Palgrave Estate Subdivision
Town of Caledon

Functional Servicing & Stormwater Management Report

October 2019

MAEL Project 2018-951

Functional Servicing & Stormwater Management Report

Palgrave Estate Subdivision
Town of Caledon

For

Casltemore Corp.

October 2019

Prepared by:

MASONGSONG ASSOCIATES ENGINEERING LIMITED
7800 Kennedy Road, Suite #201
Markham, Ontario • L3R 2C7
T (905) 944-0162 F (905) 944-0165

Project No: MAEL 2018-951

Contents:

<u>Appendices</u>

1. INTRODUCTION

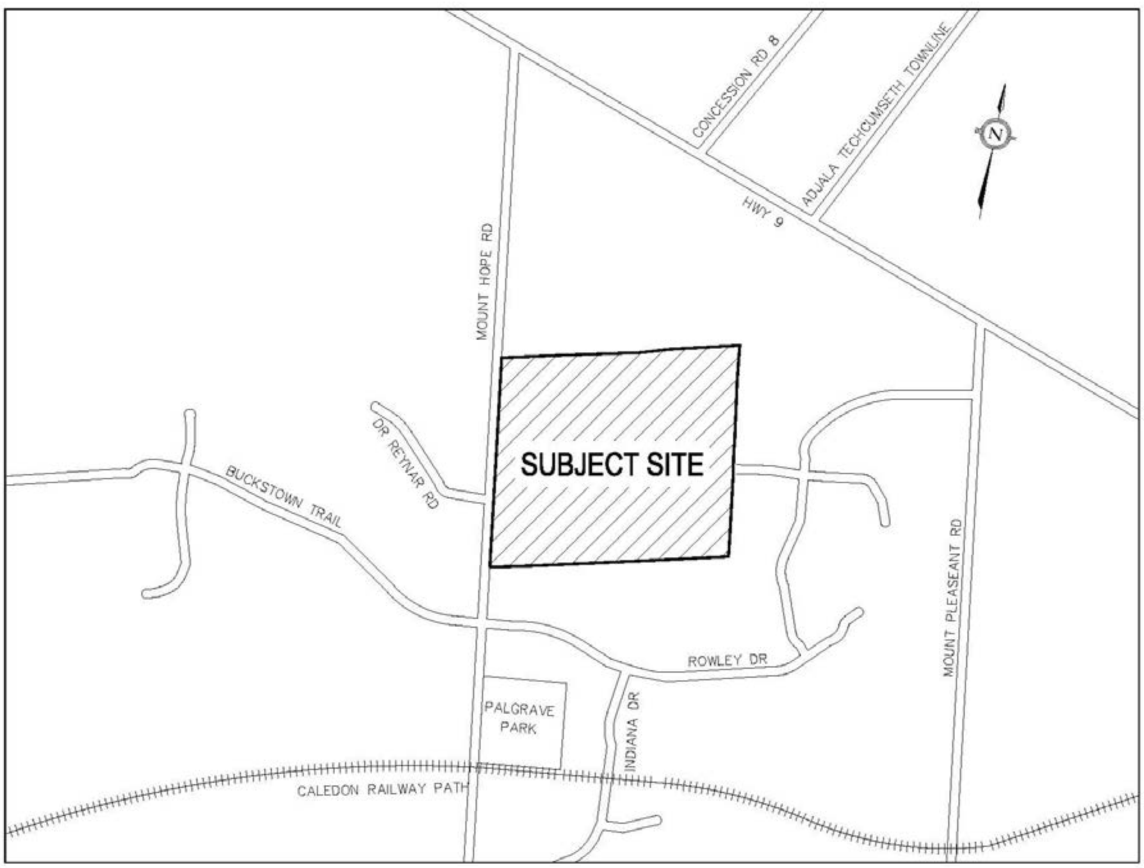
Masongsong Associates Engineering limited has been retained by Casltemore Corp. to prepare this Functional Servicing and Stormwater Management Report in support of development application for Palgrave Estate subdivision, in the Town of Caledon, Regional Municipality of Peel.

The purpose of this report is to identify the requirements for servicing/stormwater management and to demonstrate how the subject site will function within the framework of existing and proposed infrastructures.

1.1 Background

The subject site is located south of Highway 9 between Mount Hope and Mount Pleasant roads. The current use of property is mainly as agricultural field. It is abutted by Mount Hope Road to the west and existing residentials and vacant lands to other directions.

Refer to below for proposed site location plan:



1.2 Proposed Development

Proposed development draft plan of subdivision consists of 29 estate lots and municipal roads namely Street A, B, and C. The draft plan also delineates areas to be designated as green spaces.

Refer to Appendix-A for proposed draft plan of subdivision.

Major development works for the initial stage of proposed development will be construction of municipal roads, installation of watermain and utilities.

1.3 Existing Grading and Landform

From the topographic survey observation, the subject land terrain generally remains undisturbed at natural state. The existing landform feature slope ranges from moderate to steep. Existing woodlands, watercourses and vegetations concludes key natural features found throughout the subject site.

1.4 Existing Infrastructures

The key existing infrastructures reviewed in support of the subject lands include:

Water A 300 mm diameter municipal watermain within Mount Hope Road. A 150mm watermain on Barbara Place and McGuire Trail to the east of the subject site

Sanitary No municipal sanitary sewer system is available in this part of the Town and all existing adjacent residential lots are provided with individual septic system.

Storm The proposed development is located within rural part of the Town with no municipal storm sewer system. Existing watercourses as drainage receiving system and roadside ditches as drainage conveyance system along with drainage culverts are considered subject site existing stormwater management features.

2 PROPOSED SERVICES

The proposed site is estate lot development and existing municipal services are not fully available in the vicinity of the subject site to service the proposed development. The only municipal service available to service the proposed development is existing watermain within the adjacent municipal roads.

This report will describe how the proposed development can be serviced in context of estate lot development in order to comply with relevant agencies requirement including Town of Caledon and Region of Peel standard criteria. It also points out to any potential constraints that may affect the serviceability of the site.

2.1 Water Servicing

The subject site is within Peel Region Pressure District 8A water distribution system. A 200mm diameter PVC watermain is proposed along the proposed municipal roads namely Street A, B, and C. and service connections to proposed lots will be made from this main. Proposed service connection will be 25mm cupper line and to be installed as per Region of Peel standard detail 1-7-1.

The proposed watermain requires looping; therefore, a 150mm watermain extension beyond the limit of proposed development is proposed be installed to connect to existing 150mm watermain in McGuire Trail in order to form a strong looped system.

Refer to Drawing GP1 enclosed in Appendix-B for illustration of proposed site water servicing system.

2.2 Water Distribution System Modeling

Flow testing of existing hydrants on Mount Hope Road and Barbara Place indicate 83 and 86 psi, static pressure respectively.

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.

The summary of analysis result is provided in the following Table 2.1:

Table 2.1

No	Scenarios	EPANET Results	Region Criteria
1	Max. pressure during min. hour demand (kpa)	629	< 690 (Ok)
2	Min. pressure during max. hour demand (kpa)	570	> 275 (OK)
3	Min. pressure during max. day demand + fire (kpa)	242	> 140 (OK)

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

Refer to Appendix-C for watermain analysis detailed calculations and EPANET result output.

2.3 Sanitary Sewerage

As noted, there is no municipal sanitary sewer system available for this development. Typically, due to the nature/type of proposed estate lots, septic system for individual lot is considered feasible alternative for sanitary servicing. Proposed septic system typical size and approximate location of disposal area / leaching bed is show on proposed development engineering plans. The actual size and location of the system (in consideration with the individual lot landform constraints) will be detailed during individual site grading and siting plan preparation stages.

The design of septic system is to be coordinated with site mechanical consultant during detailed design stages.

Refer to Drawing GP1 enclosed in Appendix-B for illustration of proposed septic system approximate locations.

3 STORMWATER MANAGEMENT

3.1 Water Quantity

Proposed municipal roads are considered major change to existing landform yet in comparison to overall site area it accounts only for 6.5% of development area. In addition, disturbance to existing landform and minor increase in hard surface (driveways and roof) within the proposed lots will not result in significant increase to post-development runoffs. This is due to size of disturbed area in comparison to overall size of the proposed lots which will largely remain unchanged at pre-development condition as vegetated surface with minimum grading changes.

In the context of the proposed estate lot development, there will we be no significant increase in post-development peak runoff; therefore, design of new end-of-pipe stormwater management facility/feature is not feasible or recommended.

Nonetheless, as part of the Low Impact Development (LID) measures, Enhanced Grass Swale is proposed as lot-level and conveyance controls for attenuation of stormwater runoff from proposed roads which helps in peak runoff reduction. It also conveys the runoff to existing watercourse which qualifies as drainage receiving system.

In addition, the Low Impact Development measures proposed as lot-level infiltration-based controls for each individual lot (as outlined in MECP Stormwater Management Planning and Design Manual) to include the followings:

- reduced grading to allow greater ponding of stormwater and natural infiltration;
- directing roof leaders to rear yard ponding areas, soakaway pits, or to cisterns or rain barrels;
- sump pumping foundation drains to rear yard ponding areas;
- infiltration trenches;
- grassed swales;
- pervious pipe systems;
- vegetated filter strips; and
- stream and valley corridor buffer strips.

Design and Implementation of the above lot-level quantity controls will be applicable during detailed individual lot grading and siting plans preparation.

Efforts should be made during road and lot design/construction stages so that the existing overall drainage pattern is to be maintained at original conditions to the extent possible).

Refer to Drawing DR1 enclosed in Appendix-B, for illustration proposed development drainage scheme.

Furthermore, from the topographical survey contours observation, it is evident that the proposed development receives external drainage from lands to the north of the subject site. Drainage from this external area which is estimated to be 15.10 ha is tributary to existing watercourse that traverses the subject site.

As part the proposed development, Street 'A' crosses the existing watercourse and therefore, a drainage culvert is proposed to safely convey flows to downstream receiving system. Proposed culvert is sized to convey 25-year event flows. Total flow to be conveyed by the proposed 1.22 x 0.610 m box culvert is calculated as follows:

Total flow = External flows+ internal flows

<u>External</u>

Q = CIA
Where:
Q = Design flow (m^3/sec)
C = Runoff coefficient
I = Rainfall intensity (mm/hour)
A = Contributing drainage area (ha)
C = 0.30
I = $a/(t+c)^b$ (a=3158, b=0.9335, c=15)

t	= 85.80 min (Calculated by Airport Formula method see detailed calculation in Appendix-C-)
I	$=3158/ (85.80+15)^{0.9335}$
	= 42.58 mm/hour
A	= 10.77 ha (external drainage Area)
Q (25-y)	= (0.3) x (42.58) x (10.77) /360
	$=0.38\ m^3/s$

Internal

Q	= CIA
Where:	
C	= 0.30
I	$= a/ (t+c)^b$ (a=3158, b=0.9335, c=15)
t	= 85.80 min (Calculated by Airport Formula method see detailed calculation in Appendix-C)
I	$=3158/ (85.80+15)^{0.9335}$
	= 42.58 mm/hour
A	= 21.32 ha
Q (25-y)	= (0.30) x (42.58) x (2.32) /360
	$=0.76\ m^3/s$

Q	= CIA
Where:	
C	= 0.50
I	$= a/ (t+c)^b$ (a=3158, b=0.9335, c=15)
t	= 85.80 min (Calculated by Airport Formula method see detailed calculation in Appendix-C)
I	$=3158/ (85.80+15)^{0.9335}$
	= 42.87 mm/hour
A	= 4.42 ha (Proposed streets) Q
(25-y)	= (0.5) x (42.58) x (4.42) /360
	$=0.26\ m^3/s$

Total flows to culvert= 1.40 m^3/s (0.38+0.76+0.26)

Proposed culvert is sized to covey the flows at about 75 % full flow capacity. Proposed culvert full flows capacity is 1.51 m^3/s larger than the required flow of 1.40 m^3/s.

Refer to in Appendix-C for Discharge/velocity Curve for Box Culvert design for detailed calculations.

Drainage tributary to existing watercourse downstream of the proposed culvert is calculated as follows:

Q = CIA

Where:

C = 0.30

I = $a/(t+c)^b$ (a=3158, b=0.9335, c=15)

t = 85.80 min (Calculated by Airport Formula method see detailed calculation in Appendix-C)

I = $3158/(85.80+15)^{0.9335}$

= 42.58 mm/hour

A = 4.75 ha

Q (25-y) = (0.30) x (42.58) x (4.75) /360=0.17 m^3/s

The total drainage downstream of culvert is calculated to be 1.57 m^3/s (1.40+0.17). The downstream segment of existing watercourse to be modified to 20.00m wide watercourse with min. depth of 0.35m for sufficient conveyance capacity to convey post-development flows to existing conveyance system beyond the limits of the proposed development. The flows from 25-year event tributary to downstream segment of watercourse is calculated to be 1.57 m^3/s and the watercourse conveyance capacity is 1.70 m^3/s. Refer to Appendix-C for watercourse generalized cross-section capacity analysis calculations

3.2 Water Quality

Proposed Enhanced Grass Swale as roadside ditches not only convey and attenuate stormwater runoff it also provides effective quality control functionality. To this end, the proposed enhanced grass swale along proposed municipal roads provide quality treatment for stormwater runoff from roads. Road drainage is directed to enhanced grass swale by providing gutter outlets at certain interval which will convey road drainage to enhanced grass swale.

Detailed design of Enhanced Grass Swale will be provided at detailed design stages.

Typical detail of enhanced grass swale is shown on Drawing DR1 enclosed in Appendix-B of this report.TRCA standard Enhanced Grass Swale detail is enclosed in Appendix-A for reference.

3.3 Water Balance

No significant changes to overall water balance essential components are expected due to proposed development. As such, the impact of proposed lot development on water balance was considered minor in nature. Nonetheless, the recommended LIDs mitigation measures (to offset the loss of infiltration from rooftop and paved areas) is to direct rooftops and driveways drainage to grassed areas where natural infiltration of runoff can occur. The implementation of LIDs measures are possible during proposed lots detailed design at permitting stages.

3.4 Sedimentation and Erosion Control During Construction

On-site erosion and sediment control should be implemented for all construction activities within the subject site, and for each consecutive stages of construction, including earthworks, servicing and building activities. Erosion and sedimentation control BMP is to be designed in accordance with TRCA Sedimentation Control Guidelines for Urban Construction (2006).

The basic principles to be considered for minimizing erosion, sedimentation, and resultant negative environmental impacts include:

- 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;
- Erect sediment control fence around site perimeters;
- Install sediment control fence around site perimeters existing wetlands;
- Provide sediment traps (e.g. rock check dams, straw bales, scour basins) along interceptor swales and points of swale discharge;
- 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.
- Remove erosion and sediment controls once construction is completed and sediment run-off from the construction activities has stabilized.

Refer to Appendix-B, Drawing EC1 for Erosion and Sedimentation Control plan.

4 LANDFORM AND GRADING

Effort is made to preserves the existing landform and grades to the extent possible. To achieve this, proposed lot grading boundaries and corner grades matches existing grades minimizing any grading disturbances along proposed lot boundaries. Typically, main grading will be within/around the proposed house envelope and driveways.

Typical house envelop and septic system for individual lots are shown within areas where slopes are minimum to avoid major landform alteration. However, more detail grating will require coordination with site architect at detailed lot grading design stages and the house can be designed/tailored to better fit to existing landform to minimize grading works.

Refer to Drawing GR1 enclosed in Appendix-B for conceptual grading plan.

5 SUMMARY AND RECOMMENDATIONS

This report has demonstrated that the subject development can be serviced by existing and proposed servicing infrastructures. More specifically, servicing and SWM design analysis for proposed development is summarized as follows:

Water A 200mm watermain is proposed to service the subject development. A 150mm proposed watermain is further extended east to connect to existing 150mm main on McGuire Trail to form a strong looped system.

Sanitary All proposed lots are provided with septic system. Design of septic system will be finalized during individual lot detailed design stages.

Storm Quantity Control
No quantity control is required for subject site as the proposed development does not significantly changes the quantitative nature of existing drainage scheme. Nonetheless, as part of Low Impact Development (LID) measures, enhanced grass swale is proposed to reduce peak post-development runoff.

Quality Control

Enhanced Grass Swale (as roadside ditch) is proposed for treatment of road derange. Similar LID measures are to be considered for individual lots during detailed lot siting and grading stages.

Water Balance
Water balance essential components do not experience significant changes due to proposed development; However, there are opportunities for mitigation by implementation of LIDs for the purpose of water balance to promote infiltration during site plan stages for individual lots.

We trust you will find this submission complete and in order. Should you have any questions, please contact the undersigned.

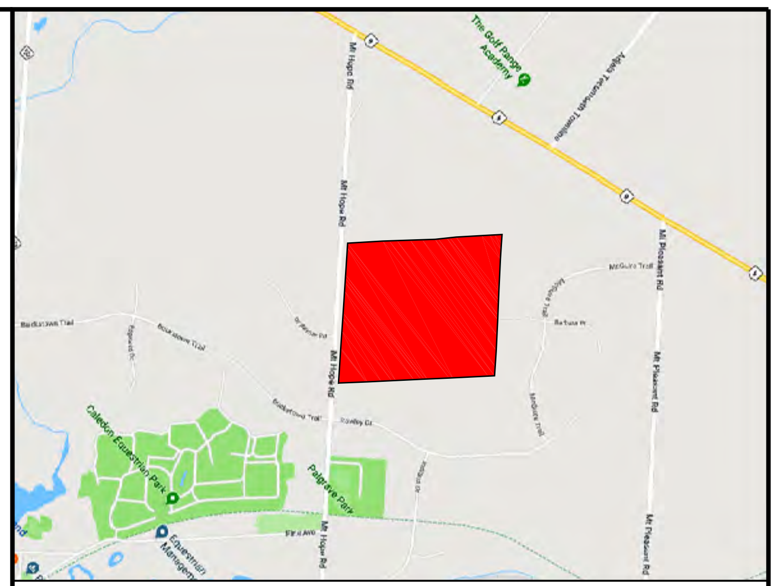
Respectfully Submitted,
MASONGSONG ASSOCIATES ENGINEERING LIMITED

LICENSED PROFESSIONAL ENGINEER
L.ENSUNCHO
100086571
PROVINCE OF ONTARIO

Mansoor Nooristani, C.E.T.
Senior Project Technologist

Lucila Ensuncho, M.A.Sc., P.Eng
Principal

Appendix A



KEY PLAN

SUBJECT PROPERTY

metric scale

LEGEND

Boundary of Subdivision

Approximate Limit of EZ2

Structural Envelopes

Significant Woodland (NVCA Dripline staked 28-Feb-2019)

Potential Reforestation Areas

Butternut

Total potential reforestation area = 13.16 ha±

Notes

1. Structural envelopes to generally be confined to areas with slopes of 10% or less (areas with 11-15% slope and above may be considered in certain instances). (Secondary Plan Policy 7.1.9.11)

0 20 40 80
metric scale

POTENTIAL DEVELOPMENT PROPOSED SUBDIVISION PART of LOT 28, CON. 8 TOWN of CALEDON REGION of PEEL

DESIGN PLAN SERVICES INC.
Town Planning Consultants

900 The East Mall, Suite 300
Etobicoke, Ontario M9B 6K2
Telephone (416) 626-5445
www.designplan.ca

DESIGN PLAN SERVICES TOWN PLANNING CONSULTANTS

Scale	Date	Drawing Number	Rev.	Drawn	Design
1:2500	Sept. 20/19	1896-14b		CA	Wb

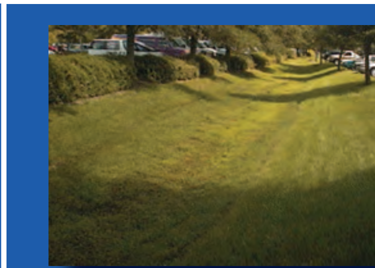
ENHANCED GRASS SWALES

CVC/TRCA LOW IMPACT DEVELOPMENT
PLANNING AND DESIGN GUIDE - FACT SHEET

GENERAL DESCRIPTION

Enhanced grass swales are vegetated open channels designed to convey, treat and attenuate stormwater runoff (also referred to as enhanced vegetated swales). Check dams and vegetation in the swale slows the water to allow sedimentation, filtration through the root zone and soil matrix, evapotranspiration, and infiltration into the underlying native soil. Simple grass channels or ditches have long been used for stormwater conveyance, particularly for roadway drainage. Enhanced grass swales incorporate design features such as modified geometry and check dams that improve the contaminant removal and runoff reduction functions of simple grass channel and roadside ditch designs.

