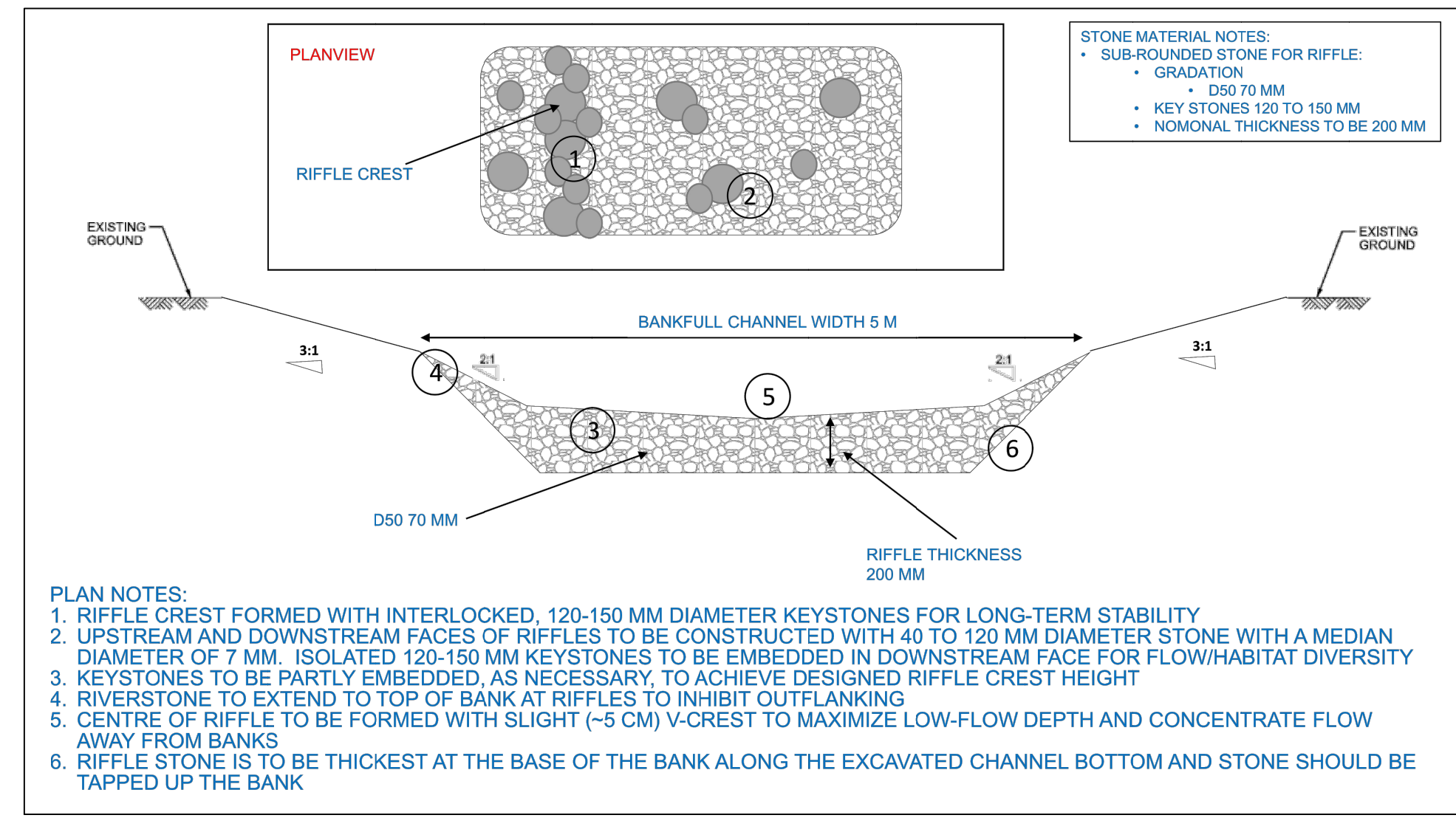
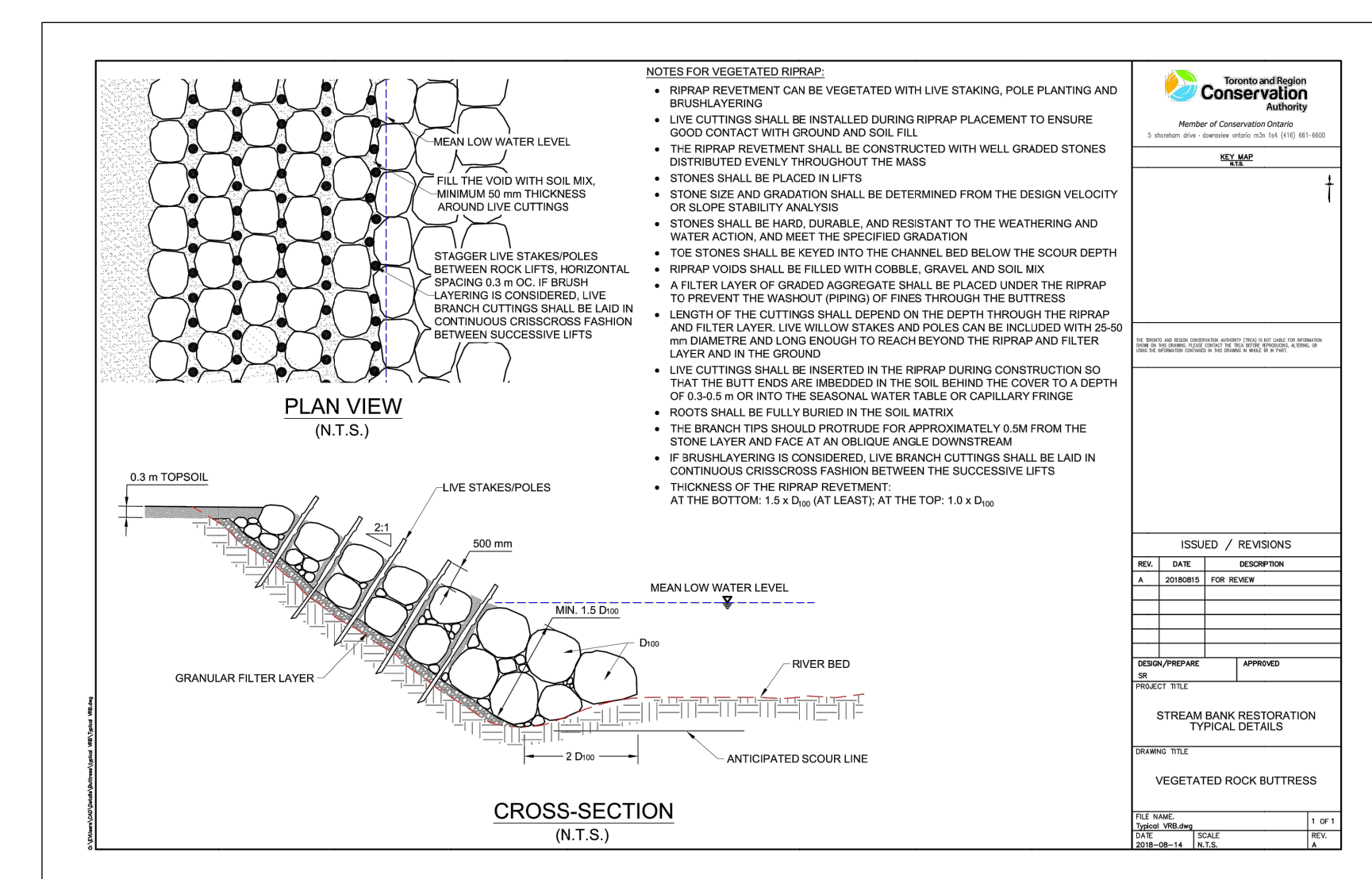
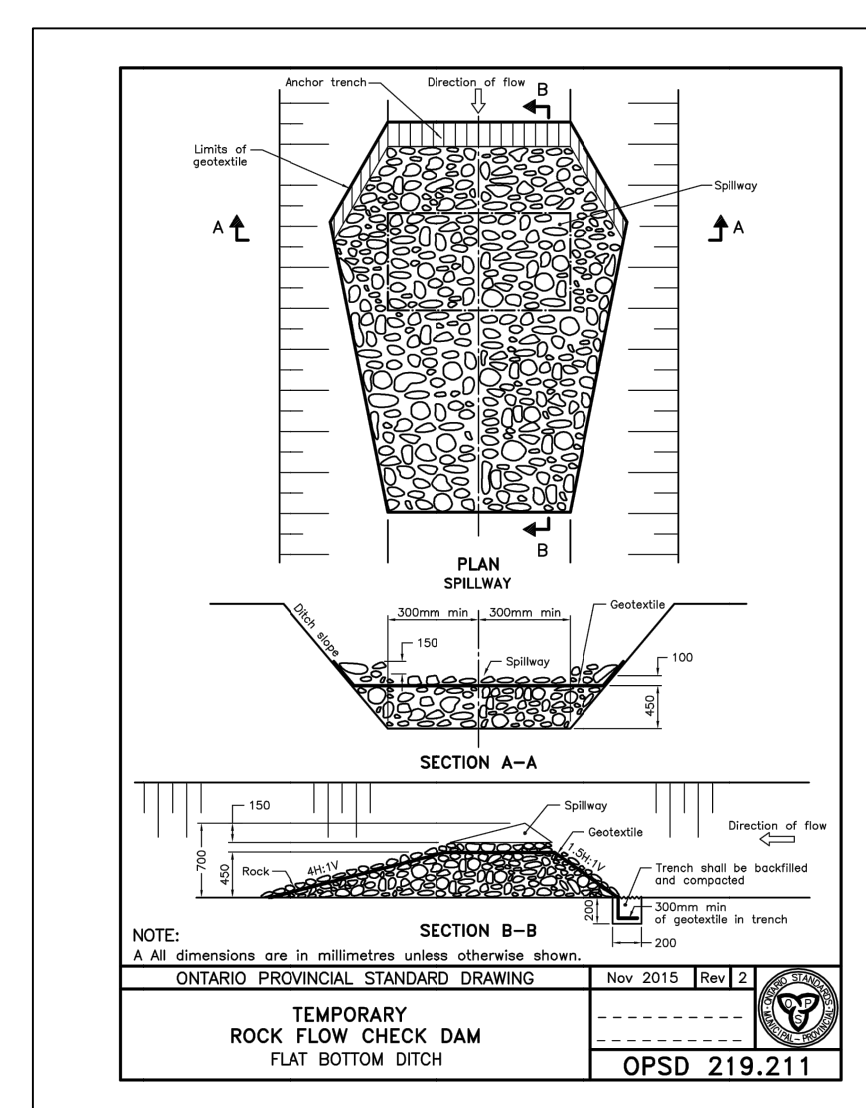
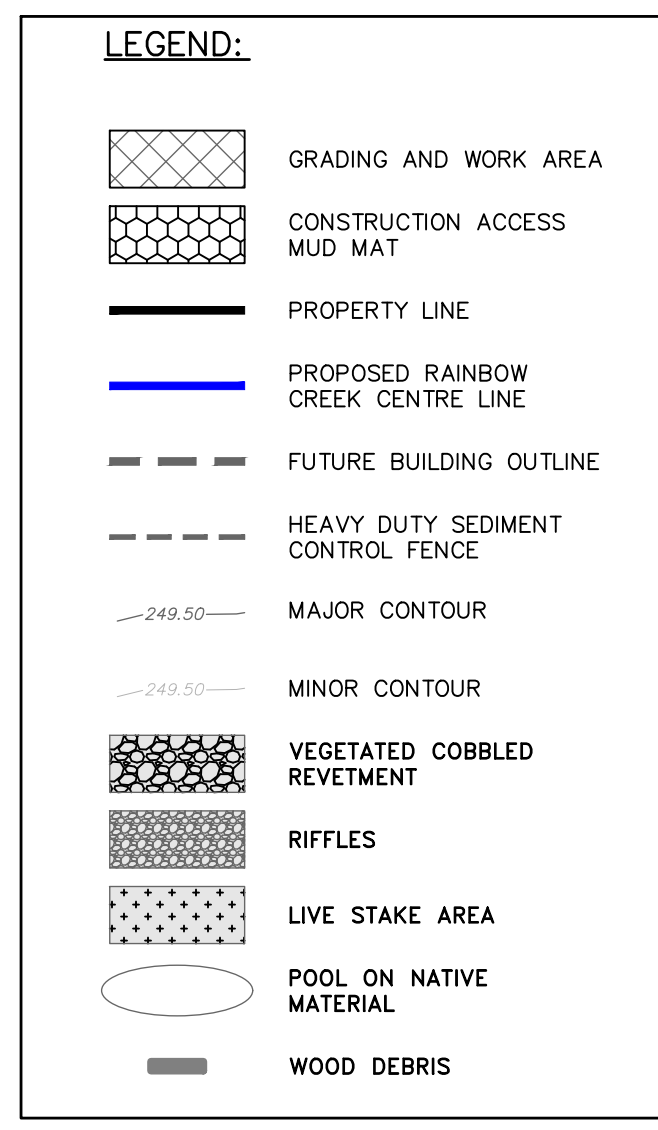
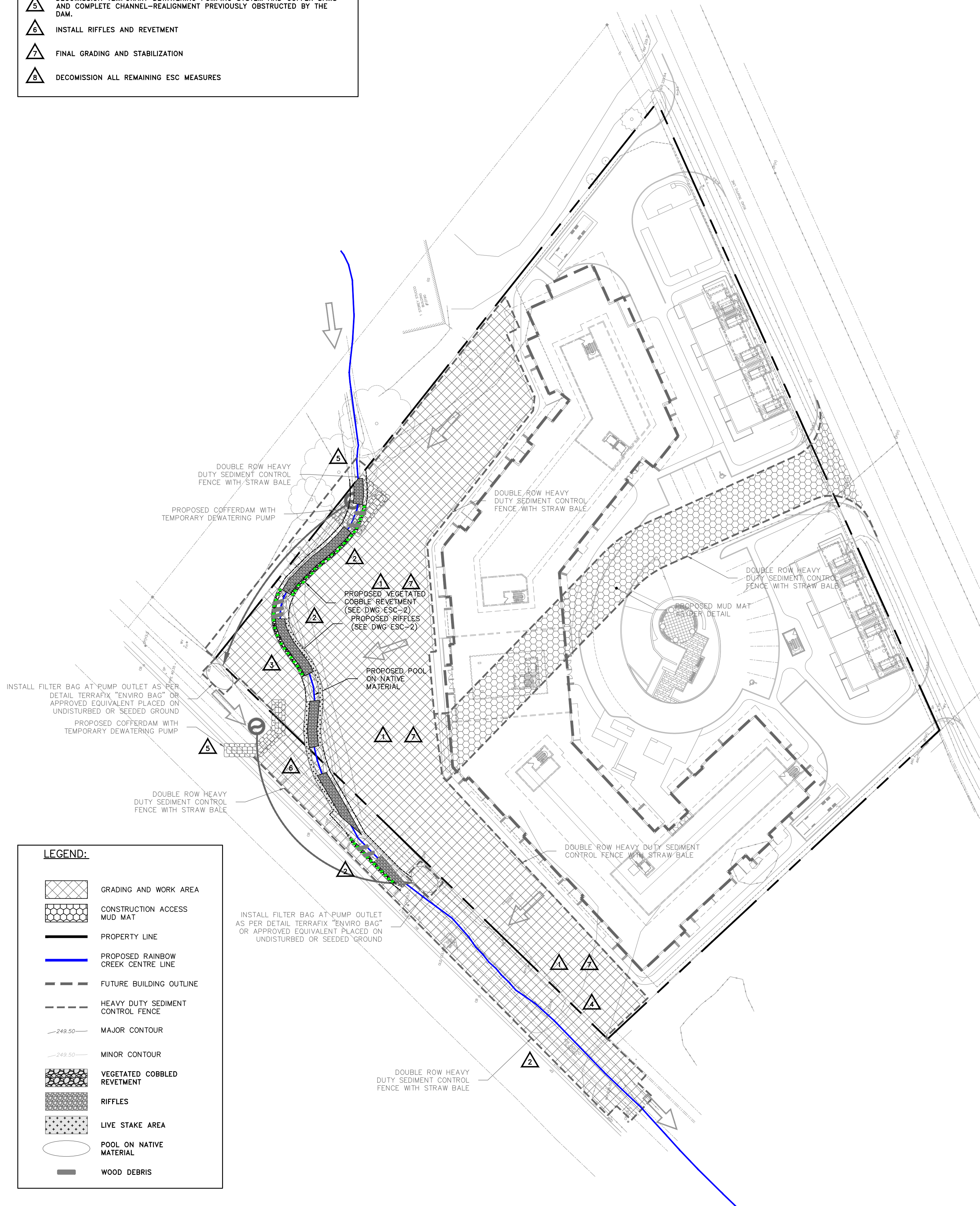
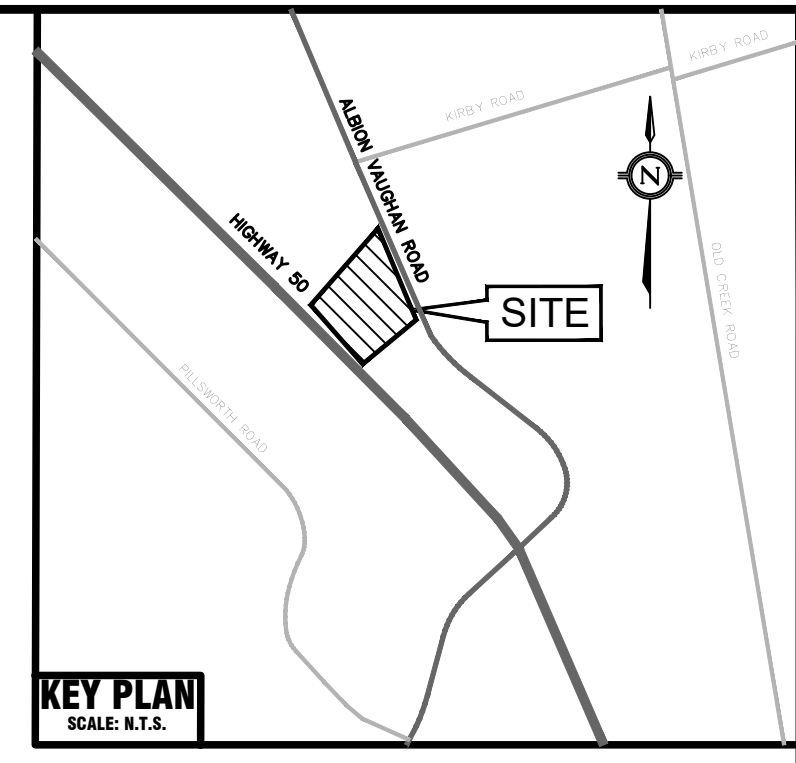
SCALE: 1:500 | **PLAN No.:** ESC-1

DATE: JANUARY 2021



ESC STAGE 2 NOTES:

- 1 CONDUCT EARTHWORKS OPERATIONS
- 2 RE-ALIGN CHANNEL AND STABILIZE BANKS WITH TERRAFIX
- 3 INSTALL ROCK CHECK DAMS AND EXCAVATE POOLS IN LOCATIONS AS SHOWN
- 4 REMOVE EXISTING ACCESS AND CULVERT
- 5 DECOMMISSION TEMPORARY DEWATERING PUMPING SYSTEM AND COFFER DAMS AND COMPLETE CHANNEL-REALIGNMENT PREVIOUSLY OBSTRUCTED BY THE DAM.
- 6 INSTALL RIFFLES AND REVETMENT
- 7 FINAL GRADING AND STABILIZATION
- 8 DECOMMISSION ALL REMAINING ESC MEASURES



UTILITY NOTES:
THE POSITION OF POLE LINES, CONDUITS, WATERMANS, SEWERS AND OTHER UNDERGROUND 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 DAMAGE.

