GRAVENHURST
GATEWAY TO MUSKOKA

Infrastructure Services Department

Stormwater Management Facilities Inspection & Maintenance Manual

SEPTEMBER 2024

Contents

Revision History

Date	Description of Modification
Dec 7, 2023	Document Creation Only Part A (Preamble) and Part B (Regulated Stormwater Detention Ponds) & associated appendices C. Kirkpatrick, Manager of Operations
Sept 5, 2024	Document Completion Part C, combining of all documents and as-built drawings B. Stillwell, Infrastructure Technologist
Document File Path:	
https://muskokaonline.sharepoint.com/sites/GH-Road/StormWater/Forms/Group%20by%20Topic.aspx?as=json	

PART 'A': PREAMBLE

Section A1 - Introduction

This document has been prepared in response to Environmental Compliance Approval (ECA) for Municipal Stormwater Management System ECA number 309-S701 (Issue 1), dated October 6, 2022 for the Corporation of the Town of Gravenhurst. Reference **Appendix 1** (ECA 309-S701 - Item 1). Specifically, this document references the inspection and maintenance requirements of municipal SWM systems owned and operated by the Town of Gravenhurst.

Pursuant to the aforementioned ECA, a storm water management consists of *"storm sewers, culverts, ditches, stormwater management facilities (ie. stormponds) and outlets. It does not include sanitary sewage works or combined sewage works".*

It is understood that the municipal Stormwater Management (SWM) systems serving the Town of Gravenhurst (and as identified in the aforementioned ECA) are encompassing a variety of watersheds and subsequently impactful to Lake Muskoka, Muskoka Bay, Gull Lake, Hoc Roc River and Jevins Lake.

Section A2 – Compliance with ECAs and other Applicable Legislation

It is acknowledged that the Owner (the Town of Gravenhurst) will comply with requirements as specified in ECA 309-S701 – Issue 1.

The Town will further endeavor to ensure those responsible in performing the inspection and maintenance functions for the municipally owned Stormwater Management Facilities (SWMFs) are intrinsically familiar with:

- ECA 309-S701-Issue 1;
- Specifications of the stormpond design being inspected (if available);
- Previous inspection records, and
- Other relevant information/legislation, as may be required and/or relevant.

The SWMFs as identified in the ECA shall be operated in accordance with the requirements under the Ontario Environmental Protection Act (RSO 1990) and the Ontario Water Resources Act (RSO 1990) and shall be, at all times, maintained in a 'state of repair'. Other applicable legislation that may be relevant to SWMF design and/or maintenance are identified in **Appendix 11** (Applicable Legislation and Regulations).

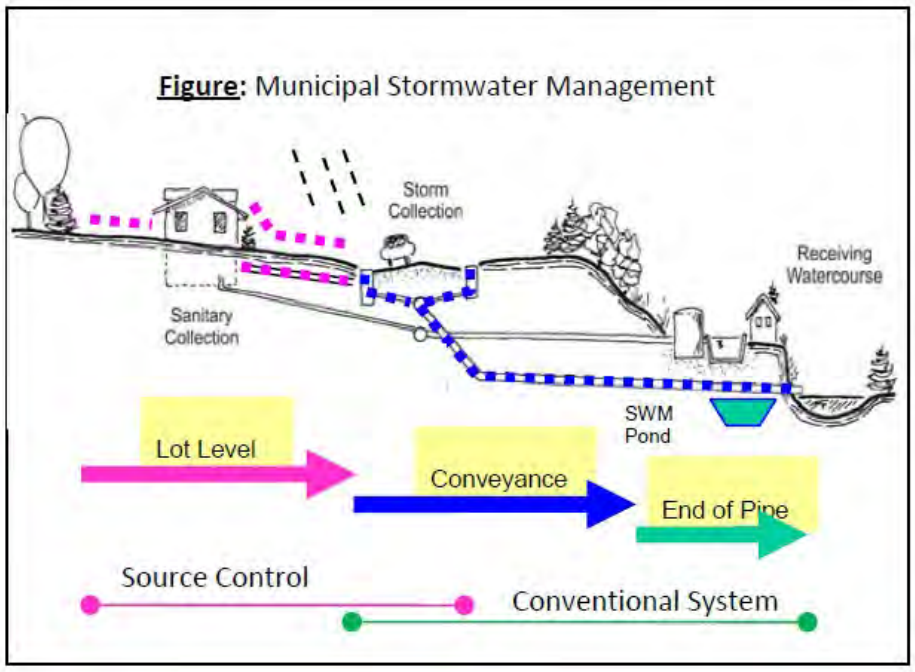
Section A3 - Municipal Stormwater Management Treatment Train

Typically, it is acknowledged that the increase in direct runoff to receiving bodies of water is due to uncontrolled development resulting in increased impervious areas as well as developments with rapid storm conveyance systems (inadequate lot level or end-of-pipe design elements). This, in conjunction with climate change, leads to an increase in peak stream flows and the subsequent increase of flooding and risks to life and property.

In designing Stormwater Management Systems, it is imperative that a wholistic approach be embraced. This would mean that for any given development site, the catchment area and receiver characteristics be critically and fully modelled and analyzed and that SWM incorporate best practices, inclusive of the "treatment train" approach.

As illustrated in **Figure 1,** the 'treatment train' approach starts with lot-level controls, followed by conveyance controls and concluding with end-of-pipe SWM facilities (i.e. ponds, oil grit separators, constructed wetlands).

Figure 1: Municipal Stormwater Management – Treatment Train Categories



The 'treatment train' approach is intended to minimize the risks (i.e. contaminants) to any receiving body of water. For major site developments and linear development projects, 'best practices' for SWM quantity and quality control requirements would incorporate, where possible, elements of lot level controls and end of pipe controls. These would include the following:

Lot Level Controls

- Rooftop detention
- Parking lot storage through catch basin restrictors or orifices in the storm sewer
- Reduced % grade of lot
- Disconnecting roof leaders and directing the flow to soak away pits

- Porous pavement
- Rain gardens
- Water reuse systems Conveyance Controls
- Grassed swales
- Pervious pipe systems
- Pervious catch-basins
- Bio swales
- Filtration systems
- Infiltration systems
- Capture and management systems with L.I.D.
- Filter strips
- Buffer strips

End-of-pipe (EOP) Stormwater Management

- Infiltration and biofiltration basins
- Infiltration trenches
- Manufactured Treatment Devices (i.e., oil/grit separators or filters)
- Sand filters
- Dry ponds
- Wet ponds
- Wetlands
- Hybrid Ponds
- Filtration Devices
- Adsorptive Materials
- Underground Storage

Stormponds as identified in **Part 'B'** (Regulated Stormwater Detention Ponds) of this document are one of many recommended 'end-of-pipe' strategies for stormwater management.

Section A4 - Climate Change & Gravenhurst's Storm Sewer Master Plan 2021

Stormwater is rainwater, snowmelt, or other forms of precipitation. Stormwater follows the principles of the water cycle, which include infiltration, evapotranspiration, run-off, storage in water bodies, and precipitation. Climate (and climate change) is intricately linked to the water cycle, in particular precipitation and evapotranspiration.

In Ontario, municipalities are responsible for municipal stormwater management (e.g. planning, design, establishment, operation and maintenance). Municipal stormwater management is inclusive of the urban surface run-off that is or would be collected by means of separate municipal storm sewers. Increasingly, it has become apparent the systems set in place decades ago in many / most municipalities

are (in some cases) not designed to effectively management the deluge of water that may result with some of these storm events

The increased frequency and intensity of storm events is negatively impactful to the safety of members of public, the environment, municipal infrastructure and private property. The Ontario Climate Change Strategy (OCCS, 2015) defines climate change *"as any significant change in long-term weather patterns. It can apply to any major variation in temperature, wind patterns or precipitation that occurs over time."* The OCCS states that extreme weather events such as storms and droughts are becoming more frequent around the world and states that **climate change requires a shift in thinking and behavior.**

As identified in Section A3 of this document, to help mitigate the impacts of climate change specific to stormwater runoff, developers and municipalities alike must be intrinsically familiar with and adhere to the 'best practice' design elements for stormwater management, inclusive of lot level and end-of-pipe controls. These 'best practice' design elements must be considered during the environmental planning and SWM design processes.

As an adjunct to the design component of SWMF, in October 2021 Tatham Engineering submitted a *'Master Storm Sewer Report'* for the Town of Gravenhurst. This study brought forth, not only a condition assessment of its current linear (storm) infrastructure, but recommendations, and a hierarchy thereof, to effectively address climate change demands.

Since the preparation of the report, the Director of Infrastructure Services has moved forward to implement a multi-year capital initiative to implement recommendations put forth in the aforementioned document. It is to be acknowledged that these improvements were costed out to be in the order $27 million dollars (2021) and is significantly impactful to the Town's budgetary thresholds. As such, the implementation of any such recommendations will be over a number of years are subject council approval.

Section A5 – Document Format & Updates to Manual

This document has been prepared such that **Part 'B'** (Regulated Stormwater Detention Ponds) is specific to the inspection and maintenance requirements of stormponds, whereas **Part 'C'** addresses the inspections and maintenance requirements for catchbasins, stormsceptors and other stormwater works appurtenances.

Appendix 10 (References) provides an overview and/or acknowledgement of documents referenced in preparation of the Town's Stormpond Inspection and Maintenance Manual.

This document, or components therein, will be updated as required, as sewage works are modified, altered extended, replaced or enlarged after the date of issuance of the approval of said works.

Section 2.2 (Characteristics of Municipally Owned Stormponds)
will be updated as the
Town assumes additional and/or modifies existing SWMFs

PART 'B': REGULATED STORMWATER DETENTION PONDS

Section B1 – Stormponds – An Overview

1.1 Benefits of Stormponds

The goal of stormwater management is to maintain the health of streams, lakes and aquatic life as well as provide opportunities for human uses of water by mitigating the effects of urban development. To achieve this goal, stormwater management strives to maintain the natural hydrologic cycle, prevent an increased risk of flooding, prevent undesirable stream erosion, and protect water quality.

Stormwater Detention Ponds (whether wet or dry) are designed to protect downstream infrastructure from flooding by temporarily storing runoff, and to improve water quality by trapping pollutant laden sediment in runoff from urban drainage areas. Centralized collection of polluted sediments in these type of facilities (stormponds) helps prevent their premature release into rivers and lakes where they can degrade water quality and adversely impact aquatic life.

These stormponds are designed to temporarily detain and release water slowly over a period of 24 to 120 hours after a rain event, depending on the sensitivity of the receiving watercourse. This slow release helps to mitigate storm induced flooding of downstream infrastructure, while also promoting settling of contaminated sediment between rain events.

Like other urban infrastructure such our municipal roads, stormponds require regular inspection and maintenance to ensure that they continue to meet their water quality and quantity design objectives. These maintenance tasks may include stabilization of banks, repair of outlet structures, landscaping and periodic removal of accumulated sediment.

For more information on the benefits of SWMF maintenance, please refer to *Inspection and Maintenance Guide for Stormwater Management Ponds and Constructed Wetlands (2018 - TRCA & CH2M Hill Canada Ltd.)*

1.2 Inclusions and Exclusions of Stormpond Inspections and Maintenance Manual

This document has been prepared solely for the Inspection and Maintenance of municipally owned stormponds within the Town of Gravenhurst. It does not include other aspects of stormwater management facilities, including:

- Site-specific design elements of inventoried of stormwater ponds
    - Unless otherwise specified, the stormponds as identified in this document do not have site-specific storm pond design and inspection elements and therefore will adhere to the Inspection Checklist as provided in Appendix 2.
- Sediment Removal, Removal Methods, Dewatering and Consolidation Processes

  - Should, through the scheduled inspection of a stormpond, result in the determination that sediment removal needs to be considered and/or performed, the Town will issue an RFP requiring bidders to submit their proposal (and costing) on the methods and procedures for sediment removal, inclusive of dewatering and consolidation processes
- Inspection and Maintenance Costs
  - Operating Costs associated with the Inspection and Maintenance of stormponds will be tracked and carried in the municipality's general Infrastructure operating budget.
  - Capital Expenditures associated with Stormpond Management will be identified through the Inspection and Maintenance Program and will be presented to Council for consideration. The capital costs for stormpond rehabilitation will be identified through RFP process.

For components excluded from this document, the Town shall, typically and where applicable, reference one or more following documents:

- *Inspection and Maintenance Guide for Stormwater Management Ponds and Constructed Wetlands 2018 Toronto Region Conservation Authority and CH2M Hill Canada Ltd.*
- *Stormwater Management Planning and Design Manual, Ministry of Environment (March 2003)*
- *A stand-alone stormpond maintenance manual that may be produced at a later date to enhance the provisions stipulated in this document.*

1.3 Use of this Guide

This document serves as a guideline to address fundamental elements that should be considered in routine SWMF inspection and maintenance and sediment removal decision making processes. It is not a regulation and does not change legislative requirements.

Recommendations provided in this document are consistent with those identified in the *Inspection and Maintenance Guide for Stormwater Management Ponds and Constructed Wetlands (2018)*.

Section B2 – Inventory and Drainage Area of Municipal Owned Stormponds

2.1 Inventory of Municipally Owned Stormponds

Appendix 1 (ECA (MOECC) ECA Number: 309-S701 - Issue 1) provides an inventory of municipally owned storm ponds and stormsceptors. It is acknowledged that many of the municipally owned stormponds, as identified in the **Appendix 1,** do not have a site-specific inspection and maintenance manuals and/or design specifications.

This document therefore is intended to provide guidance to the municipality in terms of general inspection and maintenance requirements for municipally owned SWM facilities, recognizing there may be some variability from site to site. The inspection and maintenance procedures, as described in this

document, are intended to be inclusive and meet requirements of the stormpond design(s) that currently exist in the Town.

As the Town experiences growth, the Town shall endeavour to obtain from the developer, prior to assumption, "as built" drawings of as well as a site-specific stormwater management facility inspection and maintenance manual(s). The site-specific inspection and maintenance manual will supersede the requirements specified in this document.

The number of municipally owned wet ponds and owned dry ponds is provided in is supported by site-specific ECAs as well as ECA 309-S701-Issue 1. **(Appendix 1)**

2.2 Characteristics of Municipally Owned Stormponds (Dry & Wet)

Characteristics of each municipally owned stormpond is based on approved ECA applications identified.

2.2.1 Pineridge Gate Subdivision – Woodman's Chart & Hedgewood Lane

2.2.1 PINERIDGE GATE SUBDIVISION: STORMWATER MANAGEMENT SYSTEMS Woodman's Chart & Hedgewood Lane	
System 1	**System 2**
309-03 STORMWATER MANAGEMENT DETENTION POND	**309-04 DRY DETENTION POND**
ECA NO. 8499-AE9Q22	**ECA NO. 8499-AE9Q22**
TOWN ISSUED ASSET N0. SWM-DAE9Q22-14	**TOWN ISSUED ASSET N0. SWM-DAE9Q22-15**

SYSTEM 1: SPECIFICATIONS 309-03 STORMWATER DETENTION POND (per ECA 309-S701)

Location	44°54'32.1"N 79°21'34.3"W
Municipal Address No.	55 Woodman's Chart
Watershed/Subwatershed	Jevins Lake Watershed
Receiver of discharge	Tributary of Jevins Lake
Outlet location	44°54'29.7"N 79°21'36.3"W
Catchment Area	13.5 Hectares
Level of Treatment for suspended solids	Basic (60% TSS removal)
Treatment for other Contaminants, as required	N/A
Level of Volume control	0
Design Storm	1:5-year through 1:100-year design storm
Reference ECA(s)	8499-AE9Q22
Reference Sewage Works as part of treatment train	N/A

Brief Description	Dry detention pond designed to provide basic level water quality treatment and post to pre-development peak flow attenuation (see ECA)
Receive Emergency Sanitary Overflows	No
Notes	N/A

SYSTEM 1: IMAGES & AERIAL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Gravenhurst

SYSTEM 2: SPECIFICATIONS OF 309-04 DRY POND (per ECA 309-S701)

Location	44°54'41.0"N 79°21'48.5"W
Municipal Address No.	16 Pineridge Gate
Watershed/Subwatershed	Muskoka Bay watershed
Receiver of discharge	Municipal storm sewer
Outlet location	44°54'42.3"N 79°21'51.3"W
Catchment Area	10.31 Hectares
Level of Treatment for suspended solids	Basic (60% TSS removal)
Treatment for other Contaminants, as required	N/A
Level of Volume control	0
Design Storm	1:5-year through 1:100-year design storm
Reference ECA(s)	8499-AE9Q22
Reference Sewage Works as part of treatment train	N/A
Brief Description	Dry detention pond designed to provide basic level water quality treatment and post to pre-development peak flow attenuation (see ECA)
Receive Emergency Sanitary Overflows	No
Notes	N/A

SYSTEM 2: IMAGES & AERIA

2.2.2 Pineridge Gate Subdivision – Pineridge Gate

2.2.2 PINERIDGE GATE SUBDIVISION **Pineridge Gate**	
System 1	**System 2**
309-13- STORMWATER MANAGEMENT WET POND	**309-14 – STORMWATER MANAGEMENT DETENTION POND**
ECA NO. 5617-5HUHQ3	**ECA NO. 5617-5HUHQ3**
TOWN ISSUED ASSET N0. SMP-D5HUHQ3-02	**TOWN ISSUED ASSET N0. SMP-W5HUHQ3-03**

SYSTEM 1: DESCRIPTION 309-13 (per ECA No. 5617-5HUHQ3)

A wet stormwater management pond and associated appurtenances located in the northeastern area of the development is designed for the 5 yr., 10 yr., 25 yr., & 100-year storm events to service a drainage area of 21.60ha. to reduce post-development flows lo below pre-development flows from 0.343m3/s to 0.043m3/s for the 5 year, 0.423ni3/s lo

0.054m3/s for the 10 year, 0.589m3/s to 0.1 14m3/s for the 25 year and 0.837m3/s to 0.201m3/s for the 100-year storm event. The pond is designed to retain a maximum volume capacity of 3605m3 at surface ponding depth of 1.237m. Flows will be controlled by a three-stage system. The first stage will consist of a sediment forebay. The second stage is a 450mm dia. perforated riser pipe with a T/G of 255.25m discharging through a 150mm dia. outlet pipe with a slope of 0.50%. The third stage will consist of a ditch inlet catch basin and overflow weir set at an elevation of 255.75m. The ditch inlet discharges to a 17m - 300mm dia. culvert with a slope of 0.50%. Both the emergency overflow and ditch inlet storm sewer discharge to the existing drainage course which ultimately drains to Gull Lake located approximately 280m downstream from the proposed facility.

SYSTEM 1: SPECIFICATIONS OF 309-13 - STORMWATER MANAGEMENT WET POND (per ECA 309-S701)

Location	44°54'41.9"N 79°21'53.4"W
Municipal Address No.	9 Pineridge Gate Unit 3
Watershed/Subwatershed	Muskoka Bay watershed
Receiver of discharge	Municipal storm sewer
Outlet location	44°54'42.3"N 79°21'53.9"W
Catchment Area	Unknown
Level of Treatment for suspended solids	Basic (60% TSS removal)
Treatment for other contaminants, as required	N/A
Level of Volume control	0
Design Storm	Unknown
Reference ECA(s)	N/A
Reference Works as part of treatment train	N/A
Brief Description	Stormwater management detention pond designed to attenuate post development runoff and provide basic level water quality treatment
Receive Emergency Sanitary Overflows	No
Notes / Additional Information	N/A

SYSTEM 1: AERIAL / IMAGES

SYSTEM 2: DESCRIPTION 309-14 (per ECA No. 5617-5HUHQ3)

A dry storm water management pond and associated appurtenances located in the eastern central area of the development is designed for the 5 yr., 10 yr., 25 & 100-year storm events to service a drainage area of 10.l3ha. to reduce post-development flows to below pre-development flows IVom 0.695m3/s lo 0.203ra3/s for the 5 year. 0.870m3/s to 0.297 ni3/s for the 10 year, 1.124m3/s to 0.346m3/s for the 25 year and 1.470m3/s lo 0.372m3/s for the 100-year storm event. The pond is designed to retain a maximum volume capacity of 1732m3 at surface ponding depth of 1.245m. Flows will be controlled by a two-stage system. The first stage will consist of a 450 mm dia. perforated riser pipe with a T/G of 257.00m discharging through a 200mm diameter outlet pipe at 0.50% slope lo the second stage. The second stage will consist of a ditch inlet catch basin set at a T/G of 257.00m discharging to a 400mm dia. 19m storm sewer at 1.00% slope. The runoff will connect to a storm sewer which discharges to the existing drainage ditch which ultimately drains to the second storm water management pond located approximately 78m downstream.

SYSTEM 2: SPECIFICIATIONS OF 309-14 – STORMWATER MANAGEMENT DETENTION POND (per ECA 309-S701)

Location	44°54'35.7"N 79°21'56.5"W
Municipal Address No.	5 Pineridge Gate Unit 10
Watershed/Subwatershed	Jevins Lake watershed
Receiver of discharge	Tributary of Jevins Lake
Outlet location	44°54'36.1"N 79°21'56.0"W
Catchment Area	Unknown
Level of Treatment for suspended solids	Basic (60% TSS removal)
Treatment for other contaminants, as required	N/A
Level of Volume control	0
Design Storm	Unknown
Reference ECA(s)	N/A
Reference Works as part of treatment train	N/A
Brief Description	Stormwater management detention pond designed to attenuate post development runoff and provide basic level water quality treatment
Receive Emergency Sanitary Overflows	No
Notes / Additional Information	N/A

SYSTEM 2: AERIAL / IMAGES

2.2.3 Centennial Centre

2.2.3 CENTENNIAL CENTRE STORMWATER MANAGEMENT SYSTEMS Centennial Dr.	
System 1	**System 2**
309-06 - STORMWATER MANAGEMENT DRY POND	**309-07 – PIPE STORAGE**
ECA NO. 3-1610-91-006	**ECA NO. 3-1610-91-006**
TOWN ISSUED ASSET N0. SMP-D91006-01	**TOWN ISSUED ASSET N0. N/A**

SYSTEM 1 & 2: DESCRIPTION (per ECA 3-1610-91-006)

A dry pond of approx. 239m of 900mm diameter perforated pipes providing 151m3 storage, a detention pond providing 724m3 storage at depth of 0.52m for the 1:25 year storm together with an outlet structure consisting of approx. 3m of 450mm diameter pipe, discharging ultimately into Gull Lake.