Where development density, topography and depth to water table permit, enhanced grass swales are a preferred alternative to both curb and gutter and storm drains as a stormwater conveyance system. When incorporated into a site design, they can reduce impervious cover, accent the natural landscape, and provide aesthetic benefits.



DESIGN GUIDANCE

GEOMETRY AND SITE LAYOUT

- Shape: Should be designed with a trapezoidal or parabolic cross section. Trapezoidal swales will generally evolve into parabolic swales over time, so the initial trapezoidal cross-section design should be checked for capacity and conveyance assuming it is a parabolic cross-section. Swale length between culverts should be 5 metres or greater.
- Bottom Width: Should be designed with a bottom width between 0.75 and 3.0 metres. Should allow for shallow flows and adequate water quality treatment, while preventing flows from concentrating and creating gullies.
- Longitudinal Slope: Slopes should be between 0.5% and 4%. Check dams should be incorporated on slopes greater than 3%.
- Length: When used to convey and treat road runoff, the length simply parallels the road, and therefore should be equal to, or greater than the contributing roadway length.
- Flow Depth: A maximum flow depth of 100 mm is recommended during a 4 hour, 25 mm Chicago storm event.
- Side Slopes: Should be as flat as possible to aid in providing pretreatment for lateral incoming flows and to maximize the swale filtering surface. Steeper side slopes are likely to have erosion gullying from incoming lateral flows. A maximum slope of 2.5:1 (H:V) is recommended and a 4:1 slope is preferred where space permits.

PRE-TREATMENT

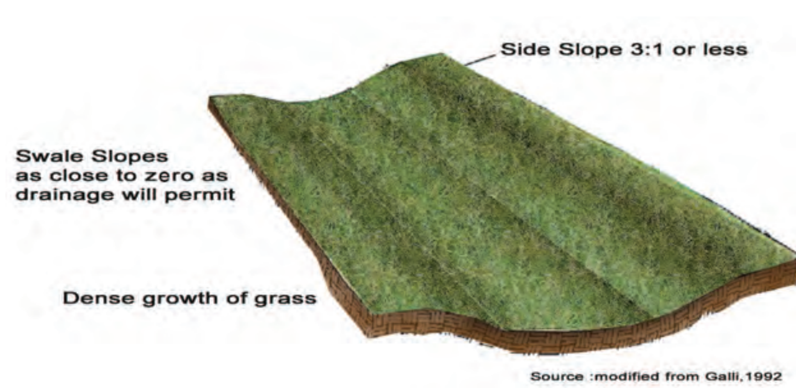
A pea gravel diaphragm located along the top of each bank can be used to provide pretreatment of any runoff entering the swale laterally along its length. Vegetated filter strips or mild side slopes (3:1) also provide pretreatment for any lateral sheet flow entering the swale. Sedimentation forebays at inlets to the swale are also a pretreatment option.

CONVEYANCE AND OVERFLOW

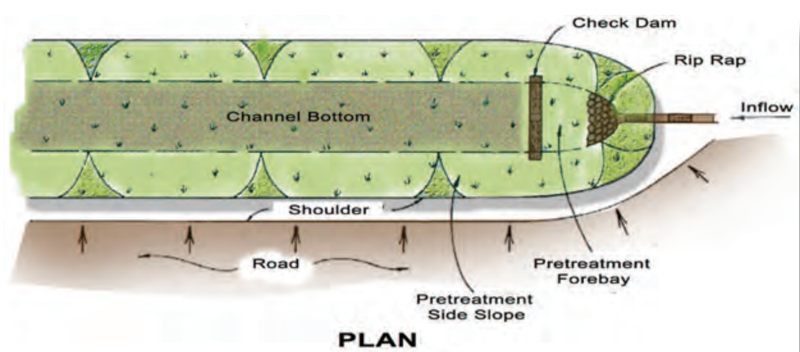
Grass swales must be designed for a maximum velocity of 0.5 m/s or less for the 4 hour 25 mm Chicago storm event. The swale should also convey the locally required design storm (usually the 10 year storm) at non-erosive velocities.

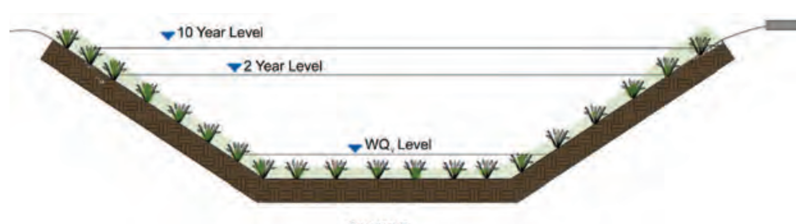
SOIL AMENDMENTS

If soils along the location of the swale are highly compacted, or of such low fertility that vegetation cannot become established, they should be tilled to a depth of 300 mm and amended with compost to achieve an organic content of 8 to 15% by weight or 30 to 40% by volume.



PLAN VIEW OF A GRASS SWALE





PLAN AND PROFILE VIEWS

ABILITY TO MEET SWM OBJECTIVES

BMP	Water Balance Benefit	Water Quality Improvement	Stream Channel Erosion Control Benefit
Enhanced Grass Swale	Partial - depends on soil infiltration rate	Yes, if design velocity is 0.5 m/s or less for a 4 hour, 25 mm Chicago storm	Partial - depends on soil infiltration rate

GENERAL SPECIFICATIONS

Component	Specification	Quantity
Check Dams	Constructed of a non-erosive material such as suitably sized aggregate, wood, gabions, riprap, or concrete. All check dams should be underlain with geotextile filter fabric. Wood used for check dams should consist of pressure treated logs or timbers, or water-resistant tree species such as cedar, hemlock, swamp oak or locust.	Spacing should be based on the longitudinal slope and desired ponding volume.
Gravel Diaphragm	Washed stone between 3 and 10 mm in diameter.	Minimum of 300 mm wide and 600 mm deep.

CONSTRUCTION CONSIDERATIONS

Grass swales should be clearly marked before site work begins to avoid disturbance during construction. No vehicular traffic, except that specifically used to construct the facility, should be allowed within the swale site. Any accumulation of sediment that does occur within the swale must be removed during the final stages of grading to achieve the design cross-section. Final grading and planting should not occur until the adjoining areas draining into the swale are stabilized. Flow should not be diverted into the swale until the banks are stabilized.

Preferably, the swale should be planted in the spring so that the vegetation can become established with minimal irrigation. Installation of erosion control matting or blanketing to stabilize soil during establishment of vegetation is highly recommended. If sod is used, it should be placed with staggered ends and secured by rolling the sod. This helps to prevent gullies.

OPERATION AND MAINTENANCE

Generally, routine maintenance will be the same as for any other landscaped area; weeding, pruning, and litter removal. Grassed swales should be mown at least twice yearly to maintain grass height between 75 and 150 mm. The lightest possible mowing equipment should be used to prevent soil compaction. Routine roadside ditch maintenance practices such as scraping and re-grading should be avoided. Regular watering may be required during the first two years until vegetation is established. Routine inspection is very important to ensure that dense vegetation cover is maintained and inlets and pretreatment devices are free of debris.

For the first two years following construction the swale should be inspected at least quarterly and after every major storm event (> 25 mm). Subsequently, inspections should be conducted in the spring and fall of each year and after major storm events. Inspect for vegetation density (at least 80% coverage), damage by foot or vehicular traffic, accumulation of debris, trash and sediment, and structural damage to pretreatment devices.

Trash and debris should be removed from pretreatment devices and the surface of the swale at least twice annually. Other maintenance activities include weeding, replacing dead vegetation, repairing eroded areas, dethatching and aerating as needed. Remove accumulated sediment on the swale surface when dry and exceeding 25 mm depth.

SITE CONSIDERATIONS

Available Space
Grass swales usually consume about 5 to 15% of their contributing drainage area. A width of at least 2 metres is needed.

Site Topography
Site topography constrains the application of grass swales. Longitudinal slopes between 0.5 and 6% are allowable. This prevents ponding while providing residence time and preventing erosion. On slopes steeper than 3%, check dams should be used.

Drainage Area & Runoff Volume
The conveyance capacity should match the drainage area. Sheet flow to the grass swale is preferable. If drainage areas are greater than 2 hectares, high discharge through the swale may not allow for filtering and infiltration, and may create erosive conditions. Typical ratios of impervious drainage area to treatment facility area range from 5:1 to 10:1.

Soil
Grass swales can be applied on sites with any type of soils.

Pollution Hot Spot Runoff
To protect groundwater from possible contamination, source areas where land uses or human activities have the potential to generate highly contaminated runoff (e.g., vehicle fueling, servicing and demolition areas, outdoor storage and handling areas for hazardous materials and some heavy industry sites) should not be treated by grass swales.

Proximity to Underground Utilities
Utilities running parallel to the grass swale should be offset from the centerline of the swale. Underground utilities below the bottom of the swale are not a problem.

Water Table
The bottom of the swale should be separated from the seasonally high water table or top of bedrock elevation by at least one (1) metre.

Setback from Buildings
Should be located a minimum of four (4) metres from building foundations to prevent water damage.

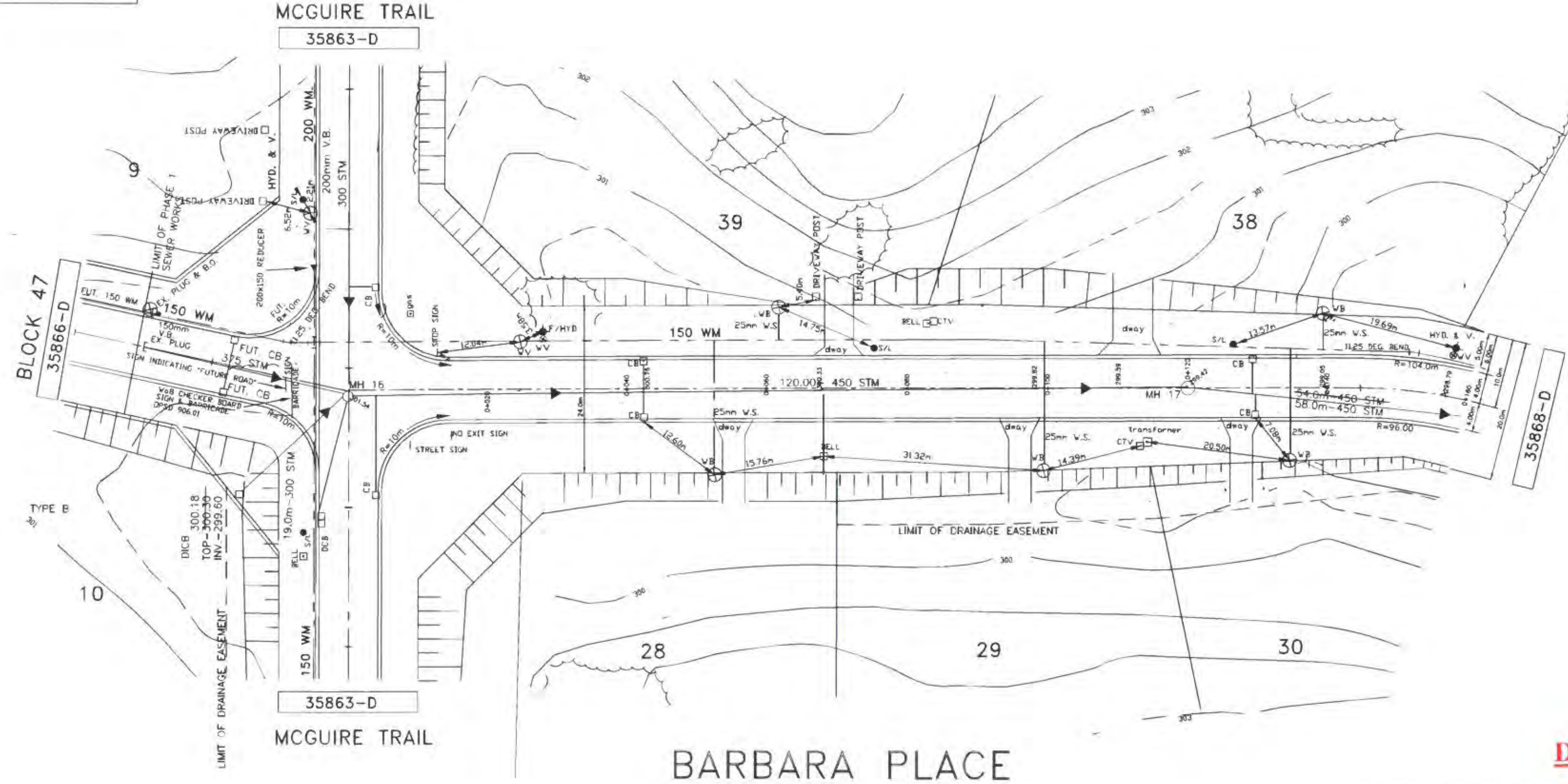
TORONTO AND REGION Conservation for The Living City
CVC CREDIT VALLEY CONSERVATION

FOR FURTHER DETAILS SEE SECTION 4.8 OF THE CVC/TRCA LID SWM GUIDE

BENCHMARK:

NAIL IN HYDRO-POLE ON THE EAST SIDE OF MOUNT PLEASANT ROAD (NINTH LINE) @ MCGUIRE TRAIL.

= 305.800



BARBARA PLACE

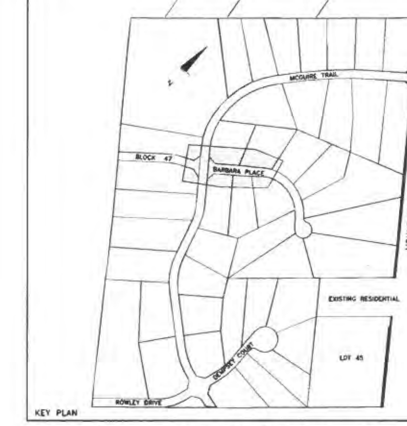
TOWN OF CALEDON
APPROVED AS NOTED
THIS APPROVAL CONSTITUTES A GENERAL REVIEW AND DOES NOT CERTIFY DIMENSIONAL ACCURACY
THIS APPROVAL IS SUBJECT TO THE FURTHER CERTIFICATION OF THE "AS CONSTRUCTED" WORKS BY A REGISTERED PROFESSIONAL ENGINEER OF THE PROVINCE OF ONTARIO
DATE: ________
APPROVED BY: ________

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN. SEWERS			GAS MAINS		
STM. SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		
M.O.E.					

REVISIONS

DATE	DETAILS	INIT.
12/10/94	FIRST SUBMISSION REVISIONS	DH
20/03/95	SECOND SUBMISSION REVISIONS	JM
01/03/01	REDESIGN	DH
06/02/02	FIRST SUBMISSION COMMENTS ON REDESIGN TOWN OF CALEDON	DH
01/04/02	SUBMISSION COMMENTS TOWN OF CALEDON REGION OF PEEL	DH
04/07/02	REGION OF PEEL SECOND SUBMISSION COMMENTS & TOWN OF CALEDON COMMENTS	DH DH
22/08/02	TOWN OF CALEDON COMMENTS	DH



FOR GENERAL NOTES & CONSTRUCTION DETAILS REFER TO DWG. 6441-A-21

FOR TYPICAL ROAD CROSS-SECTIONS REFER TO DWG 6441-A-21

ROAD BASE:

40mm DEPTH OF HL 3 ASPHALT SURFACE COURSE
65mm DEPTH OF HL 8 ASPHALT BASE COURSE
150mm DEPTH OF GRANULAR 'A' GRANULAR BASE
300mm DEPTH OF GRANULAR 'B' GRANULAR SUB BASE

CURB TO BE PER OPSD-600.06

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.

REGION OF PEEL
MAIN LINE VALVES – MUELLER RESILIENT WEDGE GATE VALVES 2360-23
FIRE HYDRANTS – CANADA VALVE CENTURY B50B18
MAIN STOP – MUELLER – H15008
CURB STOP – MUELLER – H15209

AS CONSTRUCTED BY

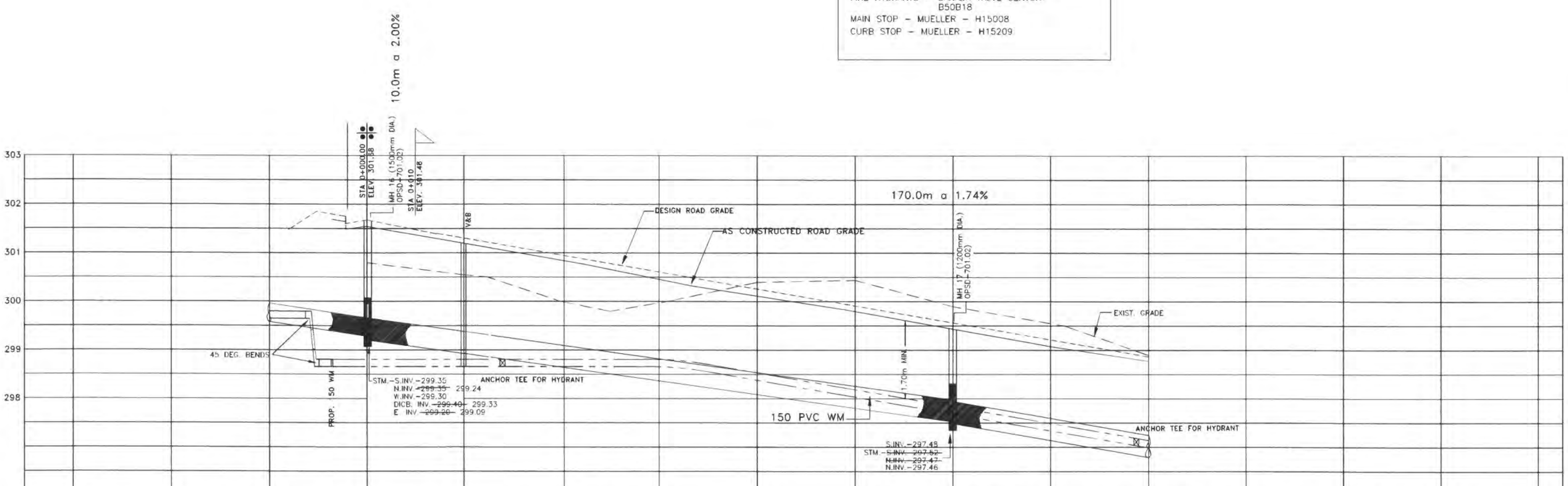
NOVEMBER 15/07

Calder Engineering Ltd.
13226 Coleraine Drive, Caledon, ON L7B 3B2
T 905-857-7600 F 905-857-5900

T-88051C

Aquafor Beech Limited
14 ABACUS ROAD
BRAMPTON, ONTARIO L6T 5B7
(905) 794-2367

DESIGN BY | APPROVED BY



375 STM

120.0m-450 STM @ 1.43%
~~120.0m-450 STM @ 1.40%~~
BIG 'O' BOSS 2000 HDPE

58.0m-450 STM @ 1.69%
~~54.0m-450 STM @ 1.74%~~
BIG 'O' BOSS 2000 HDPE

WATERMAINS UP TO & INCLUDING 300mm DIA. P.V.C. 1120 CL.150 AWWA C-900-75 WITH OUTSIDE DIA. OF CAST IRON PIPE AND RUBBER GASKET TYPE JOINTS.