BENCHMARK:
ELEVATIONS ARE REFERRED TO THE CITY OF BRAMPTON BENCHMARK No. 042010221, BEING A BRASS CAP IN CONCRETE APPROX. 21 m SOUTH OF CENTRELINE OF HAVESVILLE ROAD AND 11 m EAST OF CENTRELINE OF REGIONAL ROAD 50, IN FRONT OF GAS STATION/COFFEE SHOP, HAVING AN ELEVATION OF 220.967 m.

1 01/14/21 ISSUED TO TRCA				D.H.
No.	DATE	REVISIONS	STAMP	D.H.
PROJECT: MULTIPLE RESIDENTIAL CONDO DEVELOPMENT 12148 ALBION VAUGHAN ROAD, TOWN OF CALEDON				
CONSULTANT: MASONSGONS ASSOCIATES		180 KENNEDY ROAD SUITE 201 MIDLAND ONTARIO L4R 4B7 T: 905.446.8182 www.maso.ca		
CONSULTATION AUTHORITY: Conservation for The Living City 5 Shoreham Drive Downsview Ontario M3N 1S4 (416) 661-6600				
TITLE: STAGE 2: EARTHWORKS AND CHANNEL RE-ALIGNMENT				
DESIGN	W.A.	CHECKED	D.H.	CONTRACT No. 17-849
SCALE	1:500			PLAN No. ESC-2
DATE	JANUARY 2021			

GENERAL ESC NOTES:

1. EROSION AND SEDIMENT CONTROL (ESC) MEASURES WILL BE IMPLEMENTED PRIOR TO, AND MAINTAINED DURING CONSTRUCTION PHASES, TO PREVENT ENTRY OF SEDIMENT INTO THE WATER. ALL DAMAGED EROSION AND SEDIMENT CONTROL MEASURES SHOULD BE REPAIRED OR REPLACED WITHIN 48 HOURS OF INSPECTION OR BOTH.
2. ALL DISTURBED AREAS WILL BE MINIMIZED TO THE EXTENT POSSIBLE, AND TEMPORARILY OR PERMANENTLY STABILIZED OR RESTORED AS THE WORK PROGRESSES.
3. THE EROSION AND SEDIMENT CONTROL STRATEGIES OUTLINED ON THE PLANS ARE NOT STATIC AND MAY NEED TO BE UPGRADED/AMENDED AS SITE CONDITIONS CHANGE TO MINIMIZE SEDIMENT LAIDEN RUNOFF FROM LEAVING THE WORK AREA. IF THE PRESCRIBED MEASURES ON THE PLANS ARE NOT EFFECTIVE IN PREVENTING THE RELEASE OF A DELETERIOUS SUBSTANCE, THEN ALTERNATIVE MEASURES MUST BE IMPLEMENTED IMMEDIATELY TO MINIMIZE POTENTIAL ECOLOGICAL IMPACTS AND A TORONTO REGION CONSERVATION AUTHORITY ENFORCEMENT OFFICE SHOULD BE IMMEDIATELY CONTACTED. ADDITIONAL ESC MEASURES TO BE KEPT ON SITE AND USED AS NECESSARY.
4. ALL ACTIVITIES, INCLUDING MAINTENANCE PROCEDURES, WILL BE CONTROLLED TO PREVENT THE ENTRY OF PETROLEUM PRODUCTS, DEBRIS, RUBBLE, CONCRETE OR OTHER DELETERIOUS SUBSTANCES INTO THE WATER. VEHICULAR REFUELING AND MAINTENANCE AND REFUELING.

TRCA STANDARD NOTES:

1. ALL IN-WATER AND NEAR WATER WORKS WILL BE CONDUCTED IN THE DRY WITH APPROPRIATE EROSION AND SEDIMENT CONTROLS.
2. AN ENVIRONMENTAL MONITOR WILL ATTEND THE SITE TO INSPECT ALL NEW CONTROLS, AS WELL AS ON A REGULAR BASIS, OR FOLLOWING RAIN/SNOWMELT EVENT, TO MONITOR ALL WORKS, AND IN PARTICULAR WORKS RELATED TO EROSION AND SEDIMENT CONTROLS, DEWATERING OR UNWATERING, RESTORATION AND IN- OR NEAR- WATER WORKS. SHOULD CONCERNS ARISE ON SITE THE ENVIRONMENTAL MONITOR WILL CONTACT THE TRCA ENFORCEMENT OFFICER AS WELL AS THE PROPONENT.
3. ALL ACTIVITIES, INCLUDING MAINTENANCE PROCEDURES, WILL BE CONTROLLED TO PREVENT THE ENTRY OF PETROLEUM PRODUCTS, DEBRIS, RUBBLE, CONCRETE OR OTHER DELETERIOUS SUBSTANCES INTO THE WATER. VEHICULAR REFUELING AND MAINTENANCE WILL BE CONDUCTED A MINIMUM OF 30 METRES FROM THE WATER.
4. THE PROPONENT/CONTRACTOR SHALL MONITOR THE WEATHER SEVERAL DAYS IN ADVANCE OF THE ONSET OF THE PROJECT TO ENSURE THAT THE WORKS WILL BE CONDUCTED DURING FAVOURABLE WEATHER CONDITIONS. SHOULD AN UNEXPECTED STORM ARISE, THE CONTRACTOR WILL REMOVE ALL UNFIXED ITEMS FROM THE REGIONAL STORM FLOOD PLAN THAT WOULD HAVE THE POTENTIAL TO CAUSE A SPILL OR AN OBSTRUCTION TO FLOW, E.G. FUEL TANKS, PORTA- POTITIES, MACHINERY EQUIPMENT, CONSTRUCTION MATERIALS, ETC.
5. ALL DEWATERING/UNWATERING SHALL BE TREATED AND RELEASED TO THE ENVIRONMENT AT LEAST 30 METRES FROM A WATERCOURSE OR WETLAND AND ALLOWED TO DRAIN THROUGH A WELL-VEGETATED AREA. NO DEWATERING EFFLUENT SHALL BE SENT DIRECTLY TO ANY WATERCOURSE, WETLAND OR FOREST, OR ALLOWED TO DRAIN ONTO DISTURBED SOILS WITHIN THE WORK AREA. THESE CONTROL MEASURES SHALL BE MONITORED FOR EFFECTIVENESS AND MAINTAINED OR REVISED TO MEET THE OBJECTIVE OF PREVENTING THE RELEASE OF SEDIMENT LADEN WATER.
6. ALL ACCESS TO THE WORK SITE SHALL BE FROM EITHER SIDE OF THE WATERCOURSE. NO EQUIPMENT OR VEHICLES ARE PERMITTED TO CROSS THROUGH THE WATERCOURSE UNLESS APPROVED BY TRCA.
7. IN ORDER TO COMPLY WITH THE MIGRATORY BIRDS CONVENTION ACT AND ENDANGERED SPECIES ACT, ALL VEGETATION REMOVAL (INCLUDING TREES) MUST BE COMPLETED BETWEEN JULY 1 TO SEPTEMBER 15.
8. TO PROTECT LOCAL FISH POPULATIONS DURING THEIR SPawning, NURSERY AND MIGRATORY PERIODS, IN- WATER/NEAR-WATER ACTIVITIES, MAY ONLY OCCUR DURING THE COLD WATER CONSTRUCTION TIMING WINDOW.
9. AN ENVIRONMENTAL MONITOR WILL BE ON SITE, AND PROVIDE ADVICE, TO ENSURE THAT ACTIVITIES THAT COULD HAVE A NEGATIVE IMPACT TO THE NATURAL ENVIRONMENT ARE EFFECTIVELY MITIGATED AS CONSTRUCTION PROCEEDS. THE ENVIRONMENTAL MONITOR SHALL NOTIFY THE TRCA ENFORCEMENT OFFICER AND PROJECT MANAGER IF AN ISSUE ARISES.

OTHER EROSION AND SEDIMENT CONTROL NOTES:

1. PLEASE REFER TO ESC GUIDELINE FOR URBAN CONSTRUCTION (DECEMBER 2006) FOR THE DESIGN AND DESIGN ALTERATION OF ESC MEASURES.
2. ANY SEDIMENT SPILL FROM THE SITE SHOULD BE REPORTED TO MINISTRY OF ENVIRONMENT (SPILL ACTION CENTER) AT 1-800-268-6000.
3. THE CONTRACTOR SHALL MONITOR WEATHER FORECASTS TO ENSURE THAT THE WORKS WILL BE CONDUCTED IN FAVOURABLE WEATHER. THE CONTRACTOR IS RESPONSIBLE FOR REMOVING ALL CONSTRUCTION EQUIPMENT AND MATERIALS THAT WOULD HAVE POTENTIAL TO CAUSE A SPILL OR OBSTRUCTION (I.E. FUEL TANKS, PORTABLE TOILETS, MACHINERY, ETC.), FROM THE 100 YEAR FLOODPLAIN IN THE CASE OF A LARGE STORM EVENT.
4. AN AFTER-HOURS CONTACT NUMBER IS TO BE VISIBLY POSTED ON-SITE FOR EMERGENCIES. ALL THE PLANS SHOULD HAVE NAME AND CONTACT INFO OF THE PERSON RESPONSIBLE FOR ESC MEASURES.
5. ALL NEAR OR IN-WATER WORKS SHALL BE COMPLETED WITHIN THE TIMING WINDOW SPECIFIED BY THE DFO, BETWEEN JULY 1 TO SEPTEMBER 15, UNLESS THE APPROPRIATE APPROVAL AGENCIES HAVE PROVIDED PRIOR WRITTEN APPROVAL. TO EXTENSION OF THE TIMING WINDOW, THE CONTRACTOR SHALL PLAN AND IMPLEMENT THEIR ACTIVITIES TO ENSURE ADHERENCE TO THE TIMING WINDOW RESTRICTIONS.
6. TEMPORARY SEDIMENT CONTROL FENCE TO BE INSTALLED ON THE DOWN SLOPE SIDE OF PITS AND IN TRENCHING LOCATIONS WHERE GRADES SLOPE TOWARD THE NATURAL SYSTEMS OR CATCH BASINS TO ENSURE.

GENERAL NOTES

- THE FOLLOWING RESTORATION RECOMMENDATIONS FOLLOW THE PRACTICAL OBJECTIVES FOR THE REVETMENT AND THE RESTORATION METHODS IN THE TRCA GUIDELINE FOR DETERMINING ECOSYSTEM COMPENSATION (TORONTO AND REGION CONSERVATION AUTHORITY, 2018).
- RESTORATION EFFORTS WILL AIM TO RESTORE THE REALIGNED ROBINSON CREEK AND THE REDESIGNED FLOODPLAIN.
- RESTORATION PLANTINGS WILL BE IMPLEMENTED FOLLOWING THE COMPLETION OF THE WATERCOURSE REALIGNMENT.
- THE SPECIES TO BE PLANTED AS PART OF THE RESTORATION EFFORTS ARE NATIVE TO THE REGION AND SUITABLE TO THE SITE CONDITIONS.
- ALL TREES AND WOODY DEBRIS FROM REMOVED DUE TO SITE DISTURBANCE SHOULD BE KEPT ON-SITE AND DISTRIBUTED THROUGHOUT THE SITE TO PROVIDE WILDLIFE HABITAT OPPORTUNITIES, AWAY FROM THE ACTIVE FLOW CHANNEL, AFTER TO COMPLETION OF RESTORATION PLANTINGS.
- IF OF SMALL ENOUGH DIAMETER, TREE MATERIAL REMOVED DURING SITE CLEARING COULD BE USED AS EMBEDDED WOODY DEBRIS TO BE INCORPORATED INTO THE CHANNEL REALIGNMENT DESIGN.

SOIL AMENDMENTS

- WITHIN THE REDESIGNED FLOODPLAIN, INCLUDING THE NATURAL FEATURE SETBACK AND FLOOD/EROSION HAZARD ACCESS SETBACK, SOILS ARE TO BE IMPROVED AFTER CONSTRUCTION WORKS BY:
 - DECOMPACTION OF SUBSOIL TO A DEPTH OF 25 CM, BY TILLING OR SCARIFYING THE SOIL IN A PERPENDICULAR DIRECTION TO THE REALIGNED WATERCOURSE.
 - INCORPORATION OF 7 CM OF COMPOST INTO THE SOILS DURING TILLING.
 - APPLICATION OF 20 - 30 CM OF UNCOMPACTED IMPORTED TOPSOIL WITH 15% ORGANIC MATTER BY DRY WEIGHT.

IN-CHANNEL RESTORATION

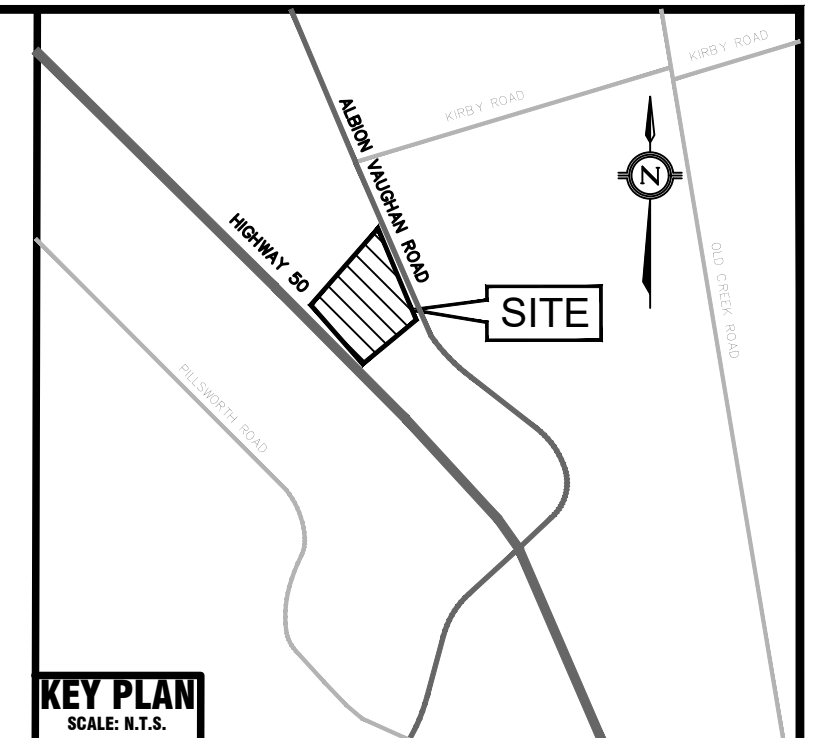
- LIVE STAKES (BRANCH CUTTINGS FROM LIVE SHRUBS) HAVE BEEN RECOMMENDED TO BE PLACED IN THE BENDS AND VEGETATED ROCK REVETMENT PORTIONS OF THE ROBINSON CREEK RE-ALIGNMENT.
- LIVE STAKES ARE TO BE PLANTED IN GROUPS OF 10/SPECIES AT 0.3 M ON-CENTRE SPACING.
- LIVE STAKES ARE RECOMMENDED TO BE 25 - 75 MM DIAMETER STAKES, TO BE HAND PLACED BETWEEN THE STONE REVETMENT/RIP-RAP.
- STAKES SHOULD BE BURIED >0.5 M BELOW THE RIP-RAP, ENSURING PLACEMENT WITHIN THE SOIL MATRIX AND SEASONAL WATER TABLE.
- CERTIFIED SOILS SHOULD BE USED TO FILL THE REMAINING SPACE IN EACH PLANTING HOLE.
- THE TIMING WINDOW FOR CONDUCTING ANY IN-WATER OR NEAR-WATER WORKS IS JULY 1 TO SEPTEMBER 15.