SYSTEM 1: SPECIFICATIONS OF 309-06 DRY POND (per ECA 309-S701)

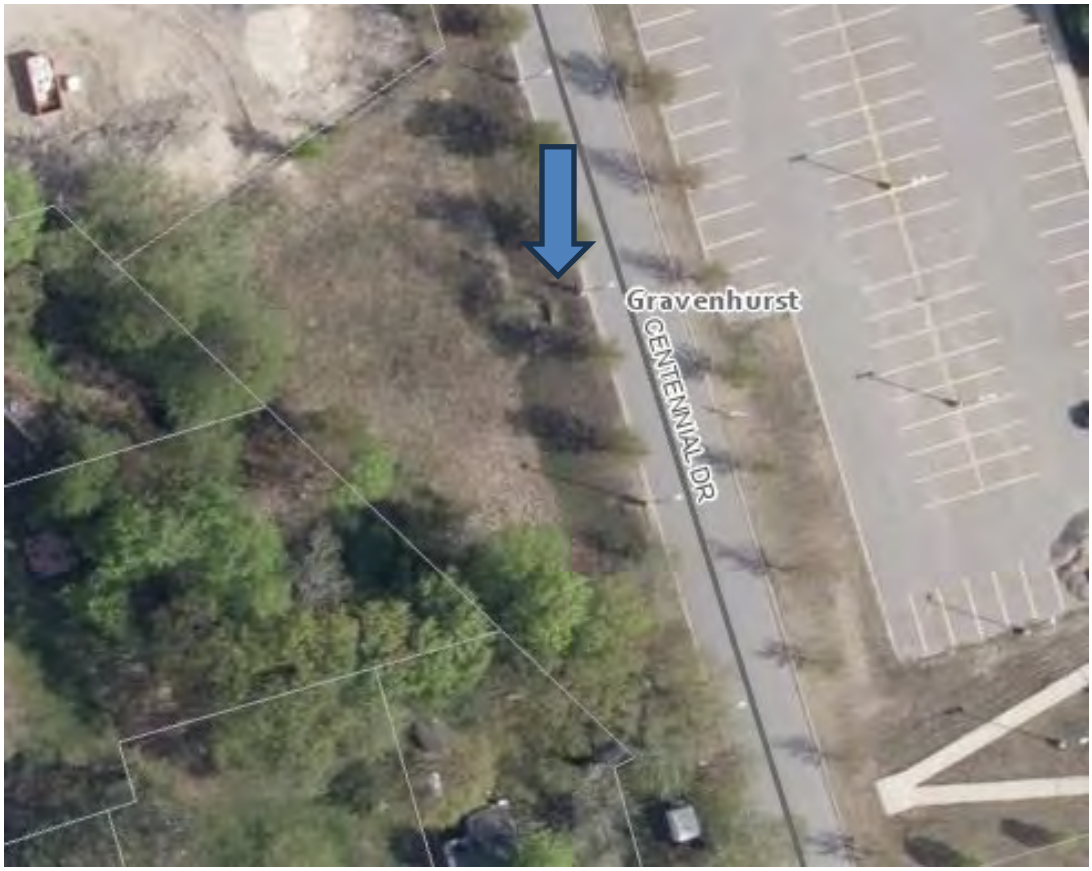
Location	44°55'22.7"N 79°22'18.5"W
Municipal Address No.	101 Centennial Dr. Unit 10

Municipal Address No.	101 Centennial Dr. Unit 10
Watershed/Subwatershed	Gull Lake watershed
Receiver of discharge	Tributary of Gull Lake
Outlet location	44°55'24.0"N 79°22'19.0"W
Catchment Area	10.22 hectares
Level of Treatment for suspended solids	Basic (60% TSS removal)
Treatment for other contaminants, as required	N/A
Level of Volume control	0
Design Storm	1:5-year through 1:25-year design storm
Reference ECA(s)	3-1610-91-006
Reference Works as part of treatment train	N/A
Brief Description	Dry detention pond designed to provide basic level water quality treatment and post to pre-development peak flow attenuation (see ECA)
Receive Emergency Sanitary Overflows	No
Notes / Additional Information	N/A

SYSTEM 2: SPECIFICATIONS OF 309-07 PIPE STORAGE (per ECA 309-S701)

Location	44°55'22.7"N 79°22'18.5"W
Municipal Address No.	101 Centennial Dr.
Watershed/Subwatershed	Gull Lake Watershed
Receiver of discharge	Centennial Park SWMF
Outlet location	44°55'24.0"N 79°22'19.0"W
Catchment Area	10.22 hectares
Level of Treatment for suspended solids	Basic (60% TSS removal)
Treatment for other contaminants, as required	N/A
Level of Volume control	0
Design Storm	1:5-year through 1:25-year design storm
Reference ECA(s)	3-1610-91-006
Reference Works as part of treatment train	N/A
Brief Description	Pipe Storage designed to provide basic level water quality treatment and post to pre-development peak flow attenuation (see ECA)
Receive Emergency Sanitary Overflows	No
Notes / Additional Information	N/A

SYSTEM 1: IMAGES & AERIAL


Gravenhurst
CENTENNIAL DR

2.2.4 Pine St. Residential Subdivision

2.2.4 PINE STREET RESIDENTIAL SUBDIVISION **382 Pine St.**	
System 1	**System 2**
309-10 – DRY DETENTION POND	**309-04 – OIL AND GRIT SEPARATOR**
ECA NO. 8249-97ZL4U	**ECA NO. 8249-97ZL4U**
TOWN ISSUED ASSET N0. **SMP-D97ZL4U-12**	**TOWN ISSUED ASSET N0.** **OG-97ZL4U-13**

SYSTEM 1: DESCRIPTION - 309-10 (per ECA No 8249-97ZL4U)

Stormwater management Pond: a dry pond located in Block 33 in the southwest corner of the proposed development having a total storage of approximately 614 cubic metres, 240.9 cubic metres of extended detention storage with a outlet storm sewer pipe orifice, discharging to an oil/grit separator (stormceptor STC-300 or equivalent) downstream of the dry pond to remove minimum of 70% total suspended solids discharging to a level spreader swale at the pond outlet to promote infiltration and dispersion of outflow.

SYSTEM 1: SPECIFICATIONS OF 309-10 – DRY DETENTION POND (per ECA 309-S701)

Location	44°56'17.0"N 79°22'33.9"W
Municipal Address No.	382 Pine St.
Watershed/Subwatershed	Muskoka Bay watershed
Receiver of discharge	Pine Street Subdivision OGS
Outlet location	44°56'16.7"N 79°22'34.6"W
Catchment Area	2.52 hectares
Level of Treatment for suspended solids	Basic (70% TSS removal)
Treatment for other contaminants, as required	N/A
Level of Volume control	0
Design Storm	1:5-year through 1:100-year design storm
Reference ECA(s)	8249-97ZL4U
Reference Works as part of treatment train	N/A
Brief Description	Dry detention pond designed to provide basic level water quality treatment and post to pre-development peak flow attenuation
Receive Emergency Sanitary Overflows	No
Notes / Additional Information	N/A

SYSTEM 2: SPECIFICATIONS OF 309-04 – Oil and Grit Separator (per ECA 309-S701)

Location	44°56'17.0"N 79°22'33.9"W

Municipal Address No.	382 Pine St.
Watershed/Subwatershed	Muskoka Bay watershed
Receiver of discharge	Muskoka Bay
Outlet location	44°56'16.7"N 79°22'34.6"W
Catchment Area	2.52 hectares
Level of Treatment for suspended solids	Basic (70% TSS removal)
Treatment for other contaminants, as required	N/A
Level of Volume control	0
Design Storm	Pine Street SWMF discharge
Reference ECA(s)	8249-97ZL4U
Reference Works as part of treatment train	N/A
Brief Description	Oil and Grit Separator (Stormceptor Model STC-300) designed to provide normal level water quality treatment for Pine Street SWMF discharge (see ECA)
Receive Emergency Sanitary Overflows	No
Notes / Additional Information	N/A

SYSTEM 1: IMAGES & AERIAL

2.2.6 Muskoka Bay Estates

2.2.7 MUSKOKA BAY ESTATES **North Muldrew Lake Rd and Carrick Trail**	
System 1	**System 2**
309-11 – EXTENDED WET DETENTON POND	**309-12 – EXTENDED WET DETENTION POND**
ECA NO. 9870-6A4URV	**ECA NO. 9870-6A4URV**
TOWN ISSUED ASSET N0. **SMP-W6A4URV-10**	**TOWN ISSUED ASSET N0.** **N/A**

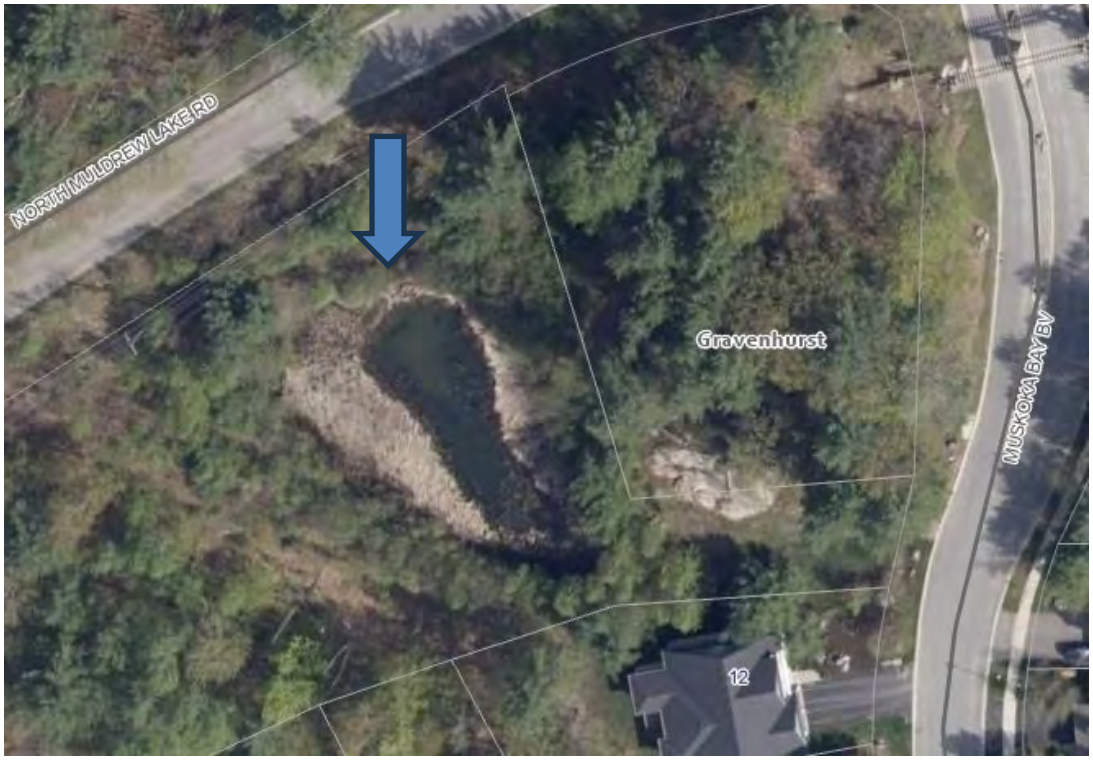
SYSTEM 1: DESCRIPTION – 309-11 – (per ECA No. 9870-6A4URV)

A sediment forebay 2.5 metres deep, 45 metres long and 10 metres wide on average; - a storage pond consisting of: - a permanent pool with a capacity of approx. 800 cubic metres (including the storage capacity of sediment forebay); - an active quantity storage of approx. 2822 cubic metres for the 100 year storm; - outlet control consisting of: - a 450 millimetre diameter riser pipe with 8 rows of 14 -25 millimetre diameter openings discharging to a 16 metre long , 300 millimetre diameter pipe equipped with a 75 millimetre diameter orifice at its outlet rated at 15 litres per second for a head of 1.7 metres, which discharges to a roadside drainage ditch via a 400 millimetre diameter culvert; - a 3.0 metre wide rectangular weir rated at 524 litres per second for a head of 0.2 metres, discharging to a roadside drainage ditch via a 400 millimetre diameter culvert.

SYSTEM 1: SPECIFICATIONS OF 309-11- EXTENDED WET DETENTION POND (per ECA 309-S701)

Location	44°54'51.1"N 79°23'34.3"W
Municipal Address No.	10 Muskoka Bay Blvd.
Watershed/Subwatershed	Muskoka Bay watershed
Receiver of discharge	Roadside ditch
Outlet location	44°54'50.9"N 79°23'33.2"W
Catchment Area	Unknown
Level of Treatment for suspended solids	Enhanced (80% TSS removal)
Treatment for other contaminants, as required	N/A
Level of Volume control	0
Design Storm	1:5-year through 1:100-year design storm
Reference ECA(s)	9870-6A4URV
Reference Works as part of treatment train	N/A
Brief Description	Extended detention wet pond designed to provide post to pre- development peak flow attenuation and enhanced level water quality treatment (See ECA)
Receive Emergency Sanitary Overflows	No
Notes / Additional Information	N/A

SYSTEM 1: AERIAL / IMAGES



SYSTEM 2: DESCRIPTION 309-12 (per ECA 9870-6A4URV)

A sediment forebay 2.7 metres deep and 700 metres in area ; - a storage pond consisting of: - a permanent pool with a capacity of approx. 1700 cubic metres (including the storage capacity of sediment forebay); - an active quantity storage of approx. 3583 cubic metres for the 100 year storm; - outlet control consisting of: - a 450 millimetre diameter riser pipe with 8 rows of 14 -25 millimetre diameter openings discharging to a 33 metre long , 600 millimetre diameter pipe equipped with a 100 millimetre diameter orifice at its outlet rated at 29 litres per second for a head of 1.8 metres, which discharges to an existing watercourse; - a 3.0 metre wide rectangular weir rated at 756 litres per second for a head of 0.2 metres, discharging to an existing watercourse.

Location	44°54'44.4"N 79°23'35.7"W
Municipal Address No.	TBD
Watershed/Subwatershed	Muskoka Bay Watershed
Receiver of discharge	Tributary of Muskoka Bay
Outlet location	44°54'42.9"N 79°23'30.7"W
Catchment Area	Unknown
Level of Treatment for suspended solids	Enhanced (80% TSS removal)

Treatment for other contaminants, as required	N/A
Level of Volume control	0
Design Storm	1:5-year through 1:100-year design storm
Reference ECA(s)	9870-6A4URV
Reference Works as part of treatment train	N/A
Brief Description	Extended detention wet pond designed to provide post to pre- development peak flow attenuation and enhanced level water quality treatment (See ECA)
Receive Emergency Sanitary Overflows	No
Notes / Additional Information	N/A

Section B3 – Objectives and Priorities

3.1 Objectives of an Inspection and Maintenance Program

It is acknowledged that the Town shall ensure that SWM systems under its care and control are properly operated and maintained. This shall include but not be limited to assessing the pond's performance, adequate funding and sufficient operating staffing and training.

An inspection and maintenance program describes the parameters to be inspected and monitored and provides a record of management that can be used to verify due diligence by the Town in the event that the infrastructure fails or malfunctions. Inspection and maintenance programs also provide a platform upon which the Town can respond more effectively to public concerns and help raise awareness of the importance of the stormwater facilities being monitored.

For the purpose of obtaining technical information and maintaining records, the goals of the Inspection and Maintenance Program specific to storm ponds is:

a) To establish a maintenance schedule;
b) To evaluate the SWMF's hydraulic response to rainfall events with respect to peak flows and design drawdown times;
c) To assess the effectiveness of all components that contribute to the designed functionality of the SWMF;
d) To determine if vegetation and/or wildlife is impacting the functionality of the SWMF;
e) To determine the budget for future long-term inspection and maintenance works, and
f) To maintain a record of site conditions and interventions.

3.2 Maintenance Priorities

It is acknowledged that the data collected through the Inspection and Maintenance Program will be addressed based on established priorities and budget availability. In order for the Town to determine how maintenance activities should be prioritized, criteria should be established as part of the asset management database. These criteria should be based on historical maintenance requirements, drainage area and downstream sensitivities, and may include consideration of the following:

a) Downstream sensitive areas
b) Pollutant removal capability
c) Safety
d) Ability to perform work

Where a SWMF ceases to function as designed, a workplan shall be developed that includes local community notification, plans for rehabilitating the SWMF to proper function in a reasonable time, identification of actions that will be taken to prevent reoccurrence and timelines for implement the workplan (ECA 309 S701 Schedule E, Section 2.15).

Should a deficiency be identified in the scheduled Inspection and Maintenance of a storm pond, staff will

- Identify deficiency in the inspection and maintenance report;
- Issue a Work Order / Service Request to address deficiency and maintain in accordance with maintenance priorities
    - If capital works are identified, staff designate is to document and present in future capital budget cycles for consideration by Council, and
- To ensure Work Order/Service Request is closed out with appropriate details.

3.3 CLI ECA 309-S701 Requirements – Facility Signage & Education (Website)

3.3.1 Facility Warning and Educational Signage

Through the installation of onsite signage, supported by periodic educational campaigns, residents will be informed about stormpond function and warned about the hazards of SWMFs for recreational purposes. Residents will also be reminded that SWMF are typically naturalized areas are not a highly manicured landscape subject to frequent grass cutting. It is intended that these educational efforts will assist in increased community awareness and stewardship for the municipality's stormpond infrastructure.

As per ECA 309 S701 Schedule E (Section 3.3), the Town has established signage for all municipally owned SWMFs. A template of stormpond signage is provided in **Appendix 3** (Stormpond Signage – Template and Specifications).

The signage shall denote:

- Identification that the site contains a SWMF;
- Identification of potential hazards and limitation water use and applicable;
- Identification of purpose of the SWMF (or QR code to website);

- ECA approval number and/or asset ID, an
- Town's contact information.

In the Town of Gravenhurst, the signs will have a QR codes to link interested parties to the Town's website to educate interested parties about the function and risks of stormponds.

3.3.2 Stormpond Information on the Town's Website

Information about the Town's stormponds, including function, purpose, benefits and safety is available on the Town's website. Signage placed at stormponds will depict a QR code which, once accessed, would link interested parties to this webpage. From time to time, the Town may update or otherwise modify the contents provided on this webpage (Link: https://www.gravenhurst.ca/living-here/roads-and-sidewalks/road-and-sidewalk-maintenance/drainage-maintenance/)

3.4 Stormpond Related Issue Tracks

The Town will document stormpond related issue tracks in the most current iteration of the work order management system. Such issue tracks will document the nature of the complaint and the associated response/resolve.

Section B4 – Inspections and Maintenance of Existing Stormponds

4.1 Inspections and Preventive Maintenance

Prior to each scheduled inspection, the SWM facility information available in the asset management database should be reviewed, including the age and function of the facility and details about past maintenance. If available, as-built drawings are to be reviewed prior to the inspection to confirm design components being inspected. With each inspection, photographs and descriptions of components inspected are to be taken and stored within the database.

Inspections can be conducted by a single person (provided no water entry is required). A detailed Stormpond Inspection Checklist is provided in **Appendix 2** (Stormpond Maintenance and Inspection Checklist) will assist in identifying the state of repair of inspection items.

4.2 Record Keeping & Reporting

4.2.1 Record Keeping

All records (digital) of inspections, including photographs, shall be housed in the appropriate software platform (i.e. Citywide, Sharepoint) as determined by the Director of Infrastructure Services or designate. The stormpond inspection database shall be created, accessible and/or modified only by appropriate staff. It is intended that the Town retain all relevant records of stormponds (including inspection records) for the life of the asset.

As part of the SWMF asset management database, these records would, where information is available, include details about:

a. Asset ID and name of SWMF
b. The design and servicing of each stormwater facility;
c. The dates of construction and assumption;
d. Attributes of the SWMF, including by not limited to:
    - General facility appearance
    - Inlet and outlet structures
    - Outlet channel
    - Low flow channels
    - Emergency overflow spillways
    - Vegetation & Wildlife
    - Access roads and walkways
    - Perimeter fencing
    - Sediment accumulation
    - Public safety
    - Other notable features

e. Scheduled Inspection and Maintenance reports. During scheduled maintenance and inspection, each feature would be nominally rated and ranked. For example:
    - Excellent (the component has no deterioration)
    - Satisfactory (some wear is noticed, but it does not affect the functionality)
    - Attention required (component is still functioning but has minor problems that may prevent the component from functioning properly during extreme events – some simple upkeep is required)
    - Non-functional (the component is no longer functioning as designed or is missing)
    - Safety hazard (the component presents a safety hazard)

    Please refer to **Appendix 2** (Stormpond Maintenance and Inspection Checklist).

f. Either complaint driven or via scheduled Inspection and maintenance, the Town will record (and address) any observed illegal activities that could impact the appearance or function of the SWMF, such as illegal encroachment or illegally installed private drains.

The database specific to the Town's storm ponds would be created, updated, stored and accessible via the most current iteration of the Town's asset management platform (i.e. Citywide) and/or the Town's collaborative document management and storage system (i.e. Sharepoint).

4.2.2 Reporting

Pursuant to Section 5.0 of ECA No. 309-3701, the Town shall:

- Prepare an annual performance report for the Authorized System that is to be prepared to the MOECC (Director) by April 30th of each year. Such report shall include where available and applicable provisions as identified in section 5.2 of ECA 309-3701.

4.3 Algae Control

Algae can become a problem in stormwater ponds, particularly when pond turnover rates are low and runoff into (or at) the facility contains abnormally high nitrogen and phosphorous levels. Excessive algae is unappealing and can create odours leading to complaints from surrounding residents. Algae can also negatively impact the treatment performance of the pond and clog outlets, resulting in more frequent and costly maintenance.