AS CONSTRUCTED ROAD GR.	301.54	301.20	300.85	300.45	300.10	299.78	299.42	299.05	298.75	AS CONSTRUCTED ROAD GR.
PROP. ROAD GR.	~~301.68~~	~~301.31~~	~~300.96~~	~~300.61~~	~~300.26~~	~~299.91~~	~~299.56~~	~~299.21~~	~~298.87~~	PROP. ROAD GR.
EX. ROAD GR.										EX. ROAD GR.
CHAINAGE	0+000	0+020	0+040	0+060	0+080	0+100	0+120	0+140	0+160	CHAINAGE

Client: PINE GLEN ESTATES
EAST HALF OF LOT 28 & PART OF EAST HALF OF LOT 27
CONC. 8 (ALBION)
TOWN OF CALEDON
REGION OF PEEL

Municipality: TOWN OF CALEDON

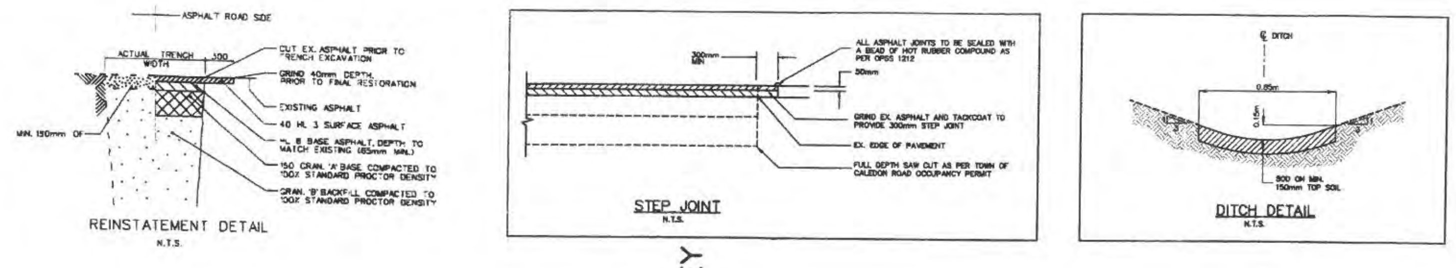
BARBARA PLACE

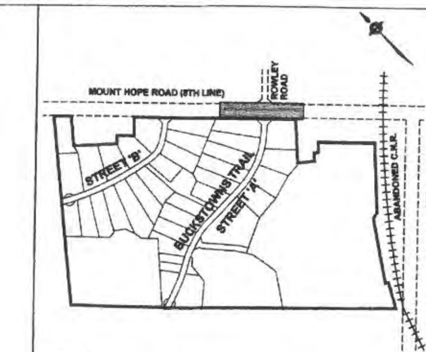
STA. 0+000 TO STA. 0+160

SCALE HOR. 1:500 VERT. 1:50	AREA	PROJECT No. 6441
DRAWN BY D. HAY	CHECKED BY	PLAN No. 35867-D
DATE MAY 1994	SHEET OF	

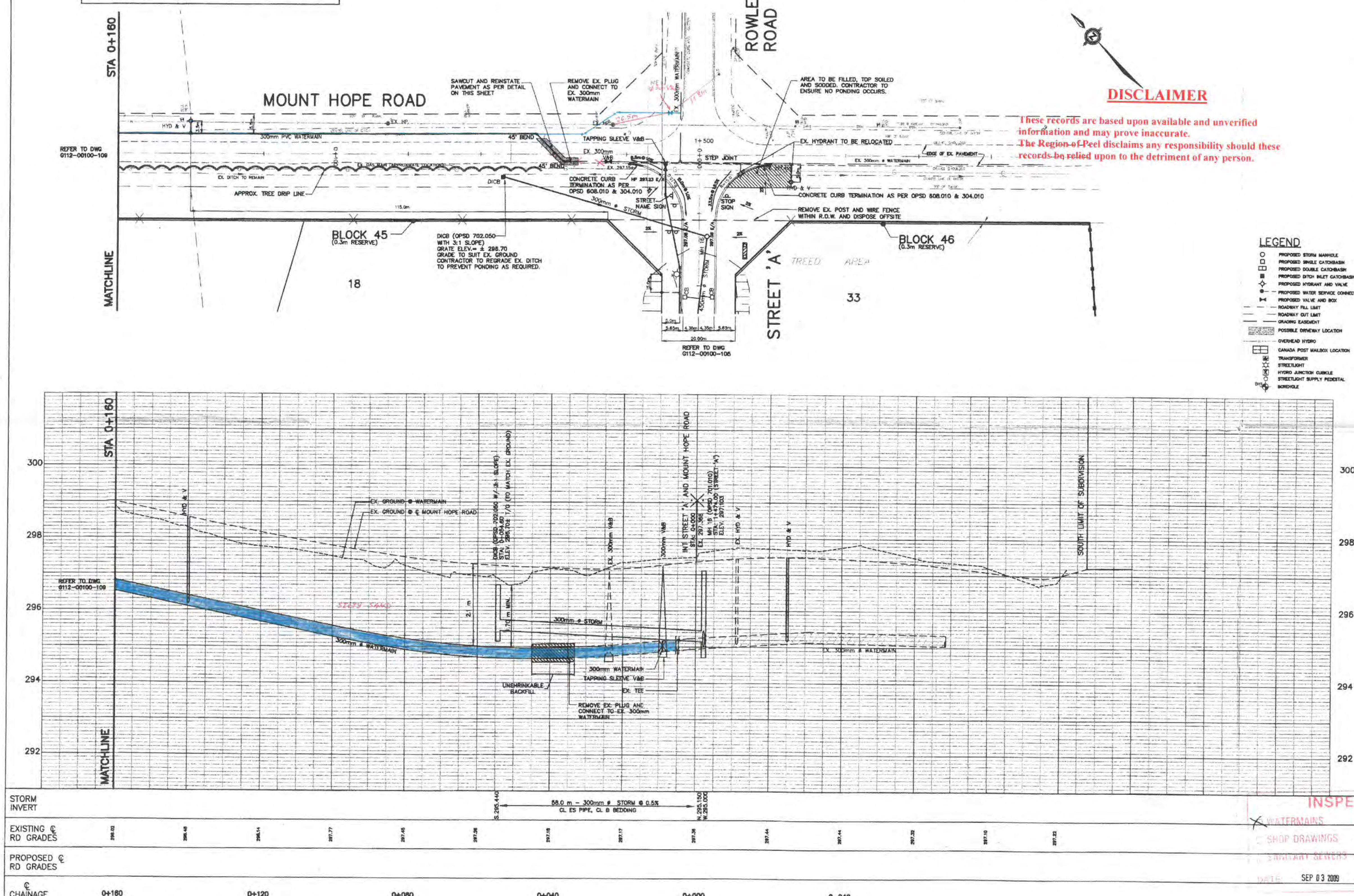
WATERMAIN INSTALLATION REQUIREMENTS

1. LOCATION OF EXISTING WATERMAIN AND GASMAIN TO BE VERIFIED IN FIELD PRIOR TO CONSTRUCTION AND PROPOSED WATERMAIN RELOCATED TO NEW LOCATION IF REQUIRED.
2. WATERMAIN LOCATION TO BE SET 5.50m OFF STREET LINE OR MODIFIED TO PROVIDE MIN. 1.5m HORIZONTAL PIPE CLEARANCE FROM EX. GASMAIN.
3. PIPE JOINT DEFLECTION TO BE WITHIN MANUFACTURER'S SPECIFICATION.
4. WATERMAIN TRENCH TO BE CONFINED WITH VERTICAL TRENCH WALLS USING BOX AND/OR CLOSE SHEETING AS REQUIRED TO LIMIT SURFACE WIDTH OF TRENCH TO OUTSIDE THE LIMITS OF THE EXISTING ASPHALT PAVEMENT.
5. WATERMAIN TRENCH TO BE BACKFILLED WITH GRANULAR 'B' TO ROAD BASE ELEVATION.
6. ROADWAY SHOULDER TO BE RESTORED TO ORIGINAL ELEVATION WITH A MIN. 150mm DEPTH GRANULAR 'A'.
7. THE WATERMAIN ALONG THE WEST SIDE OF MOUNT HOPE ROAD IS TO BE CONSTRUCTED WITHOUT DISTURBANCE TO THE EXISTING ASPHALT ROADWAY SURFACE ADJACENT, EXCEPT FOR THE REQUIRED CONNECTION TO THE EX. WATERMAIN SHOWN. SHOULD ANY PORTION OF THE EXISTING ASPHALT PAVEMENT BE DISTURBED OR IN ANYWAY DAMAGED BY THE CONTRACTOR DURING THE WATERMAIN CONSTRUCTION BEYOND THE CONNECTION AREA SHOWN HEREON, THE CONTRACTOR WILL BE RESPONSIBLE FOR REINSTATEMENT OF THE DAMAGED ROADWAY SECTION TO THE CENTRELINE OF PAVEMENT TO THE ORIGINAL CONDITION OR BETTER WITHOUT ADDITIONAL COMPENSATION THEREFOR.
8. SAW CUT EX. PAVEMENT INCLUDING STEP JOINT TO PROVIDE A SMOOTH JOINT AT THE AREA OF EX. WATERMAIN CONNECTION.
9. ONE LANE WIDTH OF CONTINOUS UNINTERRUPTED EMERGENCY ACCESS SHALL BE PROVIDED AT ALL TIMES WITH TRAFFIC FLAG PERSONS. REFER TO TRAFFIC CONTROL DEVICES TO ONTARIO TRAFFIC MANUAL BOOK No. 7, "TEMPORARY CONDITION".





KEY PLAN
N.T.S.



FOR GENERAL NOTES REFER TO DWG G10

WATER SYSTEM NOTES

1. ALL WATERMAINS SHALL BE P.V.C. CLASS 150, AWWA C900–75.
2. A 12 GAUGE T.W.H. SOLID COPPER LIGHT COLOURED PLASTIC COATED TRACER WIRE MUST BE INSTALLED WITH THE P.V.C. PIPE AND BROUGHT TO THE SURFACE AT EACH VALVE BOX. TRACER WIRE IS TO BE ATTACHED TO THE PIPE AND THE OUTSIDE OF EACH VALVE BOX BY MEANS OF TAPE.
3. WATERMAIN BEDDING AS PER REGION STD 1–5–1 AND 1–5–2.
4. HYDRANT AND VALVE AS PER REGION STD 1–6–1.
5. VALVE BOXES SHALL BE CAST IRON SLIDING TYPE COMPLETE WITH VALVE GUIDE PLATES. FROST RINGS TO BE PROVIDED IN DRIVEWAY LOCATIONS.
6. ALL WATERMAIN SHALL HAVE 1.7m MINIMUM COVER.
7. WATERMAIN MUST HAVE MINIMUM VERTICAL CLEARANCE OF 150 mm ABOVE AND 500 mm BELOW SEWERS AND ALL OTHER UTILITIES WHEN CROSSING.
8. CHLORINATION: ALL NEW MAINS AND SERVICES MUST BE CHLORINATED AND TESTED BY AN AUTHORITY APPROVED BY THE REGION OF PEEL.
9. CORROSION PROTECTION: "PROTECTED CAPS" ARE TO BE ATTACHED ON ALTERNATING BOLTS ON ALL DIRECT BURIED FITTINGS.

BOLT DIA.	PROTECTED CAP WEIGHT
20 mm	175 gr.
22 mm	160 gr.
25 mm	150 gr.
29 mm	140 gr.
32 mm	400 gr.

10. ALL HYDRANTS ARE TO BE CONSTRUCTED USING ANCHOR TEES.
11. ALL WATER SERVICES ARE TO BE 25mm COPPER.
12. VALVE BOXES (150mm AND 300mm DIA.) TO BE RESTRAINED AS PER REGION STD 1–3–3A.

ADDITIONAL NOTES FOR WATERMAIN IN FILL AREAS

1. PIPES ARE NOT TO BE LAID ON FILL UNTIL THE FIELD DENSITY TEST REPORTS HAVE BEEN SUBMITTED TO AND APPROVED BY THE ENGINEER.
2. FILL TO BE PLACED TO A MIN. 600mm ABOVE THE WATERMAIN GRADES AND TO 3.0m MIN. ON EACH SIDE COMPACTED TO A MIN. OF 100% STANDARD PROCTOR DENSITY IN 300mm LIFTS.
3. TESTS SHALL BE TAKEN ALONG THE CENTRE LINE OF THE WATERMAIN AND ON LINES 1.8m ON EITHER SIDE OF SAME AT A MAX. INTERVAL OF 30.0m. TEST TO BE TAKEN AT EACH 600mm LIFT.
4. ALL HYDRANTS, TEES, BRANCH VALVES AND HORIZONTAL BENDS AND WATERMAIN ON FILL ARE TO BE TIED WITH TIE RODS, IN ADDITION TO CONCRETE BLOCKING.
5. BARREL AND PIPE JOINT DEFLECTIONS ARE NOT ALLOWED IN FILL AREAS.
6. REFER DRG. G10 FOR ROAD RESTORATION REQUIREMENTS FOR MOUNT HOPE ROAD.

NO.	BY	DATE	REVISION	CONS. CHECKED	TOWN APPR'D
5	YR	05/08/09	REVISED AS PER TOWN COMMENTS		
4	YR	07/04/09	SUBMISSION TO REGION OF PEEL		
3	YR	23/02/09	REVISED AS PER TOWN COMMENTS		
2	YR	31/10/08	2nd ENGINEERING SUBMISSION		
1	BL	17/06/08	1st ENGINEERING SUBMISSION		

APPROVED FOR CONSTRUCTION

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: Aug 27/09 APPROVED BY: [signature]

CRAIG CAMPBELL, C.E.T.
DIRECTOR OF PUBLIC WORKS AND ENGINEERING

BENCH MARK:
ELEVATIONS SHOWN HEREON ARE GEODETIC AND ARE DERIVED FROM MINISTRY OF TRANSPORTATION PRECISE BENCHMARK No. BM 524–71. BENCH MARK IS LOCATED ON A FRAME BARN ON THE SOUTH SIDE OF HIGHWAY 9, 10.8 km EAST OF JUNCTION OF HIGHWAY 9 AND DUFFERIN COUNTY ROAD No. 18 AT MONO MILLS, 0.5 km EAST OF ALBION TOWNSHIP 8th. LINE ROAD, 56.4 m WEST OF ADJALA TOWNSHIP 8th. LINE AND 121.8 m SOUTH OF CENTRELINE OF HIGHWAY 9. TABLET IS SET HORIZONTALLY IN WEST FACE OF STONE FOUNDATION, 0.49m NORTH OF SOUTH–WEST CORNER AND 1.01 m BELOW FRAMEWORK. PUBLISHED ELEVATION = 308.261 metres

Y. I. RO — PROVINCE OF ONTARIO

PROJECT NAME
PALGRAVE ESTATES WEST SUBDIVISION
21T–88040 C

CONSULTANT
UMA | AECOM

REGION OF PEEL

THE CORPORATION OF THE
TOWN OF CALEDON

INSPECTION
WATERMAINS · ROADWORK · SHOP DRAWINGS · STORM SEWERS · SANITARY SEWERS · TRAFFIC
SEP 03 2009

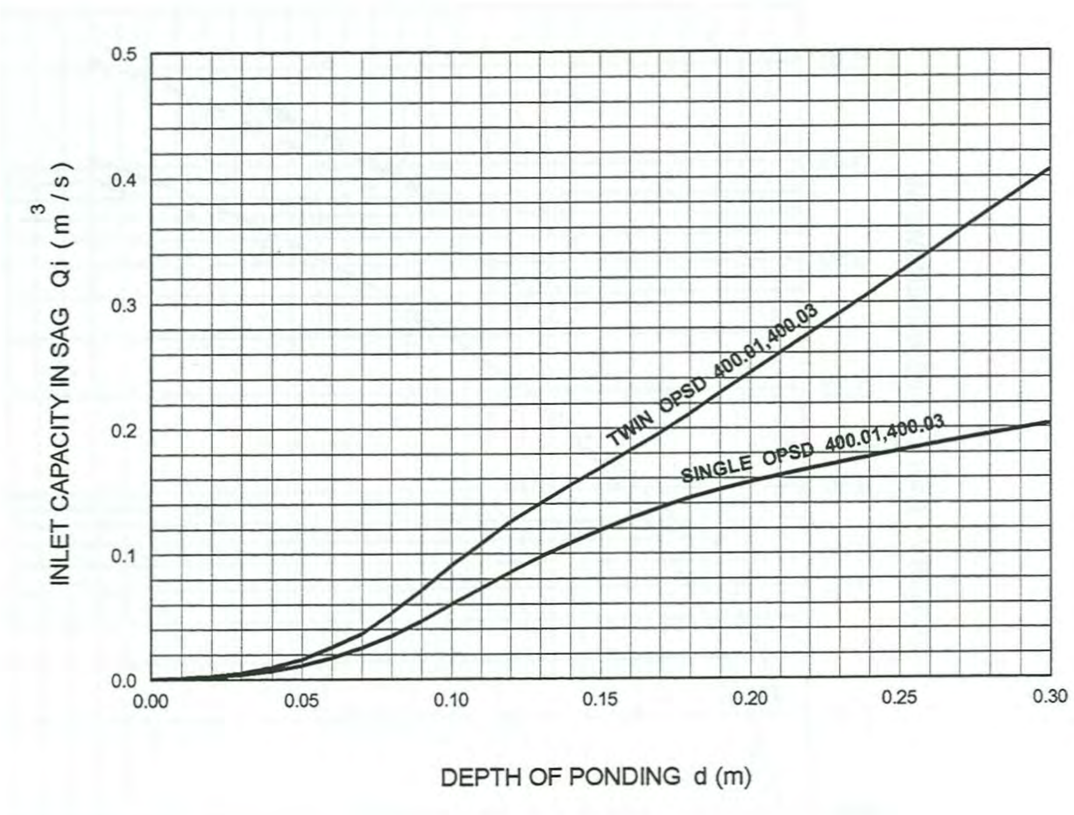
PLAN AND PROFILE
MOUNT HOPE ROAD
STA. 0+000 TO STA. 0+160