LIVE STAKE RESTORATION SPECIES

Common Name	Scientific Name	Density	Quantity
Alternate-leaved Dogwood	<i>Cornus alternifolia</i>	1 x 1 m	50
Red-osier Dogwood	<i>Cornus sericea</i>	1 x 1 m	40
Common Elderberry	<i>Sambucus canadensis</i>	1 x 1 m	15
Sandbar Willow	<i>Salix exigua</i>	1 x 1 m	60
Bebb's Willow	<i>Salix bebbiana</i>	1 x 1 m	60

NATURAL FEATURE SETBACK RESTORATION

- THE NATURAL FEATURE SETBACK IS TO BE SEEDED AND PLANTED TO BUFFER THE WATERCOURSE/NATURAL FEATURES FROM THE DEVELOPMENT.
- THE NATURAL FEATURE SETBACK IS TO BE SEEDED AT A RATE OF 25 KGS/HA WITH AN EARLY SUCCESSION WET MEADOWSEED MIX THAT ALIGNS WITH THE TRCA SEED MIX GUIDELINES (TORONTO AND REGION CONSERVATION AUTHORITY, 2004; CREDIT VALLEY CONSERVATION AUTHORITY, 2014).
- THE EARLY SUCCESSION WET MEADOW MIX (CVC 6) INCLUDES:
 - BEBB'S SEDGE (CAREX BEBBI) 5%
 - PURPLE STEMMED ASTER (ASTER PUNICEUS) 1%
 - FOWL BLUEGRASS (POA PALUSTRIS) 25%
 - FOX SEDGE (CAREX VULPINOIDEA) 25%
 - GREAT BLUE LOBELIA (LOBELIA SIPHILITICA) 1%
 - NEW ENGLAND ASTER (ASTER NOVAE-ANGLIAE) 1%
 - PATH RUSH (JUNCUS TENUIS) 3%
 - CANADA GOLDENROD (SOLIDAGO CANADENSIS) 2%
 - SOFT RUSH (JUNCUS EFFUSUS) 5%
 - STALK-GRAIN SEDGE (CAREX STIPATA) 4%
 - TALL MANNA GRASS (GLYCERIA GRANDIS) 2%
 - VIRGINIA WILD RYE (ELYMUS VIRGINICUS) 25%
 - WILD BERGAMOT (MONARDA FISTULOSA) 1%
- TO ASSIST IN ESTABLISHMENT AND PROMOTE BIOMASS, THE PLANTING AREA SHOULD ALSO BE SEEDED WITH A NURSE CROP OF COMMON OATS (AVENA SATIVA) OR BUCKWHEAT (FAGOPYRUM ESCULENTUM) AT A RATE OF 25 KGS/HA.
- SUBSEQUENTLY, THE NATURAL FEATURE SETBACK IS TO BE PLANTED WITH TREES AND SHRUBS ARE IN GROUPS OF APPROXIMATELY 10/SPECIES, AT A DENSITY OF 2.45 M X 2.45 M (6 M²), AND SHRUBS AT A 1 M X 1 M (1 M²) SPACING.
- REPLACEMENT TREE AND SPECIES ARE RECOMMENDED BE NATIVE TO TRCA'S WATERSHED, AND TARGETED TO PROVIDE NATURAL, SELF-SUSTAINING VEGETATION (TORONTO AND REGION CONSERVATION AUTHORITY, 2014).
- THE NATURAL FEATURE SETBACK AND FLOODPLAIN AREA TO BE RESTORED IS APPROXIMATELY 2,000 M² AND THE RECOMMENDED PLANTING SPACING WOULD ALLOW PLANTING OF ABOUT 330 TREES OR 2,000 SHRUBS, OR COMBINATION THEREOF.
- BASED ON THESE EXISTING SITE CONDITIONS, THE RECOMMENDED PLANTING PRESCRIPTION INCLUDES:



FLOOD/EROSION ACCESS SETBACK

- THE 10 M FLOOD/EROSION ACCESS SETBACK IS TO BE SEEDED AT A RATE OF 25 KGS/HA WITH A NATIVE GRASS SEED MIX THAT ALIGNS WITH THE TRCA SEED MIX GUIDELINES (TORONTO AND REGION CONSERVATION AUTHORITY, 2004). THE RECOMMENDED GRASS SEED MIX INCLUDES:
 - CANADA WILD RYE (ELYMUS CANADENSIS) - 20%
 - SWITCHGRASS (PANICUM VIRGATUM) - 20%
 - FOWL BLUEGRASS (POA PALUSTRIS) - 20%
 - BIG BLUESTEM (ANDROPOGON GERARDII) - 10%
 - LITTLE BLUESTEM (ANDROPOGON SCOPARIUS) - 10%
 - FOX SEDGE (CAREX VULPINOIDEA) - 10%
- SIMILAR TO THE NATURAL FEATURE SETBACK PLANTING AREA, THE 10 M FLOOD/EROSION ACCESS SETBACK SHOULD ALSO BE SEEDED WITH A NURSE CROP OF COMMON OATS OR BUCKWHEAT AT A RATE OF 25 KGS/HA.

TIMING

- PLANTING AND SEEDING SHOULD BE COMPLETED IN THE SPRING OR FALL. THE SPRING SEASON PLANTING WINDOW IS APRIL TO MID-MAY AND THE FALL SEASON WINDOW IS MID-SEPTEMBER TO LATE OCTOBER.
- THE ASSESSMENT OF PLANT STOCK SHOULD BE CONDUCTED UPON DELIVERY TO ENSURE THAT THE MATERIAL CONSISTS OF APPROPRIATE NATIVE SPECIES IN PROPER QUANTITIES.
- SEEDING SHOULD BE COMPLETED IMMEDIATELY AFTER THE PLANTING OF WOODY VEGETATION BUT NOT DURING DROUGHT-PRONE SUMMER MONTHS (TORONTO AND REGION CONSERVATION AUTHORITY, 2004).

TENDING FOR RESTORATION PLANTINGS

- RESTORATION PLANTINGS WILL REQUIRE REGULAR WATERING TO FACILITATE THE ESTABLISHMENT OF YOUNG TREES, WHICH ARE TYPICALLY HIGHLY SUSCEPTIBLE TO WATER STRESS.
- AT A MINIMUM, WATERING SHOULD OCCUR WHEN TREES SHOW SIGNS OF STRESS AND DURING PERIODS OF NATURAL DROUGHT CONDITIONS (E.G. IF THERE IS LESS THAN 25 MM OF RAIN OVER A 30-DAY PERIOD DURING LATE SPRING TO THE END OF SUMMER).

NATURAL FEATURE SETBACK TREE PLANTING PRESCRIPTION

Common Name	Scientific Name	Quantity	Size
Trees			
Silver Maple	<i>Acer saccharinum</i>	50	2 - 4 gallon pot
Paper Birch	<i>Betula papyrifera</i>	50	2 - 4 gallon pot
Hackberry	<i>Celtis occidentalis</i>	45	2 - 4 gallon pot
Tamarack	<i>Larix laricina</i>	40	100 - 150 cm (height)
Eastern Cottonwood	<i>Populus deltoides</i>	50	2 - 4 gallon pot
American Elm*	<i>Ulmus americana</i>	45	2 - 4 gallon pot
Shrubs			
Speckled Alder	<i>Alnus rugosa</i>	100	2 gallon pot
Red-osier Dogwood	<i>Cornus sericea</i>	100	2 gallon pot
Chokecherry	<i>Prunus virginiana</i>	50	2 gallon pot
Staghorn Sumac	<i>Rhus typhina</i>	50	2 gallon pot

* Note: Dutch Elm Disease resistant cultivars recommended.

UTILITY NOTES:

THE POSITION OF POLE LINES, CONDUITS, WATERMANS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWING, 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 DAMAGE.

BENCHMARKS

ELEVATIONS ARE REFERRED TO THE CITY OF BRAMPTON BENCHMARK No. 04210221, BEING A BRASS CAP IN CONCRETE APPROX. 21 m SOUTH OF CENTRELINE OF NASHVILLE ROAD AND 11 m EAST OF CENTRELINE OF REGIONAL ROAD 50, IN FRONT OF GAS STATION/COFFEE SHOP, HAVING AN ELEVATION OF 220.967 m.

No.	DATE	ISSUED TO	REVISIONS	D.H.
1	01/14/21	ISSUED TO TRCA		

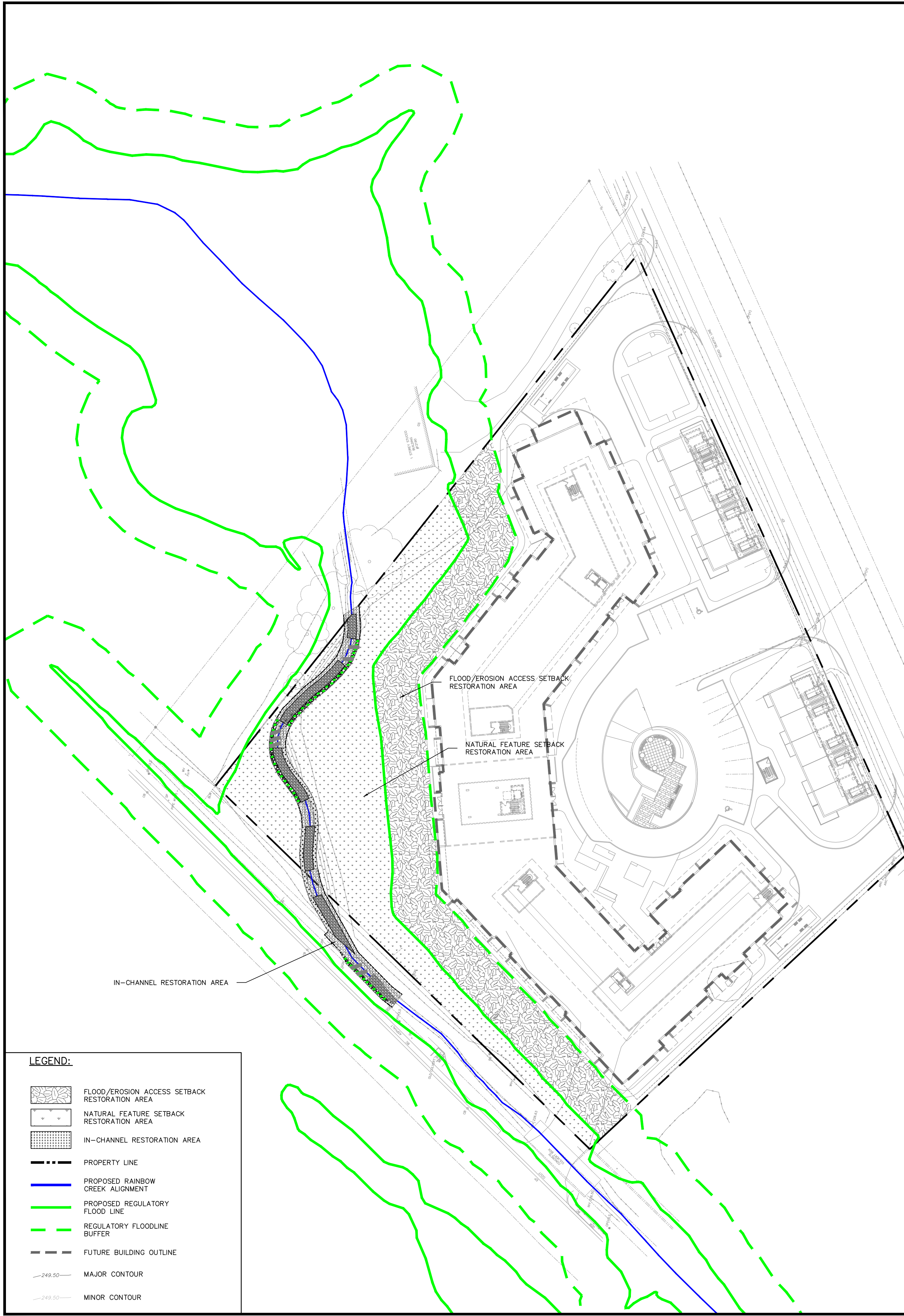
DESIGN	W.A.	CHECKED	D.H.	CONTRACT No. 17-849
SCALE	1:500			PLAN No. ESC-3
DATE	JANUARY 2021			

PROJECT: **MULTIPLE RESIDENTIAL CONDO DEVELOPMENT**
12148 ALBION VAUGHAN ROAD, TOWN OF CALEDON

CONSULTANT: **MASONGSON ASSOCIATES**
180 KENNEDY ROAD, SUITE 201, MARKHAM, ONTARIO L3R 9V7
TEL: 905-947-1812
WWW.MASONGSON.COM

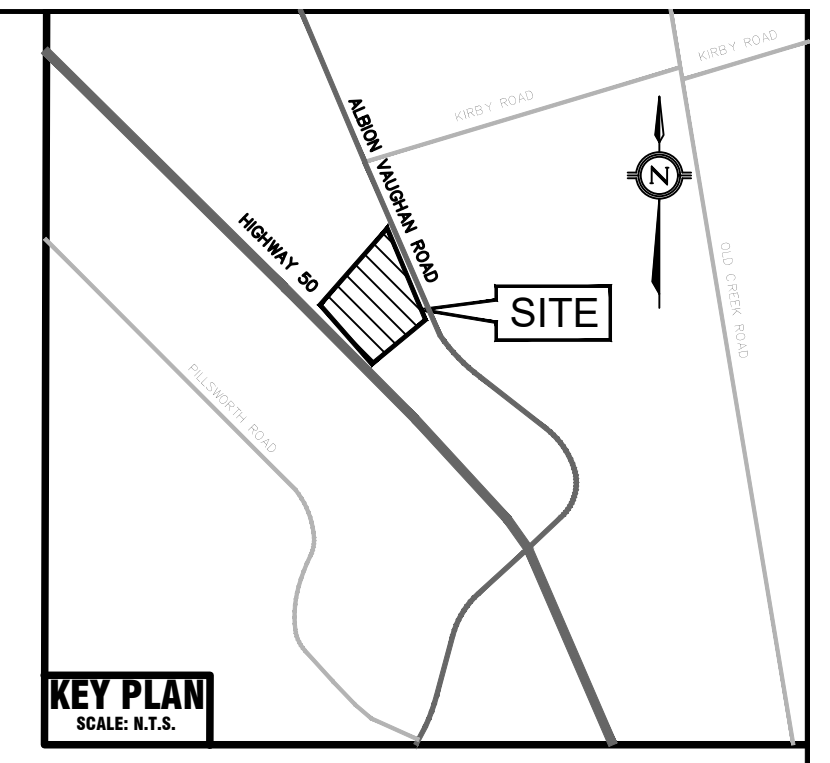
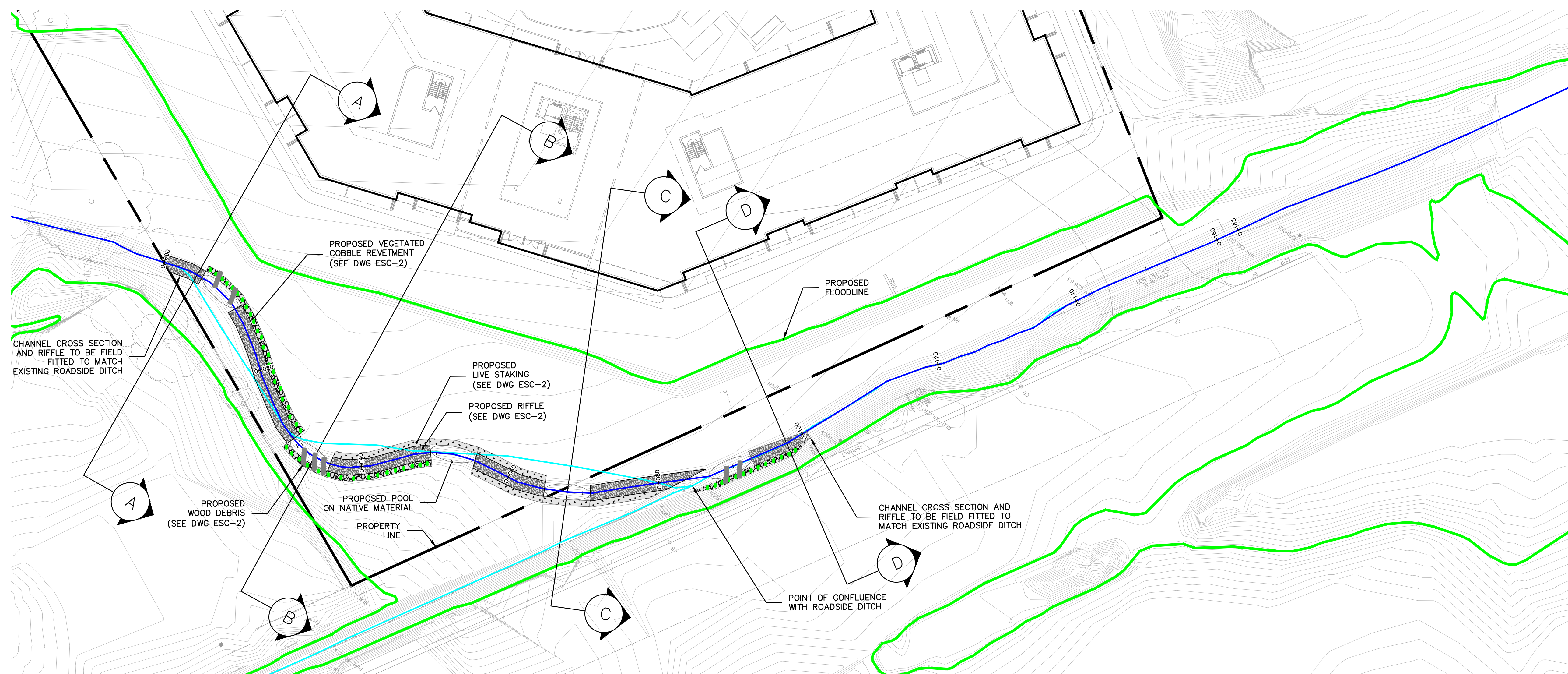
COORDINATION AUTHORITY: **TORONTO AND REGION CONSERVATION**
for The Living City
5 Shoreham Drive, Downsview Ontario M3N 1S4 (416) 610-6600