To minimize the extent and frequency of algae blooms, ponds should initially be sized and configured correctly to optimize turnover rates of water in the pond. Post development however, consideration should be given to:

- Encouraging the use of alternative organic fertilizers in the predefined catchment area
- Discouraging an inviting habitat for geese to reside in/near ponds

According to the '*Ministry of Environment's Storm Water Management Planning and Design Manual 2003',* it is recommended that vegetation in keeping with thickets or thorn bearing shrubs and trees can collectively create an effective barrier to deter members of the public from accessing pond areas. By extension, by adopting this same practice, it, in combination of limiting the amount of mowed grass around a pond, will similarly discourage geese from taking up residence in and/or around a stormpond.

4.4 Components of Stormpond Inspections

The MOECC considers the Owner of a stormwater sewage works as responsible for all aspects of designing, constructing, operating and maintaining the facility. This section provides an overview of those required maintenance operations, which are more specifically defined in the Stormpond Inspection Checklist. Reference **Appendix 2** (Stormpond Maintenance and Inspection Checklist).

a. Grass Cutting – Grass cutting is not recommended within the stormwater management facility. Allowing the grass to grow acts as a natural deterrent to geese which may pollute the facility. If the grass is to be cut to improve the visual appeal of the SWM facility, it should be done only on an as-required basis and should be mowed parallel to the shoreline while directing the grass clippings uphill to reduce the potential increase in direct organic loading to the facility.

b. Weed Control – In order to prevent the spread of unwanted weeds and non-native vegetation (i.e. phragmites), the need for weed control should be assessed on an annual basis. To maintain the water quality of the facility, herbicides and pesticides should not be used to stop the spread of these unwanted species. Instead, weeding should be done by hand to maintain both water quality and to protect surrounding vegetation. Exceptions to this recommendation should be

reviewed on a case-by-case basis, and special considerations should be made for Phragmites which have been known to grow near SWM facilities.

c. **Plantings** – It is expected that the SWM facility vegetation will require some re-planting or enhancement to recover from damages occurring during the forebay cleanouts, when they do occur. The condition of the facility vegetation should be noted during the visual inspections and corrective actions noted. An experienced contractor should be consulted with respect to the time of planting and type of vegetation. Care should be taken to restore plants in a manner which will be accommodating to future facility cleanouts and machine activity wherever possible.
d. **Trash Removal** – Trash removal will prevent the clogging of inlets and outlets that could impact the operation of the facility. Trash removal should be completed in the spring and then on an as-required basis for the duration of the year.
e. **Clearing Inlet/Outlet Structures** – During formal Inspections, the condition of the inlet structures and outlet maintenance hole/orifice, headwall and overflow weir for the SWM facility should be observed to ensure that they are free and clear of debris and sediment and to ensure that orifices are able to function properly. Any maintenance of these items should be completed immediately, as needed.
f. **General Aesthetics** – Unless otherwise specified, stormponds shall generally be maintained as a naturalized area, with minimal and 'as required' upkeep to the surrounding vegetation. General aesthetics shall address the removal of graffiti, ensuring signs are maintained and trash is removed.
g. **Nuisance Issues** – Nuisance issues can impact the designed functionality of the SWMF. This may include standing water (breading activity for mosquitos), beaver activity, or invasive species (e.g. phragmites). Nuisance issues should be addressed proactively so that they don't turn into more significant and costly problems.
h. **Sediment Accumulation** - During formal inspections when sediment depth is not being measured, localized areas of excess sediment accumulation can be observed without measurement. This may include assessing the conveyance of water both at the inlet and outlet channels. Any localized areas of excess accumulation should be further investigated. Sediment accumulation in outlet channel structures like cooling trenches (if any) should also be checked and the pipe should be flushed if required to maintain the capacity and functionality of the structure and prevent sediment from accumulating in the stone and/or sand surrounding the pipe.
i. **Mechanical Equipment Check –** Where such mechanical equipment exists at SWMF, the formal inspection shall include assessing the functionality of valves, pumps, fence gates, locks or other mechanical components. All mechanical equipment serves an important function and/or safety purpose for the facility. All movable parts should be free to operate.
j. **Structural Component Check -** Structural components shall be inspected during each formal inspection to proactively identify when corrective actions will be required. Inspection of structural components (i.e. clogged inlet or outlet structures; failed pipes or culverts) can reveal reasons for hydraulic malfunctioning.

4.5 Recommendations and Follow-up Based on Inspection

Recommendations or requirements for pond maintenance are to be clearly identified in the inspection report and subsequently addressed through the appropriate Infrastructure Services work order system or where appropriate or required, submitted as a capital project for consideration of Council.

Documentation associated with any maintenance or cleanout activities, including recommendation of capital works, is to be stored with the inspection reports.

Table 4.3 provides an overview of the Inspection frequencies for stormponds – both visual inspections and where deemed necessary, the assessment of sediment depth in stormponds.

Table 4.3: INSPECTION FREQUENCIES

Description	Inspection Frequency	Comments
Visual Inspection of Storm Ponds	a. Prior to Assumption. b. 4x per year within the first 2 years of operation. c. Minimum 1x per year after 2 years of operation. And d. After any rainfall with a total precipitation from an isolated storm event that is greater than >= 25mm in any 24 hour period	*It is recommended that the assumption checklist as provided in this Document (**Appendix 4: SWMF Requirements Prior to Assumption**) be used when the Town assesses the condition and functionality of the pond prior to assumption.
Sediment Depth Measurement	a. During periods of construction or other activity that falls within the catchment that are known to be generating higher than normal sediment loads. b. Minimum 1x per year c. If a routine depth measurement (visual or otherwise) reveals that the SWMF is nearly reaching the threshold where a cleanout will be required. d. If the outlet structure is at 50% or greater capacity during an extended dry (minimal conveyance) of water	Measurement of sediment depth is recommended as the only accurate means of determining when and if SWMF cleanout is required. Measurements should be taken using a graduated pole with a flat plate attached to the bottom.

It is recommended, that major components of the facility should be inspected after every large precipitation event (≥25 mm), OR a minimum of 1 (one) time per year.

An overview of common inspection and maintenance activities is provided in the Section 4.4. See **Appendix 2** (Stormpond Maintenance and Inspection Checklist).

4.6 Pond Rehabilitation – Pond Sediment Cleanout, Dewatering and Management

Should the results of a Pond Inspection and Maintenance Report render further review and/or Pond Rehabilitation (Sediment Cleanout; Dewatering and Management), the Town will prepare a tender (RFP) issued to industry to perform the required works. The tender shall express measurable deliverables as well as the unique challenges unique to each site (i.e. lack of 'as-builts', limited access; limited laydown area etc.) and cost.

In issuing the tender and assessing the award therein, the Town will adhere to best practices, including but not limited to the "Inspection and Maintenance Guide for Stormwater Management Ponds and Constructed Wetlands" (TRCA & Ch2m).

Section B5 – Assumption of Stormponds

5.1 SWMF Assumption

The transfer of a SWMF ownership from the develop to the future owner (usually a municipality) shifts full responsibility for long term operation and maintenance of the facility to the new owner. This process of ownership transfer typically occurs several years after the construction of the SWMF, when all building activities within the drainage area have been completed.

It is common practice for land developers to provide a Letter of Credit (LoC) to the municipality before they begin construction. In this context, and LOC is a document issued by a third party (e.g. financial institution) that guarantees that the developer has made a fixed amount of money available which the municipality can draw upon if needed. It essentially acts an insurance policy in the event that the developer fails to meet certain agreed upon financial and/or performance obligations to the municipality. The total amount of the LOC will vary depending on the scale and complexity of the development. For larger developments, there may be a specific amount set aside specifically for the SWMF, which will only be refunded to the developer when the facility is assumed by the municipality.

As part of the assumption process, there are a number of steps that the Town shall employ to avoid potentially higher long-term maintenance and repair costs over the life of the SWMF. **Appendix 4** (SWMF Requirements Prior to Assumption) provides a Pre-Assumption Checklist for assessing the functionality and condition of stormponds.

PART 'C': CATCHBASIN, STORMSCEPTORS, STORMSEWERS INVENTORY, INSPECTION AND MAINTENANCE

Section C1 – Catchbasins

1.1 Catchbasin Inventory

The list of catch basins can be seen in the 2021 Master Storm Sewer Report. The locations of the catch basins can be noted in Table 4.4 and Drawing S-1 to S-8 in Appendix 8. A digital representation of these locations can be seen in the Muskoka GEOHub Employee Version.

1.2 Catchbasin Inspection

Catch basins should be inspected for the following:

- Obstructions restricting the flow of water into the grate and obstructions within the catch basin

- Sediment accumulation in the bottom of the catch basin

- Damage to the frame and grate, damage to the concrete structure, damage of the inlet/outlet parging.

- signs of infiltration of groundwater through inlet / outlet

- Evidence of tampering or unauthorized pipe connections (e.g. Roof leader pipe connections)

1.3 Catchbasin Maintenance

Catch basin maintenance shall conform to SOP PW-1-11 as amended. Refer to Appendix 6 for SOP PW-1-11

Section C2 – Stormsewers

2.1 Stormsewer Inventory

All Town of Gravenhurst storm sewers have been inventoried as per the 2021 Master Storm Sewer Report, the list of the inventoried storm sewer systems has been provided in a list in Appendix 7.

2.2 Stormsewer Inspection

Storm sewers should be visually inspected for the following as to not contravene the safety procedures put fourth is SOP PW-1-11:

- Obstructions restricting flow of water

- Signs of pipe deterioration

- Signs of pipe deflection

- Deterioration of parging around inlet/outlet pipe

- Separation of pipe sections

- Evidence of stagnant water

- Presence of granular, dirt or other material in pipe indicating collapse of the pipe.

If any of the above are noted, further inspection shall be completed using Closed Circuit Television (CCTV) in order to identify specific areas in need of repair, replacement or flushing.

2.3 Stormsewer Maintenance

Maintenance of storm sewer are triggered by constituent complaint or case by case basis as required. Due to the ageing nature of the existing infrastructure in the Town of Gravenhurst, flushing of storm sewer systems does not occur until a visual or mechanical inspection (CCTV) has taken place and the necessity of flushing has been proven to be warranted. If sewer flushing is warranted; a qualified professional will be contracted to conduct the flushing work and or replacement works.

Section C3 – Oil/Grit Separators

3.1 Oil/Grit Separators Inventory

All oil/grit separators under the jurisdiction of the Town of Gravenhurst have been identified under CLI-ECA 309-S701 (Appendix 1)

3.2 Oil/Grit Separator Inspection

- All oil/grit separators shall be inspected twice annually.

- if the oil/grit separator is observed to have significant sediment or trash in the bottom of the device, an oily sheen or frothing and or unusual coloring to the water, the device should be noted cleaned immediately to stop the migration of contaminants.

- Inspections should be performed immediately after oil, fuel or other chemical spills.

3.3 Oil/Grit Separator Maintenance

All oil/grit separators shall have all sediment removed annually using a vacuum truck in accordance with the manufacturers standards and specifications as set out in the devices owner's manual on site specific bases.

Appendix 1 - ECA (MOECC) ECA Number: 309-S701 - Issue 1

Ontario

ENVIRONMENTAL COMPLIANCE APPROVAL
For a Municipal Stormwater Management System

ECA Number: 309-S701
Issue Number: 1

Pursuant to the *Environmental Protection Act*, R.S.O 1990, c. E. 19 (EPA*),* and the regulations made thereunder and subject to the limitations thereof, this environmental compliance approval is issued under section 20.3 of Part II.1 of the EPA to:

Gravenhurst, the Corporation of the Town of

3-5 Pineridge Gate
Gravenhurst, ON P1P1Z3

For the following Sewage Works:

Town of Gravenhurst Storm Management System

This Environmental Compliance Approval (ECA) includes the following:

Schedule	Description
Schedule A	System Information
Schedule B	Municipal Stormwater Management System Description
Schedule C	List of Notices of Amendment to this ECA: Additional Approved Works
Schedule D	General
Schedule E	Operating Conditions
Schedule F	Residue Management
Appendix A	Stormwater Management Criteria

Except where specified otherwise, all prior ECAs, or portions thereof, issued by the Director for Sewage Works described in section 1 of Schedule B are revoked and replaced by this Approval.

DATED at TORONTO this 6th day of October, 2022

Signature

Aziz Ahmed, P.Eng.
Director, Part II.1, *Environmental Protection Act*

Schedule A: System Information

System Owner	**Gravenhurst, the Corporation of the Town of**
ECA Number	**309-S701**
System Name	**Town of Gravenhurst Storm Management System**
ECA Issue Date	**October 6th, 2022**

1.0 ECA Information and Mandatory Review Date

ECA Issue Date	October 6th, 2022
Application for ECA Review Due Date	March 15, 2026

1.1 Pursuant to section 20.12 of the EPA, the Owner shall submit an application for review of the Approval no later than the Application for ECA Review Date indicated above.

2.0 Related Documents

2.1 Other Documents

Document Title	Version
Design Criteria for Sanitary Sewers, Storm Sewers, and Forcemains for Alterations Authorized under Environmental Compliance Approval	v.1.1 (Jul 28, 2022)

3.0 Stormwater Master Plan and Asset Management Plan

Document Title	Version
Asset Management – Storm Sewer	v.1 (Dec.15, 2021)
Master Storm Sewer Report	v.1 (Oct. 12, 2021)

4.0 Operating Authority

System	Operating Authority
Town of Gravenhurst Stormwater Management System	Corporation of the Town of Gravenhurst

Schedule B: Municipal Stormwater Management System Description

System Owner	**Gravenhurst, the Corporation of the Town of**
ECA Number	**309-S701**
System Name	**Town of Gravenhurst Storm Management System**
ECA Issue Date	**October 6th, 2022**

1.0 System Description

1.1 The following is a summary description of the Sewage Works comprising the Municipal Stormwater Management System:

Overview

The Municipal Stormwater Management (SWM) System serving the Town of Gravenhurst, is a separate system for stormwater only (designed not to convey sanitary sewage, combined sewage) within the Lake Muskoka, Muskoka Bay, Gull Lake, Hoc Roc River, and Jevins Lake watersheds. The Municipal SWM System consists of storm sewers, culverts, ditches, Stormwater Management Facilities and outlets.

This ECA covers the entire Municipal SWM System owned and operated by the Town of Gravenhurst. This ECA does not cover municipally, or privately owned sewage works on industrial or commercial land.

This Town of Gravenhurst SWM System connects to the District Municipality of Muskoka stormwater management system.

Sewage Collection System

1.2 The Authorized System comprises:

1.2.1 The Sewage Works described and depicted in each document or file identified in column 1 of Table B1.

Table B1: Infrastructure Map	
Column 1 Document or File Name	Column 2 Date
220536 - SI-1	January 2022
220536 - SI-2	January 2022
220536 - SI-3	January 2022
220536 - SI-4	January 2022

220536 - SI-5	January 2022
220536 - SI-6	January 2022
220536 - SI-7	January 2022
220536 - SI-8	January 2022

1.2.2 Storm Sewers, Stormwater Management Facilities, stormwater pumping stations and Sewage Works associated with a Third Pipe Collection System that have been added, modified, replaced, or extended through authorization provided in a Schedule C Notice respecting this Approval, where Completion occurs on or after the date identified in column 2 of Table B1 for each document or file identified in column 1.

1.2.3 Storm Sewers, Stormwater Management Facilities and Sewage Works associated with a Third Pipe Collection System that have been added, modified, replaced, or extended through authorization provided by Schedule D of this Approval, where Completion occurs on or after the date identified in column 2 of Table B1 for each document or file identified in column 1.

1.2.4 Any Sewage Works described in conditions 1.3 through 1.8 below.

Stormwater Collection System

1.3 Categorization of the Authorized System at the date of issue of this Approval is as follows:

Table B2. Stormwater Collection System by Diameter

System Type	Pipe Diameter (mm)	Length (km)	System Totals (km)
Storm Sewers	Up to 250	2.15	--
Storm Sewers	> 250 - 500	8.79	--
Storm Sewers	> 500 - 1050	3.96	--
Storm Sewers	> 1050	0.24	--
Total Storm Sewers	--	--	21.65
Ditches / Swales	--	--	0.34
Total System Length (km)	--	--	15.47

Table B3. Summary of Stormwater Management Facilities by Type and Pumping Stations

Facility Type	Basic Treatment for Suspended Solids*	Normal Treatment for Suspended Solids *	Enhanced Treatment for Suspended Solids *	Other Treatment Level for Suspended Solids**	Total Quality Control	Total Quantity Control	Total Number of Facilities
LID Facilities - Retention (infiltration,	0	0	0	0	0	0	0

evapotranspiration, harvest)							
LID Facilities - Filtration	0	0	0	0	0	0	0
Stormwater Management Ponds – Wet (includes wetlands, hybrids)	0	0	4	0	4	4	4
Stormwater Management Ponds - Dry	8			0	8	8	8
Super Pipe / Storage Facility	0	0	1	0	1	1	1
Filtration MTD - Filter Unit	0	0	0	0	0		0
Sedimentation MTD - OGS	0	1	1	0	2		2
Pumping Stations							0
Other	0	0	0	0	0	0	0
Total Number of Facilities	8	0	6	0	15	13	15

* Basic, normal, and enhanced treatment correspond to 60%, 70% and 80% suspended solids removal on an annual average long-term basis, respectively.

** Treatment levels below 60% suspended solids removal on an annual average long-term basis.

Table B4. Third Pipe Collection System				
Description	Pipe Diameter (mm)	Length (km)	Quantity	System Totals
Third Pipe Sewer	Up to 250	N/A	N/A	N/A
Third Pipe Sewer	> 250 - 500	N/A	N/A	N/A
Third Pipe Sewer	> 500	N/A	N/A	N/A
Total	--	--	--	N/A
Other Infrastructure Components (e.g., storage tank)	N/A	N/A	N/A	N/A

Table B5. Sewage Works on Private Land that are part of the Municipal Stormwater Treatment Train*		
Description	Location	ECA # (if applicable)
N/A		

* Identifies privately owned Sewage Works that are not part of the Authorized System, but are part of a Stormwater Treatment Train

Stormwater Management Facilities

1.4 The following are Stormwater Management Facilities in the Authorized System:

309-03 – Stormwater Management Detention Pond

Location	44°54'32.1"N 79°21'34.3"W
Watershed/Subwatershed	Jevins Lake Watershed
Receiver of discharge	Tributary of Jevins Lake
Outlet location	44°54'29.7"N 79°21'36.3"W
Catchment Area	13.5 Hectares
Level of Treatment for suspended solids	Basic (60% TSS removal)
Treatment for other Contaminants, as required	N/A
Level of Volume control	0
Design Storm	1:5-year through 1:100-year design storm
Reference ECA(s)	8499-AE9Q22
Reference Sewage Works as part of treatment train	N/A
Brief Description	Dry detention pond designed to provide basic level water quality treatment and post to pre-development peak flow attenuation (see ECA)
Receive Emergency Sanitary Overflows	No
Notes	N/A

309-04 – Dry Detention Pond

Location	44°54'41.0"N 79°21'48.5"W
Watershed/Subwatershed	Muskoka Bay watershed
Receiver of discharge	Municipal storm sewer
Outlet location	44°54'42.3"N 79°21'51.3"W
Catchment Area	10.31 Hectares
Level of Treatment for suspended solids	Basic (60% TSS removal)
Treatment for other Contaminants, as required	N/A
Level of Volume control	0
Design Storm	1:5-year through 1:100-year design storm
Reference ECA(s)	8499-AE9Q22
Reference Sewage Works as part of treatment train	N/A
Brief Description	Dry detention pond designed to provide basic level water quality treatment and post to pre-development peak flow attenuation (see ECA)
Receive Emergency Sanitary Overflows	No
Notes	N/A

309-06 – Dry Detention Pond

Location	44°55'22.7"N 79°22'18.5"W
Watershed/Subwatershed	Gull Lake watershed
Receiver of discharge	Tributary of Gull Lake
Outlet location	44°55'24.0"N 79°22'19.0"W
Catchment Area	10.22 hectares
Level of Treatment for suspended solids	Basic (60% TSS removal)
Treatment for other contaminants, as required	N/A
Level of Volume control	0
Design Storm	1:5-year through 1:25-year design storm
Reference ECA(s)	3-1610-91-006
Reference Works as part of treatment train	N/A
Brief Description	Dry detention pond designed to provide basic level water quality treatment and post to pre-development peak flow attenuation (see ECA)
Receive Emergency Sanitary Overflows	No
Notes / Additional Information	N/A

309-07 – Pipe Storage

Location	44°55'22.7"N 79°22'18.5"W
Watershed/Subwatershed	Gull Lake Watershed
Receiver of discharge	Centennial Park SWMF
Outlet location	44°55'24.0"N 79°22'19.0"W
Catchment Area	10.22 hectares
Level of Treatment for suspended solids	Basic (60% TSS removal)
Treatment for other contaminants, as required	N/A
Level of Volume control	0
Design Storm	1:5-year through 1:25-year design storm
Reference ECA(s)	3-1610-91-006
Reference Works as part of treatment train	N/A
Brief Description	Pipe Storage designed to provide basic level water quality treatment and post to pre-development peak flow attenuation (see ECA)
Receive Emergency Sanitary Overflows	No
Notes / Additional Information	N/A

309-09 – Extended Detention Wetland

Location	44°55'07.9"N 79°23'50.9"W
Watershed/Subwatershed	Muskoka Bay watershed

Receiver of discharge	Tributary of Muskoka Bay
Outlet location	44°55'08.3"N 79°23'51.7"W
Catchment Area	6.96 hectares
Level of Treatment for suspended solids	Enhanced (80% TSS removal)
Treatment for other contaminants, as required	N/A
Level of Volume control	0
Design Storm	1:5-year through 1:100-year design storm
Reference ECA(s)	7816-7X3J3D
Reference Works as part of treatment train	N/A
Brief Description	Extended detention wetland designed to provide post to pre-development peak flow attenuation and enhanced level water quality treatment (see ECA)
Receive Emergency Sanitary Overflows	No
Notes / Additional Information	N/A