SCALE: HORIZ. 1:500	VERT. 1:50	PROJECT No. G112–00100
DESIGNED BY: S.G., V.W.	DRAWN BY: V.W.	DRAWING No. 106
CHECKED BY: B.L.	DATE: MAY 17, 2006	

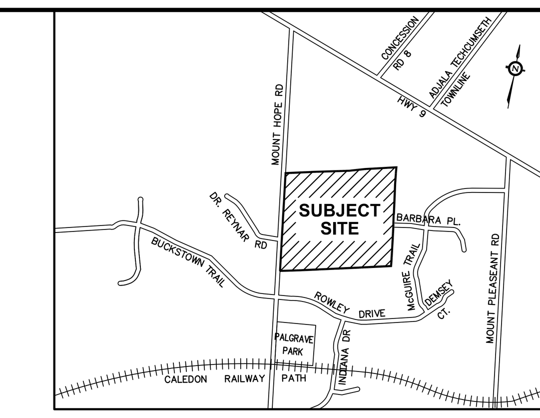
65715-0

AS CONSTRUCTED BY MAACON CONSTR. ON JAN. 4/10.
INSPECTOR'S COPY.
Olga Velynets

Design Chart 4.19: Inlet Capacity at Road Sag



Appendix B



LEGEND :

- PROPOSED DRIVEWAY WITH CULVERT
- PROPOSED CULVERT
- HYDRANT
- PROPOSED WATER SERV. CONNECTION
- PROPOSED UTILITY BOX
- PROPOSED LIGHT POLE
- PROPOSED VALVE & BOX
- LIMIT OF DEVELOPMENT
- STRUCTURE ENVELOP LINE
- WATERCOURSE
- EXISTING TREES
- EDGE OF VEGETATION
- SEPTIC TANK SYSTEM (TYP)
- PROPOSED HOUSE (TYP)

TOWN NOTES:

GENERAL

A. SINGLE - STAGE CURB & GUTTER TO COMPLY WITH OPSD 600.040 COMPLETE WITH 2 - 15M BARS

B. TWO - STAGE CURB & GUTTER TO COMPLY WITH OPSD 600.070

C. SIDEWALKS TO COMPLY WITH OPSD-310.010 AND ARE TO BE 1.5 METRES WIDE ON A 150mm COMPACTED GRANULAR "A" BASE. MINIMUM THICKNESS AS FOLLOWS :
- -NORMAL THICKNESS 125mm.
- -RESIDENTIAL DRIVEWAY 150mm
- -COMMERCIAL/INDUSTRIAL DRIVEWAY 200mm (REINFORCEMENT AS PER OPSS IF REQUIRED)

D. NATIVE SUBGRADE SHALL HAVE A CROSSFALL OF 3% AND THE MATERIAL SHALL BE APPROVED BY A SOILS CONSULTANT AND IS SUBJECT TO APPROVAL BY THE DIRECTOR OF PUBLIC WORKS AND ENGINEERING.

E. THE ROAD BASE SHALL INCORPORATE 1OOmm DIAMETER SUBDRAIN WITH FACTORY INSTALLED FILTER FABRIC AS PER TOWN OF CALEDON STANDARD No. 240.

F. ALL CURB RADII TO BE MINIMUM OF 10.0 METRES RESIDENTIAL AND 15.0 METRES INDUSTRIAL AT THE EDGE OF ASPHALT.

G. NATIVE SUBGRADE TO BE COMPACTED TO MINIMUM 95% STANDARD PROCTOR MAXIMUM DRY DENSITY AND SHALL BE PROOF ROLLED.

H. GRADE AND CROSS FALL ADJUSTMENT OF MAINTENANCE HOLE AND CATCH BASIN FRAMES WILL BE MADE USING PRODUCTS SPECIFICALLY MANUFACTURED FOR THAT PURPOSE AS PER OPSD 704.010.

I. NON-COMPRESSIBLE BACK FILL WILL BE USED DURING REBUILDING, ADJUSTI NG, OR ANY OTHER APPLICABLE CATCH BASIN OR MAINTENANCE HOLE WORKS.

J. CURB AND SIDEWALK CONCRETE SHALL BE 30MPa AT 28 DAYS WITH 7% +/- 1.5% ENTRAINED AIR AND NOT LESS THAN 355 kg/m3 OF CEMENT.(PER OPSS 315 AND 353)

REGION OF PEEL NOTES:

GENERAL

1. THE APPLICANT, APPLICANT'S REPRESENTATIVE, CONSULTANT, CONTRACTOR AND SUB CONTRACTORS ARE RESPONSIBLE TO ENSURE THAT THEIR DESIGN MATERIALS AND CONSTRUCTION PRACTICES CONFORM TO THE LATEST REGION OF PEEL STANDARDS, SPECIFICATIONS, MATERIALS AND DESIGN CRITERIA, POSTED ON REGION OF PEEL'S WEBSITE (www.peelregion.ca/pw/standards). IN THE ABSENCE OF REGION SPECIFICATIONS, THE ONTARIO PROVINCIAL STANDARD SPECIFICATIONS (OPSS) SHALL APPLY.
2. ALL WORKS SHALL BE COMPLETED IN ACCORDANCE WITH THE "OCCUPATIONAL HEALTH AND SAFETY ACT". THE GENERAL CONTRACTOR SHALL BE DEEMED THE CONSTRUCTOR AS DEFINED IN THE ACT.
3. THE CONTRACTOR AT THEIR EXPENSE SHALL VERIFY THE LOCATION, DIMENSION AND ELEVATION OF ALL EXISTING SERVICES AND UTILITIES IN THE FIELD.
4. PRIOR TO EXCAVATION OR BORING CONTRACTOR AT THEIR EXPENSE SHALL EXPOSE AND VERIFY THE LOCATION AND ELEVATION OF ALL EXISTING UTILITIES AND SERVICES TO BE CROSSED AND MUST NOTIFY THE DESIGN ENGINEER AND THE AGENCY FIELD INSPECTOR AND/OR PROJECT MANAGER IMMEDIATELY, IN WRITING, OF ANY CONFLICTS OR DISCREPANCIES. CONTRACTOR SHALL BE RESPONSIBLE FOR EXPOSING THE EXISTING UTILITIES FAR ENOUGH IN ADVANCE OF CONSTRUCTION TO MAKE NECESSARY DESIGN MODIFICATIONS FOR REVIEW AND APPROVAL, IF REQUIRED, WITHOUT DELAYING THE WORK.
5. THE CONTRACTOR, AT THEIR EXPENSE AND TO THE SATISFACTION OF THE REGION OF PEEL, SHALL BE RESPONSIBLE FOR THE RESTORATION AND THE REPAIR OF THE EXISTING UTILITIES AND ALL AREAS BEYOND THE PLAN OF SUBDIVISION DISTURBED DURING CONSTRUCTION.
6. THE SUPPORT OF ALL UTILITIES SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.
7. ALL BACKFILL FOR SEWERS, WATERMAINS AND UTILITIES ON THE ROAD ALLOWANCE MUST BE MECHANICALLY COMPACTED.
8. ALL BOREHOLES SHOWN ON DRAWING ARE FOR INFORMATION ONLY. REFER TO GEOTECHNICAL REPORT.
9. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SPECIFIED.

WATERMAINS

1. THE REGION OF PEEL SHALL CONDUCT THE OPERATION OF EXISTING VALVES AND HYDRANTS IF REQUIRED.
2. ALL WATERMAINS SHALL HAVE 1.70m MINIMUM COVER FOR URBAN ROAD DESIGN AND 2.1m MINIMUM COVER FOR RURAL ROAD DESIGN.
3. ALL WATERMAINS SHALL MAINTAIN A MINIMUM 1.5m CLEARANCE FROM ALL MANHOLES AND CATCH BASINS, WHERE APPLICABLE.
4. FOR WATERMAINS CROSSING OVER OR UNDER SEWERS A MINIMUM 0.5m VERTICAL CLEARANCE SHALL BE PROVIDED.
5. FOR WATERMAIN CROSSING A SANITARY SEWER, WATERMAIN JOINTS ARE TO BE OFFSET A MINIMUM OF 2.5m HORIZONTALLY FROM THE CENTERLINE OF THE SANITARY SEWER.
6. WATERMAIN BEDDING SHOULD BE AS PER TRENCH DETAIL ON THE PLAN AND PROFILE DRAWING AND COMPACTED TO 100% SPD.
7. WATERMAINS TO BE INSTALLED TO GRADES AS SHOWN ON APPROVED PLANS, COPY OF GRADE SHEET MUST BE SUPPLIED TO THE REGION OF PEEL INSPECTOR PRIOR TO COMMENCEMENT OF WORK.
8. ANY JOINT DEFLECTION SHALL BE 50% OF MANUFACTURER'S SPECIFICATIONS. PIPE BARREL DEFLECTION IS PROHIBITED.
9. FIRE HYDRANTS SHALL BE INSTALLED AS PER REGION STD. DWG. 1-6-1 OR 1-6-2 WITH FLANGE SET BETWEEN 50mm AND 150mm ABOVE FINISHED GRADE.
10. ALL HYDRANTS SHALL HAVE 1.2m MINIMUM HORIZONTAL CLEARANCE FROM ALL OTHER UTILITIES AND STRUCTURES MEASURED FROM THE NEAREST POINT OF THE STRUCTURE.
11. MECHANICAL RESTRAINERS ARE REQUIRED FOR ALL FITTINGS, VALVES, DEAD ENDS, CAPS AND HYDRANTS ON ALL PVC WATERMAINS; MINIMUM RESTRAINED PIPE LENGTH AS PER REGION'S STANDARD.
12. STAINLESS STEEL NUTS AND BOLTS ARE TO BE USED ON ALL METALLIC FITTINGS AND JOINT RESTRAINTS.
13. ALL METALLIC VALVES, FITTINGS, THROUGH WALL METAL PIPING AND JOINT RESTRAINTS TO BE C/W DENSO PASTE, DENSO MASTIC & DENSO TAPE OR APPROVED EQUAL APPLIED TO MANUFACTURER'S RECOMMENDATIONS.
14. WHERE PLASTIC PIPE IS USED, INSTALL A 12 GAUGE TWU STRANDED COPPER, LIGHT COLOURED, PLASTIC COATED TRACER WIRE ATTACHED TO THE PIPE WITH APPROVED WIRE SPLICE. THE WIRE SHOULD BE BROUGHT TO THE SURFACE AT EACH SERVICE & VALVE BOX AND HYDRANT VALVES.
15. 50mm DIAMETER WATERMAIN SHALL BE TYPE K SOFT COPPER. WATERMAIN INSTALLATION IN CUL-DE-SACS AS PER REGION STD. DWG. 1-7-4.
16. A PHYSICAL SEPARATION MUST BE MAINTAINED AT ALL CONNECTION POINTS OF NEW WATERMAIN TO THE EXISTING SYSTEM UNTIL BACTERIOLOGICAL TESTS HAVE PASSED, AS PER STD. DWG 1-7-7 AND 1-7-8.
17. PROVISION FOR FLUSHING OF NEW WATERMAINS PRIOR TO TESTING MUST BE PROVIDED WITH AT LEAST 50mm OUTLET ON WATERMAINS SMALLER THAN 300mm IN DIAMETER, AND MINIMUM 100mm OUTLET ON WATERMAINS 300mm AND LARGER. COPPER WATERMAINS ARE TO HAVE FLUSHING POINTS AT THE END, THE SAME SIZE AS THE WATERMAIN, AS PER STD. DWG. 1-7-7 AND 1-7-8.
18. ALL SERVICE CONNECTIONS TO PVC PIPES ARE TO BE MADE USING APPROVED WIDE BAND SERVICE SADDLE. DIRECT TAPPING IS NOT ALLOWED.
19. COPPER WATER SERVICES SHALL BE MINIMUM 25mm OR AS INDICATED ON THE APPROVED DRAWINGS. NON METALLIC SERVICES SHALL BE AS PER LATEST APPROVED REGIONAL PRODUCT LIST C/W TRACER WIRE.
20. THE MINIMUM LATERAL DISTANCE BETWEEN WATER SERVICES AND OTHER UTILITIES SHALL BE 1.2m.
21. ALL RESIDENTIAL WATER SERVICE BOXES/CURB STOPS SHALL BE INSTALLED WITHIN SODDED AREAS WITH MINIMUM DISTANCE OF 1.0 METRES FROM THE EDGE OF THE DRIVEWAY, BE FLUSH WITH GRADE AND ACCESSIBLE AT ALL TIME.
22. VALVE AND BOXES SHALL BE CAST IRON SLIDING TYPE, COMPLETED WITH VALVE GUIDE PLATES AND INSTALLED AS PER REGION STD. 1-3-8. MAINLINE VALVES TO BE RESTRAINED AS PER REGION STD. 1-3-3A. VALVES SHALL OPEN TO THE LEFT (COUNTER-CLOCKWISE)
23. ALL WATER SERVICES BOXES SHOULD BE “LEAD FREE” AS PER REGION'S MATERIAL SPECIFICATIONS.
24. THE REGION WILL COMPLETE THE NECESSARY WATER TESTING (PRESSURE TEST, FLUSHING, CHLORINATION AND SAMPLING). CONTRACTOR MAY PROCEED WITH HIS OWN PRESSURE TEST AND FLUSHING PRIOR TO REGION'S TESTING.

WATERMAIN IN FILL AREA

1. NO WATERMAIN TO BE LAID ON FILL UNTIL THE FIELD DENSITY TEST REPORTS HAVE BEEN SUBMITTED TO AND APPROVED BY THE REGION OF PEEL OR THE CONSULTING ENGINEER.
2. PIPE JOINTS DEFLECTIONS ARE NOT ALLOWED IN FILL AREA.
3. JOINTS SHALL BE MECHANICALLY RESTRAINED THE WHOLE LENGTH.
4. ALL HYDRANTS, TEE BRANCH VALVES AND HORIZONTAL BENDS ARE TO BE MECHANICALLY RESTRAINED WITH TIE RODS.
5. IN EXISTING MUNICIPAL RIGHT-OF-WAY OR EASEMENT, FILL TO BE PLACED TO 600mm MINIMUM ABOVE THE OBVERT OF THE WATERMAIN AND TO 300mm EITHER SIDE, COMPACTED TO MINIMUM 100% STANDARD PROCTOR DENSITY IN 300mm LIFTS; AND THEREAFTER, FOR EVERY 300mm LIFT ALONG THE CENTERLINE, AND 1.5m TO EITHER SIDE, OF WATERMAIN AT MAXIMUM INTERVAL OF 30.0m. TEST RESULTS MUST BE SUBMITTED TO AND APPROVED BY THE CONSULTANT OR AGENCY.

REVISIONS

No.	BY	DATE	REVISION	CONS. CHECKED	TOWN APPR'D
1	--	----			

APPROVED FOR CONSTRUCTION

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:____________________
H. MUNTZ, P.ENG.
Town Engineer

ELEVATION NOTES

ELEVATION SHOWN HEREON ARE GEODETIC AND DERIVED FROM THE TOWN OF CALEDON BENCHMARKS.

LOCAL BENCHMARK

NO. 008197558066 ELEVATION = 277.870 METRES AND NO. 00819778416 ELEVATION = 318.849 METRES

DESIGNED BY: LICENSED PROFESSIONAL ENGINEER W. C. IP OCT 11,19 PROVINCE OF ONTARIO

APPROVED BY

PROJECT: **PALGRAVE ESTATES SUBDIVISION**

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

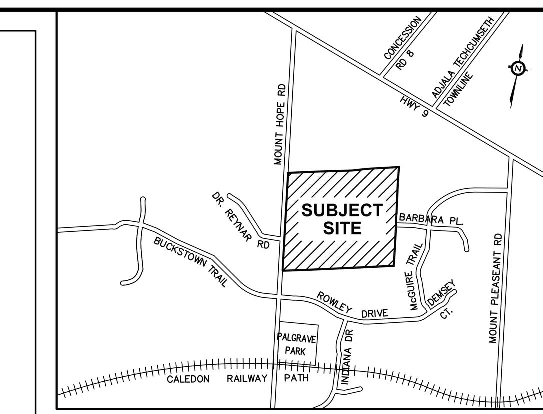
Region of Peel — Working for you

TOWN OF CALEDON

TITLE: **GENERAL PLAN**

SCALE: 1:1000		PROJECT No. 18-951	
DESIGNED BY: M.N.	DRAWN BY: MAEL CAD	PLAN No. GP1	
CHECKED BY: A.I.	DATE: OCTOBER 2019		

G:\projects\18\951\CAD\General\18951_GP1.dwg, 11/18/2019 5:53 PM, 1:1, Masongsong Associates Engineering Limited



LEGEND :

- PROPOSED DRIVEWAY WITH CULVERT
- PROPOSED CULVERT
- HYDRANT
- PROPOSED WATER SERV. CONNECTION
- PROPOSED UTILITY BOX
- PROPOSED LIGHT POLE
- PROPOSED VALVE & BOX
- LIMIT OF DEVELOPMENT
- STRUCTURE ENVELOP LINE
- WATERCOURSE
- EXISTING TREES
- EDGE OF VEGETATION
- SEPTIC TANK SYSTEM (TYP)
- PROPOSED HOUSE (TYP)
- 0.40 DRAINAGE AREA (ha) / 0.75 RUNOFF COEFFICIENT
- 01 EXTERNAL DRAINAGE AREA ID / 15.10 DRAINAGE AREA (ha) / 0.25 RUNOFF COEFFICIENT
- PROPOSED OVERLAND FLOW DIRECTION
- EXISTING OVERLAND FLOW
- PROPOSED DRAINAGE AREA
- EXISTING DRAINAGE AREA
- EXTERNAL DRAINAGE AREA
- PROPOSED ENHANCED GRASS SWALE

REVISIONS

No.	BY	DATE	REVISION	CONS. CHECKED	TOWN APPR'D
1	--	----			

APPROVED FOR CONSTRUCTION

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:____________________
H. MUNTZ, P.ENG.
Town Engineer

ELEVATION NOTES

ELEVATION SHOWN HEREON ARE GEODETIC AND DERIVED FROM THE TOWN OF CALEDON BENCHMARKS.