STAGE 3: RESTORATION

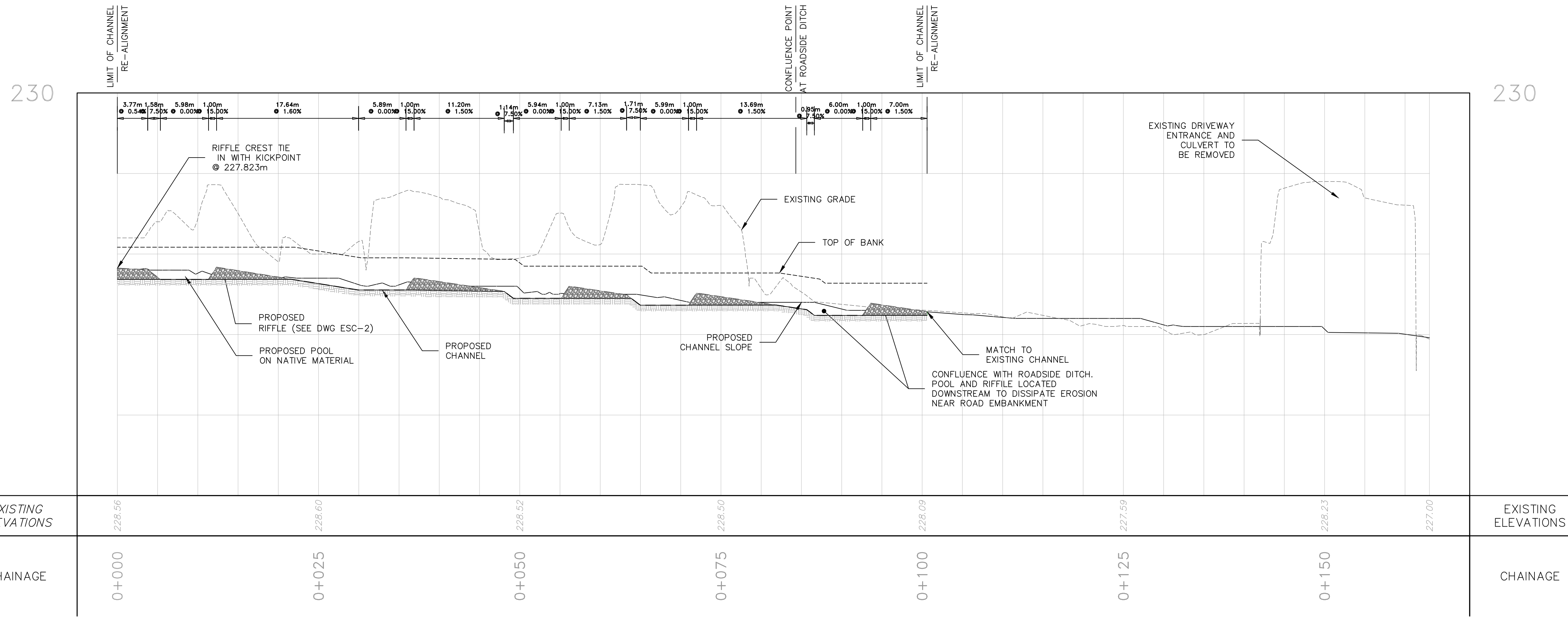


LEGEND:

- FLOOD/EROSION ACCESS SETBACK RESTORATION AREA
- NATURAL FEATURE SETBACK RESTORATION AREA
- IN-CHANNEL RESTORATION AREA
- PROPERTY LINE
- PROPOSED RAINBOW CREEK ALIGNMENT
- PROPOSED REGULATORY FLOOD LINE
- REGULATORY FLOODLINE BUFFER
- FUTURE BUILDING OUTLINE
- MAJOR CONTOUR
- MINOR CONTOUR



- LEGEND:**
- PROPERTY LINE
 - BUILDING OUTLINE
 - PROPOSED RAINBOW CREEK CENTRELINE
 - EXISTING RAINBOW CREEK CENTRELINE
 - PROPOSED REGULATORY FLOOD LINE
 - CROSS SECTIONS
 - MAJOR CONTOUR
 - MINOR CONTOUR
 - VEGETATED COBBLED REVETMENT
 - RIFFLES
 - LIVE STAKE AREA
 - POOL ON NATIVE MATERIAL
 - WOOD DEBRIS



UTILITY NOTES:
 THE POSITION OF POLE LINES, CONDUITS, WATERMANS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWING, 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 DAMAGE.

BENCHMARKS:
 ELEVATIONS ARE REFERRED TO THE CITY OF BRAMPTON BENCHMARK NO. 042010221, BEING A BRASS CAP IN CONCRETE APPROX. 21 m SOUTH OF CENTRELINE OF NASHVILLE ROAD AND 11 m EAST OF CENTRELINE OF REGIONAL ROAD 50, IN FRONT OF GAS STATION/COFFEE SHOP, HAVING AN ELEVATION OF 220.967 m.

No.	DATE	REVISIONS	D.H.
1	01/14/21	ISSUED TO TRCA	

STAMP	STAMP
-------	-------

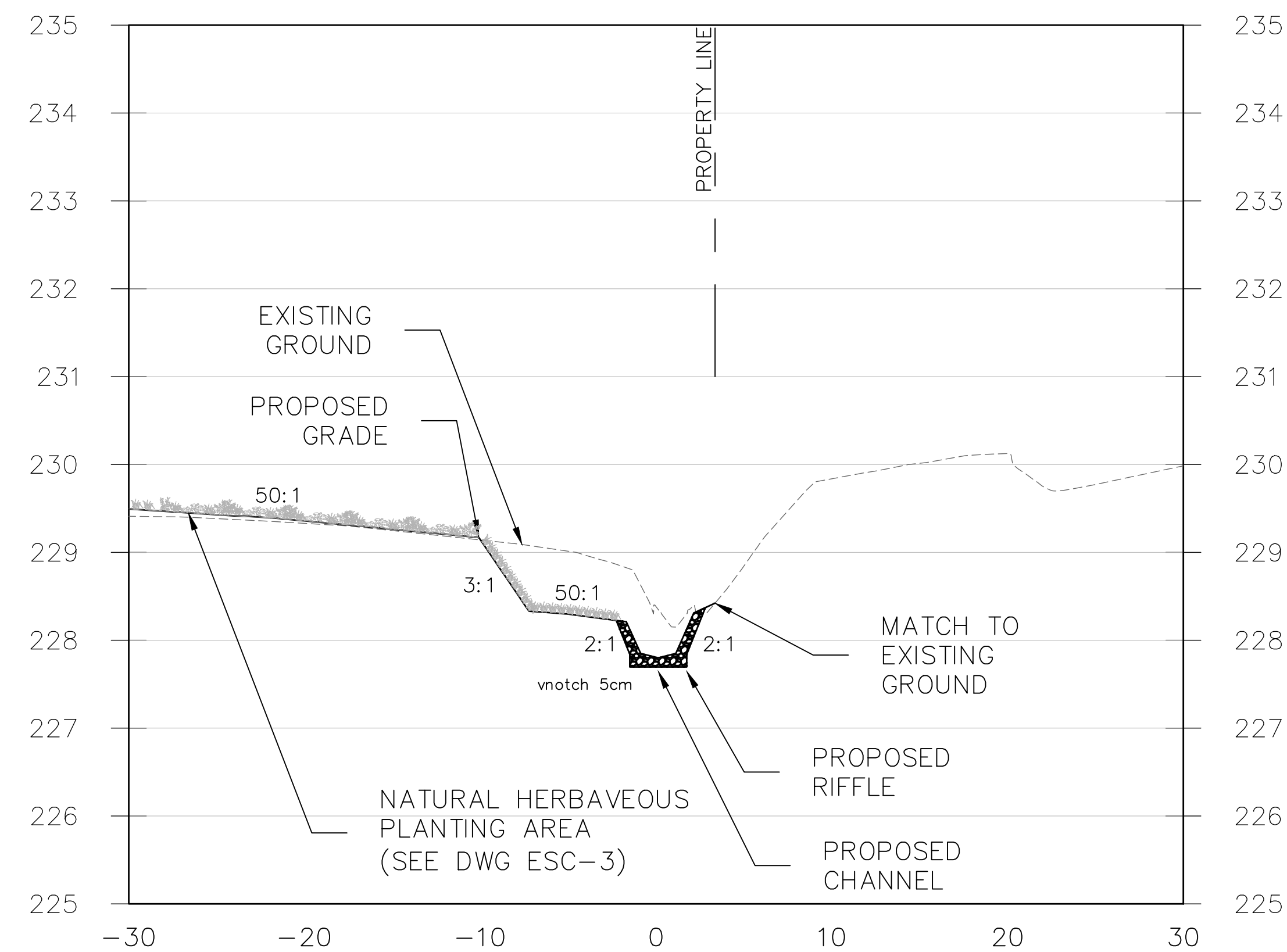
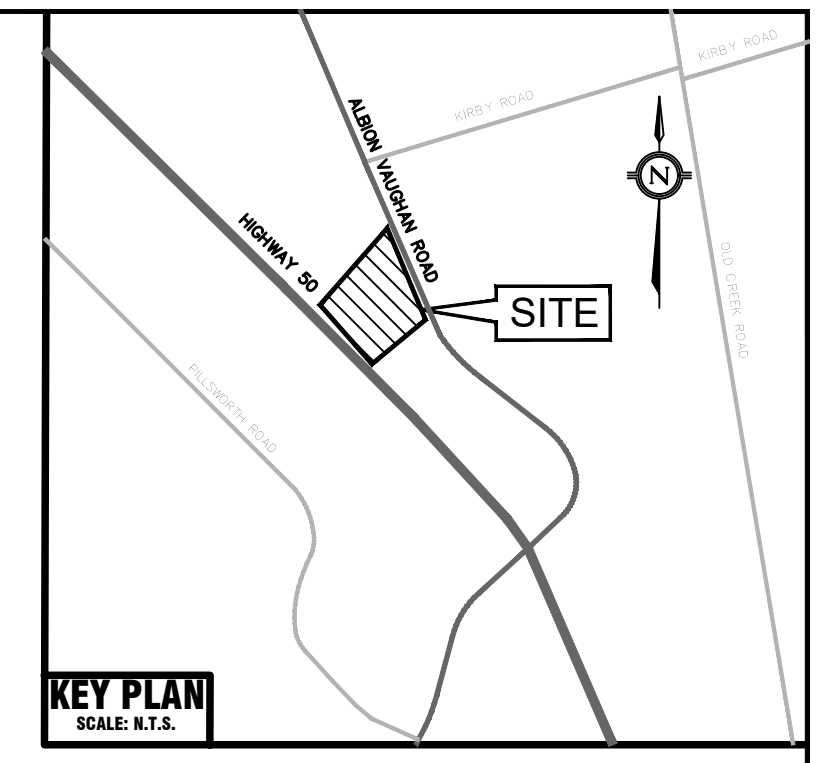
PROJECT:
MULTIPLE RESIDENTIAL CONDO DEVELOPMENT
 12148 ALBION VAUGHAN ROAD, TOWN OF CALEDON

CONSULTANT:
MASONGSONG ASSOCIATES
 1780 KENNEDY ROAD SUITE 101
 MARKHAM ONTARIO L3R 9W7
 T: 905.944.9162
 WWW.MASONGSONG.COM

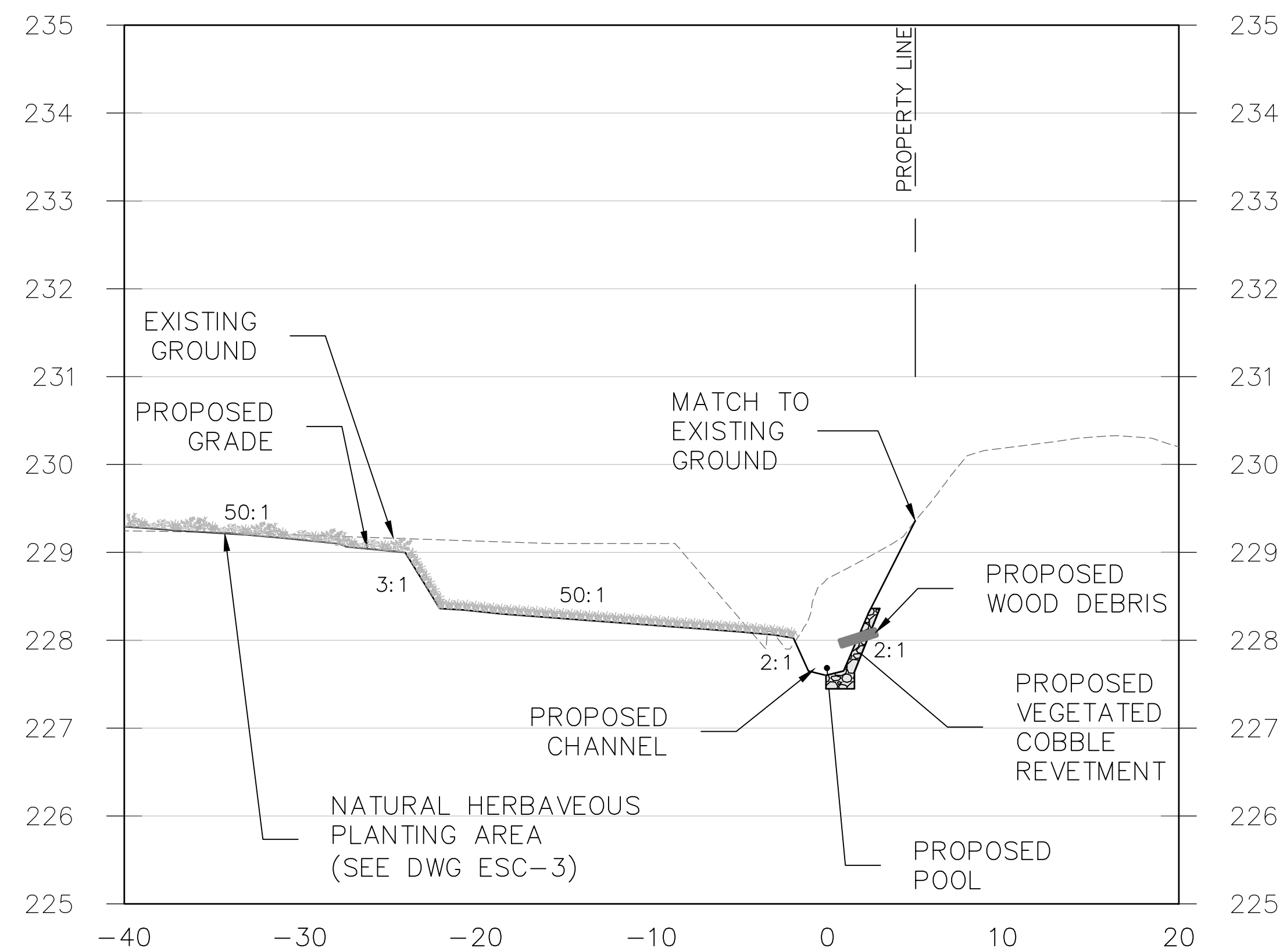
CONSERVATION AUTHORITY:
TORONTO AND REGION Conservation
for The Living City
 5 Shoreham Drive Downsview Ontario M3N 1S4 (416) 661-6600

TITLE:
PROPOSED CHANNEL PLAN AND PROFILE

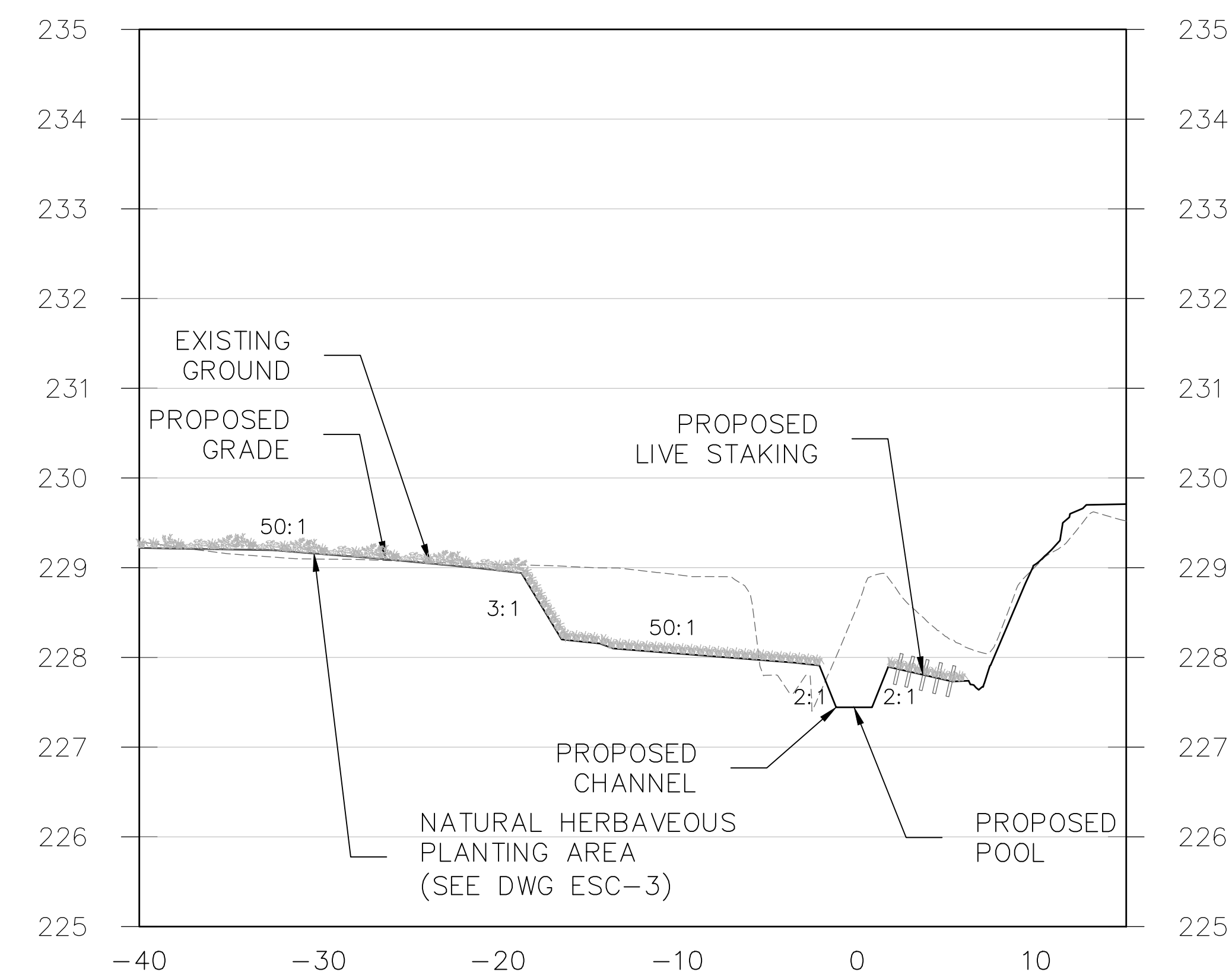
DESIGN	W.A.	CHECKED	D.H.	CONTRACT No. 17-849
SCALE	H: 1:300 V: 1:30			PLAN No.
DATE	JANUARY 2021			P1