309-10 – Dry Detention Pond

Location	44°56'17.0"N 79°22'33.9"W
Watershed/Subwatershed	Muskoka Bay watershed
Receiver of discharge	Pine Street Subdivision OGS
Outlet location	44°56'16.7"N 79°22'34.6"W
Catchment Area	2.52 hectares
Level of Treatment for suspended solids	Basic (70% TSS removal)
Treatment for other contaminants, as required	N/A
Level of Volume control	0
Design Storm	1:5-year through 1:100-year design storm
Reference ECA(s)	8249-97ZL4U
Reference Works as part of treatment train	N/A
Brief Description	Dry detention pond designed to provide basic level water quality treatment and post to pre-development peak flow attenuation
Receive Emergency Sanitary Overflows	No
Notes / Additional Information	N/A

309-11 – Extended Detention Wet Pond

Location	44°54'51.1"N 79°23'34.3"W
Watershed/Subwatershed	Muskoka Bay watershed
Receiver of discharge	Roadside ditch
Outlet location	44°54'50.9"N 79°23'33.2"W

Catchment Area	Unknown
Level of Treatment for suspended solids	Enhanced (80% TSS removal)
Treatment for other contaminants, as required	N/A
Level of Volume control	0
Design Storm	1:5-year through 1:100-year design storm
Reference ECA(s)	9870-6A4URV
Reference Works as part of treatment train	N/A
Brief Description	Extended detention wet pond designed to provide post to pre-development peak flow attenuation and enhanced level water quality treatment (See ECA)
Receive Emergency Sanitary Overflows	No
Notes / Additional Information	N/A

309-12 – Extended Detention Wet Pond

Location	44°54'44.4"N 79°23'35.7"W
Watershed/Subwatershed	Muskoka Bay watershed
Receiver of discharge	Tributary of Muskoka Bay
Outlet location	44°54'42.9"N 79°23'30.7"W
Catchment Area	Unknown
Level of Treatment for suspended solids	Enhanced (80% TSS removal)
Treatment for other contaminants, as required	N/A
Level of Volume control	0
Design Storm	1:5-year through 1:100-year design storm
Reference ECA(s)	9870-6A4URV
Reference Works as part of treatment train	N/A
Brief Description	Extended detention wet pond designed to provide post to pre-development peak flow attenuation and enhanced level water quality treatment (See ECA)
Receive Emergency Sanitary Overflows	No
Notes / Additional Information	N/A

309-13 – Stormwater Management Detention Pond

Location	44°54'41.9"N 79°21'53.4"W
Watershed/Subwatershed	Muskoka Bay watershed
Receiver of discharge	Municipal storm sewer
Outlet location	44°54'42.3"N 79°21'53.9"W
Catchment Area	Unknown
Level of Treatment for	Basic (60% TSS removal)

suspended solids	
Treatment for other contaminants, as required	N/A
Level of Volume control	0
Design Storm	Unknown
Reference ECA(s)	N/A
Reference Works as part of treatment train	N/A
Brief Description	Stormwater management detention pond designed to attenuate post development runoff and provide basic level water quality treatment
Receive Emergency Sanitary Overflows	No
Notes / Additional Information	N/A

309-14 – Stormwater Management Detention Pond

Location	44°54'35.7"N 79°21'56.5"W
Watershed/Subwatershed	Jevins Lake watershed
Receiver of discharge	Tributary of Jevins Lake
Outlet location	44°54'36.1"N 79°21'56.0"W
Catchment Area	Unknown
Level of Treatment for suspended solids	Basic (60% TSS removal)
Treatment for other contaminants, as required	N/A
Level of Volume control	0
Design Storm	Unknown
Reference ECA(s)	N/A
Reference Works as part of treatment train	N/A
Brief Description	Stormwater management detention pond designed to attenuate post development runoff and provide basic level water quality treatment
Receive Emergency Sanitary Overflows	No
Notes / Additional Information	N/A

309-04 – Oil and Grit Separator

Location	44°56'17.0"N 79°22'33.9"W
Watershed/Subwatershed	Muskoka Bay watershed
Receiver of discharge	Muskoka Bay
Outlet location	44°56'16.7"N 79°22'34.6"W
Catchment Area	2.52
Level of Treatment for suspended solids	Normal (70% TSS removal)
Treatment for other	N/A

contaminants, as required	
Level of Volume control	0
Design Storm	Pine Street SWMF discharge
Reference ECA(s)	8249-97ZL4U
Reference Works as part of treatment train	N/A
Brief Description	Oil and Grit Separator (Stormceptor Model STC-300) designed to provide normal level water quality treatment for Pine Street SWMF discharge (see ECA)
Receive Emergency Sanitary Overflows	No
Notes / Additional Information	N/A

Stormwater Pumping Stations

1.5 The following are identified Stormwater pumping stations in the Authorized System:

[Stormwater Pumping Station Name]

Asset ID and Name	N/A
Site Location	
Watershed/Subwatershed	
Latitude and Longitude	
Coordinates (optional)	
Description	
Pumping Station Capacity	
Equipment	
Emergency Storage	
Equipment: Associated controls and Appurtenances	
Overflow	
Standby Power	
Notes	

Third Pipe Collection System

1.6 The following are identified third pipe systems in the Authorized System.

[*Asset ID* (e.g., Third Pipe 10]

Asset ID and Name	
Location	
Watershed/Subwatershed	
Receiver of discharge	

Outlet location	N/A
Catchment Area	
Treatment, if applicable	
Reference ECA(s), if applicable	
Brief Description	
Notes	

Other Works:

1.7 The following works are part of Authorized System:

Table B6: Other Works			
Column 1 Asset ID / Name	Column 2 Site Location (Latitude & Longitude)	Column 3 Component	Column 4 Description
N/A			

Developer-Operated Facilities:

1.8 The following facilities are part of the Authorized System, have been constructed, and are being operated by the developer under the authority of an agreement entered into with the Owner of the system.

Table B7: Developer-Operated Facilities			
Asset ID	Type of Facility	Location	Developer Name
N/A			

1.9 The Owner shall notify the Director, using the Director Notification Form, within thirty (30) days where the operation of any Facility identified in Table B7 has been:

1.9.1 Incorporated into the overall Stormwater Management System and assumed by an Operating Authority identified in Schedule B of this Approval.

1.9.2 Has been transferred from the developer identified in Table B7 to another party.

Transitional – Facilities with Individual ECAs

1.10 The following Facilities are connected to the Authorized System, but ownership has not been assumed by the Owner. These Sewage Works are

not part of the Authorized System and will continue to have separate ECAs until the Facilities are assumed by the Owner.

Table B8: Facilities with Individual ECAs				
Asset ID	Type of Facility	Location	ECA Number	Developer Name
309-01	Wet Pond	44°56'16.8"N 79°21'58.7"W	9884-BH8LY9	G2 Development Inc.
309-02	Wet Pond	44°56'40.9"N 79°22'07.1"W	3108-6G7NZE	LIV Gravenhurst LP

1.11 The Owner shall notify the Director, using the Director Notification Form, within thirty (30) days where the ownership of any Facility identified in Table B8 has been assumed by the Owner.

1.12 The Director Notification required in condition 1.11 shall include:

1.12.1 A request from the developer to revoke the ECA identified in Table B8; or

1.12.2 A copy of an agreement or other documentation that demonstrates that the municipality has assumed ownership of the Facility and that the ECA identified in Table B8 should be revoked.

Schedule C: List of Notices of Amendment to this ECA: Additional Approved Sewage Works

System Owner	**Gravenhurst, the Corporation of the Town of**
ECA Number	**309-S701**
System Name	**Town of Gravenhurst Storm Management System**
ECA Issue Date	**October 6th, 2022**

1.0 General

1.1 Table C1 provides a list of all notices of amendment to this Approval that have been issued pursuant to clause 20.3(1) of the EPA that impose terms and conditions in respect of the Authorized System after consideration of an application by the Director (Schedule C Notices).

Table C1: Schedule C Notices

Column 1 Issue #	Column 2 Issue Date	Column 3 Description	Column 4 Status	Column 5 DN#
N/A	N/A	N/A	N/A	N/A

Schedule D: General

System Owner	**Gravenhurst, the Corporation of the Town of**
ECA Number	**309-S701**
System Name	**Town of Gravenhurst Storm Management System**
ECA Issue Date	**October 6th, 2022**

1.0 Definitions

1.1 For the purpose of this Approval, the following definitions apply:

"Adverse Effect(s)" has the same meaning as defined in section 1 of the EPA.

"Alteration(s)" includes the following, in respect of the Authorized System, but does not include repairs to the system:

a) An extension of the system,

b) A replacement or retirement of part of the system, or

c) A modification of, addition to, or enlargement of the system.

"Appendix A" means Appendix A of this Approval.

"Approval" means this Environmental Compliance Approval including any Schedules attached to it.

"Appurtenance(s)" has the same meaning as defined in O. Reg. 525/98 (Approval Exemptions) made under the OWRA.

"Authorized System" means the Sewage Works comprising the Municipal Stormwater Management System authorized under this Approval".

"Class Environmental Assessment Project" means an Undertaking that does not require any further approval under the EAA if the proponent complies with the process set out in the Municipal Engineers Association Class Environmental Assessment document, (Municipal Class Environmental Assessment approved by the Lieutenant Governor in Council on October 4, 2000 under Order in Council 1923/2000), as amended from time to time.

"Combined Sewer(s)" means pipes that collect and transmit both sanitary Sewage and other Sewage from residential, commercial, institutional, and

industrial buildings and facilities and Stormwater through a single-pipe system, but does not include Nominally Separate Sewers.

“Completion” means substantial performance as described in s.2 (1) of the *Construction Act*, R.S.O. 1990, c. C.30.

“Compound of Concern” means a Contaminant that is discharged from the Facility in an amount that is not negligible.

“Contaminant” has the same meaning as defined in section 1 of the EPA.

“CSO” means a combined sewer overflow which is a discharge to the environment at designated location(s) from a Combined Sewer or Partially Separated Sewer that usually occurs as a result of precipitation when the capacity of the Sewer is exceeded. An intervening time of twelve hours or greater separating a CSO from the last prior CSO at the same location is considered to separate one overflow Event from another.

"CWA" means the *Clean Water Act*, R.S.O. 2006, c.22.

“Design Criteria” means the design criteria set out in the Ministry’s publication “Design Criteria for Sanitary Sewers, Storm Sewers and Forcemains for Alterations Authorized under Environmental Compliance Approval”, (as amended from time to time).

“Design Guidelines for Sewage Works” means the Ministry document titled “Design Guidelines for Sewage Works”, 2008 (as amended from time to time).

"Director" means a person appointed by the Minister pursuant to section 5 of the EPA for the purposes of Part II.1 of EPA (Environmental Compliance Approvals).

“Director Notification Form” means the most recent version of the Ministry form titled Director Notification – Alterations to a Municipal Stormwater Management System, as obtained directly from the Ministry or from the Ministry’s website.

"District Manager" means the district manager or a designated representative of the Local Ministry Office.

"EAA" means the *Environmental Assessment Act*, R.S.O. 1990, c. E.18.

"EPA" means the *Environmental Protection Act*, R.S.O. 1990, c.E.19.

“ESC” means erosion and sediment control.

“Facility” means the entire operation located on the property where the Sewage Works or equipment is located.

“Form SW1” means the most recent version of the Ministry form titled Record of Future Alteration Authorized for Storm Sewers/Ditches/Culverts as obtained directly from the Ministry or from the Ministry’s website.

“Form SW2” means the most recent version of the Ministry form titled Record of Future Alteration Authorized for Stormwater Management Facilities as obtained directly from the Ministry or from the Ministry’s website.

“Form SW3” means the most recent version of the Ministry form titled Record of Future Alteration Authorized for Third Pipe Collection Systems as obtained directly from the Ministry or from the Ministry’s website.

"Licensed Engineering Practitioner” means a person who holds a licence, limited licence, or temporary licence under the *Ontario Professional Engineers Act* R.S.O. 1990, c. P.28.

"LID" means “low impact development” a Stormwater management strategy that seeks to mitigate the impacts of increased runoff and Stormwater pollution by managing runoff as close to its source as possible. LID comprises a set of site design strategies that minimize runoff and distributed, small scale structural practices that mimic natural or predevelopment hydrology through the processes of infiltration, evapotranspiration, harvesting, filtration, and detention of Stormwater.

“Local Ministry Office” means the local office of the Ministry responsible for the geographic area where the Authorized System is located.

"Minister" means the Minister of the Ministry or such other member of the Executive Council as may be assigned the administration of the EPA and OWRA under the *Executive Council Act*, R.S.O. 1990, c. E.25.

"Ministry" means the Ministry of the Minister and includes all employees or other persons acting on its behalf.

“Monitoring Plan” means the monitoring plan prepared and maintained by the Owner under condition 4.1 in Schedule E of this Approval.

“MTD” means manufactured treatment device.

“Municipal Drain” has the same meaning as drainage works as defined in section 1 of the *Drainage Act* R.S.O. 1990, c. D.17.

“Municipal Drainage Engineer’s Report” means a report signed by a drainage engineer employed or contracted by a municipality and approved in writing by municipal council or equivalent.

“Municipal Sewage Collection System” means all Sewage Works, located in the geographical area of a municipality, that collect and transmit sanitary Sewage and are owned, or may be owned pursuant to an agreement with a municipality entered into under the *Planning Act* or *Development Charges Act*, 1997, by:

a) A municipality, a municipal service board established under the *Municipal Act*, 2001 or a city board established under the *City of Toronto Act*, 2006; or

b) A corporation established under sections 9, 10, and 11 of the *Municipal Act*, 2001 in accordance with section 203 of that Act or under sections 7 and 8 of the *City of Toronto Act*, 2006 in accordance with sections 148 and 154 of that Act.

“**Municipal Stormwater Management System”** means all Sewage Works, located in the geographical area of a municipality, that collect, transmit, or treat Stormwater and are owned, or may be owned pursuant to an agreement entered into under the *Planning Act* or *Development Charges Act*, 1997, by:

a) A municipality, a municipal service board established under the *Municipal Act*, 2001 or a city board established under the *City of Toronto Act*, 2006; or

b) A corporation established under sections 9, 10, and 11 of the *Municipal Act*, 2001 in accordance with section 203 of that Act or under sections 7 and 8 of the *City of Toronto Act*, 2006 in accordance with sections 148 and 154 of that Act.

“Natural Environment” has the same meaning as defined in section 1 of the EPA.

"Nominally Separate Sewer(s)" mean Separate Sewers that also have connections from roof leaders and foundation drains, and are not considered to be Combined Sewers.

“OGS” means Oil and Grit Separators;

“Operating Authority” means, in respect of the Authorized System, the person, entity, or assignee that is given responsibility by the Owner for the operation, management, maintenance, or Alteration of the Authorized System, or a portion of the Authorized System.

"Owner" for the purposes of this Approval means the Corporation of the Town of Gravenhurst, and includes its successors and assigns.

"OWRA" means the *Ontario Water Resources Act*, R.S.O. 1990, c. O.40.

“O&M Manual” means the operation and maintenance manual prepared and maintained by the Owner under condition 3.2 in Schedule E of this Approval.

"Partially Separated Sewer(s)" means Combined Sewers that have been retrofitted to transmit sanitary Sewage but in which roof leaders or foundation drains still contribute Stormwater inflow to the Partially Separated Sewer.

“Pre-development” means the more stringent of a site’s:

a) Existing condition prior to proposed development or construction activities; or

b) Condition as defined by the local municipality.

"Prescribed Person” means a person prescribed in O. Reg. 208/19 (Environmental Compliance Approval in Respect of Sewage Works) for the purpose of ss. 20.6 (1) of the EPA, and where the alteration, extension, enlargement, or replacement is carried out under an agreement with the Owner.

“**Privately Owned Stormwater Works”** means Stormwater Sewage Works on private land that are privately owned and, while not part of the Authorized System, are considered part of a Stormwater Treatment Train.

“Qualified Person (QP)” means persons who have obtained the relevant education and training and have demonstrated experience and expertise in the areas relating to the work required to be carried out by this Approval.

“Schedule C Notice(s)” means a notice(s) of amendment to this Approval issued pursuant to clause 20.3(1) of the EPA that imposes terms and conditions in respect of the Authorized System after consideration of an application by the Director.

“Separate Sewer(s)” means pipes that collect and transmit sanitary Sewage and other Sewage from residential, commercial, institutional, and industrial buildings.

“Sewage” has the same meaning as defined in section 1 of the OWRA.

“Sewage Works” has the same meaning as defined in section 1 of the OWRA.

“Sewer” has the same meaning as defined in section 1 of O. Reg. 525/98 under the OWRA.

"Significant Drinking Water Threat" has the same meaning as defined in section 2 of the CWA.

“Significant Snowmelt Event(s)” means the melting of snow at a rate which adversely affects the performance and function of the Authorized System and/or the Sewage Treatment Plant(s) identified in Schedule A of this Approval.

“Significant Storm Event(s)” means a minimum of 25 mm of rain in any 24 hours period.

“Source Protection Authority” has the same meaning as defined in section 2 of the CWA.

"Source Protection Plan" means a drinking water source protection plan prepared under the CWA.

“SSO” means a sanitary sewer overflow which is a discharge of Sewage from a Separate Sewer or Nominally Separate Sewer to the environment from designated location(s) in the Authorized System.

“Standard Operating Policy for Sewage Works” means the standard operating policy developed by the Ministry to assist in the implementation of Source Protection Plan policies related to Sewage Works and providing minimum design and operational standards and considerations to mitigate risks to sources of drinking water, as amended from time to time.

“Storm Sewer” means Sewers that collect and transmit, but not exfiltrate or lose by design, Stormwater resulting from precipitation and snowmelt.

“Stormwater” means rainwater runoff, water runoff from roofs, snowmelt, and surface runoff.

“Stormwater Management Facility(ies)” means a Facility for the treatment, retention, infiltration, or control of Stormwater.

“Stormwater Management Planning and Design Manual” means the Ministry document titled “Stormwater Management Planning and Design Manual”, 2003 (as amended from time to time).

“Stormwater Treatment Train” means a series of Stormwater Management Facilities designed to meet Stormwater management objectives (e.g., Appendix A) for a given area, and can consist of a combination of MTDs, LIDs and end-of-pipe controls.

“TRCA” means the Toronto Region Conservation Authority.

“Third Pipe Collection System” means Sewage Works designed to collect and transmit foundation drainage and/or groundwater to a receiving surface water or dry well;

"Undertaking" has the same meaning as in the EAA.

“Vulnerable Area(s)” has the same meaning as in the CWA.

2.0 General Conditions

2.1 The works comprising the Authorized System shall be constructed, installed, used, operated, maintained, replaced, or retired in accordance with the conditions of this Approval, which includes the following Schedules:

Schedule A – System Information

Schedule B – Municipal Stormwater Management System Description

Schedule C – List of Notices of Amendment to this ECA

Schedule D – General

Schedule E – Operating Conditions

Schedule F – Residue Management

Appendix A – Stormwater Management Criteria

2.2 The issuance of this Approval does not negate the requirements of other regulatory bodies, which includes but is not limited to, the Ministry of Northern Development, Mines, Natural Resources and Forestry and the local Conservation Authority.

2.3 Where there is a conflict between a provision of any document referred to in this Approval and the conditions of this Approval, the conditions in this Approval shall take precedence. Where there is a conflict between the information in a Schedule C Notice and another section of this Approval, the document bearing the most recent date shall prevail.

2.4 The Owner shall ensure that any person authorized to carry out work on or operate any aspect of the Authorized System is provided with a print or electronic copy of this Approval and the conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

2.5 The conditions of this Approval are severable. If any condition of this Approval, or the application of any requirement of this Approval to any circumstance, is held invalid or unenforceable, the application of such condition to other circumstances and the remainder of this Approval shall not be affected thereby.

3.0 Alterations to the Municipal Stormwater Management System

3.1 For greater certainty, the Alterations authorized under this Approval are limited to Sewage Works comprising the Authorized System which does not include municipally or Privately Owned Stormwater Works:

3.1.1 On industrial, commercial, or institutional land;

3.1.2 Serving a single parcel of land, unless the stormwater management facility is located on a municipally owned park or community center;

3.1.3 That are operated as waste disposal sites defined under the EPA or snow dump / melt facilities; or,

3.1.4 That propose to collect, store, treat, or discharge stormwater containing substances or pollutants (other than Total Suspended Solids, or oil and grease) detrimental to the environment or human health.

3.2 Any Schedule C Notice shall provide authority to alter the Authorized System in accordance with the conditions of this Approval.

3.3 All Schedule C Notices issued by the Director for the Municipal Stormwater Management System shall form part of this Approval.

3.4 The Owner and a Prescribed Person shall ensure that the documentation required through conditions in this Approval and the documentation required in the Design Criteria are prepared for any Alteration of the Authorized System.

3.5 The Owner shall notify the Director within thirty (30) calendar days of placing into service or Completion of any Alteration of the Authorized System which had been authorized:

3.5.1 Under Schedule D to this Approval where the Alteration results in a change to Sewage Works specifically described in Schedule B of this Approval;

3.5.2 Through a Schedule C Notice respecting Sewage Works other than Storm Sewers; or

3.5.3 Through another approval that was issued under the EPA prior to the issue date of this Approval.

3.6 The notification requirements set out in condition 3.5 do not apply to any Alteration in respect of the Authorized System which:

3.6.1 Is exempt under section 53(6) of the OWRA or by O. Reg. 525/98;

3.6.2 Constitutes maintenance or repair of the Authorized System; or

3.6.3 Is a Storm Sewer, ditch, or culvert authorized by condition 4.1 of Schedule D of this Approval.

3.7 The Owner shall notify the Director within ninety (90) calendar days of:

3.7.1 The discovery of existing Sewage Works not described or depicted in Schedule B, or

3.7.2 Additional or revised information becoming available for any Sewage Works described in Schedule B of this Approval.

3.8 The notifications required in condition 3.5 and 3.7 shall be submitted to the Director using the Director Notification Form.