LOCAL BENCHMARK

NO. 008197558066 ELEVATION = 277.870 METRES AND NO. 00819778416 ELEVATION = 318.849 METRES

DESIGNED BY — LICENSED PROFESSIONAL ENGINEER W. C. IP OCT 11,19 PROVINCE OF ONTARIO

APPROVED BY

PROJECT:

PALGRAVE ESTATES SUBDIVISION

CONSULTANT:

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

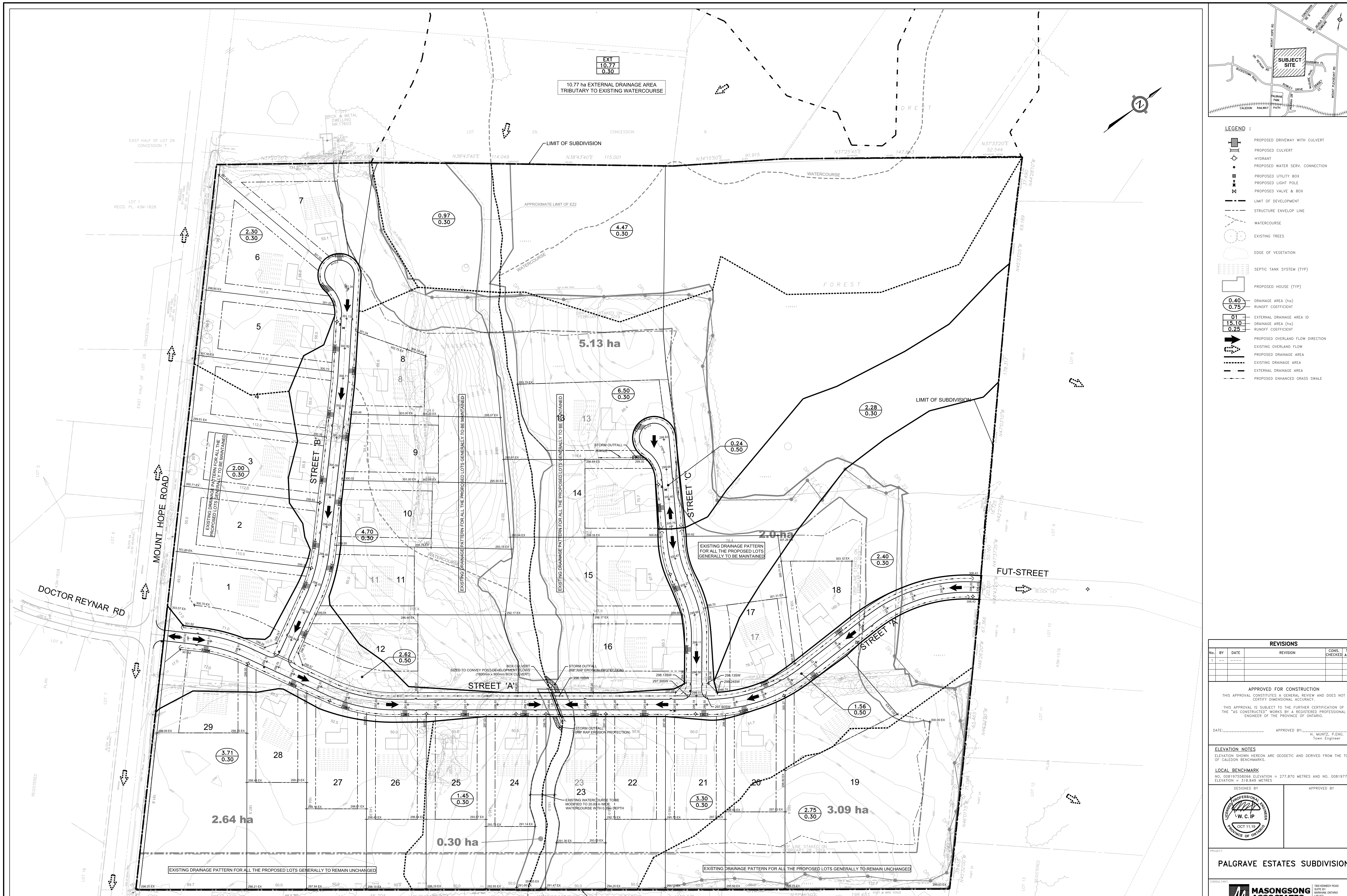
Region of Peel
Working for you

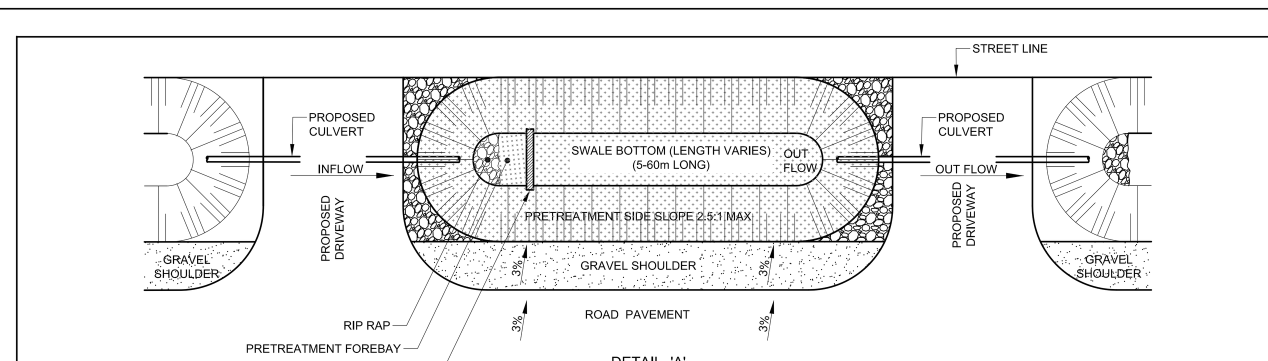
TOWN OF CALEDON

TITLE:

EXISTING DRAINAGE PLAN

SCALE: 1:1000		PROJECT No. 18-951
DESIGNED BY: M.N.	DRAWN BY: MAEL CAD	PLAN No. DR1
CHECKED BY: A.I.	DATE: OCTOBER 2019	

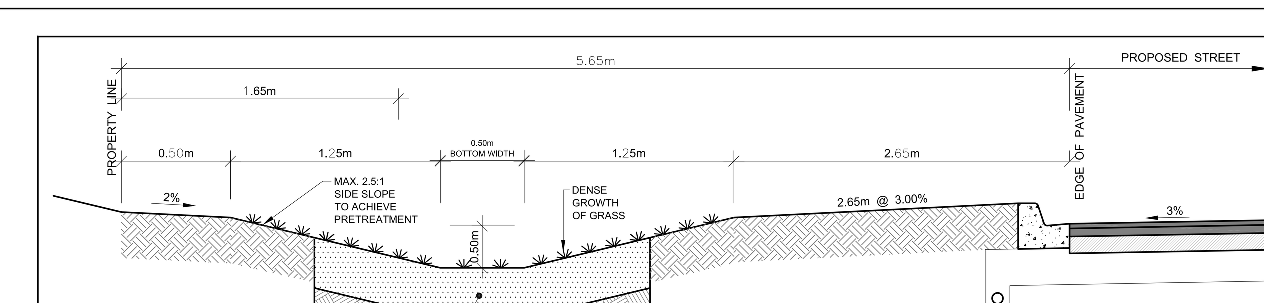




DETAIL 'A'
ENHANCED GRASS SWALE (TYP)

DETAILED DRAINAGE PLAN FOR INDIVIDUAL LOTS TO BE PROVIDED IN PERMITTING STAGE

PROPOSED GRADING DISTURBANCES TO BE LIMITED TO ROAD CONSTRUCTION AREAS AND AROUND PROPOSED HOUSES



IF SOIL ALONG THE LOCATION OF THE SWALE ARE HIGHLY COMPACTED, OR OF SUCH LOW FERTILITY THAT VEGETATION CANNOT BECOME ESTABLISHED, THEY SHOULD BE TILLED TO A DEPTH OF 300 mm AND AMENDED WITH COMPOST TO ACHIEVE AN ORGANIC CONTENT OF THE 30 TO 40% BY VOLUME

DETAIL 'B'
ENHANCED GRASS SWALE (TYP)

REVISIONS

APPROVED FOR CONSTRUCTION
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.

ELEVATION NOTES
ELEVATION SHOWN HEREON ARE GEODETIC AND DERIVED FROM THE TOWN OF CALEDON BENCHMARKS.

LOCAL BENCHMARK
NO. 008197558066 ELEVATION = 277.870 METRES AND NO. 00819778416 ELEVATION = 318.849 METRES

PALGRAVE ESTATES SUBDIVISION

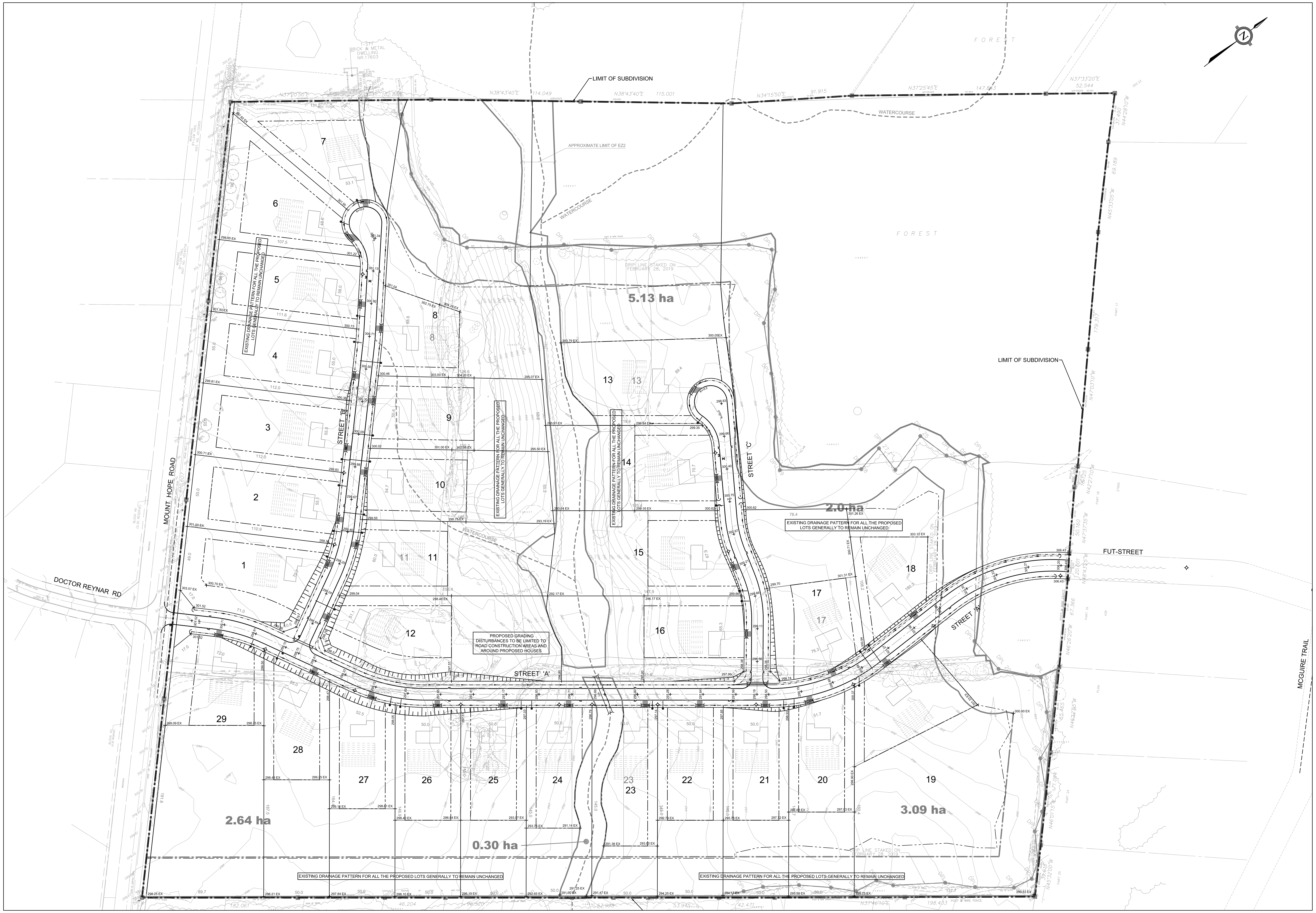
MASONGSONG ASSOCIATES

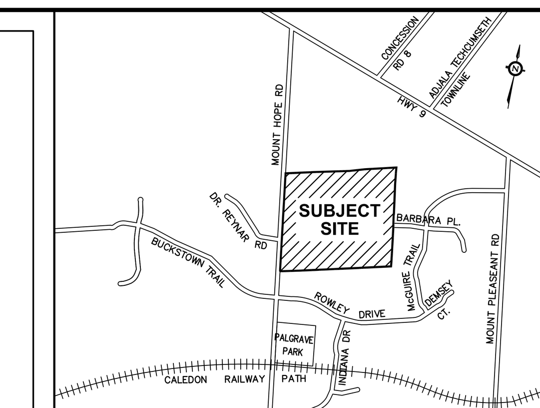
Region of Peel
Working for you

TOWN OF CALEDON

PROPOSED DRAINAGE PLAN

SCALE: 1:1000
PROJECT No. 18-951
DESIGNED BY: M.N.
DRAWN BY: MAEL CAD
CHECKED BY: A.I.
DATE: OCTOBER 2019
PLAN No. DR2



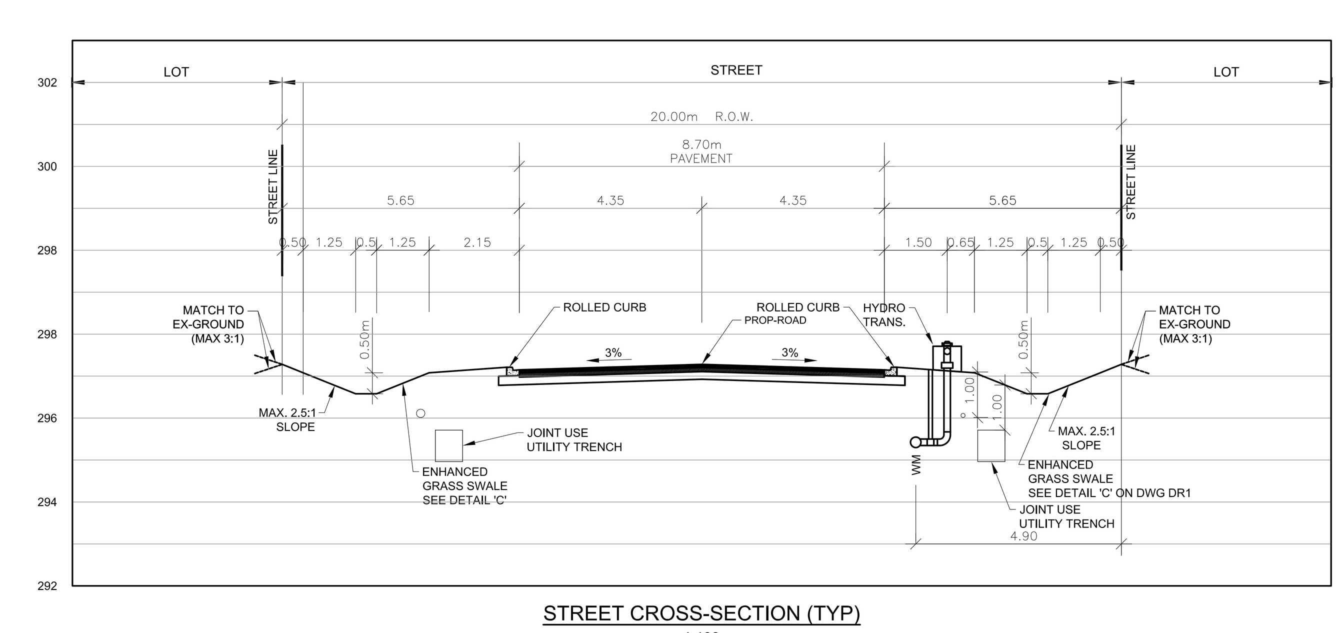


LEGEND :

- PROPOSED DRIVEWAY WITH CULVERT
- PROPOSED CULVERT
- HYDRANT
- PROPOSED WATER SERV. CONNECTION
- PROPOSED UTILITY BOX
- PROPOSED LIGHT POLE
- PROPOSED VALVE & BOX
- LIMIT OF DEVELOPMENT
- STRUCTURE ENVELOP LINE
- WATERCOURSE
- EXISTING TREES
- EDGE OF VEGETATION
- SEPTIC TANK SYSTEM (TYP)
- PROPOSED HOUSE (TYP)
- 300.20EX × EXISTING ELEVATION
- 300.20EX × PROPOSED ELEVATION

GENERAL NOTES:

A. SINGLE - STAGE CURB & GUTTER TO COMPLY WITH OPSD 600.040 COMPLETE WITH 2 - 15M BARS
B. TWO - STAGE CURB & GUTTER TO COMPLY WITH OPSD 600.070
C. SIDEWALKS TO COMPLY WITH OPSD-310.010 AND ARE TO BE 1.5 METRES WIDE ON A 150mm COMPACTED GRANULAR "A" BASE. MINIMUM THICKNESS AS FOLLOWS :
-NORMAL THICKNESS 125mm.
-RESIDENTIAL DRIVEWAY 150mm
-COMMERCIAL/INDUSTRIAL DRIVEWAY 200mm
(REINFORCEMENT AS PER OPSS IF REQUIRED)
D. NATIVE SUBGRADE SHALL HAVE A CROSSFALL OF 3% AND THE MATERIAL SHALL BE APPROVED BY A SOILS CONSULTANT AND IS SUBJECT TO APPROVAL BY THE DIRECTOR OF PUBLIC WORKS AND ENGINEERING.
E. THE ROAD BASE SHALL INCORPORATE 100mm DIAMETER SUBDRAIN WITH FACTORY INSTALLED FILTER FABRIC AS PER TOWN OF CALEDON STANDARD No. 240.
F. ALL CURB RADII TO BE MINIMUM OF 10.0 METRES RESIDENTIAL AND 15.0 METRES INDUSTRIAL AT THE EDGE OF ASPHALT.
G. NATIVE SUBGRADE TO BE COMPACTED TO MINIMUM 95% STANDARD PROCTOR MAXIMUM DRY DENSITY AND SHALL BE PROOF ROLLED.
H. GRADE AND CROSS FALL ADJUSTMENT OF MAINTENANCE HOLE AND CATCH BASIN FRAMES WILL BE MADE USING PRODUCTS SPECIFICALLY MANUFACTURED FOR THAT PURPOSE AS PER OPSD 704.010.
I. NON-COMPRESSIBLE BACK FILL WILL BE USED DURING REBUILDING, ADJUSTI NG, OR ANY OTHER APPLICABLE CATCH BASIN OR MAINTENANCE HOLE WORKS.
J. CURB AND SIDEWALK CONCRETE SHALL BE 30MPa AT 28 DAYS WITH 7% +/- 1.5% ENTRAINED AIR AND NOT LESS THAN 355 kg/m3 OF CEMENT.(PER OPSS 315 AND 353)



STREET CROSS-SECTION (TYP)
1:100

REGION OF PEEL GENERAL NOTES:

1. THE APPLICANT, APPLICANT'S REPRESENTATIVE, CONSULTANT, CONTRACTOR AND SUB CONTRACTORS ARE RESPONSIBLE TO ENSURE THAT THEIR DESIGN MATERIALS AND CONSTRUCTION PRACTICES CONFORM TO THE LATEST REGION OF PEEL STANDARDS, SPECIFICATIONS, MATERIALS AND DESIGN CRITERIA, POSTED ON REGION OF PEEL'S WEBSITE (www.peelregion.ca/pw/standards). IN THE ABSENCE OF REGION SPECIFICATIONS, THE ONTARIO PROVINCIAL STANDARD SPECIFICATIONS (OPSS) SHALL APPLY.
2. ALL WORKS SHALL BE COMPLETED IN ACCORDANCE WITH THE "OCCUPATIONAL HEALTH AND SAFETY ACT". THE GENERAL CONTRACTOR SHALL BE DEEMED THE CONSTRUCTOR AS DEFINED IN THE ACT.
3. THE CONTRACTOR AT THEIR EXPENSE SHALL VERIFY THE LOCATION, DIMENSION AND ELEVATION OF ALL EXISTING SERVICES AND UTILITIES IN THE FIELD.
4. PRIOR TO EXCAVATION OR BORING CONTRACTOR AT THEIR EXPENSE SHALL EXPOSE AND VERIFY THE LOCATION AND ELEVATION OF ALL EXISTING UTILITIES AND SERVICES TO BE CROSSED AND MUST NOTIFY THE DESIGN ENGINEER AND THE AGENCY FIELD INSPECTOR AND/OR PROJECT MANAGER IMMEDIATELY, IN WRITING, OF ANY CONFLICTS OR DISCREPANCIES. CONTRACTOR SHALL BE RESPONSIBLE FOR EXPOSING THE EXISTING UTILITIES FAR ENOUGH IN ADVANCE OF CONSTRUCTION TO MAKE NECESSARY DESIGN MODIFICATIONS FOR REVIEW AND APPROVAL, IF REQUIRED, WITHOUT DELAYING THE WORK.
5. THE CONTRACTOR, AT THEIR EXPENSE AND TO THE SATISFACTION OF THE REGION OF PEEL, SHALL BE RESPONSIBLE FOR THE RESTORATION AND THE REPAIR OF THE EXISTING UTILITIES AND ALL AREAS BEYOND THE PLAN OF SUBDIVISION DISTURBED DURING CONSTRUCTION.
6. THE SUPPORT OF ALL UTILITIES SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.
7. ALL BACKFILL FOR SEWERS, WATERMAINS AND UTILITIES ON THE ROAD ALLOWANCE MUST BE MECHANICALLY COMPACTED.
8. ALL BOREHOLES SHOWN ON DRAWING ARE FOR INFORMATION ONLY. REFER TO GEOTECHNICAL REPORT.
9. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SPECIFIED.