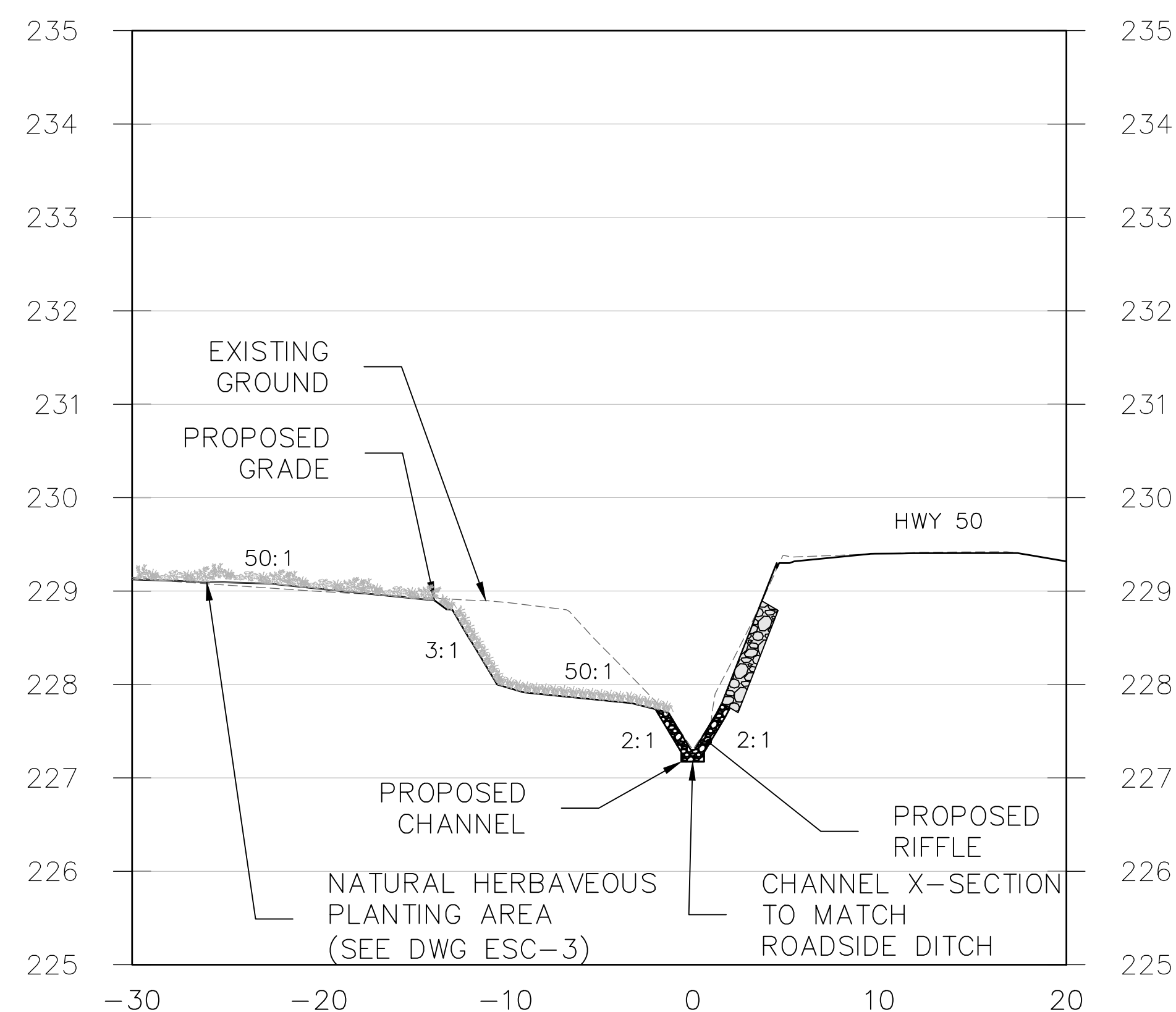
RIFFLE SECTION A-A
H: 1:300 V 1:60



POOL SECTION B-B
H: 1:300 V 1:60



POOL SECTION C-C
H: 1:300 V 1:60



RIFFLE SECTION D-D
H: 1:300 V 1:60

UTILITY NOTES:
THE POSITION OF POLE LINES, CONDUITS, WATERMANS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWING, 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 DAMAGE.

BENCHMARK:
ELEVATIONS ARE REFERRED TO THE CITY OF BRAMPTON BENCHMARK No. 042010221, BEING A BRASS CAP IN CONCRETE APPROX. 21 m SOUTH OF CENTRELINE OF NASHVILLE ROAD AND 11 m EAST OF CENTRELINE OF REGIONAL ROAD 50, IN FRONT OF GAS STATION/COFFEE SHOP, HAVING AN ELEVATION OF 220.967 m.

No.	DATE	REVISIONS	D.H.
1	01/14/21	ISSUED TO TRCA	

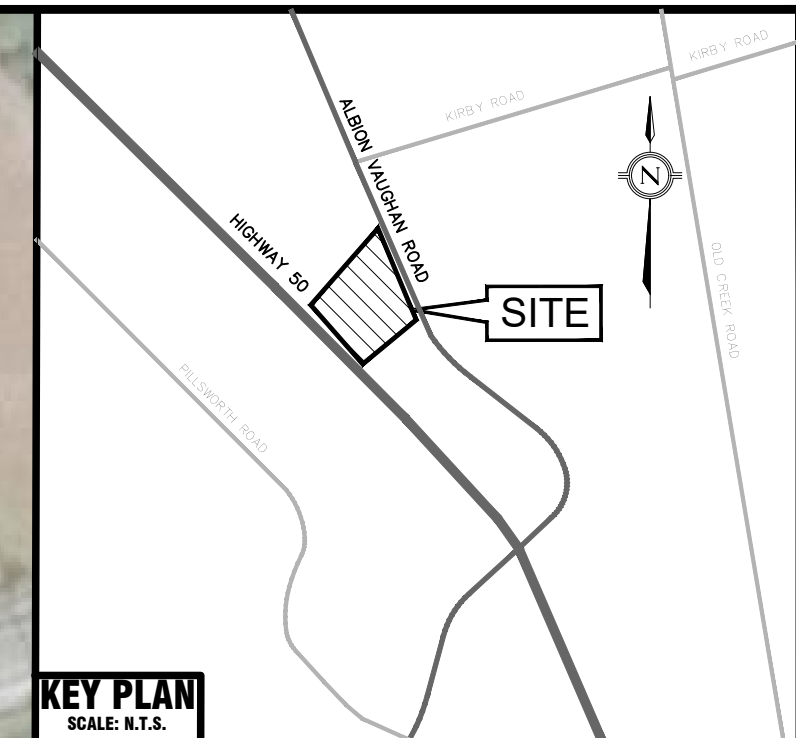
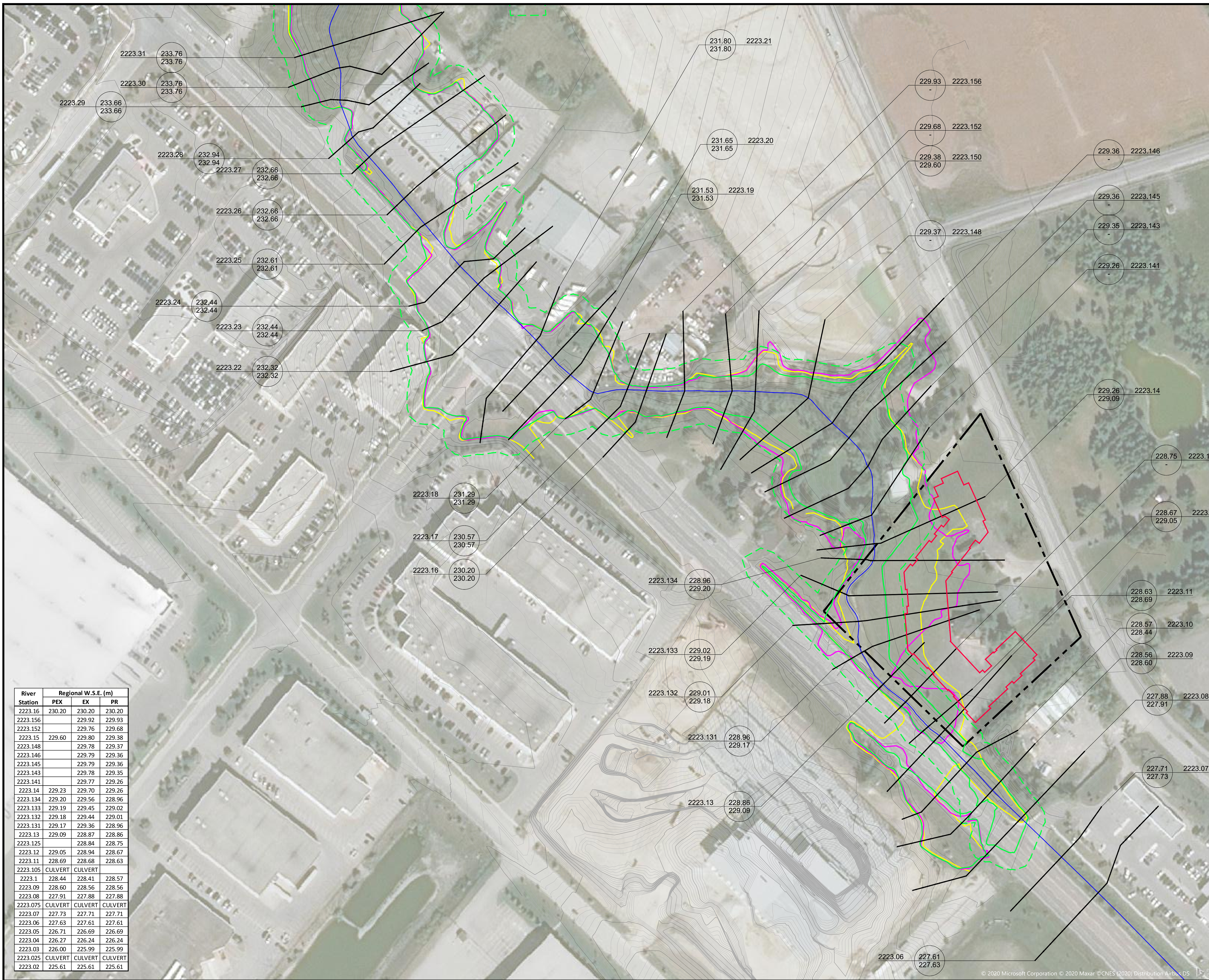
DESIGN	W.A.	CHECKED	D.H.	CONTRACT No. 17-849
SCALE	H 1:500 V 1:100		PLAN No.	
DATE	JANUARY 2021		XSEC	

PROJECT: **MULTIPLE RESIDENTIAL CONDO DEVELOPMENT**
12148 ALBION VAUGHAN ROAD, TOWN OF CALEDON

CONSULTANT: **MASONGSONG ASSOCIATES**
1780 KENNEDY ROAD SUITE 101 BRAMPTON ONTARIO L6Y 4K7
T. 905.844.9162 www.msa.ca

CONSERVATION AUTHORITY: **Conservation for The Living City**
5 Shoreham Drive Downsview Ontario M3N 1S4 (416) 661-6600

TITLE: **PROPOSED CHANNEL CROSS-SECTIONS**



- LEGEND:**
- PROPERTY LINE
 - BUILDING OUTLINE
 - RAINBOW CREEK CENTRELINE
 - REGULATORY FLOOD LINE (PEX)
 - REGULATORY FLOOD LINE (EX)
 - REGULATORY FLOOD LINE (PR)
 - REGULATORY FLOOD LINE
 - CROSS-SECTION LENGTH
 - MAJOR CONTOUR
 - MINOR CONTOUR
 - REGIONAL FLOOD ELEVATION (m)
 - CROSS-SECTION STATION
 - ORIGINAL FLOOD ELEVATION
 - CROSS-SECTION LEADER LINE

UTILITY NOTES:

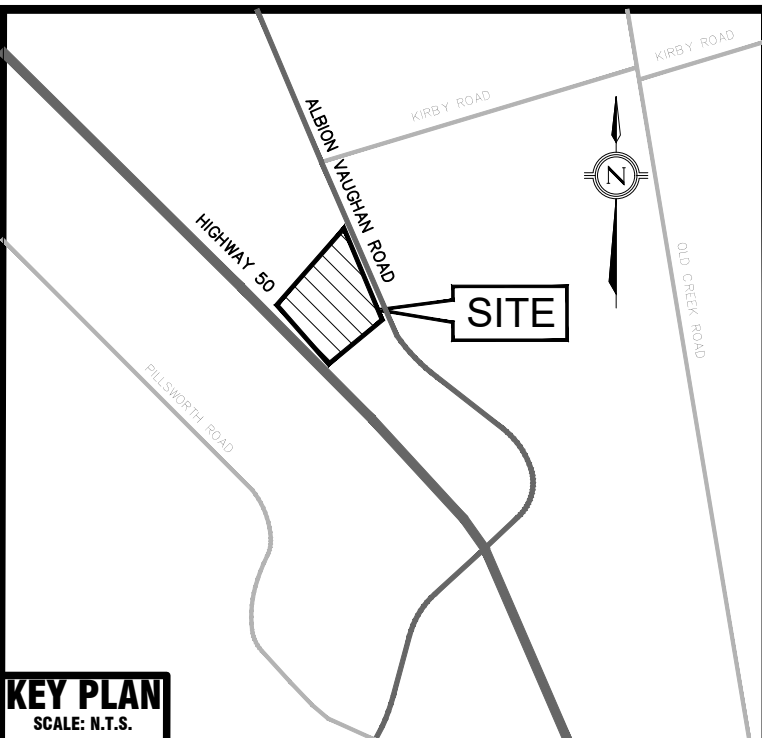
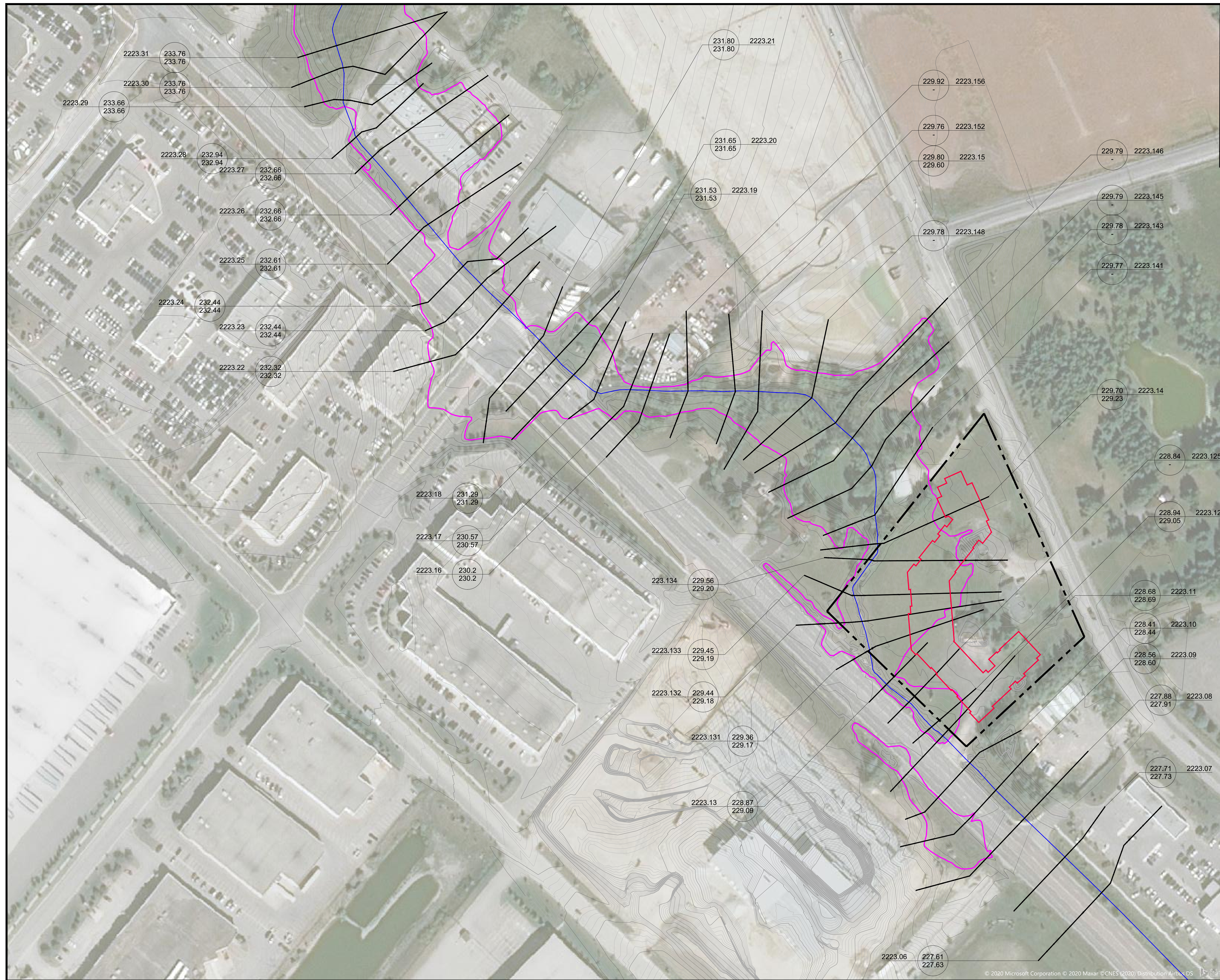
THE POSITION OF POLE LINES, CONDUITS, WATERMANS, SEWERS AND OTHER UNDERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED BEFORE STARTING WORK; THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR DAMAGE.

BENCHMARKS:

ELEVATIONS ARE REFERRED TO THE CITY OF BRAMPTON BENCHMARK No. 042010221, BEING A BRASS CAP IN CONCRETE APPROX. 21 m SOUTH OF CENTRELINE OF NASHVILLE ROAD AND 11 m EAST OF CENTRELINE OF REGIONAL ROAD 50, IN FRONT OF GAS STATION/COFFEE SHOP, HAVING AN ELEVATION OF 220.967 m.