3.9 The Owner shall ensure that any chemicals, coagulants, or polymers used in the stormwater management system have obtained written approval from the Director prior to use, unless required for spill control or spill clean-up.

3.10 The Owner shall ensure that an ESC plan is prepared, and temporary ESC measures are installed in advance of and maintained during any construction activity on the Authorized System, subject to the following conditions:

3.10.1 Inspections of ESC measures are to be conducted at a frequency specified per the ESC plan, for dry weather periods (active and inactive construction phases), after Significant Storm Events and Significant Snowmelt Events, and after any extreme weather events.

3.10.2 Any deficiencies shall be addressed, and any required maintenance actions(s) shall be undertaken as soon as practicable once they have been identified.

3.10.3 Inspections and maintenance of the temporary ESC measures shall continue until they are no longer required.

3.11 The Owner shall ensure that records of inspections required by this Approval during any construction activity, including those required under condition 3.10:

3.11.1 Include the name of the inspector, date of inspection, visual observations, and the remedial measures, if any, undertaken to maintain the temporary ESC measures.

3.11.2 Be retained with records relating to the Alteration that the construction relates to, such as the form required in conditions 4.4.1, 5.5.1, and 6.2.1 of Schedule D, or the Schedule C Notice.

3.11.3 Be retrievable and made available to the Ministry upon request.

3.12 The document(s) or file(s) referenced in Table B1 of Schedule B of this Approval shall:

3.12.1 Be retained by the Owner;

3.12.2 Include at a minimum:

a) Identification of Storm Sewers, which shall include the following information:

i Location relative to street names or easements; and

ii Sewer diameters.

b) Identification of existing municipally owned Stormwater Sewage Works, including but not limited to ditches, swales, culverts, outlets, Stormwater Management Facilities, sedimentation MTD (for example oil grit separators), filtration MTD, LID, end of pipe controls, Third Pipe Collection Systems, and pumping stations, including any applicable Asset IDs.

c) Identification of the main tributaries and receiving water bodies to that the Sewage Works discharge to.

d) Delineation of municipal, watershed, and subwatershed boundaries, as available.

e) Identification of the storm sewersheds for each outlet.

f) Identification of any source protection Vulnerable Areas.

g) Identification of any Sewage Works that receive SSOs or CSOs.

3.12.3 Be updated to include:

a) Alterations authorized under Schedule D of this Approval or through a Schedule C Notice within twelve (12) months of the Alteration being placed into service.

b) Updates to information contained in the document(s) or files(s) not associated with an Alteration within twelve (12) months of becoming aware of the updated information.

3.13 An Alteration is not authorized under Schedule D of this ECA for projects that impact Indigenous treaty rights or asserted rights where:

3.13.1 The project is on Crown land or would alter access to Crown land;

3.13.2 The project is in an open or forested area where hunting, trapping or plant gathering occur;

3.13.3 The project involves the clearing of forested land unless the clearing has been authorized by relevant municipal, provincial, or federal authorities, where applicable;

3.13.4 The project alters access to a water body;

3.13.5 The proponent is aware of any concerns from Indigenous communities about the proposed project and these concerns have not been resolved; or,

3.13.6 Conditions respecting Indigenous consultation in relation to the project were placed in another permit or approval and have not been met.

3.14 No less than 60 days prior to construction associated with an Alteration the Director may notify the Owner in writing that a project is not authorized through Schedule D of this ECA where:

3.14.1 Concerns regarding treaty rights or asserted rights have been raised by one or more Indigenous communities that may be impacted by the Alteration; or

3.14.2 The Director believes that it is in the public interest due to site specific, system specific, or project specific considerations.

3.15 Where an Alteration is not authorized under condition 3.13 or 3.14 above:

3.15.1 An application respecting the Alteration shall be submitted to the Ministry; and,

3.15.2 The Alteration shall not proceed unless:

a) Approval for the Alteration is granted by the Ministry (i.e., a Schedule C Notice); or,

b) The Director provides written notice that the Alteration may proceed in accordance with conditions in Schedule D of this ECA.

4.0 Authorizations of Future Alterations to Storm Sewers, Ditches, or Culverts - Additions, Modifications, Replacements and Extensions

4.1 The Owner or a Prescribed Person may alter the Authorized System by adding, modifying, replacing, or extending a Storm Sewer, ditch, or culvert within the Authorized System subject to the following conditions and conditions 4.2 and 4.3 below:

4.1.1 The design of the addition, modification, replacement, or extension:

a) Has been prepared by a Licensed Engineering Practitioner;

b) Has been designed only to collect and transmit Stormwater;

c) Has not been designed to collect or treat any sanitary Sewage;

d) Has not been designed to collect, store, treat, control, or manage groundwater, unless for the purpose of foundation drains, road subdrains, or LIDs;

e) Satisfies the Design Criteria or any municipal criteria that have been established that exceed the minimum requirements set out in the Design Criteria;

f) Satisfies the standards set out in Ontario Provincial Standard Specifications (OPSS) and Ontario Provincial Standard Drawings (OPSD), as applicable to ditches and culverts;

g) Is consistent with or otherwise addresses the design objectives contained within the Design Guidelines for Sewage Works;

h) Is planned, designed, and built to be consistent with the Stormwater Management Planning and Design Guidance Manual. If there is a conflict with Appendix A of this Approval, then Appendix A shall prevail; and

i) Includes design considerations to protect sources of drinking water, including those set out in the Standard Operating Policy for Sewage Works, and any applicable local Source Protection Plan policies.

4.1.2 The addition, modification, replacement, or extension shall be designed so that it will:

a) Not adversely affect the ability to maintain a gravity flow in the Authorized System without overflowing or increase surcharging any maintenance holes as per design; and

b) Provide smooth flow transition to existing gravity Storm Sewers;

4.1.3 The Alteration shall not result in:

a) Adverse Effects; or

b) A deterioration of the approved effluent quality or quantity of downstream Stormwater Management Facilities which results in not being able to achieve the overall Stormwater performance criteria per Appendix A.

4.1.4 The Storm Sewer, ditch or culvert addition, modification, replacement, or extension is wholly located within the municipal boundary over which the Owner has jurisdiction or there is a written agreement in place with the adjacent property owner respecting the Alteration and resulting Sewage Works.

4.1.5 The Owner consents in writing to the addition, modification, replacement, or extension.

4.1.6 A Licensed Engineering Practitioner has verified in writing that the addition, modification, replacement, or extension meets the requirements of conditions 4.1.1 a) to h), 4.3.9, and 4.3.10.

4.1.7 The Owner has verified in writing that the addition, modification, replacement, or extension has complied with inspection and testing requirements in the Design Criteria.

4.1.8 The Owner has verified in writing that the addition, modification, replacement, or extension meets the requirements of conditions 4.1.1 i), 4.1.2 to 4.1.6, 4.3.7, and 7.2.

4.2 The addition of Storm Sewers or ditches can be constructed but not operated until the Stormwater Management Facilities required to service the new Storm Sewers or ditches are in operation.

4.3 The Owner or a Prescribed Person is not authorized to undertake an Alteration described above in condition 4.1 where the Alteration relates to the addition, modification, replacement, or extension of a Storm Sewer that:

4.3.1 Passes under or through a body of surface water, unless trenchless construction methods are used or the local Conservation Authority has authorized an alternative construction method.

4.3.2 Has a nominal diameter greater than 2,400 mm, or equivalent sizing.

4.3.3 Is a Combined Sewer.

4.3.4 Is a concrete channel.

4.3.5 Is designed to, at any time, transmit, store, or control sanitary Sewage.

4.3.6 Converts rural road cross section ditches to curb, gutter, and Storm Sewers if the Stormwater volume and/or peak flow is increased and no water quality treatment is planned or demonstrated to be achieved, in accordance with this Approval and Appendix A, to offset the increase in Stormwater.

4.3.7 Results in new discharges or increased discharges to a Municipal Drain without written approval by the Owner and a signed Municipal Drainage Engineer's Report in accordance with the *Drainage Act* R.S.O. 1990, c. D.17.

4.3.8 Establishes a new outlet with direct discharge into the Natural Environment without monitoring in accordance with this Approval and without achieving the requirements set in Appendix A.

4.3.9 Increases Stormwater flow of an existing Storm Sewer or ditch without achieving water quality criteria set in Appendix A in accordance with this Approval unless the existing downstream Municipal Stormwater Management System has sufficient residual transmission and treatment capacity to accommodate the additional Stormwater.

4.3.10 Increases local hydraulic capacity of an existing Storm Sewer or ditch to accommodate new Stormwater flows unless the existing downstream Municipal Stormwater Management System has sufficient residual hydraulic capacity to accommodate the additional Stormwater.

4.3.11 Connects to another Municipal Stormwater Management System, unless:

a) Prior to construction, the Owner of the Authorized System obtains written consent from the Owner or Owner's delegate of the Municipal Stormwater System being connected to; and

b) The Owner of the Authorized System retains a copy of the written consent from the Owner or Owner's delegate of the Municipal Stormwater Management System being connected

to as part of the record that is recorded and retained under condition 4.4.

4.3.12 Is part of an Undertaking in respect of which:

a) A request under s.16(6) of the EAA has been made, namely a request that the Minister make an order under s.16;

b) The Minister has made an order under s.16; or

c) The Director under that EAA has given notice under s.16.1 (2) that the Minister is considering making an order under s.16.

4.4 The consents and verifications required in conditions 4.1 and 4.3, if applicable, shall be:

4.4.1 Recorded on SW1, prior to the Storm Sewer, ditch, or culvert addition, modification, replacement, or extension being placed into service; and

4.4.2 Retained for a period of at least ten (10) years by the Owner.

4.5 For greater certainty, the verification requirements set out in condition 4.4 do not apply to any Alteration in respect of the Authorized System which:

4.5.1 Is exempt under section 53(6) of the OWRA or by O. Reg. 525/98; or

4.5.2 Constitutes maintenance or repair of the Authorized System.

5.0 Authorizations of Future Alterations to Stormwater Management Facilities - Additions, Modifications, Replacement, and Extensions

5.1 Subject to conditions 5.2 and 5.3, the Owner or a Prescribed Person may alter the Stormwater Management Facilities in the Authorized System by adding, modifying, replacing, or extending the following components:

5.1.1 Rooftop storage

5.1.2 Parking lot storage

5.1.3 Superpipe storage

5.1.4 Reduced lot grading

5.1.5 Roof leader to ponding area

5.1.6 Roof leader to soakaway pit

5.1.7 Infiltration trench

5.1.8 Engineered grassed swales / bioswale

5.1.9 Pervious pipes

5.1.10 Pervious catchbasins

5.1.11 Vegetated filter strips

5.1.12 Natural buffer strips

5.1.13 Green roofs/Rooftop gardens

5.1.14 Wet pond

5.1.15 Engineered wetland

5.1.16 Dry pond

5.1.17 Hybrid Facility

5.1.18 Infiltration basin

5.1.19 Filtration MTD

5.1.20 Sedimentation MTD - OGS

5.1.21 LID that relies on one or more of the following mechanisms to achieve treatment and control:

a) Evapotranspiration;

b) Infiltration into the ground; or

c) Filtration.

5.1.22 Any other Stormwater Management Facilities where the Director has provided authorization in writing to proceed with the Alteration.

5.2 Any Alteration to the Authorized System authorized under condition 5.1 is subject to the following conditions:

5.2.1 The design of the Alteration shall:

a) Be prepared by a Licensed Engineering Practitioner;

b) Be designed only to collect, receive, treat, or control only Stormwater and has not been designed to collect, receive, treat, or control sanitary Sewage;

c) Is planned, designed, and built to be consistent with the Stormwater Management Planning and Design Guidance Manual. If there is a conflict with Appendix A of this Approval, then Appendix A shall prevail;

d) Satisfy the Design Criteria or any municipal criteria that have been established that exceed the minimum requirements set out in the Design Criteria;

e) Be part of a Stormwater Treatment Train approach that satisfies the requirements outlined in Appendix A, or transmits Stormwater to a Stormwater Management Facility that satisfies the requirements outlined in Appendix A;

f) Includes an outlet or an emergency overflow for the Sewage Works, with the verification of the location, route, and capacity of the receiving major system to accommodate overflows; and

g) Include design considerations to protect sources of drinking water, including those set out in the Standard Operating Policy for Sewage Works and any applicable local Source Protection Plan policies.

5.2.2 The Alteration shall not result in:

a) Adverse Effects; or

b) A deterioration on the approved effluent quality or quantity of downstream Stormwater Management Facilities which results in not being able to achieve the overall Stormwater performance criteria per Appendix A.

5.2.3 The Alteration may incorporate co-benefits, but in doing so shall not diminish functionality or efficiency of any Stormwater Management Facility(ies) that may be impacted by the Alteration.

5.2.4 Any new sedimentation MTD that is part of the Alteration shall meet the following requirements:

a) Tested in accordance with the TRCA protocol Procedure for Laboratory Testing of OGSs and testing data verified in accordance with the ISO 14034 Environmental Technology Verification (ETV) protocol. The suspended solids removal claimed for the sedimentation MTD in achieving the water

quality criteria in Appendix A, and the sizing methodology used to determine the appropriate sedimentation MTD dimensions for the particular site, shall be based on the verified removal efficiency for all particle size fractions comprising the particle size distribution specified within the testing protocol or a particle size distribution approved by the Director.

b) Using the verified sediment removal efficiencies for the respective surface loading rates specified in the testing protocol, the sedimentation MTD sizing methodology shall use linear interpolation to calculate sediment removal efficiencies for surface loading rates that lie between the specified surface loading rates. For surface loading rates less than the lowest specified and tested surface loading rate, the sediment removal efficiency shall be assumed to be identical to the verified removal efficiency for the lowest specified and tested surface loading rate. Where available, 15 min rainfall stations shall be used for sizing the sedimentation MTD.

c) When two or more sedimentation MTD are installed in series, no additional sediment removal credit shall be applied beyond the sediment removal credit of the largest device in the series.

d) The sediment removal rate at the specified surface loading rates determined for the tested full scale, commercially available MTD may be applied to similar MTDs of smaller or larger size by proper scaling. Scaling the performance results of the tested MTD to other model sizes without completing additional testing is acceptable provided that:

   i The claimed sediment removal efficiencies for the similar MTD are the same or lower than the tested MTD at identical surface loading rates; and

   ii The similar MTD is scaled geometrically proportional to the tested unit in all inside dimensions of length and width and a minimum of 85% proportional in depth.

e) The units must be installed in an off-line configuration if the unit had an effluent concentration greater than 25 mg/L at any of the surface loading rates conducted during the sediment scour and resuspension test as part of the ISO 14034 verification.

f) The sedimentation MTD should be sized for the highest suspended solids percent removal physically and

economically practicable, and used as a pre-treatment device in a treatment train designed to achieve the water quality criteria in Appendix A.

5.2.5 Any new filtration MTD that is part of the Alteration shall meet the following requirements:

a) Field tested and verified in accordance with a minimum of one of the following protocols:

i Washington State Technology Assessment Protocol - Ecology (TAPE) General Use Level Designation (GULD); and

1. Has ISO 14034 ETV verification to satisfy ETV Canada requirements;

2. The field monitoring data set used to obtain GULD certification should include a minimum of three (3) events that exceed 75th percentile rainfall event with at least one hour with an intensity of 6 mm/h or greater.

ii Another testing and verification method, where the Director has communicated acceptability in writing.

b) Where available, 15 min rainfall stations shall be used for sizing the filtration MTD using the rainfall intensity corresponding to 90% of annual runoff volume;

c) The SS removal rate determined for the tested full scale, commercially available filtration MTD, or single full-scale commercially available cartridge or filtration module, may be applied to other model sizes of that filtration MTD provided that appropriate scaling principles are applied. Scaling the tested filtration MTD or single full-scale commercially available cartridge or filtration module, to determine other model sizes and performance without completing additional testing is acceptable provided that:

i Depth of media, composition of media, and gradation of media remain constant.

ii The ratio of the maximum treatment flow rate to effective filtration treatment area (filter surface area) is the same or less than the tested filtration MTD;

iii The ratio of effective sedimentation treatment area to effective filtration treatment area is the same or greater than the tested filtration MTD; and

iv The ratio of wet volume to effective filtration treatment area is the same or greater than the tested filtration MTD.

5.2.6 When it is necessary to use Privately Owned Stormwater Works in the Stormwater Treatment Train to achieve Appendix A criteria as part of or as a result of an Alteration, the following conditions apply:

a) The Owner shall, through legal instruments or binding agreements, obtain the right to access, operate, and maintain the Privately Owned Sewage Works;

b) The Owner shall ensure that the right to access, operate and maintain the Privately Owned Sewage Works described in condition 5.2.6 a) above is maintained at all times that the works are in service and used to achieve Appendix A criteria.

c) The Owner shall ensure on-going operation and maintenance of the Privately Owned Stormwater Works;

d) The Owner ensures on-going operation and maintenance of the Privately Owned Stormwater Works; and

e) The Owner shall ensure that the Privately Owned Stormwater Works have obtained separate approval(s) under the EPA, as required.

5.2.7 The Alteration is wholly located within the municipal boundary over which the Owner has jurisdiction or there is a written agreement in place with the adjacent municipality respecting the Alteration and resulting Sewage Works.

5.2.8 The Owner consents in writing to the Alteration authorized under condition 5.1.

5.2.9 A Licensed Engineering Practitioner has verified in writing that the Alteration authorized under condition 5.1 meets the design requirements of conditions 5.2.1 a) to f), 5.2.4 and 5.2.5.

5.2.10 The Owner has verified in writing that the Alteration authorized under condition 5.1 meets the requirements of conditions 5.2.1 g), 5.2.2, 5.2.6 to 5.2.9, 5.3, 5.4, and 7.2.

5.3 The authorization in condition 5.1 does not apply:

5.3.1 To the establishment of a regional Stormwater management end-of-pipe flood control Facility;

5.3.2 Where the Alteration will result in new or increased discharges to a Municipal Drain without written approval by the Owner and a signed Municipal Drainage Engineer's Report in accordance with the *Drainage Act* R.S.O. 1990, c. D.17;

5.3.3 To the establishment of a new outlet with direct discharge into the Natural Environment without treatment and monitoring in accordance with this Approval;

5.3.4 Where the Alteration will service a drainage area greater than 65 ha;

5.3.5 Where the Alteration will result in conversion of an existing Stormwater Management Facility into another type of Stormwater Management Facility;

5.4 Any Alteration to LID or end-of-pipe Stormwater Management Facilities shall be inspected before operation of the Alteration to confirm construction as per specifications (including depth, as applicable).

5.5 The consents and verifications required in conditions 5.2.8 to 5.2.10 if applicable, shall be:

5.5.1 Recorded on Form SW2, prior to undertaking the Alteration; and

5.5.2 Retained for a period of at least ten (10) years by the Owner.

5.6 For greater certainty, the verification requirements set out in condition 5.5 do not apply to any Alteration in respect of the Authorized System which:

5.6.1 Is exempt under section 53(6) of the OWRA or by O. Reg. 525/98; or

5.6.2 Constitutes maintenance or repair of the Authorized System.

6.0 Authorizations of Future Alterations for Third Pipe Collection System Additions, Modifications, Replacements and Extensions

6.1 The Owner or a Prescribed Person may alter the Authorized System by adding, modifying, replacing, or extending, and operating works comprising a municipal Third Pipe Collection System to collect foundation drainage and groundwater where:

6.1.1 The design of the Alteration:

a) Has been prepared by a Licensed Engineering Practitioner;

b) Is limited to collection, transmission, reuse and/or treatment of only foundation drainage and groundwater, and is not designed to collect or treat sanitary Sewage;

c) Satisfies the Design Criteria or any municipal criteria that have been established that exceed the minimum requirements set out in the Design Criteria; and

d) Is scoped so that the resulting Sewage Works are intended to:

i Primarily function for the non-potable reuse, as deemed acceptable by the Owner and the local health unit, of foundation drainage and/or groundwater, and no discharge to a Storm Sewer or Separate Sewer if there is excess volume that cannot be reused; and/or

ii Provide wetland recharge, in which case, collection of rooftop runoff will also be acceptable.

6.1.2 The Alteration is not located on a contaminated site, or where natural occurring conditions result in contaminated discharge, or where the site receives contaminated groundwater or foundation drainage from another site, unless the discharge being received has been remediated or treated prior to acceptance by the Third Pipe Collection System.

6.1.3 The Owner has undertaken a site assessment for water quantity, water quality, and hydrogeological site conditions regarding the Alteration.

6.1.4 The Alteration will not result in Adverse Effects.

6.1.5 The Alteration is wholly located within the municipal boundary over which the Owner has jurisdiction or there is a written agreement in place with the adjacent property owner respecting the Alteration and resulting Sewage Works.

6.1.6 The Owner consents in writing to the Alteration.

6.1.7 A Licensed Engineering Practitioner has verified in writing that the Alteration meets the requirements of condition 6.1.1.

6.1.8 The Owner has verified in writing that the Alteration meets the requirements of conditions 6.1.2 to 6.1.7.

6.2 The consents, verifications and documentation required in conditions 6.1.7 and 6.1.8 shall be:

6.2.1 Recorded on Form SW3 prior to undertaking the Alteration; and

6.2.2 Retained for a period of at least ten (10) years by the Owner.

6.3 For greater certainty, the verification requirements set out in condition 6.2 do not apply to any Alteration in respect of the Authorized System which:

6.3.1 Is exempt under section 53(6) of the OWRA or by O. Reg. 525/98; or

6.3.2 Constitutes maintenance or repair of the Authorized System, including changes to software for an existing SCADA system resulting from Alterations authorized in condition 6.1.

6.4 The Owner shall update, within twelve (12) months of the Alteration of the Sewage Works being placed into service, any drawings maintained for the Municipal Stormwater Management System to reflect the Alterations of the Sewage Works, where applicable.

7.0 Outlets

7.1 Any outlet established or altered as part of an Alteration authorized through conditions 4, 5, or 6 of Schedule D in this Approval shall have regard to the 2012 TRCA Stormwater Management Criteria document, Appendix E, for outlets.