REVISIONS

No.	BY	DATE	REVISION	CONS. CHECKED	TOWN APPR'D
1	--	----			

APPROVED FOR CONSTRUCTION

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:____________________
H. MUNTZ, P.ENG.
Town Engineer

ELEVATION NOTES

ELEVATION SHOWN HEREON ARE GEODETIC AND DERIVED FROM THE TOWN OF CALEDON BENCHMARKS.

LOCAL BENCHMARK

NO. 008197558066 ELEVATION = 277.870 METRES AND NO. 00819778416 ELEVATION = 318.849 METRES

DESIGNED BY: LICENSED PROFESSIONAL ENGINEER W. C. IP OCT 11,19 PROVINCE OF ONTARIO

APPROVED BY

PROJECT:

PALGRAVE ESTATES SUBDIVISION

CONSULTANT:

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

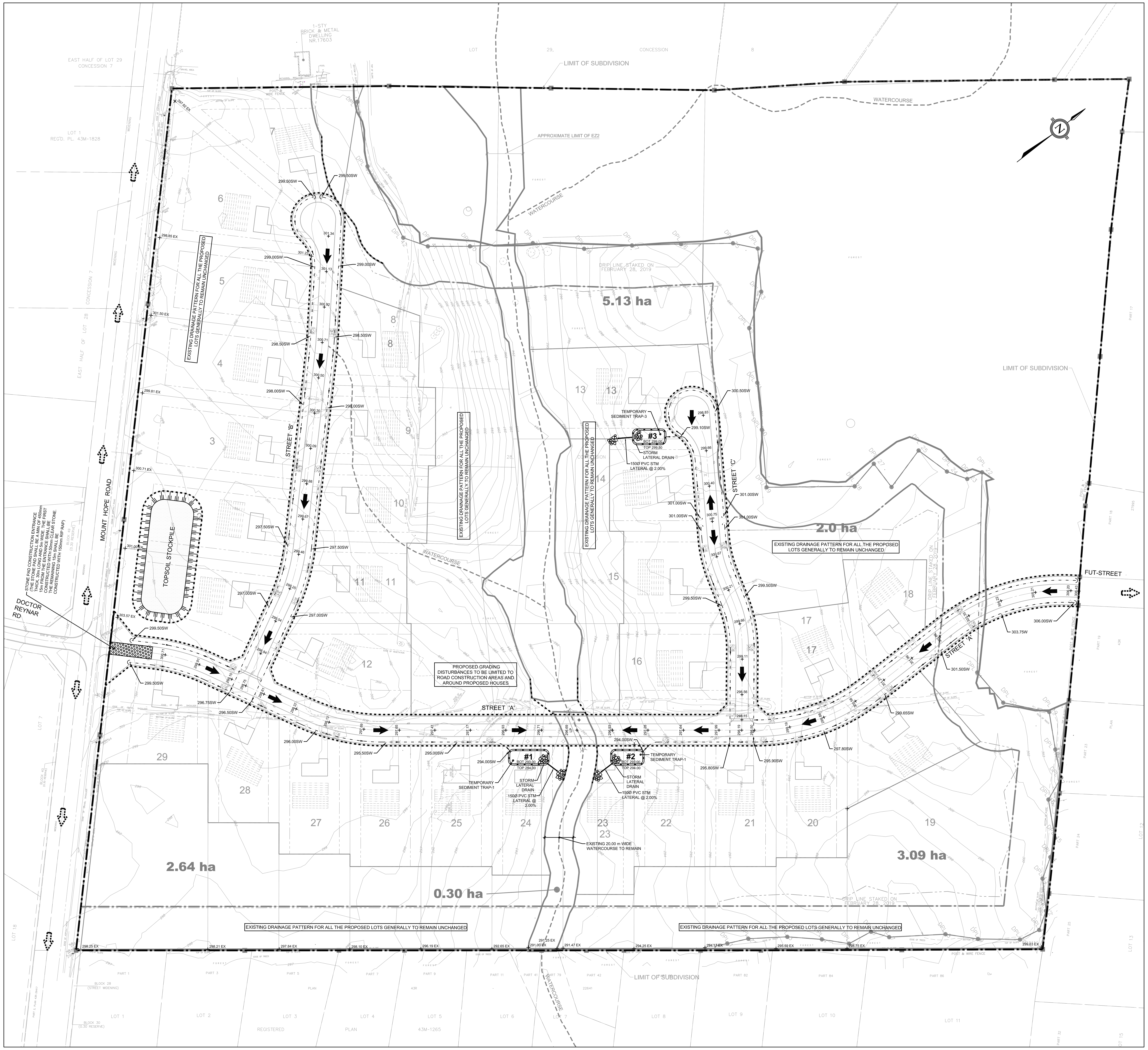
Region of Peel — Working for you

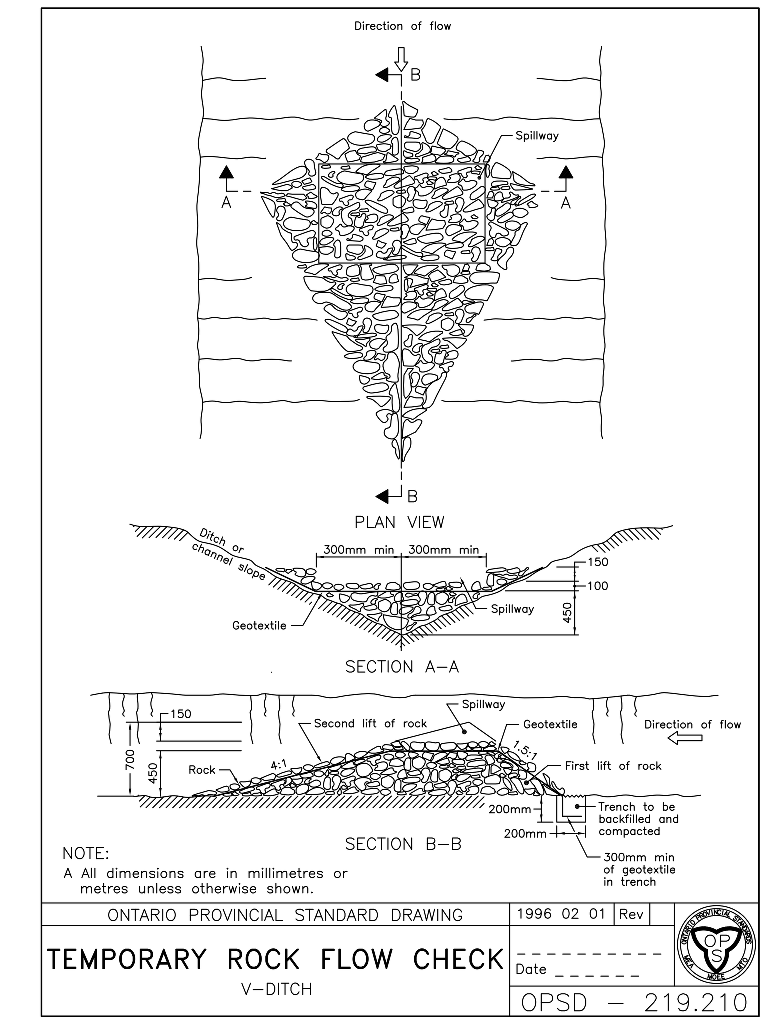
TOWN OF CALEDON

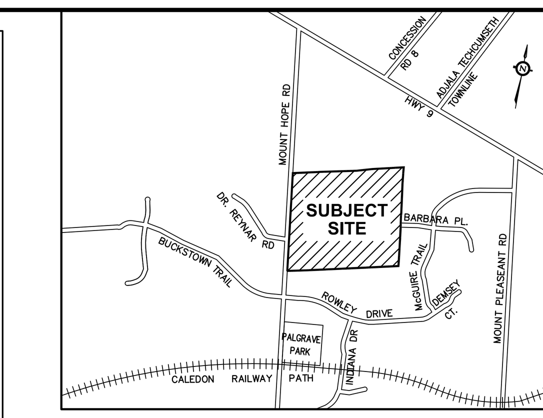
TITLE:

GRADING PLAN

SCALE: 1:1000		PROJECT No. 18-951	
DESIGNED BY: M.N.	DRAWN BY: MAEL CAD	PLAN No. GR1	
CHECKED BY: A.I.	DATE: OCTOBER 2019		

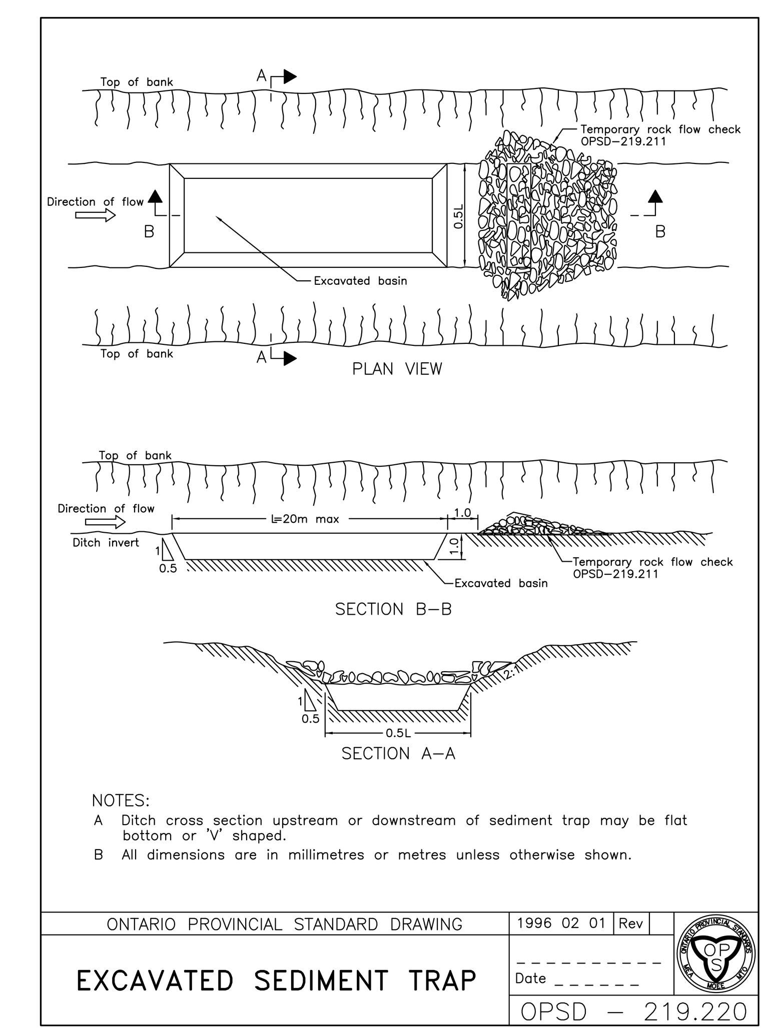






LEGEND:

- PROPOSED DRIVEWAY WITH CULVERT
- PROPOSED CULVERT
- HYDRANT
- PROPOSED WATER SERV. CONNECTION
- PROPOSED UTILITY BOX
- PROPOSED LIGHT POLE
- PROPOSED VALVE & BOX
- LIMIT OF DEVELOPMENT
- STRUCTURE ENVELOP LINE
- WATERCOURSE
- EXISTING TREES
- EDGE OF VEGETATION
- SEPTIC TANK SYSTEM (TYP)
- PROPOSED HOUSE (TYP)



LEGEND:

- TEMPORARY INTERCEPTOR SWALE
- ROCK CHECK DAM
- TEMPORARY SEDIMENT/SILT CONTROL FENCE
- TEMPORARY STONE PAD CONSTRUCTION ENTRANCE
- PROPOSED MAJOR OVERLAND FLOW ROUTE
- EXISTING MAJOR OVERLAND FLOW ROUTE

TEMPORARY SEDIMENT TRAP–1 (OPSD 2019.130)

TRIBUTARY AREA	=2.02ha
TOTAL STORAGE REQUIRED	=2.02hax125m³/ha
	=252.50m³
TOTAL STORAGE PROVIDED	=270.00m³

TEMPORARY SEDIMENT TRAP–1 (OPSD 2019.130)

TRIBUTARY AREA	=1.45 ha
TOTAL STORAGE REQUIRED	=1.45hax125m³/ha
	=181.25m³
TOTAL STORAGE PROVIDED	=195.00m³

TEMPORARY SEDIMENT TRAP–3 (OPSD 2019.130)

TRIBUTARY AREA	=0.20ha
TOTAL STORAGE REQUIRED	=0.20hax125m³/ha
	=25.00m³
TOTAL STORAGE PROVIDED	=30.00m³

TOPSOIL STOCKPILE DATA

FOOTPRINT AREA	=34,700 m²
TOTAL VOLUME	=34,700 x 0.30
	=10,410 m³
HEIGHT	=4.00 m
SIDE SLOPE	=1.5H – 1.0V
TOTAL VOLUME	=10,410 m³

REVISIONS

No.	BY	DATE	REVISION	CONS. CHECKED	TOWN APPR'D
1	--	----			

APPROVED FOR CONSTRUCTION

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.

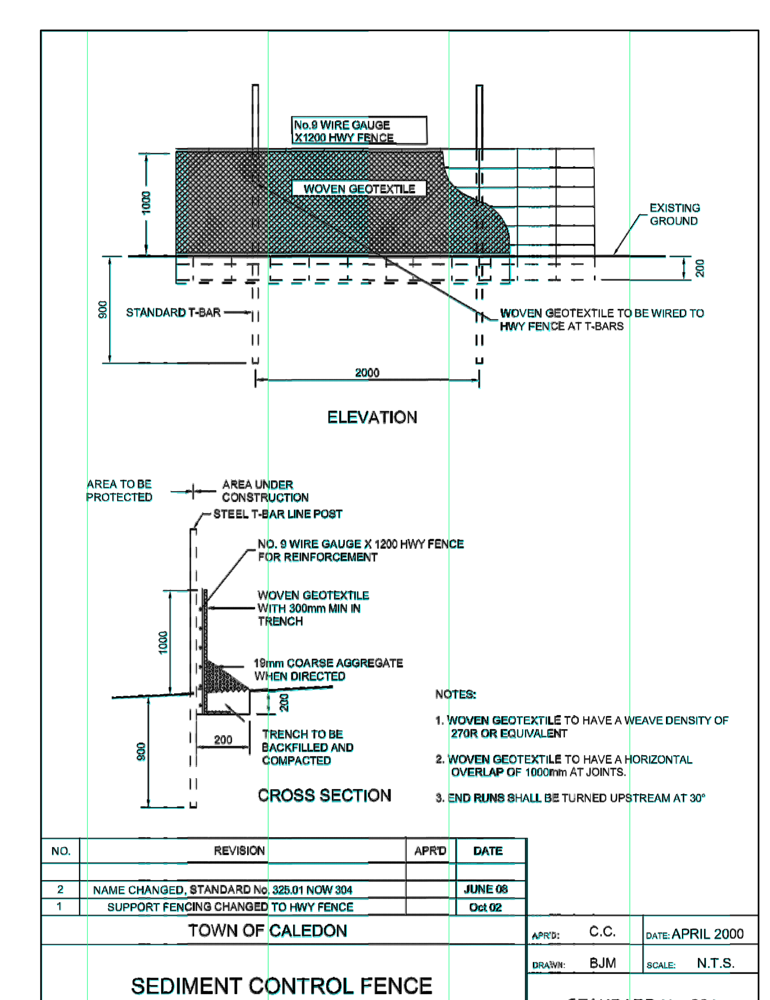
DATE:________________ APPROVED BY:____________________
H. MUNTZ, P.ENG.
Town Engineer

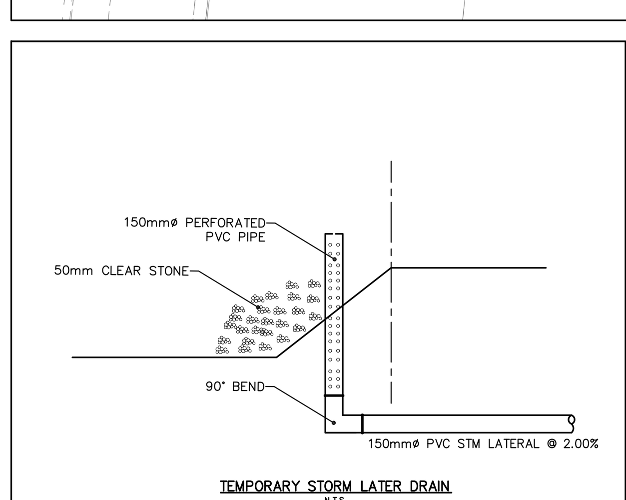
ELEVATION NOTES

ELEVATION SHOWN HEREON ARE GEODETIC AND DERIVED FROM THE TOWN OF CALEDON BENCHMARKS.