River Station	Regional W.S.E. (m)		
	PEX	EX	PR
2223.16	230.20	230.20	230.20
2223.156		229.92	229.93
2223.152		229.76	229.68
2223.15	229.60	229.80	229.38
2223.148		229.78	229.37
2223.146		229.79	229.36
2223.145		229.79	229.36
2223.143		229.78	229.35
2223.141		229.77	229.26
2223.14	229.23	229.70	229.26
2223.134	229.20	229.56	228.96
2223.133	229.19	229.45	229.02
2223.132	229.18	229.44	229.01
2223.131	229.17	229.36	228.96
2223.13	229.09	228.87	228.86
2223.125		228.84	228.75
2223.12	229.05	228.94	228.67
2223.11	228.69	228.68	228.63
2223.105	CULVERT	CULVERT	
2223.1	228.44	228.41	228.57
2223.09	228.60	228.56	228.56
2223.08	227.91	227.88	227.88
2223.075	CULVERT	CULVERT	CULVERT
2223.07	227.73	227.71	227.71
2223.06	227.63	227.61	227.61
2223.05	226.71	226.69	226.69
2223.04	226.27	226.24	226.24
2223.03	226.00	225.99	225.99
2223.025	CULVERT	CULVERT	CULVERT
2223.02	225.61	225.61	225.61

1	11/20	ISSUED FOR TRCA	I.S.
No.	DATE	REVISIONS	STAMP
PROJECT: MULTIPLE RESIDENTIAL CONDO DEVELOPMENT 12148 ALBIN VAUGHAN ROAD, TOWN OF CALEDON			
CONSULTANT: MASONGSONG ASSOCIATES 180 KENNEDY ROAD, SUITE 201, MISSISSAUGA, ONTARIO L4X 1B7, CANADA T. 905.846.8102 www.msa.ca			
CONSULTANT'S AUTHORITY: Conservation for The Living City 5 Shoreham Drive, Downsview Ontario M3N 1S4 (416) 661-6600			
FILE: COMPOSITE PLAN			
DESIGN	I.S.	CHECKED	L.E.
SCALE			CONTRACT No. 17-849
DATE	NOVEMBRE 2020		PLAN No. CP



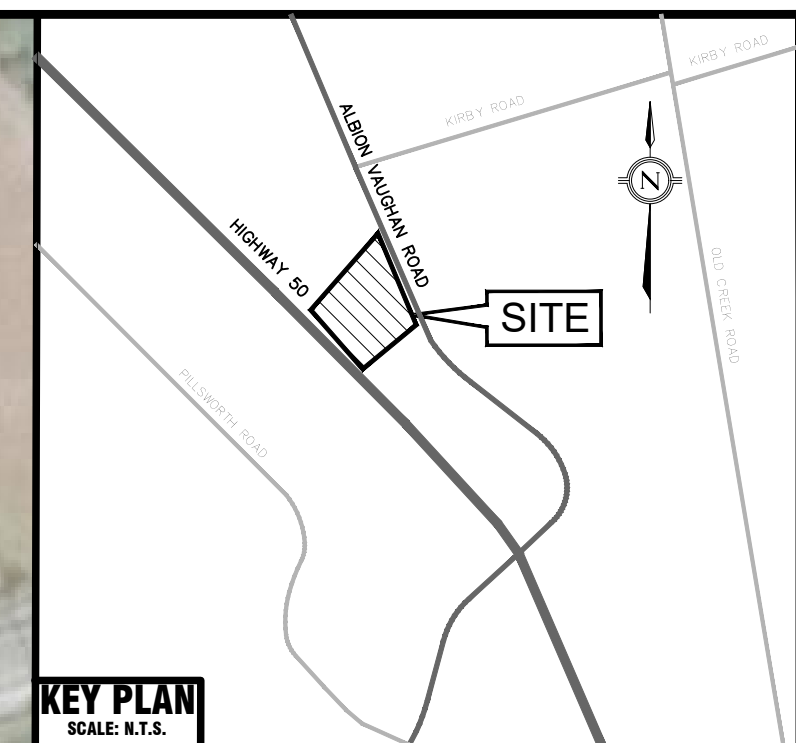
- LEGEND:**
- PROPERTY LINE
 - BUILDING OUTLINE
 - RAINBOW CREEK CENTRELINE
 - REGULATORY FLOOD LINE
 - CROSS-SECTION LENGTH
 - MAJOR CONTOUR
 - MINOR CONTOUR
 - REGIONAL FLOOD ELEVATION (m)
 - CROSS-SECTION STATION
 - ORIGINAL FLOOD ELEVATION
 - CROSS-SECTION LEADER LINE

UTILITY NOTES:
 THE POSITION OF POLE LINES, CONDUITS, WATERMANS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND 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 DAMAGE.

BENCHMARKS:
 ELEVATIONS ARE REFERRED TO THE CITY OF BRAMPTON BENCHMARK No. 042010221, BEING A BRASS CAP IN CONCRETE APPROX. 21 m SOUTH OF CENTRELINE OF NASHVILLE ROAD AND 11 m EAST OF CENTRELINE OF REGIONAL ROAD 50, IN FRONT OF GAS STATION/COFFEE SHOP, HAVING AN ELEVATION OF 229.967 m.

No.	DATE	REVISIONS	STAMP

PROJECT: MULTIPLE RESIDENTIAL CONDO DEVELOPMENT			
12148 ALBION VAUGHAN ROAD, TOWN OF CALEDON			
CONSULTANT:			
5 Shoreham Drive Downsview Ontario M3N 1S4 (416) 661-6600			
TITLE: EXISTING CONDITION			
DESIGN	I.S.	CHECKED	L.E.
SCALE	CONTRACT No. 17-849		
DATE	PLAN No. EX		



- LEGEND:**
- PROPERTY LINE
 - BUILDING OUTLINE
 - RAINBOW CREEK CENTRELINE
 - REGULATORY FLOOD LINE
 - CROSS-SECTION LENGTH
 - MAJOR CONTOUR
 - MINOR CONTOUR
 - REGIONAL FLOOD ELEVATION (m)
 - CROSS-SECTION STATION
 - ORIGINAL FLOOD ELEVATION
 - CROSS-SECTION LEADER LINE

UTILITY NOTES:

THE POSITION OF POLE LINES, CONDUITS, WATERMANS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND 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 DAMAGE.

BENCHMARKS:

ELEVATIONS ARE REFERRED TO THE CITY OF BRAMPTON BENCHMARK No. 042010221, BEING A BRASS CAP IN CONCRETE APPROX. 21 m SOUTH OF CENTRELINE OF NASHVILLE ROAD AND 11 m EAST OF CENTRELINE OF REGIONAL ROAD 50, IN FRONT OF GAS STATION/COFFEE SHOP, HAVING AN ELEVATION OF 220.967 m.

No.	DATE	REVISIONS	STAMP
1	11/20	ISSUED FOR TRCA	I.S.

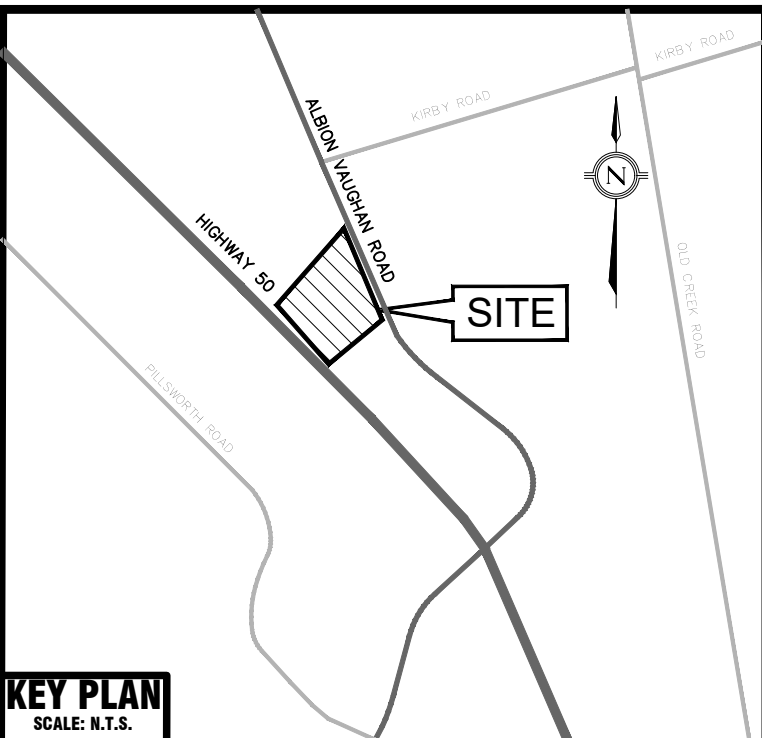
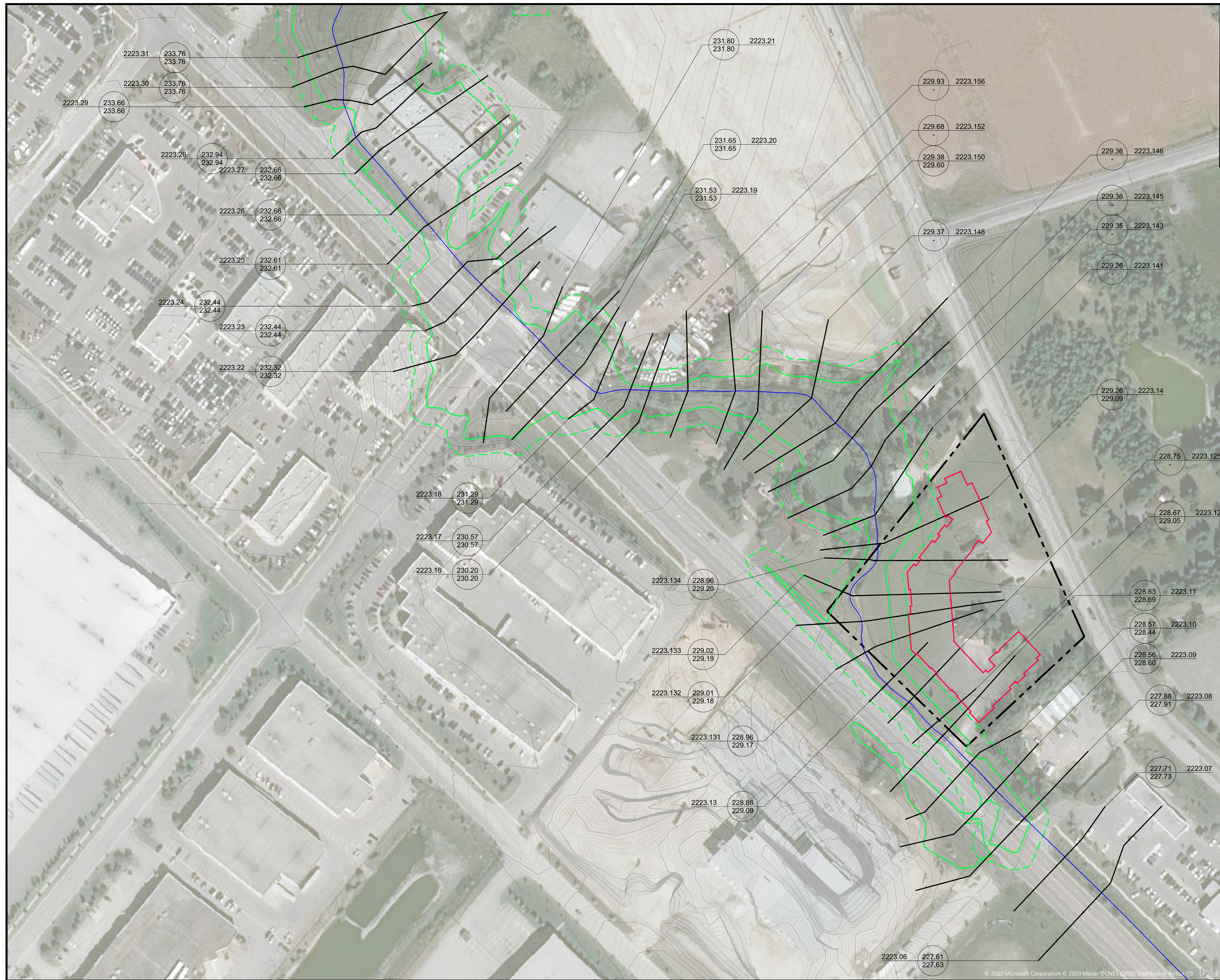
PROJECT: MULTIPLE RESIDENTIAL CONDO DEVELOPMENT
12148 ALBION VAUGHAN ROAD, TOWN OF CALEDON

CONSULTANT: MASONGSONG ASSOCIATES
180 KENNEDY ROAD, SUITE 201, MARKHAM, ONTARIO L3R 9V7
T: 905.944.8182
www.masongsong.com

COORDINATION AUTHORITY: Conservation for The Living City
5 Shoreham Drive, Downsview Ontario M3N 1S4 (416) 661-6600

TITLE: PRE-EXISTING CONDITION

DESIGN	I.S.	CHECKED	L.E.	CONTRACT No. 17-849
SCALE				PLAN No. PEX
DATE	NOVEMBRE 2020			



- LEGEND:**
- PROPERTY LINE
 - BUILDING OUTLINE
 - RAINBOW CREEK CENTRELINE
 - REGULATORY FLOOD LINE
 - - - REGULATORY FLOOD LINE
 - CROSS-SECTION LENGTH
 - MAJOR CONTOUR
 - MINOR CONTOUR
 - REGIONAL FLOOD ELEVATION (m)
 - CROSS-SECTION STATION
 - ORIGINAL FLOOD ELEVATION
 - CROSS-SECTION LEADER LINE

UTILITY NOTES:
THE POSITION OF POLE LINES, CONDUITS, WATERMANS, SEWERS AND OTHER UNDERGROUND 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 DAMAGE.

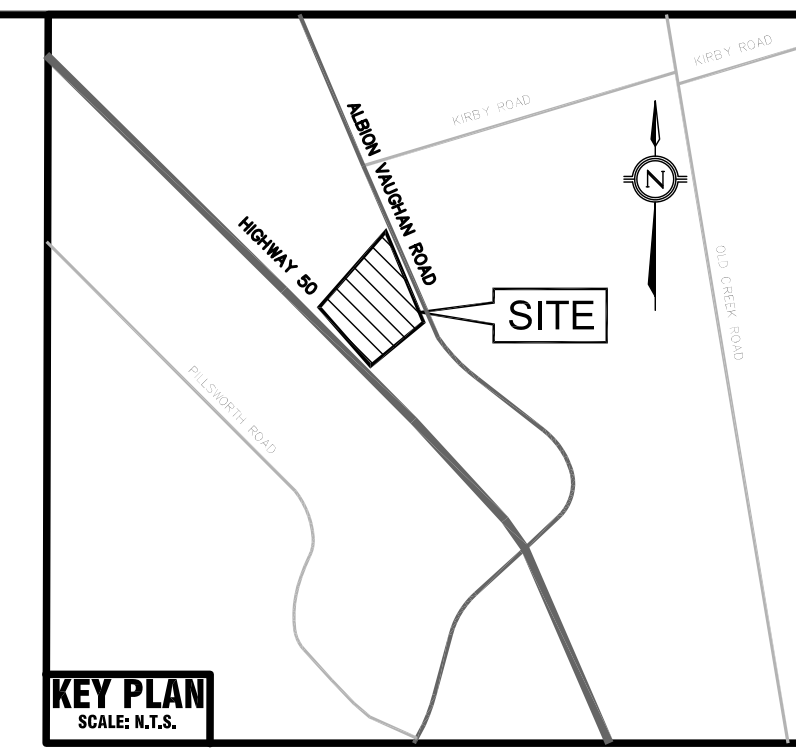
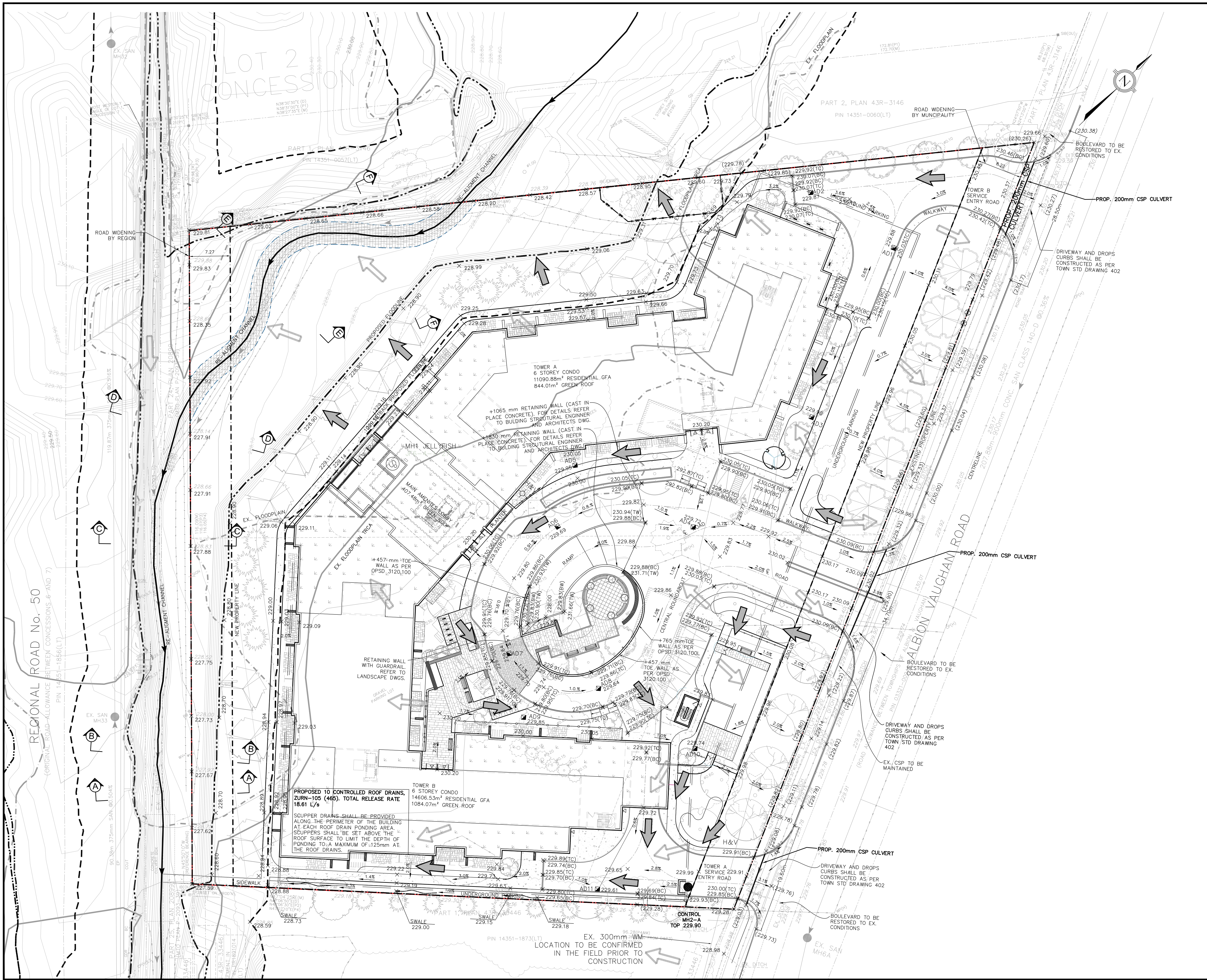
BENCHMARKS:
ELEVATIONS ARE REFERRED TO THE CITY OF BRAMPTON BENCHMARK No. 042010221, BEING A BRASS CAP IN CONCRETE APPROX. 21 m SOUTH OF CENTRELINE OF NASHVILLE ROAD AND 11 m EAST OF CENTRELINE OF REGIONAL ROAD 50, IN FRONT OF GAS STATION/COFFEE SHOP, HAVING AN ELEVATION OF 220.967 m.