7.2 Any outlet established as part of an Alteration authorized through conditions 4, 5, or 6 of Schedule D in this Approval shall not:

7.2.1 Increase discharge or create a new point source discharge to privately owned land unless there is express written consent of the owner(s) of such private land(s).

7.2.2 Result in Adverse Effects.

8.0 Previously Approved Sewage Works

8.1 If approval for an Alteration to the Authorized System was issued under the EPA and is revoked by this Approval, the Owner may make the Alteration in accordance with:

8.1.1 The terms of this Approval; or

8.1.2 The terms and conditions of the revoked approval as of the date this approval was issued, provided that the Alteration is commenced

within five (5) years of the date that the revoked approval was issued.

9.0 Transition

9.1 An Alteration of the Authorized System is exempt from the requirements in clause (e) of condition 4.1.1, clause (d) of condition 5.2.1, and clause (c) of condition 6.1.1 where:

9.1.1 Effort to undertake the Alteration, such as tendering or commencement of construction of the Sewage Works associated with the Alteration, begins on or before May 21, 2023.

9.1.2 The design of the Alteration conforms to the Stormwater Management Planning and Design Manual, and where applicable, Design Guidelines for Sewage Works;

9.1.3 The design of the Alteration was completed on or before the issue date of this Approval or a Class Environmental Assessment was completed for the Alteration and changes to the design result in significant cost increase or significant project delays; and

9.1.4 The Alteration would be otherwise authorized under this Approval.

Schedule E: Operating Conditions

System Owner	**Gravenhurst, the Corporation of the Town of**
ECA Number	**309-S701**
System Name	**Town of Gravenhurst Storm Management System**
ECA Issue Date	**October 6th, 2022**

1.0 General Operations

1.1 The Owner shall ensure that, at all times, the Sewage Works comprising the Authorized System and the related equipment and Appurtenances used to achieve compliance with this Approval are properly operated and maintained.

1.2 Prescribed Persons and Operating Authorities shall ensure that, at all times, the Sewage Works under their care and control and the related equipment and Appurtenances used to achieve compliance with this Approval are properly operated and maintained.

1.3 In conditions 1.1 and 1.2 “properly operated and maintained” includes effective performance, adequate funding, adequate operator staffing and training, including training in applicable procedures and other requirements of this Approval and the EPA, OWRA, CWA, and regulations, adequate laboratory services, process controls and alarms and the use of process chemicals and other substances used in the Authorized System.

1.4 The Owner ensure that Sewage Works are operated with the objective that the effluent from the Sewage Works is essentially free of floating and settleable solids and does not contain oil or any other substance in amounts sufficient to create a visible film, sheen, foam, or discoloration on the receiving waters, and shall evaluate the need for maintenance if the objective is not being met.

1.5 The Owner shall ensure that any Storm Sewers or ditches authorized under Schedule D of this approval are not placed into operation until the associated Stormwater Management Facilities to provide treatment are constructed and operated.

2.0 Duties of Owners and Operating Authorities

2.1 The Owner, Prescribed Persons, and any Operating Authority shall ensure the following:

2.1.1 At all times that the Sewage Works within the Authorized System are in service the Sewage Works are:

a) Operated in accordance with the requirements under the EPA and OWRA, and

b) Maintained in a state of good repair.

2.1.2 The Authorized System is operated by persons that are familiar with the requirements of this Approval.

2.1.3 All sampling, testing, monitoring, and reporting requirements under the EPA and this Approval that relate to the Authorized System are complied with.

2.1.4 All necessary steps are taken to ensure that operations of the Sewage Works and any associated physical structures do not constitute a safety or health hazard to the general public.

2.1.5 Where a Stormwater Management Facility ceases to function as a Stormwater Management Facility, whether by intent, accident, or otherwise (e.g., a CSO or an SSO), a workplan shall be developed that includes local community notification, plans for rehabilitating the Stormwater Management Facility to proper function in a reasonable time, identification of actions that will be taken to prevent reoccurrences, and timelines for implementing the workplan.

2.1.6 That operations and maintenance activities are undertaken at the frequency and in conformance with the procedures set out in the O&M Manual.

a) A Prescribed Person or Operating Authority shall only undertake operations and maintenance activities where they have been delegated the authority to undertake such activities by the Owner or the Owner has expressly approved the activity(ies).

2.2 For clarity, the requirements outlined in the above conditions 2.1 for Prescribed Persons and any Operating Authority only apply to Sewage Works within the Authorized System where they are responsible for the operation.

2.3 The Owner, Prescribed Persons, and Operating Authority shall take all reasonable steps to minimize and ameliorate any Adverse Effect on the Natural Environment or impairment of the quality of water of any waters resulting from the operation of the Authorized System, including such accelerated or additional monitoring as may be necessary to determine the nature and extent of the effect or impairment.

3.0 Operations and Maintenance

3.1 Inspection

3.1.1 The Owner shall ensure that all Sewage Works within the Authorized System are inspected at the frequency and in accordance with procedures set out in their O&M Manual.

3.1.2 The owner shall ensure that:

a) Any Stormwater Management Facilities, pumping stations, and any outlets that discharge to a receiver, are inspected at least once before December 31, 2026, if these have not been inspected since January 1, 2018 and thereafter as required by the O&M Manual; and

b) Any Stormwater Management Facilities, pumping stations, and any outlets that discharge to a receiver, established, or replaced within the Authorized System after the date of issuance of this Approval, are inspected within one year of being placed into service and thereafter as required by the O&M Manual.

3.1.3 The Owner shall clean and maintain Sewage Works within the Authorized System to ensure the Sewage Works perform as designed.

3.1.4 The Owner shall inspect the Stormwater Management Facilities in the Authorized System after significant flooding events as defined in, and in accordance with procedures documented in, the O&M Manual.

3.1.5 The Owner shall maintain records of the results of the inspections required in condition 3.1.1, 3.1.2 and 3.1.4 and any cleaning and maintenance operations undertaken, and shall make available the records for inspection by the Ministry upon request. The records shall include the following:

a) Asset ID and name of the Sewage Works;

b) Date and results of each inspection, maintenance, or cleaning;

c) Name of person who conducted the inspection, maintenance, or the name of the inspecting official, where applicable, and

d) As applicable to the type of works, observations resulting from the inspection including, at a minimum:

i Hydraulic operation of the works (e.g., length of occurrence since the last rainfall event, evidence or occurrence of overflows).

ii Condition of vegetation in and around the works.

iii Occurrence of obstructions at the inlet and outlet of the works.

iv Evidence of spills and/or oil/grease contamination.

v Presence of trash build-up, and

vi Measurements of other parameters as required in the Monitoring Plan.

3.2 Operations & Maintenance (O&M) Manual

3.2.1 The Owner shall prepare and implement an operations and maintenance manual for Sewage Works within the Authorized System on or before May 21, 2023, that includes or references, but is not necessarily limited to, the following information:

a) Procedures for the routine operation of the Sewage Works;

b) Inspection programs, including the frequency of inspection, and the methods or tests employed to detect when maintenance is necessary, including:

i Presence of algae and/or invasive species impairing the Works (e.g., phragmites, goldfish);

ii Measurements of sediment depth, manual water levels (staff gauge) and/or visual observations, as appropriate to the Stormwater Management Facilities.

c) Maintenance and repair programs, including:

i The frequency of maintenance and repair for the Sewage Works;

ii Stormwater pond sediment cleanout, dewatering, and management;

iii Excavation, modification, replacement of LID soil/media/aggregate/geotextile, such as bioretention cells, green roof, permeable pavement; and

iv The frequency of maintenance for any other Stormwater Management Facilities identified in Schedule B that collect sediment.

d) Operational and maintenance requirements to protect sources of drinking water, such as those included in the Standard Operating Policy for Sewage Works, and any applicable local Source Protection Plan policies;

e) Procedures for routine physical inspection and calibration of monitoring equipment or components in accordance with the Monitoring Plan;

f) Emergency Response, Spill Reporting and Contingency Plans and Procedures for dealing with Equipment breakdowns, potential spills, and any other abnormal situations, including notification to the Spills Action Centre, the Medical Officer of Health, and the District Manager, as applicable;

g) Procedures for receiving, responding, and recording public complaints, including recording any follow-up actions taken; and

h) As-built drawings or record drawings of the Sewage Works.

3.2.2 The Owner shall review and update the O&M Manual and ensure that access to a copy is available at each Stormwater Management Facility for the operational life of the works.

3.2.3 The Owner shall provide a copy of the O&M Manual to Ministry staff, upon request.

3.2.4 The Owner shall revise the O&M Manual to include procedures necessary for the operation and maintenance of any Sewage Works within the Authorized System that are established, altered, extended, replaced, or enlarged after the date of issuance of this approval prior to placing into service those Sewage Works.

3.2.5 For greater certainty, the O&M Manual may be a single document or a collection of documents that, when considered together, apply to all parts of the Authorized System.

3.3 On or before May 21, 2025, the Owner shall establish signage to notify the public at any Stormwater Management Facility identified in Schedule B that

is a wet pond, dry pond, hybrid Facility, or engineered wetland. The signage shall include the following minimum information:

3.3.1 Identification that the site contains a Stormwater Management Facility;

3.3.2 Identification of potential hazards and limitations of water use, as applicable;

3.3.3 Identification of the purpose of the Facility;

3.3.4 ECA approval number and/or asset ID; and

3.3.5 Owner's contact information.

3.4 Prior to any maintenance of Sewage Works comprising the Authorized System, the Owner shall ensure that all applicable permits or authorizations have been obtained from Federal or Provincial agencies having legislative mandates relating to species at risk or water resources.

4.0 Monitoring Plan

4.1 On or before May 21, 2024 or within twenty-four (24) months of the date of the publication of the Ministry's monitoring guidance, whichever is later, the Owner shall develop and implement a monitoring plan for the Authorized System. The monitoring plan shall be:

4.1.1 Signed and approved by management with the authority delegated by the Owner to do so;

4.1.2 Peer-reviewed by a third-party Qualified Person (QP), external to the development of the Monitoring Plan, to verify the adequacy of the Monitoring Plan in complying with conditions 4.4 and 4.5 of Schedule E. The results of the peer review shall include:

a) Written confirmation from the QP that they have the experience and qualifications to carry out the work; and

b) Written confirmation from the QP of the adequacy of the Monitoring Plan.

4.2 The Owner, or a QP designated by the Owner, may jointly develop the Monitoring Plan in partnership with Owner(s) of other Municipal Stormwater Management Systems as long as the Municipal Stormwater Management Systems are within the same watershed.

4.3 The Owner shall ensure the Monitoring Plan is implemented and any resulting monitoring data is recorded in an electronic database.

4.4 The Monitoring Plan shall include:

4.4.1 Procedures to verify that the operational performance of the Authorized System is as designed/planned;

4.4.2 Procedures to assess the environmental impact of the Municipal Stormwater Management System; and

4.4.3 Procedures for any corrective action that may be required to address any performance deficiencies or environmental impacts identified from above conditions 4.4.1 or 4.4.2.

4.5 The Monitoring Plan shall also include, but not be limited to:

4.5.1 Identification of the Sewage Works to be monitored, including outlets and any works that provide quality and/or quantity control;

4.5.2 Identification of the key receivers to be monitored within the Owner's municipal boundaries and the monitoring locations;

4.5.3 Consideration of relevant municipal land use and environmental planning documents (e.g., Stormwater Management Master Plan, Class Environmental Assessment Project, asset management plan, subwatershed studies, and planned development);

4.5.4 Characterization of water quality and quantity conditions and identification of water users to be protected, based on conditions 4.5.2 and 4.5.3;

4.5.5 Identification of water quality and quantity goals, as it relates to Stormwater management, using the information collected in condition 4.5.4;

4.5.6 Identification of locations of rainfall gauges to be used;

4.5.7 Identification of inspections, measurements, sampling, analysis and/or other monitoring activities that were used as the basis for or will inform future updates to the procedures identified in condition 4.4.

4.5.8 Details respecting a monitoring program for the works and the receivers, that includes, at a minimum:

a) Hydrological, chemical, physical, and biological parameters, as appropriate, in alignment with the goals;

b) Ensures water level of the Stormwater Measurement Facilities, excluding MTDs, are measured at regular intervals with a water level gauge;

c) Monitoring methodology, including the frequency and protocols for sampling, analysis, and recording, with consideration of dry and wet weather events and timing of sampling during wet weather events.

d) Ensures that the time of all samples or measurements are recorded.

4.5.9 An implementation plan for the monitoring program that identifies timelines and, if the monitoring occurs on a rotational basis, provides a description of the rotational schedule and associated works.

4.5.10 Includes a summary of all monitoring data along with an interpretation of the data and any conclusion drawn from the data evaluation about the need for future modifications to the Authorized System or system operations, and

4.5.11 Consideration of adaptive management practices (e.g., evidence-based decision making).

4.6 The Owner shall ensure that the Monitoring Plan is updated where necessary within twelve (12) months of any Alteration to the Authorized System, or more frequently as required by the Monitoring Plan.

4.7 The Owner shall, on request and without charge, provide a copy of the Monitoring Plan and any resulting monitoring data to members of the public.

5.0 Reporting

5.1 The Owner shall, upon request, make all manuals, plans, records, data, procedures and supporting documentation available to Ministry staff.

5.2 The Owner shall prepare an annual performance report for the Authorized System that:

5.2.1 Is submitted to the Director on or before April 30th of each year and covers the period from January 1st to December 31st of the preceding calendar year.

a) For clarity, the first report shall cover the period of January 1, 2023 to December 31st, 2023 and be submitted to the Director on or before April 30th, 2024.

5.2.2 Includes a summary of all monitoring data along with an interpretation of the data and an overview of the condition and operational performance of the Authorized System and any Adverse Effects on the Natural Environment;

5.2.3 Includes a summary and interpretation of environmental trends based on all monitoring information and data for the previous five (5) years;

5.2.4 Includes a summary of any operating problems encountered and corrective actions taken;

5.2.5 Includes a summary of all inspections, maintenance, and repairs carried out on any major structure, equipment, apparatus, mechanism, or thing forming part of the Authorized System;

5.2.6 Includes a summary of the calibration and maintenance carried out on all monitoring equipment;

5.2.7 Includes a summary of any complaints related to the Sewage Works received during the reporting period and any steps taken to address the complaints;

5.2.8 Includes a summary of all Alterations to the Authorized System within the reporting period that are authorized by this Approval including a list of Alterations that pose a Significant Drinking Water Threat;

5.2.9 Includes a summary of all spills or abnormal discharge events;

5.2.10 Includes a summary of actions taken, including timelines, to improve or correct performance of any aspect of the Authorized System; and

5.2.11 Includes a summary of the status of actions for the previous reporting year.

5.3 The report described in condition 5.2 shall be:

5.3.1 Made available, on request and without charge, to members of the public who are served by the Authorized System; and

5.3.2 Made available, by June 1st of the same reporting year, to members of the public without charge by publishing the report on the Internet, if the Owner maintains a website on the Internet.

6.0 Record Keeping

6.1 The Owner shall retain for a minimum of ten (10) years from the date of their creation:

6.1.1 All records, reports and information required by this Approval and related to or resulting Alterations to the Authorized System, and

6.1.2 All records, report and information related to the operation, maintenance and monitoring activities required by this Approval.

6.2 The Owner shall update, within twelve (12) months of any Alteration to the Authorized System being placed into service, any drawings maintained for the Municipal Stormwater Management System to reflect the Alteration of the Sewage Works, where applicable.

7.0 Review of this Approval

7.1 No later than the date specified in Condition 1 of Schedule A of this Approval, the Owner shall submit to the Director an application to have the Approval reviewed. The application shall, at minimum:

7.1.1 Include an updated description of the Sewage Works within the Authorized System, including any Alterations to the Sewage Works that were made since the Approval was last issued; and

7.1.2 Be submitted in the manner specified by Director and include any other information requested by the Director.

8.0 Source Water Protection

8.1 The Owner shall ensure that any Alteration in the Authorized System is designed, constructed, and operated in such a way as to be protective of sources of drinking water in Vulnerable Areas as identified in the Source Protection Plan, if available.

8.2 The Owner shall prepare a “Significant Drinking Water Threat Assessment Report for Proposed Alterations” for the Authorized System on or before May 21, 2023 that includes, but is not necessarily limited to:

8.2.1 An outline of the circumstances under which proposed Alterations could pose a Significant Drinking Water Threat based on the Director’s Technical Rules established under the CWA.

8.2.2 An outline of how the Owner assesses the proposed Alterations to identify drinking water threats under the CWA.

8.2.3 For any proposed Alteration a list of components, equipment, or Sewage Works that are being altered and have been identified as a Significant Drinking Water Threat.

8.2.4 A summary of design considerations and other measures that have been put into place to mitigate risks resulting from construction or operation of the components, equipment, or Sewage Works identified in condition 8.2.3, such as those included in the Standard Operating Policy for Sewage Works.

8.3 The Owner shall make any necessary updates to the report required in condition 8.2 at least once every twelve (12) months.

8.4 Any components, equipment, or Sewage Works added to the report required in condition 8.2 shall be include in the report for the operational life of the Sewage Works.

8.5 Upon request, the Owner shall make a copy of the report required in condition 8.2 available to the Ministry or Source Protection Authority staff.

9.0 Storm Sewer Catchment Asset Inventory

9.1 The Owner shall prepare and submit to the Director an inventory of the storm sewersheds and classify in accordance with Tables E1 and E2, on or before May 21, 2025. Minimum classification of the level of Stormwater management is as follows:

9.1.1 Level A – Stormwater receives treatment for water quality and quantity prior to discharge to the environment;

9.1.2 Level B – Stormwater receives treatment for water quality but no water quantity prior to discharge to the environment; and

9.1.3 Level C – Stormwater receives no treatment for water quality prior to discharge to the environment.

Table E1. Storm Sewershed and Associated Treatment

Outlet Asset ID	Sewershed Catchment Area (ha)	Tributary or Receiver	Subwatershed/ Watershed	Stormwater Management Level (A, B or C)	Treatment provided by other municipality (if applicable)
N/A					

Table E2. Summary of Storm Sewersheds

Stormwater Management Level	Total Number of Outlets to Environment	Total Sewershed Catchment Area (ha)
Level A	N/A	N/A
Level B		
Level C		

9.2 Within 12 (twelve) months of the date that the inventory required in condition 9.1 is submitted to the Director, the document(s) or file(s) referenced in Table B1 of Schedule B of this Approval shall be updated to identify the storm sewersheds for each outlet and their level of Stormwater management.

Schedule F: Residue Management

System Owner	**Gravenhurst, the Corporation of the Town of**
ECA Number	**309-S701**
System Name	**Town of Gravenhurst Storm Management System**
ECA Issue Date	**October 6th, 2022**

1.0 Residue Management System

1.1 Not Applicable.

Appendix A – Stormwater Management Criteria

1.0 Applicability of Criteria

1.1 The criteria listed under Table A1 of this Appendix applies to all drainage areas greater than 0.1 ha, with the construction erosion and sediment control criteria applying also to sites <0.1 ha;

1.2 Despite condition 1.1 of Appendix A, if some or all of the criteria listed under Table A1 of this Appendix have been assessed for and addressed in other adjacent developed lands to the project site through a subwatershed plan or equivalent study, then those criteria may not be applicable to the project site.