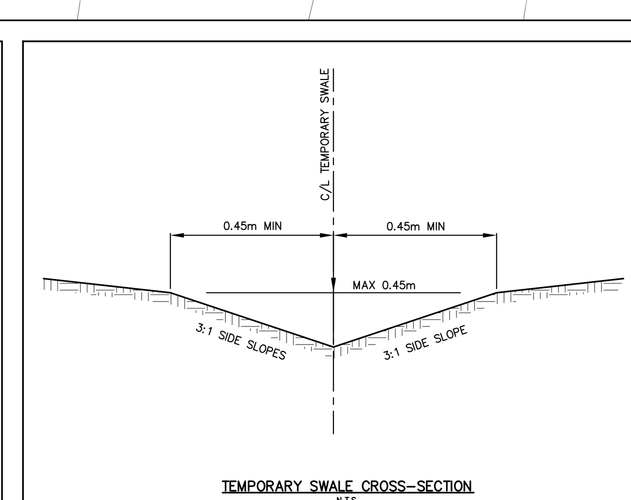
LOCAL BENCHMARK

NO. 008197558066 ELEVATION = 277.870 METRES AND NO. 00819778416 ELEVATION = 318.849 METRES





TEMPORARY STORM LATER DRAIN
N.T.S



TEMPORARY SWALE CROSS-SECTION
N.T.S

EROSION AND SEDIMENT CONTROL GENERAL NOTES

1. THE OWNER IS RESPONSIBLE FOR OBTAINING ALL NECESSARY APPROVAL FROM THE TOWN AND EXTERNAL AGENCIES PRIOR TO ANY SITE ALTERATION ACTIVITY.
2. PRIOR TO COMMENCEMENT OF ANY ON-SITE/TOPSOIL STRIPPING, EROSION & SEDIMENT CONTROL (ESC) MEASURES, AS PER APPROVED SITE ALTERATION PLAN, MUST BE INSTALLED AND APPROVED BY THE DIRECTOR OF ENGINEERING. ADDITIONAL ESC MEASURES, IF REQUIRED, SHALL BE INSTALLED AS DIRECTED BY THE DIRECTOR OF ENGINEERING. THE ESC MEASURES SHALL REMAIN IN PLACE UNTIL DIRECTED BY THE DIRECTOR OF ENGINEERING FOR THEIR REMOVAL.
3. TREES ARE TO BE RESERVED AS PER THE APPROVED TREE PRESERVATION PLAN.
4. NO CONSTRUCTION ACTIVITY OR MACHINERY SHALL BE ALLOWED BEYOND THE SILT/SNOW FENCE OR LIMITS OF THE SUBDIVISION.
5. THE CONTRACTOR IS RESPONSIBLE TO IMPLEMENT DUST CONTROL MEASURES AND CONSTRUCTION PRACTICE GUIDELINES AS APPROVED BY TOWN/TRCA.
6. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING ALL ESC MEASURES IN WORKING CONDITIONS AT ALL TIMES TO THE SATISFACTION OF THE DIRECTOR OF ENGINEERING. THE CONTRACTOR SHALL ROUTINELY INSPECT ALL ESC DEVICES MINIMUM ONCE A WEEK AND AFTER EACH RAINFALL EVENT GREATER THAN 10mm TO ENSURE THAT ESC MEASURES ARE IN PROPER WORKING CONDITIONS. ANY DAMAGES MUST BE REPAIRED WITHIN 24 HOURS.
7. ALL CONSTRUCTION VEHICLES MUST ENTER AND EXIT THE SITE ONLY FROM THE APPROVED ACCESS ROUTE(S) AS SHOWN ON THE PLAN.
8. CATCHBASIN SEDIMENT CONTROL DEVICES ARE TO BE INSTALLED IMMEDIATELY AFTER BASE ASPHALT.
9. SEDIMENTS COLLECTED IN THE SEDIMENT CONTROL PONDS SHALL BE REMOVED WHEN 50% OF THE STORAGE CAPACITY IS FILLED. THE POND SHALL BE KEPT IN OPERATION UNTIL SODDING OF DISTURBED AREAS IS COMPLETED TO THE SATISFACTION OF THE DIRECTOR OF ENGINEERING.
10. ALL DISTURBED GROUND LEFT INACTIVE FOR OVER 30 DAYS SHALL BE VEGETATED, SUBJECT TO WEATHER CONDITIONS, BY SEEDING OR APPROVED EQUIVALENT TO THE SATISFACTION OF THE DIRECTOR OF ENGINEERING.
11. ALL TOPSOIL STOCKPILES IF REMAIN ON SITE FOR MORE THAT 30 DAYS SHALL BE VEGETATED. SUBJECT TO WEATHER CONDITIONS, BY SEEDING OR APPROVED EQUIVALENT TO THE SATISFACTION OF THE DIRECTOR OF ENGINEERING.
12. STREET SWEEPING/CATCHBASIN CLEANING PROGRAM TO BE IMPLEMENTED UPON COMPLETION OF BASE ASPHALT TO THE SATISFACTION OF THE DIRECTOR OF ENGINEERING.
13. ALL TOPSOIL STOCKPILES SHALL BE SURROUNDED WITH SEDIMENT CONTROL FENCE. THE MAXIMUM SIDESLOPES FOR STOCKPILES SHALL BE 1.5 (H) TO 1.0 (V). THE MAXIMUM HEIGHT OF STOCKPILE SHOULD NOT EXCEED 5.0 METRES.
14. 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 (BEN KRUL, TELEPHONE : 416-661-6600 EXT. 5769) SHOULD BE IMMEDIATELY CONTACTED. ADDITIONAL ESC MEASURES TO BE KEPT ON SITE AND USED AS NECESSARY.
15. THE CONTRACTOR SHALL ENDEAVOUR TO PREVENT MUD TRUCKING ONTO EXISTING RIGHT-OF-WAY AND SHALL PROVIDE FOR CLEANUP AT HIS/HER OWN EXPENSE AS DIRECTED BY ENGINEER.
16. THE CONTRACTOR SHALL CARE AND CONTROL SPILLS, FLUIDS, AND MATERIALS DURING CONSTRUCTION TO MINIMIZE RISK TO ENVIRONMENT.
17. 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

DEWATERING NOTES:

1-LAY FILTER FABRIC
2-PLACE SEDIMENT BAG ON FILTER FABRIC
3-PLACE SILT SOXX ALONG THE PARAMETER OF FILTER FABRIC
4-PUMP SEDIMENT LADEN WATER FROM EROSION POND TO THE SEDIMENT BAG
5-TREATED WATER TO DISCHARGE TO CATCHBASIN
6-USE THE SAME METHOD FOR DEWATERING OF SEDIMENT TRAPS

DECOMMISSIONING OF TEMPORARY SEDIMENT CONTROL BASINS

1. AS DIRECTED BY THE CONSULTANT, REMOVE THE TEMPORARY HEADWALL STRUCTURE, MANHOLES, RIP RAP, FILTER FABRIC AND ANY CLEAR STONE AT THE BOTTOM OF THE TEMPORARY SEDIMENT CONTROL BASINS AND DISPOSE OFF-SITE.
2. EXCAVATE AND REMOVE ALL MATERIAL 0.60 METRE (MIN) BELOW BOTTOM OF THE TEMPORARY SWM POND OR MORE AS DIRECTED BY THE GEOTECHNICAL CONSULTANT. ALL EXCAVATED MATERIAL TO BE DISPOSED OFF-SITE.
3. ONCE THE TEMPORARY TEMPORARY SEDIMENT CONTROL BASINS HAVE BEEN REMOVED, THE LAND IS TO BE ENGINEERED FILLED. ALL FILLING IS TO BE COMPACTED TO 98% STANDARD PROCTOR DENSITY, OR AS APPROVED BY THE GEOTECHNICAL CONSULTANT.
4. IF DISCHARGING THE WATER THROUGH A FILTER BAG THE LOCATION OF THE DISCHARGE POINT MUST BE 30m AWAY FROM THE WATERCOURSE

DESIGNED BY: LICENSED PROFESSIONAL ENGINEER W. C. IP, OCT 11,19, PROVINCE OF ONTARIO
APPROVED BY

PROJECT:
PALGRAVE ESTATES SUBDIVISION

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

Region of Peel — Working for you
TOWN OF CALEDON

TITLE:
EROSION CONTROL PLAN

SCALE:	1:1000		PROJECT No. 18-951
DESIGNED BY: M.N.	DRAWN BY: MAEL CAD		
CHECKED BY: A.I.	DATE: OCTOBER 2019		PLAN No. EC1

Appendix C

Project:	Palgrave Estate Subdivsion
Client:	Casltemore Corp
Location:	Town of Caledon
Date of Test:	11-Oct-19
Operator:	Hydratest

Watermain Analysis

Design demands

A	Average Daily Consumption	409	l/c/d
B	Max. Daily Demand (Ax2)	818	l/c/d
C	Max. Hour Demand (Ax3)	1,227	l/c/d
D	Min. Hour Demand (Ax0.7)	286	l/c/d

Peak Demands

E	Equivalent Population (10 persons/ha) for 31 ha	310	Persons
F	Average Daily Consumption (AxF/86,400)	1.47	l/s
G	Max. Daily Demand (BxF/86,400)	2.93	l/s
I	Max. Hour Demand (CxF/86,400)	4.40	l/s
J	Min. Hour Demand (ExF/86,400)	1.03	l/s

Hydrant Flow Test Info

Mount Hope Road

K	Pressure (Ex-hydrant static pressure field test)	83.00	psi
L	Ex-hydrant static pressure head (Kx6.89476/9.81)	58.33	m
M	Elevation (Ex-Hydrant top elevation)	301.30	m
N	Total head at Ex-hydrant (L+M)	359.63	m

Barbara Place

K	Pressure (Ex-hydrant static pressure field test)	86.00	psi
L	Ex-hydrant static pressure head (Kx6.89476/9.81)	60.44	m
M	Elevation (Ex-Hydrant top elevation)	306.00	m
N	Total head at Ex-hydrant (L+M)	366.44	m

Fire Flow Demand per Region Design Criteria

O	Min. Residential fire flow (7,000 l/min)		116.67	l/s
P	Max. day demand plus fire flow (G+O)		119.60	l/s

EPANET 2 Modeling (input)

1	Total head at Ex-hydrant		359.63	m
2	Existing Main size		150-300	mm
3	Roughness		100-110	

Region Criteria for Max/Min Pressures

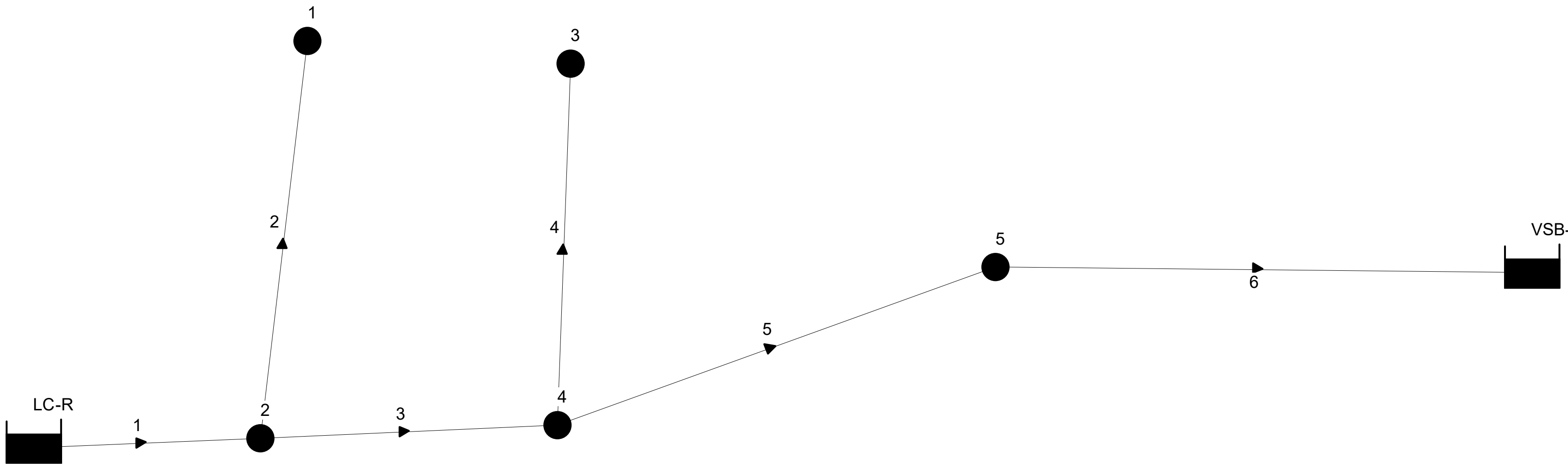
1	Maximum pressure during the min. hour demand (kpa)		690.00	kpa (100 psi)
2	Minimum pressure during max. hour demand		275.00	kpa (40 psi)
3	Minimum pressure during max. day demand plus fire flow		140.00	kpa (20 psi)

EPANET 2 pressure calculations (modeling output)

1	Maximum pressure during the min. hour demand (kpa)		64.17	m (node 4)
		or	629.12	kpa
2	Minimum pressure during max. hour demand		58.19	m (node 5)
		or	570.49	kpa
3	Minimum pressure during max. day demand plus fire flow		24.69	m (node 3)
		or	242.06	kpa

Conclusion

1	Maximum pressure during the min. hour demand (kpa)	629	< 690 (Ok)
2	Minimum pressure during max. hour demand	570	> 275 (ok)
3	Minimum pressure during max. day demand plus fire flow	242	> 140 (ok)


1
3
2
4
5
VSB-F
6
5
LC-R
1
2
3
4

HYDRATEST LTD. 7 WADSWORTH BLVD. WESTON, ON M9N 2G3 (416)248-6960

JOB NO. ______________ DATE OCT. 10, 2019

LOCATION McGUIRE TR & BARBARA PL., CALEDON

TEST DATA

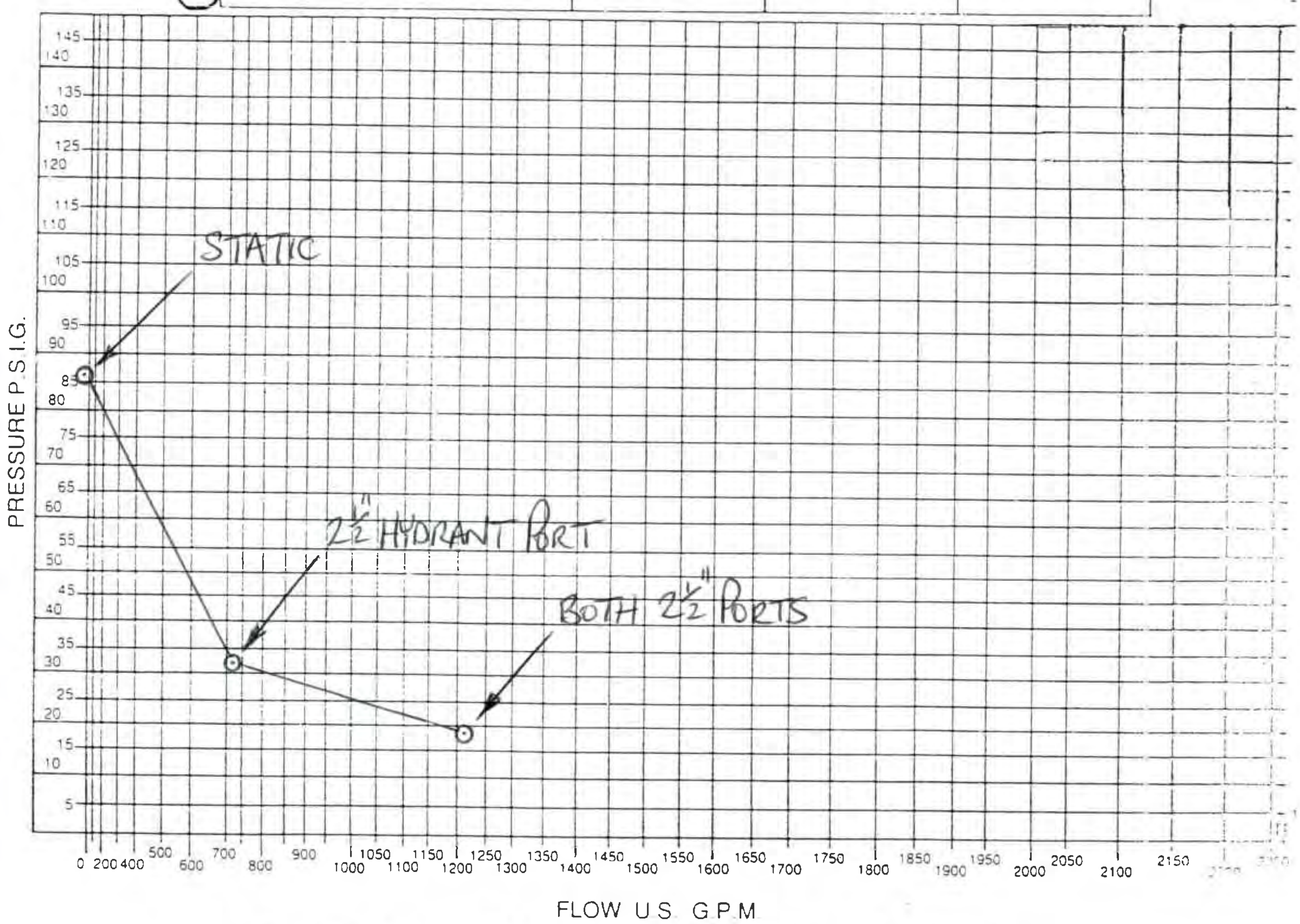
TIME OF TEST 9:05 A.M.

LOCATION OF TEST (FLOW) NE CORNER OF McGUIRE TR. + BARBARA PL.

(RESIDUAL) HYD. @ 15 BARBARA PLACE

MAIN SIZE 6" - 150mm STATIC PRESSURE 86 P.S.I.