No.	DATE	REVISIONS	STAMP
1	11/20	ISSUED FOR TRCA	

PROJECT:	MULTIPLE RESIDENTIAL CONDO DEVELOPMENT
ADDRESS:	12148 ALBIN VAUGHAN ROAD, TOWN OF CALEDON
CONSULTANT:	MASONGSONG ASSOCIATES
CONSULTANT ADDRESS:	180 KENNEDY ROAD, SUITE 201, MISSISSAUGA, ONTARIO L4Y 1R7, T. 905.844.8182, www.masong.org
COORDINATION AUTHORITY:	Conservation for The Living City
COORDINATION ADDRESS:	5 Shoreham Drive, Downsview Ontario M3N 1S4 (416) 661-6600
TITLE:	PROPOSED CONDUCTION
DESIGN:	I.S. CHECKED: L.E. CONTRACT No. 17-849
SCALE:	PLAN No. PR
DATE:	NOVEMBRE 2020

Appendix E

Engineering drawings



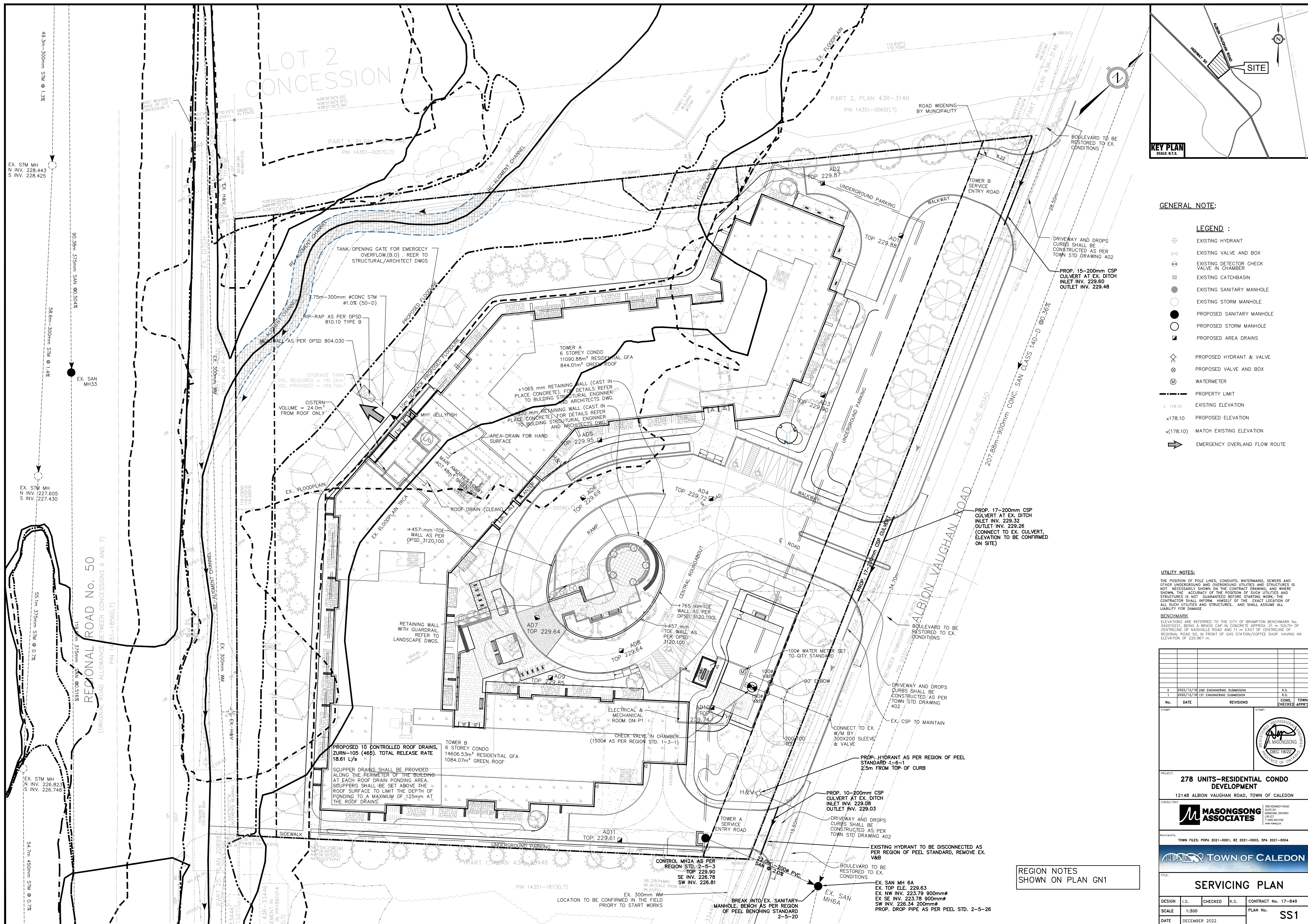
GENERAL NOTE:
REFER TO DRAWING G01 FOR GENERAL NOTES.

- LEGEND :**
- ⊕ EXISTING HYDRANT
 - ⊕ EXISTING VALVE AND BOX
 - ⊕ EXISTING DETECTOR CHECK VALVE IN CHAMBER
 - ⊕ EXISTING CATCHBASIN
 - EXISTING SANITARY MANHOLE
 - EXISTING STORM MANHOLE
 - PROPOSED SANITARY MANHOLE
 - PROPOSED STORM MANHOLE
 - PROPOSED AREA DRAINS
 - ⊕ PROPOSED HYDRANT & VALVE
 - ⊕ PROPOSED VALVE AND BOX
 - ⊕ WATERMETER
 - PROPERTY LIMIT
 - x178.10 EXISTING ELEVATION
 - x178.10 PROPOSED ELEVATION
 - x(178.10) MATCH EXISTING ELEVATION
 - ⇒ EMERGENCY OVERLAND FLOW ROUTE
 - ⇒ EXISTING OVERLAND FLOW ROUTE
 - UNDERGROUND PARKING
 - GREEN ROOF

UTILITY NOTES:
THE POSITION OF POLE LINES, CONDUITS, WATERMANS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWING, 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 DAMAGE.

BENCHMARK
ELEVATIONS ARE REFERRED TO THE CITY OF BRAMPTON BENCHMARK No. 04210221, BEING A BRASS CAP IN CONCRETE APPROX. 21 m SOUTH OF CENTRELINE OF NASHVILLE ROAD AND 11 m EAST OF CENTRELINE OF REGIONAL ROAD 50, IN FRONT OF GAS STATION/COFFEE SHOP, HAVING AN ELEVATION OF 220.967 m.

2	2022/12/18	2ND ENGINEERING SUBMISSION	R.S.
1	2020/12/18	1ST ENGINEERING SUBMISSION	R.S.
No.	DATE	REVISIONS	CONS. TOWN CHECKED APPROV.
STAMP:			STAMP:
PROJECT 278 UNITS-RESIDENTIAL CONDO DEVELOPMENT 12148 ALBION VAUGHAN ROAD, TOWN OF CALEDON			
CONSULTANT 			
TOWN FILES: POPA 2021-0001, RZ 2021-0003, SPA 2021-0004			
G:\Symbols\Town of Caledon\Caledon-Logo.jpg			
TITLE GRADING PLAN			
DESIGN	I.S.	CHECKED	R.S.
SCALE	1:300		CONTRACT No. 17-849
DATE	DECEMBER 2022		PLAN No. GR1



- GENERAL NOTE:**
- LEGEND :**
- ⊕ EXISTING HYDRANT
 - ⊕ EXISTING VALVE AND BOX
 - ⊕ EXISTING DETECTOR CHECK VALVE IN CHAMBER
 - ⊕ EXISTING CATCH-BASIN
 - ⊕ EXISTING SANITARY MANHOLE
 - ⊕ EXISTING STORM MANHOLE
 - ⊕ PROPOSED SANITARY MANHOLE
 - ⊕ PROPOSED STORM MANHOLE
 - ⊕ PROPOSED AREA DRAINS
 - ⊕ PROPOSED HYDRANT & VALVE
 - ⊕ PROPOSED VALVE AND BOX
 - ⊕ WATERMETER
 - PROPERTY LIMIT
 - x 178.10 EXISTING ELEVATION
 - x 178.10 PROPOSED ELEVATION
 - x(178.10) MATCH EXISTING ELEVATION
 - ➔ EMERGENCY OVERLAND FLOW ROUTE

UTILITY NOTES:

THE POSITION OF POLE LINES, CONDUITS, WATERMANS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWING, 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 DAMAGE.

BENCHMARK

ELEVATIONS ARE REFERRED TO THE CITY OF BRAMPTON BENCHMARK NO. 04210221, BEING A BRASS CAP IN CONCRETE APPROX. 21 m SOUTH OF CENTRELINE OF NASHVILLE ROAD AND 11 m EAST OF CENTRELINE OF REGIONAL ROAD 50, IN FRONT OF GAS STATION/COFFEE SHOP, HAVING AN ELEVATION OF 220.967 m.

No.	DATE	REVISIONS	ENGINEER	TOWN CHECKED	APPROVED
2	2022/12/18	2ND ENGINEERING SUBMISSION	R.S.		
1	2020/12/18	1ST ENGINEERING SUBMISSION	R.S.		