Table A1. Performance Criteria

Water Balance [1]	**FOR DEVELOPMENT SCENARIOS** [2] **Assessment Studies:** i) Control [3] as per the criteria identified in the water balance assessment completed in one or more of the following studies [15], if undertaken: a watershed/subwatershed plan; Source Protection Plan (Assessment Report component); Master Stormwater Management Plan, Master Environmental Servicing Plan; Class EA, or similar approach that transparently considers social, environmental and financial impacts; or local site study including natural heritage, Ecologically significant Groundwater Recharge Areas (EGRA), inflow and infiltration strategies. The assessment should include sufficient detail to be used at a local site level and consistent with the various level of studies; OR **IF Assessment Studies in i) NOT completed:** ii) Control [3] the recharge [4] to meet Pre-development [5] conditions on property; **OR** iii) Control [3] the runoff from the 90th percentile storm event. **Lake Simcoe Watershed Municipalities:** iv) Control [3] as per the evaluation of anticipated changes in water balance between Pre-development and post-development assessed through a Stormwater management plan in support of an application for Major Development [6]. The assessment should include sufficient detail to be used at a local site level. If it is demonstrated, using the approved water balance estimation methods **[7]**, that the site's post to Pre-development water balance cannot be met, and Maximum Extent Possible [8] has been attained, the proponent may use Lake Simcoe and Region Conservation Authority's (LSRCA) Recharge Compensation Program [9]. **FOR RETROFIT SCENARIOS** [10] **Assessment Studies:** i) Control as per criteria identified in the water balance assessment completed in one or more of the following studies: a watershed/subwatershed plan, Source Protection Plan (Assessment Report component), Master Stormwater Management Plan, Master Environmental Servicing Plan,

	Class EA, or local site study including natural heritage, EGRA, inflow and infiltration strategies, if undertaken. The assessment should include sufficient detail to be used at a local site level and consistent with the various level of studies; **OR** ii) If constraints [11] identified in i), then control [3] as per Maximum Extent Possible [8] based on environmental site feasibility studies or address local needs[14]. **IF Assessment Studies in i) NOT completed:** iii) Control [3] the recharge [4] to meet Pre-development [5] conditions on property; **OR** iv) Control [3] the runoff from the 90th percentile storm event.
Water Quality [1]	**FOR DEVELOPMENT SCENARIOS** [2] All of the following criteria must be met for development scenarios: **General:** i) Characterize the water quality to be protected and Stormwater Contaminants (e.g., suspended solids, nutrients, bacteria, water temperature) for potential impact on the Natural Environment, and control as necessary, **OR** ii) As per the watershed/subwatershed plan, similar area-wide Stormwater study, or Stormwater management plan to minimize, or where possible, prevent increases in Contaminant loads and impacts to receiving waters. **Suspended Solids:** i) Control [3] 90th percentile storm event and if conventional methods are necessary, then enhanced, normal, or basic levels of protection (80%, 70%, or 60% respectively) for suspended solids removal (based on the receiver). **Phosphorus:** i) Minimize existing phosphorus loadings to Lake Erie and its tributaries, as compared to 2018 or conditions prior to the proposed development, **OR** ii) Minimize phosphorus loadings to Lake Simcoe and its tributaries. Proponents with development sites located in the Lake Simcoe watershed shall evaluate anticipated changes in phosphorus loadings between Pre-development and post-development through a Stormwater management plan in support of an application for Major Development [6]. The assessment should include sufficient detail to be used at a local site level. If, using the approved phosphorus budget tool [12], it is demonstrated that the site's post to Pre-development phosphorus budget cannot be met, and Maximum Extent Possible [8] has been attained, the proponent may use LSRCA's Phosphorus Offsetting Policy [9]. **FOR RETROFIT SCENARIOS** [10] i) Improve the level of water quality control currently provided on site; **AND** ii) As per the 'Development' criteria for Suspended Solids, **OR** iii) **If 'Development' criteria for Suspended Solids cannot be met**, Works are designed as a multi-year retrofit project, in accordance with a rehabilitation study or similar area-wide Stormwater study, such that the completed treatment train will achieve the 'Development' criteria for Suspended Solids or local needs[14], within ten (10) years; **OR**

	iv) If constraints [11] identified in ii) and iii), then control [3] as per Maximum Extent Possible [8] based on environmental site feasibility studies.
Erosion Control (Watershed) [1]	**FOR DEVELOPMENT SCENARIOS** [8] i) As per erosion assessment completed in watershed/subwatershed plan, Master Stormwater Management Plan, Master Environmental Servicing Plan, Drainage Plan, Class EA, local site study, geomorphologic study, or erosion analysis; **OR** ii) As per the Detailed Design Approach or Simplified Design Approach methods described in the Stormwater Management Planning and Design Manual: a. The Detailed Design Approach may be selected by the proponent for any development regardless of size and location within the watershed provided technical specialists are available for the completion of the technical assessments; or considered more appropriate than the simplified approach given the size and location of the development within the watershed and the sensitivity of the receiving waters in terms of morphology and habitat function. b. The Simplified Design Approach may be adopted for watersheds whose development area is generally less than twenty hectares AND either one of the following two conditions apply: 1) The catchment area of the receiving channel at the point-of-entry of Stormwater drainage from the development is equal to or greater than twenty-five square kilometres; or 2) Meets the following conditions: • The channel bankfull depth is less than three quarters of a metre; • The channel is a headwater stream; • The receiving channel is not designated as an Environmentally Sensitive Area (ESA) or Area of Natural or Scientific Interest (ANSI) and does not provide habitat for a sensitive aquatic species; • The channel is stable to transitional; and • The channel is slightly entrenched; **OR** iii) In the absence of a guiding study, detain at minimum, the runoff volume generated from a 25 mm storm event over 24 to 48 hours. **FOR RETROFIT SCENARIOS** [10] i) If approaches i-iii) under 'Development Scenarios' are not feasible as per identified constraints [11], then improve the level of erosion control [3] currently provided on site to Maximum Extent Possible [8] based on environmental site feasibility studies or address local needs[14].
Water Quantity (Minor and Major System) [1]	**i)** As per municipal standards, Master Stormwater Management Plan, Class EA, Individual EA and/or ECA, as appropriate for the type of project [13]
Flood Control (Watershed Hydrology) [1]	**FOR DEVELOPMENT SCENARIOS** [2] i) Manage peak flow control as per watershed/subwatershed plans, municipal criteria being a minimum 100 year return storm (except for site-specific considerations and proximity to receiving water bodies), municipal guidelines and standards, Individual/Class EA, ECA, Master Plan, as appropriate for the type of project [13].

	FOR RETROFIT SCENARIOS [10] i) If approaches i) under 'Development Scenarios' are not feasible as per identified constraints [11], then improve the level of flood control [3] currently provided on site to Maximum Extent Possible [8] based on environmental site feasibility studies.
Construction Erosion and Sediment Control	i) Manage construction erosion and sediment control through development and implementation of an erosion and sediment control (ESC) plan. The ESC plan shall: a. Have regard to Canadian Standards Association (CSA) W202 Erosion and Sediment Control Inspection and Monitoring Standard (as amended); OR b. Have regard to Erosion and Sediment Control Guideline for Urban Construction 2019 by TRCA (as amended). ii) Be prepared by a QP for sites with drainage areas greater than 5 ha or if specified by the Owner for a drainage lower than 5 ha. iii) Installation and maintenance of the ESC measures specified in the ESC plan shall have regard to CSA W208:20 Erosion and Sediment Control Installation and Maintenance (as amended). iv) For sites with drainage areas greater than 5 ha, a QP shall inspect the construction ESC measures, as specified in the ESC plan.
Footnote	1. Where the opportunity exists on your project site or the same subwatershed, reallocation of development elements may be optimal for management as described in footnote [3]. 2. Development includes new development, redevelopment, infill development, or conversion of a rural cross-section into an urban cross-section. 3. Stormwater volumes generated from the geographically specific 90th percentile rainfall event on an annual average basis from all surfaces on the entire site are targeted for control. Control is in the following hierarchical order, with each step exhausted before proceeding to the next: 1) retention (infiltration, reuse, or evapotranspiration), 2) LID filtration, and 3) conventional Stormwater management. Step 3, conventional Stormwater management, should proceed only once Maximum Extent Possible [8] has been attained for Steps 1 and 2 for retention and filtration. 4. Recharge is the infiltration and movement of surface water into the soil, past the vegetation root zone, to the zone of saturation, or water table. 5. Pre-development is defined as the more stringent of the two following scenarios: 1) a site's existing condition, or 2) as defined by the local municipality. 6. Major Development has the same meaning as in the Lake Simcoe Protection Plan, 2009. 7. Currently, the approved tool by LSRCA for calculating the water balance is the Thornthwaite-Mather Method. Other tools agreed upon by relevant approval agencies (e.g., LSRCA, municipality, or Ministry) may also be acceptable, subject to written acceptance by the Director. 8. Maximum Extent Possible means maximum achievable Stormwater volume control through retention and LID filtration engineered/landscaped/technical Stormwater practices, given the site constraints [11]. 9. Information pertaining to LSRCA's Recharge Compensation Program and Phosphorus Offsetting Policy is available on LSRCA's website (lsrca.on.ca), or in "Water Balance Recharge Policy for the Lake Simcoe Protection Plan", dated July 2021, and prepared by Lake Simcoe Region Conservation Authority and "Phosphorus Offsetting Policy", dated July 2021, and prepared by Lake Simcoe Region Conservation Authority.

	10. Retrofit means: 1) a modification to the management of the existing infrastructure, 2) changes to major and minor systems, or 3) adding Stormwater infrastructure, in an existing area on municipal right-of-way, municipal block, or easement. It does not include conversion of a rural cross-section into an urban cross-section. 11. Site constraints must be documented. A list of site constraints can be found in Table A2. 12. Tools for calculating phosphorus budgets may include the Ministry's Phosphorus Tool, the Low Impact Development Treatment Train Tool developed in partnership by TRCA, LSRCA, and Credit Valley Conservation (CVC), or other tools agreed upon by the LSRCA and other relevant approval agencies including the municipality. 13. Possible to look at combined grey infrastructure and LID system capacity jointly. 14. Local needs include requirements for water quality, erosion, and/or water balance retrofits identified by the owner through ongoing operation and maintenance of the stormwater system, including inspection of local receiving systems and the characterization of issues requiring remediation through retrofit controls. 15. All studies shall conform with Ministry policies. If any conclusions in the studies negate policy, then the project will require a direct submission to the Ministry for review through an application pertaining to a Schedule C Notice.

Table A2. Stormwater Management Practices Site Constraints

Site Constraints	
a)	Shallow bedrock [1], areas of blasted bedrock [2], and Karst;
b)	High groundwater [1] or areas where increased infiltration will result in elevated groundwater levels which can be shown through an appropriate area specific study to impact critical utilities or property (e.g., susceptible to flooding);
c)	Swelling clays [3] or unstable sub-soils;
d)	Contaminated soils (e.g., brownfields);
e)	High Risk Site Activities including spill prone areas;
f)	Prohibitions and or restrictions per the approved Source Protection Plans and where impacts to private drinking water wells and /or Vulnerable Domestic Well Supply Areas cannot be appropriately mitigated;
g)	Flood risk prone areas or structures and/ or areas of high inflow and infiltration (I/I) where wastewater systems (storm and sanitary) have been shown through technical studies to be sensitive to groundwater conditions that contribute to extraneous flow rates that cause property flooding / Sewer back-ups;
h)	For existing municipal rights-of-way infrastructure (e.g., roads, sidewalks, utility corridor, Sewers, LID, and trails) where reconstruction is proposed and where surface and subsurface areas are not available based on a site-specific assessment completed by a QP;
i)	For developments within partially separated wastewater systems where reconstruction is proposed and where, based on a site-specific assessment completed by a QP, can be shown to: i Increase private property flood risk liabilities that cannot be mitigated through design; ii Impact pumping and treatment cost that cannot be mitigated through design; or

iii Increase risks of structural collapse of Sewer and ground systems due to infiltration and the loss of pipe and/or pavement support that cannot be mitigated through design.
j) Surface water dominated or dependent features including but not limited to marshes and/or riparian forest wetlands which derive all or a majority of their water from surface water, including streams, runoff, and overbank flooding. Surface water dominated or dependent features which are identified through approved site specific hydrologic or hydrogeologic studies, and/or Environmental Impact Statements (EIS) may be considered for a reduced volume control target. Pre-consultation with the MECP and local agencies is encouraged;
k) Existing urban areas where risk to water distribution systems has been identified through assessments to meet applicable drinking water requirements, including Procedures F-6 and F-6-1, and substantiated by a QP through an appropriate area specific study and where the risk cannot be reasonably mitigated per the relevant design guidelines;
l) Existing urban areas where risk to life, human health, property, or infrastructure has been is identified and substantiated by a QP through an appropriate area specific study and where the risk cannot be reasonably mitigated per the relevant design guidelines;
m) Water reuse feasibility study has been completed to determine non-potable reuse of Stormwater for onsite or shared use;
n) Economic considerations set by infrastructure feasibility and prioritization studies undertaken at either the local/site or municipal/system level [4].
Footnote: 1. May limit infiltration capabilities if bedrock and groundwater is within 1m of the proposed Facility invert per Table 3.4.1 of the LID Stormwater Planning and Design Guide (2010, V1.0 or most recent by TRCA/CVC). Detailed assessment or studies are required to demonstrate infiltration effects and results may permit relaxation of the minimum 1m offset. 2. Where blasting is more localized, this constraint may not be an issue elsewhere on the property. While infiltration-based practices may be limited in blasted rock areas, other forms of LID, such as filtration, evapotranspiration, etc., are still viable options that should be pursued. 3. Swelling clays are clay soils that is prone to large volume changes (swelling and shrinking) that are directly related to changes in water content. 4. Infrastructure feasibility and prioritization studies should comprehensively assess Stormwater site opportunities and constraints to improve cost effectiveness, environmental performance, and overall benefit to the receivers and the community. The studies include assessing and prioritizing municipal infrastructure for upgrades in a prudent and economically feasible manner.

Appendix 2 - SWMF (Ponds) Inspection and Maintenance Checklist

TOWN OF GRAVENHURST

Infrastructure and Services Department

SWMF INSPECTION AND MAINTENANCE MANUAL

APPENDIX 2: SWMF (PONDS) INSPECTION & MAINTENANCE CHECKLIST

Reference Document (*Refer to the Town's SWMF Inspection and Maintenance Program and Associated Documents)*	
Facility Name:	
Asset Number:	
ECA No.:	
Wet Pond or Dry Pond:	**Wet** **Dry**
Municipal Address:	**No.** **Street**
GPS Coordinates:	**Lat** **Long**
Dates of last Rainfall (amount in mm)	**Date** **Amount**
	Date **Amount**
Inspector Name (First and Last):	
Position:	
Date:	**Day** **Month** **Year**
Time:	

Part A: MAINTENANCE THRESHOLDS - SCORING DEFINITION	**n/a**	**0** *(Good) OR "NO"*	**2** *(Satisf)*	**3** *(Attn Reqd)*	**4** *(Non Func)*	**5** *(Safety Haz)*	
Not Applicable	n/a						
GOOD or "NO": The component has no deterioration**.**		0					
SATISFACTORY: Some wear is noticed, but it does not affect the functionality - Monitor for future repairs.			1				
ATTENTION REQUIRED: Component is still functioning but has minor problems that may prevent the component functioning properly during extreme events. Some simple upkeep maybe required.				2			
NON FUNCTIONAL: The component is no longer functioning as designed or is missing.					3		
SAFETY HAZARD: The component presents a safety hazard.						4	

Part B: WET PONDS							
B1. Maintenance Access Roads and Access Pathways (if any)	**n/a**	**0** *(Good) OR "NO"*	**1** *(Satisf)*	**2** *(Attn Reqd)*	**3** *(Non Func)*	**4** *(Safety Haz)*	**COMMENTS**
1a. Debris accumulation							
1b. Access Pathways (i.e. trip hazards; washouts)							
1c. Condition of Maintenance Road							
B2. Major Overland Flow Routes	**n/a**	**0** *(Good) OR "NO"*	**1** *(Satisf)*	**2** *(Attn Reqd)*	**3** *(Non Func)*	**4** *(Safety Haz)*	**COMMENTS**
2a. Is overland flow route (if any) obstructed or impacted in any manner?							
B3. Inlet Structure	**n/a**	**0** *(Good) OR "NO"*	**1** *(Satisf)*	**2** *(Attn Reqd)*	**3** *(Non Func)*	**4** *(Safety Haz)*	**COMMENTS**
Size and Material Type of Inlet Structure (circle appropriate material type and identify size)	**MATERIAL TYPE: ___CONC ___CMP ___BOSS ___MASONARY SIZE: _____ MM**						
3a. Clogged or obstructed with vegetation, debris or other							
3b. Signs of required maintenance or any sign of failure / structural damage (i.e. spalling/parging/exposed rebar/leaking/loss of joint material/other)							
3c. Weir trash rack (obstructed/corrosion/structurally sound/other)							
3d. Height of water at outlet structure (Specify capacity at outlet structure in percentage). **IF INLET STRUCTURE IS ABOVE 50% CAPACITY FURTHER MONITORING IS RECOMMENDED.**	**%**						
B4. Mechanical Componets (if applicable)	**n/a**	**0** *(Good) OR "NO"*	**1** *(Satisf)*	**2** *(Attn Reqd)*	**3** *(Non Func)*	**4** *(Safety Haz)*	**COMMENTS**
4a. Control Valves - are they fully operational							
4b. Risers - joint failurel spalling; misalignment; sediment accumulation within riser; leaking						`	
4c. Stormsceptors / Oil and Grit Separators							
4d. Other							

B5. Sediment Forebay (if applicable)	n/a	0 (Good) OR "NO"	1 (Satisf)	2 (Attn Reqd)	3 (Non Func)	4 (Safety Haz)	COMMENTS
5a. Assess whether pipes going into and/or out of the facility clogged or obstructed.							
5b. Is it necessary to conduct further assessement to determine the need for sediment removal?							
5c. Assess undesirable vegetative growth							
5d. Is there standing water in inappropriate areas?							
5f. Is there evidence of fresh fish kill?							
5g. Is there evidence of an excessive amount of mosquitos / mosquito							
5h. Is there evidence of chemicals or visible pollution (i.e. spills, oil, grease contamination) entering or clogging the facilities?							
5h. Is there floating debris?							
5i. Are there signs of embankment slope erosion or settling?							
5j. Is there evidence of algae and/or invasive species (phragmites)?							
5k. Is there abnormally high or low water (pool) levels							
5l. Other							
B6. Permanent Pool (Wet Pond) - Visual Assessment	**n/a**	**0 (Good) OR "NO"**	**1 (Satisf)**	**2 (Attn Reqd)**	**3 (Non Func)**	**4 (Safety Haz)**	**COMMENTS**
6a. Undesirable vegetative growth							
6b. Standing water in inappropriate areas							
6c. Evidence of an excessive amount of mosquitos or mosquito larve?							
6d. Floating debris							
6e. Visible Pollution							
6f. Shoreline / Sideslope erosion							
6g. Aquatic bench inadequately vegetated							
6h.Abnormally high or low water (pool) levels							
6i. Other							
B7. Outlet Structure &/or Outfall Channel from Pond	**n/a**	**0 (Good) OR "NO"**	**1 (Satisf)**	**2 (Attn Reqd)**	**3 (Non Func)**	**4 (Safety Haz)**	**COMMENTS**
Size and Material Type of Inlet Structure (circle appropriate material type and identify size)	**MATERIAL TYPE: ___CONC ___CMP ___BOSS ___MASONARY SIZE: _____ MM**						
7a. Riprap failures							
7b. Underdesirable vegeation growth							
7c. Manholes, Frames, Covers							
7d. Slope erosion							
7e. Storm drain pipes							
7f. Endwalls/headwalls							
7g. Other							
7h. Height of water at outlet structure (Specify capacity at outlet structure in percentage). **IF INLET STRUCTURE IS ABOVE 50% CAPACITY FURTHER MONITORING IS RECOMMENDED**.	**%**						
B8. Miscellaneous	**n/a**	**0 (Good) OR "NO"**	**1 (Satisf)**	**2 (Attn Reqd)**	**3 (Non Func)**	**4 (Safety Haz)**	**COMMENTS**
8a. Are there any known complaints from residents?							
8b. Is there the presence of graffiti / vandalism?							
8c. Where applicable, do safety devices require repair (i.e. fencing; gates, locks)?							
8d. Is there evidence of animal burrows?							
8e. Do safety devices (if any) require repair - i.e. perimeter fencing, gates and locks?							
8f. Is there evidence of encroachment by others (private homeowners) on the SWM facility lands?							
8g. Other							
Part C: DRY PONDS							
Dry Ponds	**n/a**	**0 (Good) OR "NO"**	**1 (Satisf)**	**2 (Attn Reqd)**	**3 (Non Func)**	**4 (Safety Haz)**	**COMMENTS**
C1. Assess undesirable vegetative or woody growth							
C2. Assess low flow channels clear of obstructions							
C3. Standing water or wet spots							
C4. Sediment or debris accumulation							
C5. Other							
Part D: SUMMARY							

Inspector's Remarks:	CIRCLE APPROPIATE CONDITION
	General Facility Condition (Check one)
	A = Acceptable
	U = Unacceptable
	O = Other
	Inspection Frequency:
	A = Annual
	AR = As Required (i.e. significant rainfall event)

Part E: ISSUANCE OF WORK ORDERS - Record all maintenance and Service Request (Type and Date)

INSERT W/OR NUMBERS ISSUED AS A RESULT OF INSPECTIONS

Part F: FOLLOW-UP AND MAINTENANCE RECORD - Closing of Work Order (Type and Date)

CONFIRMATION OF WORK ORDER COMPLETION

Follow up Inspection Completed by:

Authorized Representative Signature

Date

Title

Appendix 3 - Stormpond Signage Template

TOWN OF GRAVENHURST – Infrastructure and Services Department

SWMF INSPECTION AND MAINTENANCE MANUAL

APPENDIX 3: STORMPOND SIGNAGE TEMPLATE

Source: Town of Gravenhurst – Economic Development – Marketing Division

Appendix 4 - SWMF (Pond) Requirements Prior to Assumption

TOWN OF GRAVENHURST
Infrastructure Services Department

SWMF INSPECTION AND MAINTENANCE MANUAL

APPENDIX 4: SWMF (PONDS) REQUIREMENTS PRIOR TO ASSUMPTION

Developer:			
Name of Subdivison / Site:			
Facility Name (As Builts):			
ECA No.:			
Wet Pond or Dry Pond:	**Wet**	**Dry**	**Other**
Municipal (911) Address:	**No.**	**Street**	
GPS Coordinates:	**Latitude**	**Longitude**	
Inspector Name (First and Last):			
Position:			
Date:	**Day**	**Month**	**Year**
Time:			

Part A: PURPOSE OF INSPECTION - General			
1. Conduct an inspection and monitoring program to ensure that all structural components are function as designed and that the stage discharge relationship meets the requirements specified in the stormwater management report for the site. 2. Verify that the facility is landscaped in accordance with the approved plans and that there are no environmental concerns. 3. Verify that the catchment is fully stabilized to ensure sediment loads to the SWMF are representative of long-term rates.			
Part B: SWMF - "As-builts" & Site Specific Inspection and Maintenance Manual(s)	**Yes**	**No**	**COMMENTS (please complete details)**
1. REQUIRED: "As-Built" Drawings Unless otherwise agreed upon by the Town, the developer shall provide "as-built" survey / drawings (signed off by P. Eng) that verifies that the SWM pond or constructed wetland has been returned to its original design capacity, as per approved drawings. This survey would also provide a baseline against which future sediment accumulation surveys can be compared. In cases where only a small amount of accumulated has occurred, Owners may require that the developer provide an appropriate contribution to future maintenance work.			
2. REQUIRED: Site-Specific Inspection and Maintenance Manual Unless otherwise agreed on by the Town, the developer shall provide a site-specific Inspection and Maintenance Manual for the Stormpond and other SWMF as identified in this development			
Part C: SWMF - ASSUMPTION INSPECTION CHECKLIST	**Yes**	**No**	**COMMENTS**
a. Is inlet and outlet structures for accumlation of mixed construction debris that may affect performance?			
b. Is water level at the correct permanent pool level to determine if SWMF is interacting with the ground water table?			
c. Is there evidence of an unusally extended detention drawdown time that could indicate a blockage in the outlet structure?			
d. Is there any evidence of excessive sediment accumulaton in the forebay and downstream of the facility?			
e. Is there any evidence of seepage along the berms?			
f. Is there evidence of vandalism incluidng illegal access (e.g. gates) or encroachment about the perimeter of the facility?			
g. Are safety and security measures and control mechanisms in good working order (e.g. inlet grate)?			
h. Facility Signage:			
i Is the SWMF sign in accordance to Town's Specificatons?			
ii Is the SWMF sign erected in the appropriate location(s)?			
iii Is the sign in a good state of repair?			
iv Has a 911 Address been included on the sign(s)			
v Has the Asset Number as provided by the Town been included on the sign(s)?			
i. Is there evidence of any unusal erosion around berms and inlet or outlet structures?			
j. Upon visual inpsection, does vegetation as identified on "as-builts" appear to be healthy?			