	NUMBER OF OUTLETS & ORIFICE SIZE	PITOT PRESSURE	FLOW (U.S.G.P.M.)	RESIDUAL PRESSURE
#1	2½" HYDRANT PORT	18	712	32
#2	2x2½" HYDRANT PORTS	13	1210	19
#3				
#4				



COMMENTS HYDRANT RATED CLASS A - GREEN

Authorized Signature ______________ Hydratest Ltd. Signature [signature]

HYDRATEST LTD. 7 WADSWORTH BLVD. WESTON, ON M9N 2G3 (416)248-6960

JOB NO. ____________ DATE SEPT. 27, 2019

LOCATION 17991 MOUNT HOPE ROAD, CALEDON

TEST DATA

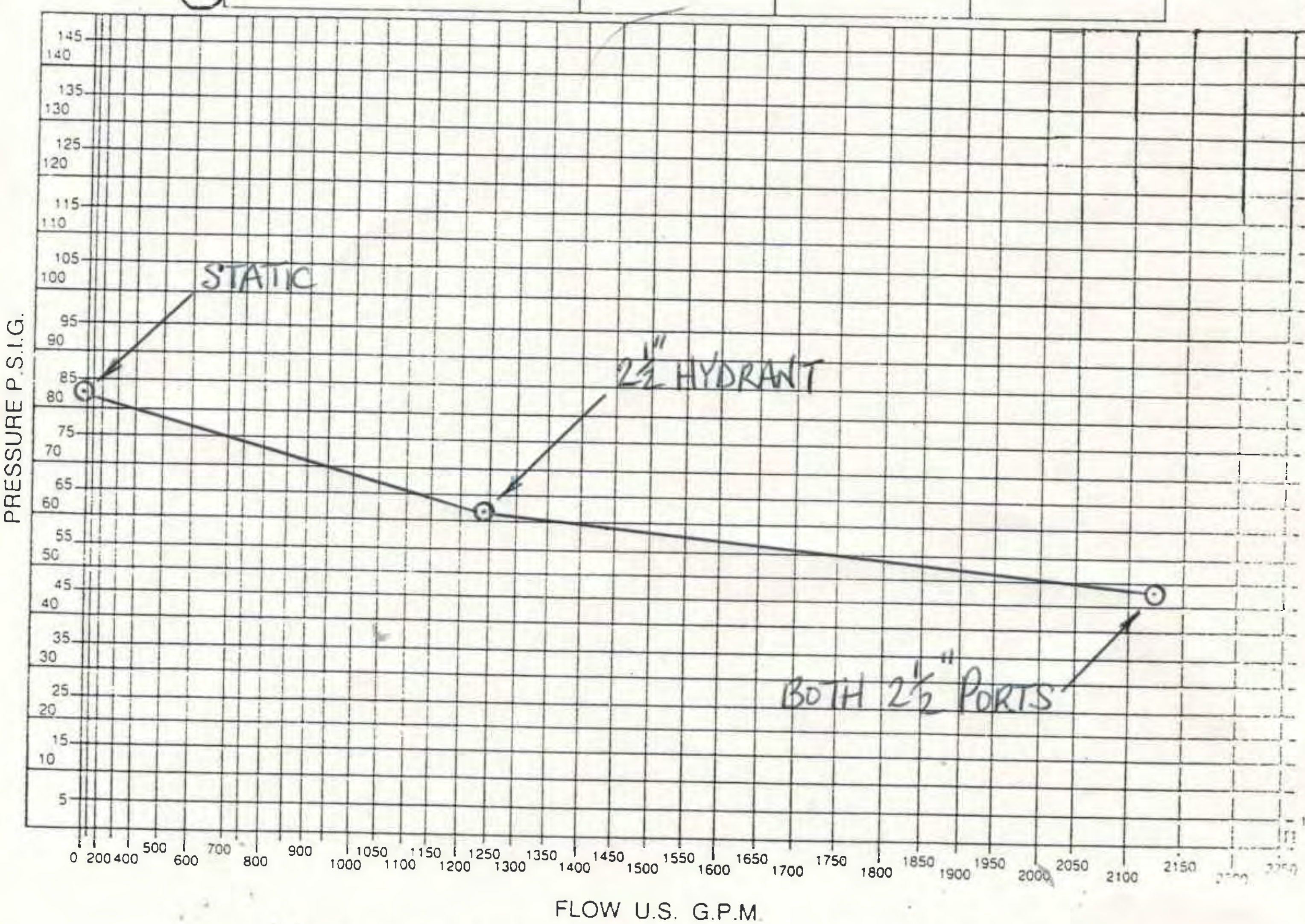
TIME OF TEST 8:45 A.M

LOCATION OF TEST (FLOW) HYDRANT IN FRONT OF 70 ROWLEY DR.

(RESIDUAL) HYD. @ (SE) CORNER OF BUCKSTOWN TR./MT. HOPE ROAD

MAIN SIZE ____________ STATIC PRESSURE 83

	NUMBER OF OUTLETS & ORIFICE SIZE	PITOT PRESSURE	FLOW (U S G P M)	RESIDUAL PRESSURE
#1	2½" HYDRANT PORT	55	1245	62
#2	2x2½" HYDRANT PORTS	40	2123	48
#3				
#4				



COMMENTS HYDRANT RATED CLASS AA- LIGHT BLUE

Authorized Signature ____________ **Hydratest Ltd. Signature** [signature]

```
**********************************************************************
*                           E P A N E T                              *
*                   Hydraulic and Water Quality                      *
*                   Analysis for Pipe Networks                       *
*                         Version 2.0                                *
**********************************************************************
```

Input File: **Minimum Hour Demand**

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
2	1	2	332.659	200
1	LC-R	2	108.97	200
4	3	4	219.871	200
3	2	4	358.773	200
5	4	5	263	200
6	5	VSB-R	200	200

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality	
1	1.03	360.21	58.96	0.00	
2	1.03	360.21	61.46	0.00	
3	1.03	362.41	63.58	0.00	
4	4.40	362.41	64.17	0.00	
5	1.03	364.65	58.65	0.00	
LC-R	26.36	359.63	0.00	0.00	Reservoir
VSB-R	-34.88	366.44	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
2	-1.03	0.03	0.01	Open
1	-26.36	0.84	5.34	Open
4	-1.03	0.03	0.01	Open
3	-28.42	0.90	6.14	Open
5	-33.85	1.08	8.49	Open
6	-34.88	1.11	8.97	Open

```
**********************************************************************
*                           E P A N E T                              *
*                   Hydraulic and Water Quality                      *
*                   Analysis for Pipe Networks                       *
*                         Version 2.0                                *
**********************************************************************
```

Input File: **Maximum Day Demand plus Fire**

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
2	1	2	332.659	200
1	LC-R	2	108.97	200
4	3	4	219.871	200
3	2	4	358.773	200
5	4	5	263	200
6	5	VSB-R	200	150

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality	
1	2.93	355.24	54.00	0.00	
2	2.93	355.27	56.52	0.00	
3	119.60	323.52	24.69	0.00	
4	2.93	342.85	44.61	0.00	
5	2.93	347.48	41.48	0.00	
LC-R	-78.18	359.63	0.00	0.00	Reservoir
VSB-R	-53.14	366.44	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
2	-2.93	0.09	0.09	Open
1	78.18	2.49	40.00	Open
4	-119.60	3.81	87.90	Open
3	72.32	2.30	34.63	Open
5	-50.21	1.60	17.62	Open
6	-53.14	3.01	94.79	Open

```
**********************************************************************
*                           E P A N E T                              *
*                   Hydraulic and Water Quality                      *
*                   Analysis for Pipe Networks                       *
*                          Version 2.0                               *
**********************************************************************
```

Input File: **Peak Hour Demand**

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
2	1	2	332.659	200
1	LC-R	2	108.97	200
4	3	4	219.871	200
3	2	4	358.773	200
5	4	5	263	200
6	5	VSB-R	200	200

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality	
1	4.40	359.84	58.59	0.00	
2	4.40	359.90	61.15	0.00	
3	4.40	361.76	62.93	0.00	
4	4.40	361.80	63.56	0.00	
5	4.40	364.19	58.19	0.00	
LC-R	17.46	359.63	0.00	0.00	Reservoir
VSB-R	-39.46	366.44	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
2	-4.40	0.14	0.19	Open
1	-17.46	0.56	2.49	Open
4	-4.40	0.14	0.19	Open
3	-26.26	0.84	5.30	Open
5	-35.06	1.12	9.06	Open
6	-39.46	1.26	11.27	Open

1. INTRODUCTION

The design of municipal services in the Region of Peel is to be based upon the current "Public Works (PW) Design, Specification & Procedures Manual". All plans are to be reviewed and cleared by the Region prior to the construction of services. Such review shall not relieve the engineer from primary responsibility for the design to meet all Federal, Provincial, Regional, and local government requirements.

Where watermains are to be used for fire protection purposes on private property they must satisfy the requirements of the Underwriters Laboratories of Canada in addition to the requirements of the local municipal plumbing department and Region of Peel specifications. Where these conflict, clarification is to be received from the Region's PW Department.

The Region of Peel strives to maintain a minimum operation pressure of 40 psi and a maximum operating pressure of 100 psi.

Refer to the Environmental Assessment Process section of this manual for the steps required to fulfill the Class Environmental Assessment process.

1.1 Geotechnical Investigation

The Consultant shall determine the need for soils investigation. However, if Region staff requests a soils investigation, the Consultant is obligated to supply one.

The purpose of an investigation would be to determine the soil's composition, bearing strength, and type, and to verify that no contamination is present; which would be determined by the consultant. The consultant shall recommend the appropriate bedding requirements based on the findings of the Geotechnical Investigation and state them on the drawings.

Boreholes shall be taken to a minimum depth of one (1) metre below the anticipated depth of the watermain invert or the deepest utility.

2.3 Water Demands

Water demands are to be calculated as follows:

Table #1 – Typical Water Demand Criteria

Population Type	Unit	Avg. Consumption Rate	Max Day Factor	Peak Hour Factor
Residential	L/cap • d	280	2.0	3.0
ICI	L/Employee • d	300	1.4	3.0

ICI = Industrial, Commercial or Institutional

Custom demands for larger volume consumers or those with exceptional peak demands require special considerations regarding flow calculations. Each case will be reviewed on an individual basis.

It has been noted that some new development can generate higher water demands during the first years of occupancy. Factors for this elevated water use include additional lawn watering for new sod and changes in water use patterns. Table #2 states the potential short term water demand criteria for new development. However, over the long term, it is estimated that water use would ultimately be reduced through water conservation programs and other potential factor including rates. As such, for the purpose of projecting long term water requirements, the water demand criteria in Table #1 should be used.

Table #2 – Potential short term water demand criteria for new development

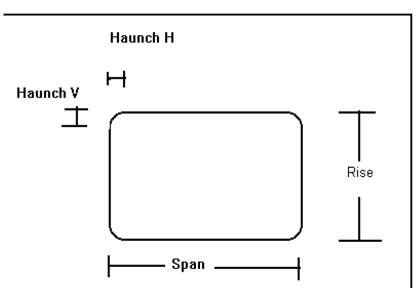
Population Type	Unit	Avg. Consumption Rate	Max Day Factor	Peak Hour Factor
Residential	L/cap • d	409	2.0	3.0
ICI	L/Employee • d	300	2.0	3.0

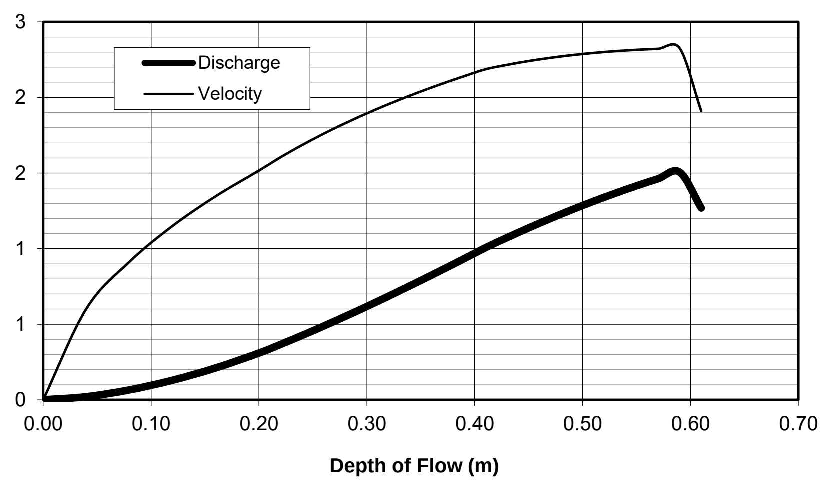
The Region may impose the higher short-term water demand criteria for new developments where water supply capacity or residual pressure may be marginal.

Discharge/Velocity Curve for Box Culverts

Span =	1.220	m		Slope =	0.0050	m/m
Rise =	0.610	m		Manning's n =	0.013	
Haunch V =	0.200	m		Sections =	1.000	
Haunch H =	0.200	m				

	Depth of Flow (m)	Wetted Perimeter (m)	Waterway Area (m2)	Hydraulic Radius (m)	Velocity V (m/s)	Capacity Q (m3/s)
0.000	0.000	0.8200	0.0000	0.0000	0.0000	0.0000
	0.040	0.9331	0.0344	0.0369	0.6025	0.02
Step = 0.040	0.080	1.0463	0.0720	0.0688	0.9134	0.07
	0.120	1.1594	0.1128	0.0973	1.1506	0.13
	0.160	1.2725	0.1568	0.1232	1.3469	0.21
0.200	0.200	1.3857	0.2040	0.1472	1.5165	0.31
	0.221	1.4277	0.2296	0.1608	1.6086	0.37
	0.242	1.4697	0.2552	0.1737	1.6931	0.43
	0.263	1.5117	0.2809	0.1858	1.7710	0.50
	0.284	1.5537	0.3065	0.1973	1.8432	0.56
Step = 0.021	0.305	1.5957	0.3321	0.2081	1.9102	0.63
	0.326	1.6377	0.3577	0.2184	1.9728	0.71
	0.347	1.6797	0.3833	0.2282	2.0313	0.78
	0.368	1.7217	0.4090	0.2375	2.0862	0.85
	0.389	1.7637	0.4346	0.2464	2.1378	0.93
0.410	0.410	1.8057	0.4602	0.2549	2.1865	1.01
	0.430	1.8623	0.4842	0.2600	2.2158	1.07
	0.450	1.9188	0.5074	0.2644	2.2409	1.14
	0.470	1.9754	0.5298	0.2682	2.2621	1.20
	0.490	2.0320	0.5514	0.2714	2.2799	1.26
Step = 0.020	0.510	2.0885	0.5722	0.2740	2.2945	1.31
	0.530	2.1451	0.5922	0.2761	2.3062	1.37
	0.550	2.2017	0.6114	0.2777	2.3152	1.42
	0.570	2.2582	0.6298	0.2789	2.3218	1.46
	0.590	2.3148	0.6474	0.2797	2.3262	1.51
0.610	0.610	3.1914	0.6642	0.2081	1.9102	1.27





Calculation of Time of Concentration

Airport Formula

For watersheds where the runoff coefficient, C, is less than 0.40, the Airport formula gives a better estimate of t_c. This method was developed for airfields and is expressed as follows:

$$t_c = \frac{3.26 * (1.1 - C) * L^{0.5}}{S_w^{0.33}}$$

where:

- t_c = time of concentration, min
- C = runoff coefficient
- S_w = watershed slope, %
- L = watershed length, m

Estimate the time of concentration, t_c, is 85.80 min per the following calculations:

Given

- C = 0.30
- S_w = 0.5%
- L = 685 m

Solution

Airport Formula; recommended when C = 0.3:

$$t_c = \frac{3.26 * (1.1 - C) * L^{0.5}}{S_w^{0.33}}$$

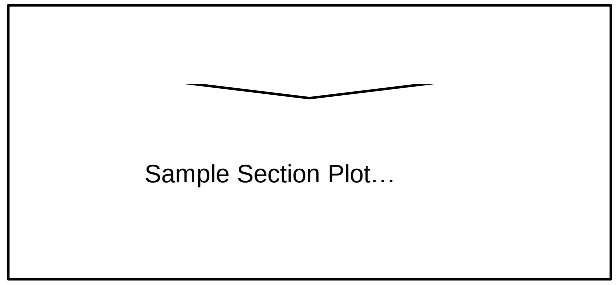
$$t_c = \frac{3.26 * (1.1 - 0.30) * 685^{0.5}}{0.5^{0.33}}$$

$$= 85.80 \text{ min}$$

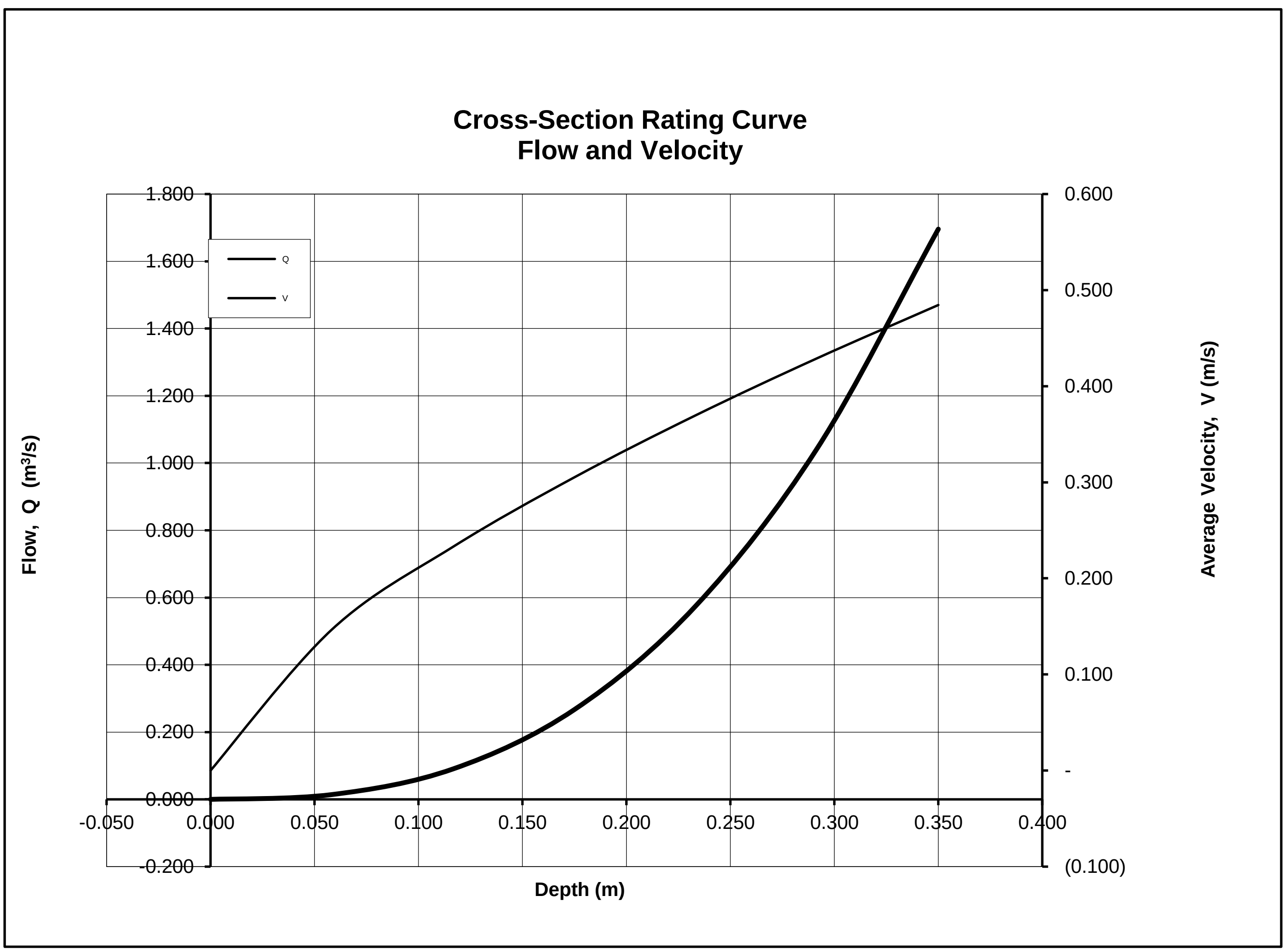
Generalized Channel Capacity Analysis

Watercourse

Top Width:	20.00	m
Bottom Width:	0.00	m
Channel Roughness:	0.050	Manning n
Longitudinal Slope:	0.0060	m/m
Side Slope:	0.035	m/m
Side Slope Roughness:	0.050	Manning n
Side slope Width:	10.00	m
Graph Exageration:	5.00	Vertical
Max Depth of Flow	350	mm
Max Flow Capacity Provided	1.70	m^3/s
25 Y Flow Capacity Required	1.57	m^3/s



Case 4: Open Channel



Municipal and Development Engineering

Water Resources Engineering

Planning

Project Manag

MASONGSONG ASSOCIATES ENGINEERING LIMITED
Consulting Engineers • Planners • Project M

Markham Head Office

7800 Kennedy Road, Suite 201
Markham, Ontario
L3R 2C7

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

W: www.maeng.ca