278 UNITS-RESIDENTIAL CONDO DEVELOPMENT

12148 ALBION VAUGHAN ROAD, TOWN OF CALEDON

MASONGSONG ASSOCIATES

7856 KENNEDY ROAD, SUITE 1000, MARKHAM, ONTARIO L3R 9W2
 905.944.9492
 www.masongsong.com

TOWN FILES: POPA 2021-0001, RZ 2021-0005, SFA 2021-0004

TOWN OF CALEDON

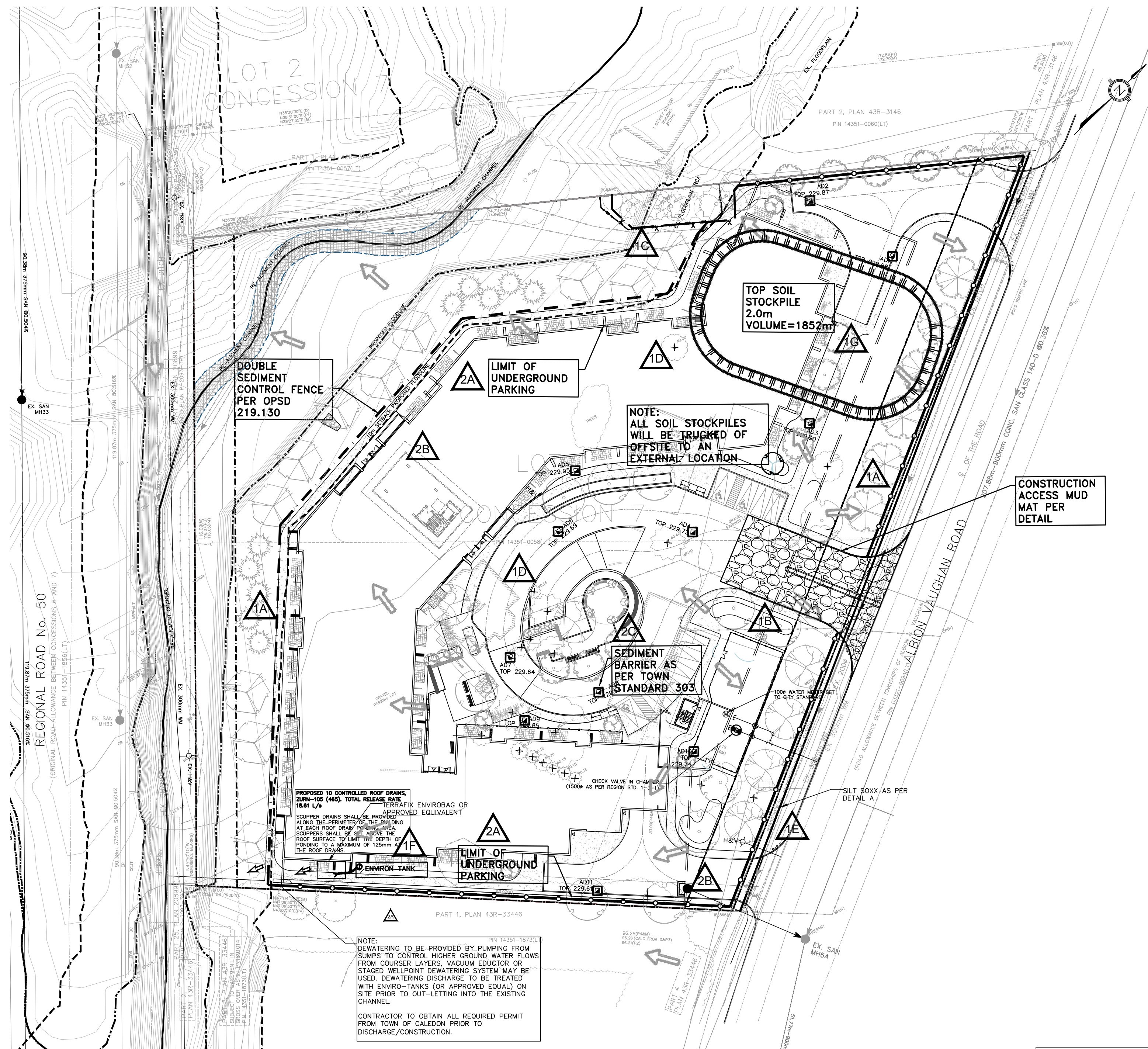
SERVICING PLAN

DESIGN I.S. CHECKED R.S. CONTRACT NO. 17-849

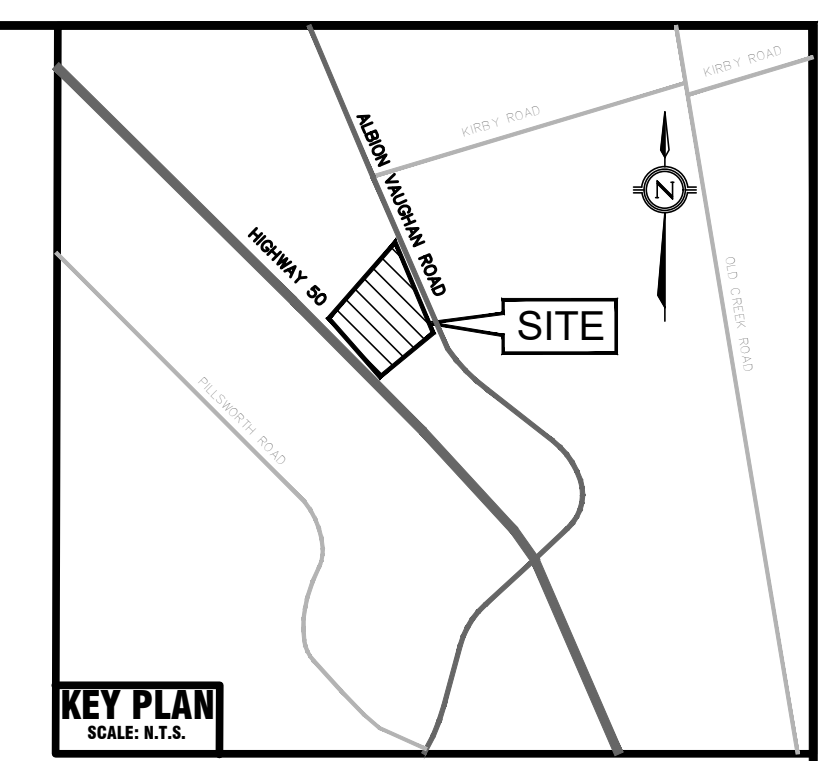
SCALE 1:300 PLAN No. **SS1**

DATE DECEMBER 2022

REGION NOTES SHOWN ON PLAN GN1

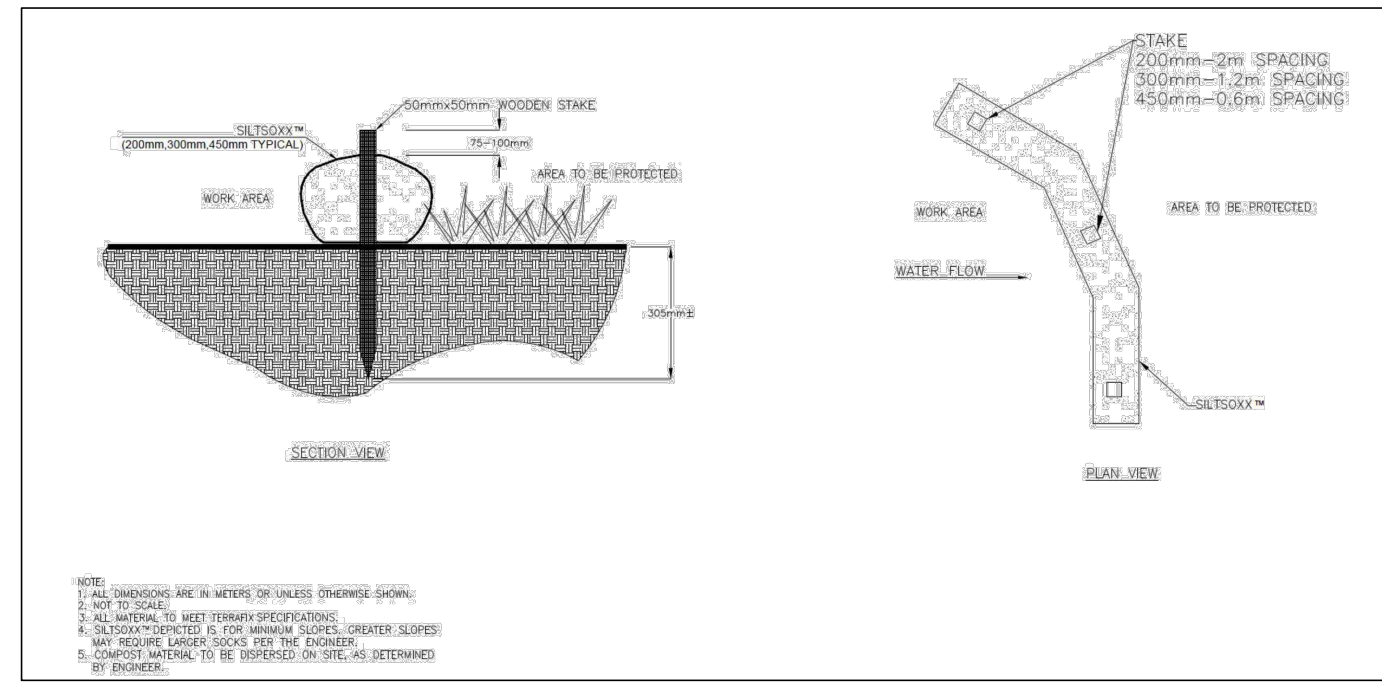
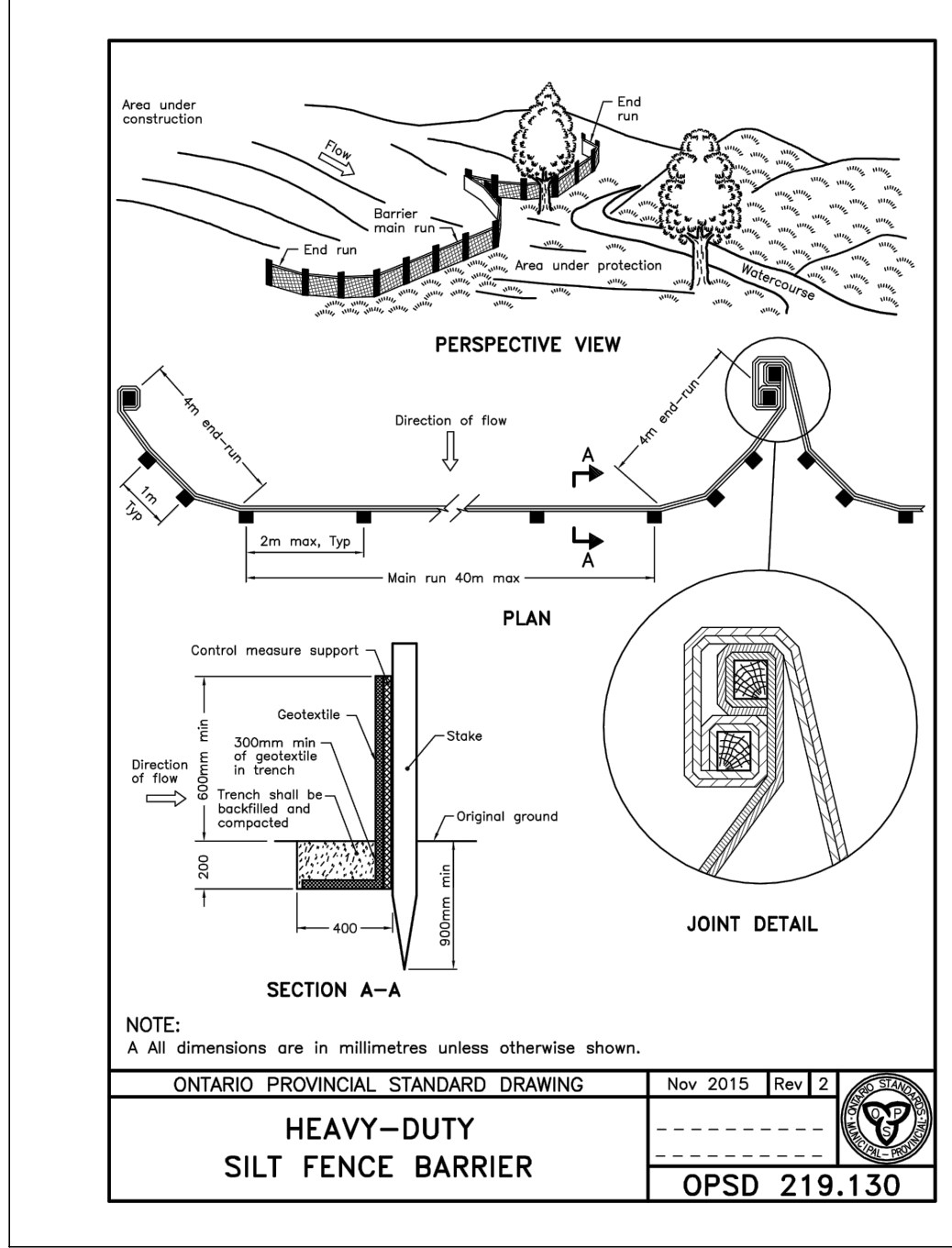
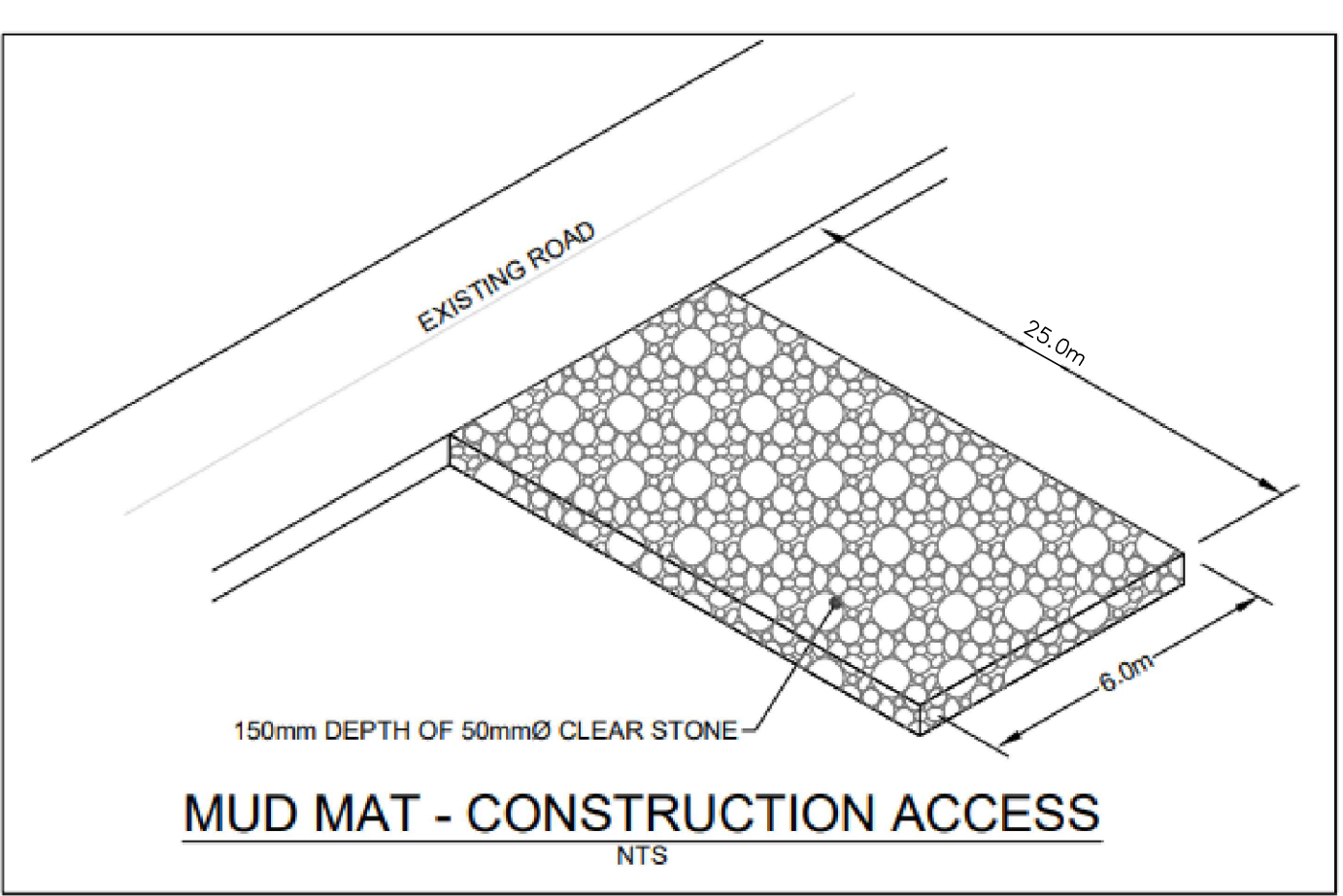
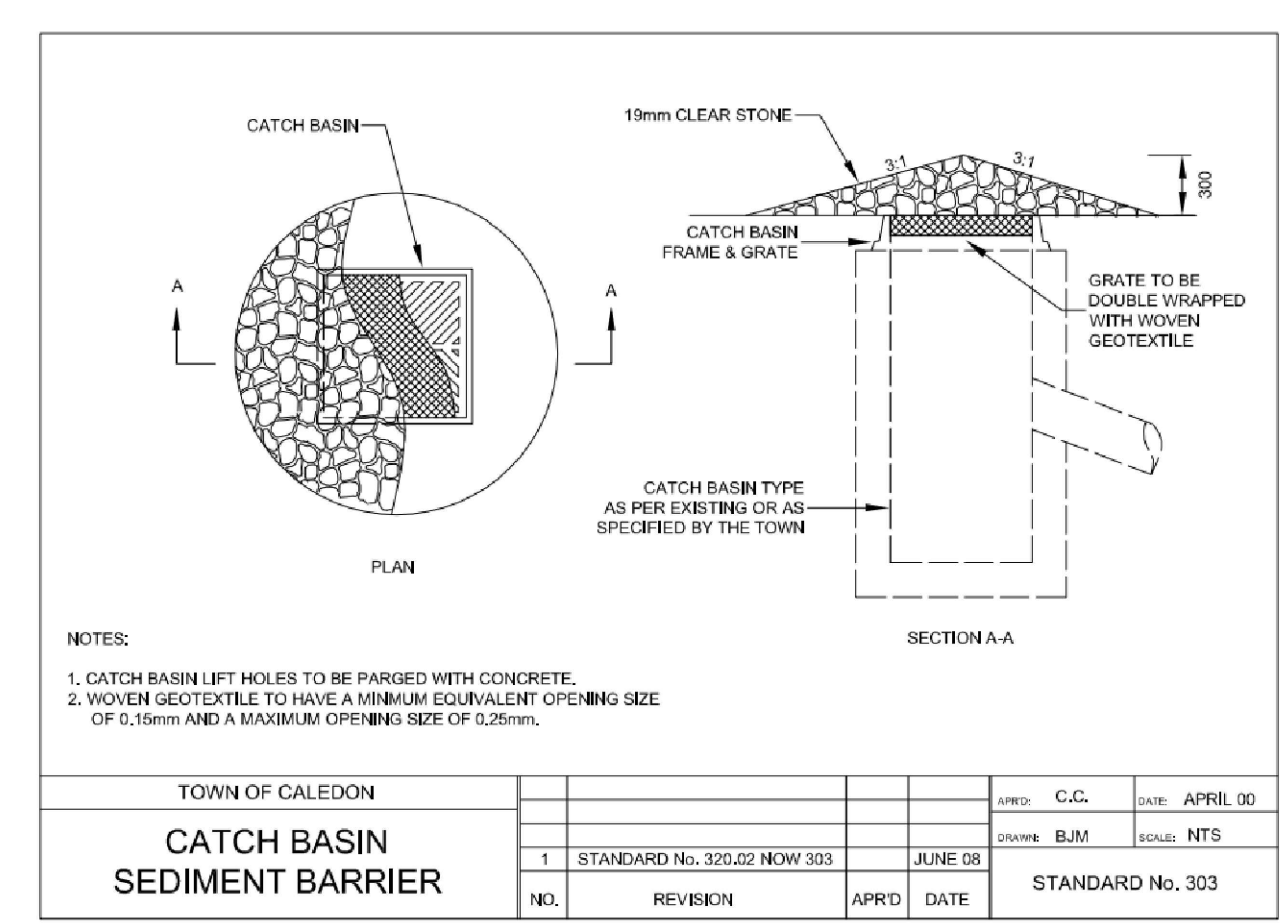


Section 1: Site Management	
#	Standard Notes
1	"Erosion and Sediment Control (ESC) measures will be implemented prior to, and maintained during the construction phases, to prevent entry of sediment into the water. All damaged erosion and sediment control measures should be repaired and/or replaced within 48 hours of the inspection."
2	"disturbed areas will be minimized to the extent possible, and temporarily or permanently stabilized or restored as the work progresses."
3	"All in-water and near water works will be conducted in the dry with appropriate erosion and sediment controls."
4	"The erosion and sediment control strategies outlined on the plans are not static and may need to be upgraded/amended as site conditions change to minimize sediment laden runoff from leaving the work areas. If the prescribed measures on the plans are not effective in preventing the release of a deleterious substance, including sediment, then alternative measures must be implemented immediately to minimize potential ecological impacts. TRCA Enforcement Officer should be immediately contacted. Additional ESC measures to be kept on site and used as necessary."
5	"An Environmental Monitor will attend the site to inspect all new controls, as well as on a regular basis, or following rain/snowmelt event, to monitor all works, and in particular works related to erosion and sediment controls, dewatering or unwatering, restoration and in- or near- water works. Should concerns arise on site the Environmental Monitor will contact the TRCA Enforcement Officer as well as the proponent."
6	"All activities, including maintenance procedures, will be controlled to prevent the entry of petroleum products, debris, rubble, concrete or other deleterious substances into the water. Vehicular refueling and maintenance will be conducted a minimum of 30 metres from the water."
7	"All grades within the Regulatory Flood Plain will be maintained or matched."
8	"The proponent/contractor shall monitor the weather several days in advance of the onset of the project to ensure that the works will be conducted during favourable weather conditions. Should an unexpected storm arise, the contractor will remove all unfixed items from the Regional Storm Flood Plain that would have the potential to cause a spill or an obstruction to flow, e.g., fuel tanks, porta-potties, machinery, equipment, construction materials, etc."
9	"All dewatering/unwatering shall be treated and released to the environment at least 30 metres from a watercourse or wetland and allowed to drain through a well-vegetated area. No dewatering effluent shall be sent directly to any watercourse, wetland or forest, or allowed to drain onto disturbed soils within the work area. These control measures shall be monitored for effectiveness and maintained or revised to meet the objective of preventing the release of sediment laden water."
10	"All access to the work site shall be from either side of the watercourse. No equipment or vehicles are permitted to cross through the watercourse unless approved by TRCA."
Section 2: Construction Timing	
11	"In order to comply with the <i>Migratory Birds Convention Act</i> , TRCA recommends that tree removals be completed between August 1 and April 1."



- GENERAL NOTE:**
REFER TO DRAWING GNT1 FOR GENERAL NOTES.
- LEGEND :**
- ⊕ EXISTING HYDRANT
 - ⊗ EXISTING VALVE AND BOX
 - ⊕ EXISTING DETECTOR CHECK VALVE IN CHAMBER
 - ⊕ EXISTING CATCHBASIN
 - ⊕ EXISTING SANITARY MANHOLE
 - ⊕ EXISTING STORM MANHOLE
 - EXISTING OVERLAND FLOW ROUTE
 - PROPERTY LIMIT
 - - - SEDIMENT CONTROL FENCE
 - HOARDING FENCE
 - TREE PROTECTION FENCE

- ESC STAGING:**
- STAGE 1 (TOPSOIL STRIPPING AND SITE CLEARING)**
- ▲ INSTALL DOUBLE SILT CONTROL FENCE AND HOARDING FENCE AROUND PROPERTY LINE
 - ▲ INSTALL CONSTRUCTION ACCESS MUD-MAT
 - ▲ INSTALL TREE PRESERVATION FENCE AS PER F102 BY PALMER ENVIRONMENTAL CONSULTING GROUP INC.
 - ▲ REMOVE EXISTING TREES AS PER LANDSCAPE PLAN No. T1
 - ▲ INSTALL ENVIRON TANK AND ENVIRON BAG
 - ▲ INSTALL ENVIRON TANK AND ENVIRON BAG
 - ▲ TOPSOIL STRIPPING
- STAGE 2 (EXCAVATION AND U/G SERVICING WORK)**
- ▲ PRE-GRADE SITE AND EXCAVATION OF U/G PARKING AREA
 - ▲ INSTALL ON-SITE SERVICING AS PER SITE SERVICING PLAN
 - ▲ INSTALL SEDIMENT TRAPS ON PROPOSED ON-SITE CATCHBASINS



UTILITY NOTES:
THE POSITION OF POLE LINES, CONDUITS, WATERWAYS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWING, 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 DAMAGE.

BENCHMARK:
ELEVATIONS ARE REFERRED TO THE CITY OF BRAMPTON BENCHMARK NO. 04210221, BEING A BRASS CAP IN CONCRETE APPROX. 21 m SOUTH OF CENTRELINE OF NASHVILLE ROAD AND 11 m EAST OF CENTRELINE OF REGIONAL ROAD 50, IN FRONT OF GAS STATION/COFFEE SHOP, HAVING AN ELEVATION OF 220.967 m.

No.	DATE	REVISIONS	CONS.	TOWN
1	2025/12/18	FIRST ENGINEERING SUBMISSION	R.S.	
2	2025/12/08	SECOND ENGINEERING SUBMISSION	R.S.	
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				
31				
32				
33				
34				
35				
36				
37				
38				
39				
40				
41				
42				
43				
44				
45				
46				
47				
48				
49				
50				

PROJECT: **MULTIPLE RESIDENTIAL CONDO DEVELOPMENT**
12148 ALBION VAUGHAN ROAD, TOWN OF CALEDON

CONSULTANT: **MASONGSONG ASSOCIATES**

Multiplicity: **G:\Symbols\Town of Caledon\Caledon-Logo.jpg**

TITLE: **EROSION & SEDIMENT CONTROL PLAN**

DESIGN I.S. CHECKED R.S. CONTRACT No. 17-849

SCALE 1:500 PLAN No. **ES1**

DATE DECEMBER 2020