k. Is there any appearance of oil present on water surface or is there presence of visable contaminants or odours?			
l. If there is a stormsceptor(s) associated with the pond, is in a 'good state of repair'			
m. Is the drawdown valve and spill containment valve (if applicable) for proper operation?			
NOTE: Unless water quality sampling is required as part of the ECA for the SWMF, it will not be required			
Part D: FINDINGS OF SWMF INSPECTION	**Yes**	**No**	**COMMENTS**
Does the Qualified Person conducting the inspection of the SWMF for the Town, or on the Town's behalf, recommend Assumption of SWMF as identified in this Inspection Report? Specifically,has SWMF met the requirements as specified above?			
Part E: IF INSPECTION FAILED ('No' in Part 'D')			**ADDITIONAL COMMENTS**
List additional deficiencies if not identified in Part 'B' and Part 'C' above			
Signature of Inspector:			**DATE (yyyy-mm-dd)**

Reference: Inspection and Maintenance Guide for SWM Ponds and Constructed Wetlands, TRCA and CH2M, 2016

Appendix 5 - Catchbasin & Oil/Grit Separator Inventory

Table 4.4: Catchbasin & Oil/Grit Separator Inventory		
#	Name Tag	Description
1	1002 PINEDALE_RD	CB
2	1003 PINEDALE_RD	CB
3	1004 PINEDALE_RD	CB
4	1005 PINEDALE_RD	CB
5	1006 PINEDALE_RD	CB
6	1007 THIRD_ST	CB
7	1010 ORIOLE_CR	CB
8	1011 ORIOLE_CR	CB
9	1012 ORIOLE_CR	MH
10	1014 ORIOLE_CR	CB
11	1015 ORIOLE_CR	CB
12	1016 ORIOLE_CR	CB
13	1017 ORIOLE_CR	CB
14	1019 SEGWUN_BV	CB
15	1020 SEGWUN_BV	CB
16	1021 SEGWUN_BV	CB
17	1022 SEGWUN_BV	CB
18	1024 SEGWUN_BV	CB
19	1026 SEGWUN_BV	CB
20	1027 SEGWUN_BV	CB
21	1029 WAGNER_ST	CB
22	1030 WAGNER_ST	CB
23	1031 WAGNER_ST	CB
24	1033 PRATT_CR	CB
25	1034 PRATT_CR	CB
26	1035 PRATT_CR	CB
27	1036 PRATT_CR	CB
28	1037 PRATT_CR	CB
29	1038 PRATT_CR	CB
30	1039 PRATT_CR	CB
31	1040 FERNWOOD_DR	MH
32	1041 FERNWOOD_DR	CB
33	1042 FERNWOOD_DR	CB
34	1043 FERNWOOD_DR	CB
35	1044 FERNWOOD_DR	CB
36	1047 PHILLIP_ST_E	CB
37	1049 FERNWOOD_DR	CB
38	1050 FERNWOOD_DR	CB
39	1051 FERNWOOD_DR	Ditch_Inlet
40	1053 EMMA_ST	CB
41	1055 EMMA_ST	CB
42	1058 BETHUNE_DR	MH
43	1059 BETHUNE_DR	MH
44	1060 CHURCH_ST	MH
45	1061 CENTENNIAL_DR	MH
46	1062 CENTENNIAL_DR	CBMH
47	1063 CENTENNIAL_DR	MH
48	1064 CENTENNIAL_DR	MH
49	1065 SECOND_ST_S	CB
50	1066 SECOND_ST_S	CB
51	1067 SECOND_ST_S	CB
52	1068 SECOND_ST_S	CB
53	1069 BETHUNE_DR	MH
54	1070 BETHUNE_DR	MH
55	1071 YMCA_PARKING_LOT	STORMCEPTOR

56	1072 BETHUNE_DR	MH
57	1073 YMCA_PARKING_LOT	CBMH
58	1074 YMCA_PARKING_LOT	CBMH
59	1075 YMCA_PARKING_LOT	CBMH
60	1076 YMCA_PARKING_LOT	CBMH
61	1077 FIRST_ST	CBMH
62	1078 FIRST_ST	CBMH
63	1079 FIRST_ST	CBMH
64	1080 FIRST_ST	MH
65	1081 FIRST_ST	CB
66	1082 FIRST_ST	CB
67	1083 FIRST_ST	CB
68	1084 FIRST_ST	CB
69	1085 FIRST_ST	CB
70	1086 FIRST_ST	CB
71	1087 FIRST_ST	CB
72	1088 FIRST_ST	CB
73	1089 CHURCH_ST	CB
74	1090 BROCK_ST	CBMH
75	1091 BROCK_ST	MH
76	1092 BROCK_ST	MH
77	1093 BROCK_ST	MH
78	1095 YMCA_PARKING_LOT	CBMH
79	1097 FIRST_ST	CBMH
80	1098 FIRST_ST	CBMH
81	1099 FIRST_ST	CBMH
82	1100 FIRST_ST	CB
83	1101 FIRST_ST	Ditch_Inlet
84	1102 FIRST_ST	CB
85	1104 SEGWUN_BV	CB
86	1105 SEGWUN_BV	CB
87	1107 SEGWUN_BV	CB
88	1108 SEGWUN_BV	CB
89	1109 LORNE_ST	CB
90	1109-2 LORNE_SEGWUN	CB
91	1110 LORNE_ST	CB
92	1111 LORNE_ST	CB
93	1112 LORNE_ST	CB
94	1113 LORNE_ST	CB
95	1114 LORNE_ST	CB
96	1115 LORNE_ST	CB
97	1118 BAY_ST	MH_BOX
98	1119 BAY_ST	MH
99	1120 BAY_ST	MH
100	1121 BAY_ST	MH
101	1122 BAY_ST	MH
102	1123 BAY_ST	MH
103	1124 BAY_ST	MH
104	1125 BAY_ST	MH
105	1126 BAY_ST	MH
106	1127 BAY_ST	CB
107	1128 WANDA_MILLER_RD	CB
108	1129 WANDA_MILLER_RD	CB
109	1130 HOTCHKISS_ST	CB
110	1131 HOTCHKISS_ST	CB
111	1132 HOTCHKISS_ST	CB
112	1133 HOTCHKISS_ST	CB

113	1134 HOTCHKISS_ST	CB
114	1135 HOTCHKISS_ST	CB
115	1136 HOTCHKISS_ST	CB
116	1137 MARY_ST_S	CB
117	1138 BAY_ST	CB
118	1139 BAY_ST	CB
119	1144 BAY_ST	CB
120	1145 BAY_ST	CB
121	1146 BAY_ST	MH
122	1147 BAY_ST	MH
123	1148 BAY_ST	MH
124	1149 BAY_ST	MH
125	1150 BAY_ST	MH
126	1151 BAY_ST	MH
127	1152 BAY_ST	MH
128	1153 BAY_ST	MH
129	1154 HOTCHKISS_ST	CB
130	1155 HOTCHKISS_ST	CB
131	1156 HOTCHKISS_ST	CB
132	1157 HOTCHKISS_ST	CB
133	1158 HOTCHKISS_ST	CB
134	1159 HOTCHKISS_ST	CB
135	1160 HOTCHKISS_ST	CB
136	1162 BURNETT_ST	CB
137	1163 BURNETT_ST	CB
138	1164 BURNETT_ST	CB
139	1165 SARAH_ST_S	CB
140	1166 HOTCHKISS_ST	CB
141	1168 STEAMSHIP_BAY_RD	CB
142	1169 STEAMSHIP_BAY_RD	CB
143	1170 STEAMSHIP_BAY_RD	CB
144	1171 STEAMSHIP_BAY_RD	MH
145	1172 STEAMSHIP_BAY_RD	CB
146	1173 STEAMSHIP_BAY_RD	CB
147	1175 STEAMSHIP_BAY_RD	MH
148	1176 STEAMSHIP_BAY_RD	DCB
149	1177 STEAMSHIP_BAY_RD	DCB
150	1178 STEAMSHIP_BAY_RD	CB
151	1179 STEAMSHIP_BAY_RD	CB
152	1180 STEAMSHIP_BAY_RD	CB
153	1181 STEAMSHIP_BAY_RD	CB
154	1182 STEAMSHIP_BAY_RD	CB
155	1183 STEAMSHIP_BAY_RD	CB
156	1185 MAPLE_HEIGHTS_DR	CB
157	1186 MAPLE_HEIGHTS_DR	CB
158	1187 MAPLE_HEIGHTS_DR	CB
159	1188 MAPLE_HEIGHTS_DR	CB
160	1189 MAPLE_HEIGHTS_DR	CB
161	1190 MAPLE_HEIGHTS_DR	CB
162	1191 MAPLE_HEIGHTS_DR	CB
163	1193 JAMES_ST	CBMH
164	1194 JAMES_ST	CBMH
165	1195 JAMES_ST	CBMH
166	1197 MAPLE_HEIGHTS_DR	CBMH
167	1198 MAPLE_HEIGHTS_DR	CBMH
168	1199 MAPLE_HEIGHTS_DR	CB
169	1200 MAPLE_HEIGHTS_DR	CB

170	1201 MAPLE_HEIGHTS_DR	CB
171	1202 MAPLE_HEIGHTS_DR	CB
172	1203 MAPLE_HEIGHTS_DR	CB
173	1205 FRASER_ST	CB
174	1206 FRASER_ST	CB
175	1207 FRASER_ST	CB
176	1208 FRASER_ST	Ditch_Inlet
177	1211 GREAVETTE_ST	MH
178	1212 GREAVETTE_ST	DCBMH
179	1213 GREAVETTE_ST	DCBMH
180	1214 GREAVETTE_ST	DCBMH
181	1215 GREAVETTE_ST	DCBMH
182	1216 GREAVETTE_ST	DCBMH
183	1217 BROWN_ST	CBMH
184	1218 BROWN_ST	DCBMH
185	1219 SARAH_ST	DCB
186	1220 PETER_ST	CB
187	1221 PETER_ST	CB
188	1222 PETER_ST	CB
189	1223 PETER_ST	CB
190	1224 PETER_ST	CB
191	1225 PETER_ST	CB
192	1226 PETER_ST	CB
193	1227 PETER_ST	CB
194	1228 GREAVETTE_ST	DICB
195	1229 SARAH_ST	CB
196	1230 PETER_ST	CB
197	1231 PETER_ST	CB
198	1232 PETER_ST	CB
199	1233 PETER_ST	CB
200	1234 BROWN_ST	MH
201	1235 BROWN_ST	CB
202	1236 BROWN_ST	CB
203	1237 BROWN_ST	CB
204	1238 BROWN_ST	CB
205	1239 BROWN_ST	CB
206	1240 BROWN_ST	MH
207	1241 MUSKOKA_ROAD_SOUTH	MH
208	1242 MUSKOKA_ROAD_SOUTH	MH
209	1243 MUSKOKA_ROAD_SOUTH	CBMH
210	1244 MUSKOKA_ROAD_SOUTH	CBMH
211	1246 LOUISE_ST	CB
212	1247 LOUISE_ST	CB
213	1248 LOUISE_ST	CB
214	1249 LOUISE_ST	CB
215	1250 WAGNER_ST	CB
216	1251 WAGNER_ST	CB
217	1252 WAGNER_ST	CB
218	1254 MUSKOKA_BEACH_ROAD	MH
219	1255 MUSKOKA_BEACH_ROAD	MH
220	1256 MUSKOKA_BEACH_ROAD	MH
221	1257 MUSKOKA_BEACH_ROAD	MH
222	1258 MUSKOKA_BEACH_ROAD	MH
223	1259 MUSKOKA_BEACH_ROAD	MH
224	1260 MUSKOKA_BEACH_ROAD	MH
225	1261 MUSKOKA_BEACH_ROAD	MH
226	1262 MUSKOKA_BEACH_ROAD	MH

227	1263 MUSKOKA_BEACH_ROAD	MH
228	1264 MUSKOKA_BEACH_ROAD	MH
229	1265 MUSKOKA_BEACH_ROAD	MH
230	1266 MUSKOKA_BEACH_ROAD	MH
231	1267 MUSKOKA_BEACH_ROAD	MH
232	1268 MUSKOKA_BEACH_ROAD	MH
233	1269 MUSKOKA_BEACH_ROAD	MH
234	1270 MUSKOKA_BEACH_ROAD	MH
235	1271 MUSKOKA_BEACH_ROAD	MH
236	1272 MUSKOKA_BEACH_ROAD	MH
237	1273 MUSKOKA_BEACH_ROAD	MH
238	1274 MUSKOKA_BEACH_ROAD	MH
239	1275 MUSKOKA_BEACH_ROAD	MH
240	1276 MUSKOKA_BEACH_ROAD	MH
241	1277 CATHERINE_STREET	CB
242	1278 CATHERINE_STREET	MH
243	1286 MULDREW_LAKE_RD	CB
244	1287 MULDREW_LAKE_RD	CB
245	1288 MULDREW_LAKE_RD	CB
246	1289 MULDREW_LAKE_RD	CB
247	1290 MULDREW_LAKE_RD	CB
248	1292 FREELAND_DR	MH
249	1293 FREELAND_DR	MH
250	1294 FREELAND_DR	MH
251	1295 THAIN_ST	MH
252	1296 THAIN_ST	MH
253	1298 SEGWUN_BV	DCB
254	1299 SEGWUN_BV	DCB
255	1300 SEGWUN_BV	CB
256	1301 SEGWUN_BV	CB
257	1302 SEGWUN_BV	CB
258	1304 FARQUHAR	CBMH
259	1305 FARQUHAR	CB
260	1307 WINEWOOD_AVE_W	CB
261	1308 WINEWOOD_AVE_W	CB
262	1309 WINEWOOD_AVE_W	CB
263	1310 FARQUHAR	MH
264	1311 FARQUHAR	CBMH
265	1312 FARQUHAR	CBMH
266	1313 FARQUHAR	CB
267	1314 FARQUHAR	CB
268	1315 FARQUHAR	CB
269	1316 FARQUHAR	CB
270	1317 FARQUHAR	CB
271	1318 FARQUHAR	CB
272	1319 FARQUHAR	CB
273	1320 FARQUHAR	CB
274	1321 FARQUHAR	CB
275	1322 FARQUHAR	CB
276	1323 FARQUHAR	CB
277	1324 FARQUHAR	CB
278	1325 FARQUHAR	CB
279	1326 FARQUHAR	CB
280	1327 FARQUHAR	CB
281	1328 FARQUHAR	CB
282	1329 FARQUHAR	CB
283	1330 FARQUHAR	CB

284	1331 FARQUHAR	CB
285	1332 SARAH_ST_N	CB
286	1333 SARAH_ST_N	CB
287	1334 SARAH_ST_N	CB
288	1335 SARAH_ST_N	CB
289	1336 JOHN_ST_N	CB
290	1338 MUSKOKA_ROAD_SOUTH	CBMH
291	1339 MUSKOKA_ROAD_SOUTH	CBMH
292	1340 MUSKOKA_ROAD_SOUTH	CBMH
293	1341 MUSKOKA_ROAD_SOUTH	CB
294	1342 MUSKOKA_ROAD_SOUTH	CBMH
295	1344 MUSKOKA_ROAD_SOUTH	DICB
296	1345 MUSKOKA_ROAD_SOUTH	MH
297	1346 MUSKOKA_ROAD_SOUTH	MH
298	1347 MUSKOKA_ROAD_SOUTH	MH
299	1348 MUSKOKA_ROAD_SOUTH	MH
300	1349 LCBO_PARKING_LOT	STORMCEPTOR
301	1351 LCBO_PARKING_LOT	MH
302	1352 LCBO_PARKING_LOT	MH
303	1353 LCBO_PARKING_LOT	MH
304	1354 LCBO_PARKING_LOT	MH
305	1355 LCBO_PARKING_LOT	CB
306	1356 EDWARD_ST	MH
307	1357 EDWARD_ST	CB
308	1358 EDWARD_ST	CB
309	1359 EDWARD_ST	CB
310	1360 LCBO_PARKING_LOT	CBMH
311	1361 LCBO_PARKING_LOT	CB
312	1362 LCBO_PARKING_LOT	CBMH
313	1363 LCBO_PARKING_LOT	CBMH
314	1364 LCBO_PARKING_LOT	CB
315	1365 LCBO_PARKING_LOT	MH
316	1366 LCBO_PARKING_LOT	CB
317	1367 EDWARD_ST	CB
318	1369 EDWARD_ST	CB
319	1370 LCBO_PARKING_LOT	CB
320	1371 COMMERCIAL_PARKING_LOT	CB
321	1373 MUSKOKA_BEACH_ROAD	CBMH
322	1374 MUSKOKA_BEACH_ROAD	MH
323	1375 MUSKOKA_BEACH_ROAD	MH
324	1376 MUSKOKA_BEACH_ROAD	MH
325	1377 MUSKOKA_BEACH_ROAD	MH
326	1378 MUSKOKA_BEACH_ROAD	MH
327	1379 MUSKOKA_BEACH_ROAD	MH
328	1380 MUSKOKA_BEACH_ROAD	MH
329	1381 MUSKOKA_BEACH_ROAD	MH
330	1382 MUSKOKA_BEACH_ROAD	MH
331	1384 MUSKOKA_BEACH_ROAD	CBMH
332	1385 MUSKOKA_BEACH_ROAD	CBMH
333	1386 MUSKOKA_BEACH_ROAD	MH
334	1387 MUSKOKA_BEACH_ROAD	MH
335	1389 MUSKOKA_BEACH_ROAD	MH
336	1390 MUSKOKA_BEACH_ROAD	MH
337	1391 MUSKOKA_BEACH_ROAD	MH
338	1392 MUSKOKA_BEACH_ROAD	MH
339	1393 MUSKOKA_BEACH_ROAD	MH
340	1394 MUSKOKA_BEACH_ROAD	MH

341	1395 MUSKOKA_BEACH_ROAD	MH
342	1396 MUSKOKA_BEACH_ROAD	MH
343	1397 LOFTY_PINES_RD	CB
344	1398 LOFTY_PINES_RD	Ditch_Inlet
345	1399 LOFTY_PINES_RD	CB
346	1401 MUSKOKA_BEACH_ROAD	MH
347	1402 MUSKOKA_BEACH_ROAD	MH
348	1403 MUSKOKA_BEACH_ROAD	MH
349	1404 MUSKOKA_BEACH_ROAD	MH
350	1405 MUSKOKA_BEACH_ROAD	MH
351	1406 MUSKOKA_BEACH_ROAD	CB
352	1407 MUSKOKA_BEACH_ROAD	CB
353	1408 MUSKOKA_BEACH_ROAD	CBMH
354	1410 MUSKOKA_ROAD_SOUTH	MH
355	1411 MUSKOKA_ROAD_SOUTH	MH
356	1412 MUSKOKA_ROAD_SOUTH	MH
357	1413 MUSKOKA_ROAD_SOUTH	MH
358	1414 MUSKOKA_ROAD_SOUTH	MH
359	1415 MUSKOKA_ROAD_SOUTH	MH
360	1416 MUSKOKA_ROAD_SOUTH	CBMH
361	1417 MUSKOKA_ROAD_SOUTH	MH
362	1418 MUSKOKA_ROAD_SOUTH	MH
363	1419 MUSKOKA_ROAD_SOUTH	MH
364	1420 MUSKOKA_ROAD_SOUTH	MH
365	1421 MUSKOKA_ROAD_SOUTH	CBMH
366	1422 MUSKOKA_ROAD_SOUTH	CBMH
367	1423 MUSKOKA_ROAD_SOUTH	MH
368	1424 MUSKOKA_ROAD_SOUTH	MH
369	1425 MUSKOKA_ROAD_SOUTH	CB
370	1426 MUSKOKA_ROAD_SOUTH	MH
371	1427 MUSKOKA_ROAD_SOUTH	MH
372	1428 MUSKOKA_ROAD_SOUTH	CB
373	1430 CAROLINE_STREET	CBMH
374	1431 CAROLINE_STREET	CBMH
375	1432 CAROLINE_STREET	CBMH
376	1433 MUSKOKA_ROAD_SOUTH	MH
377	1434 MUSKOKA_ROAD_SOUTH	MH
378	1435 MUSKOKA_ROAD_SOUTH	MH
379	1436 MUSKOKA_ROAD_SOUTH	MH
380	1437 MUSKOKA_ROAD_SOUTH	MH
381	1438 MUSKOKA_ROAD_SOUTH	MH
382	1439 CAROLINE_STREET	CB
383	1441 COMMERCIAL_PARKING_LOT	MH
384	1442 COMMERCIAL_PARKING_LOT	MH
385	1443 COMMERCIAL_PARKING_LOT	MH
386	1444 COMMERCIAL_PARKING_LOT	MH
387	1445 COMMERCIAL_PARKING_LOT	MH
388	1446 COMMERCIAL_PARKING_LOT	MH
389	1447 COMMERCIAL_PARKING_LOT	MH
390	1448 COMMERCIAL_PARKING_LOT	MH
391	1449 COMMERCIAL_PARKING_LOT	MH
392	1450 COMMERCIAL_PARKING_LOT	DCB
393	1451 COMMERCIAL_PARKING_LOT	MH
394	1452 COMMERCIAL_PARKING_LOT	MH
395	1453 COMMERCIAL_PARKING_LOT	MH
396	1454 COMMERCIAL_PARKING_LOT	MH
397	1455 COMMERCIAL_PARKING_LOT	MH

398	1456 COMMERCIAL_PARKING_LOT	CBMH
399	1457 COMMERCIAL_PARKING_LOT	CBMH
400	1458 COMMERCIAL_PARKING_LOT	CBMH
401	1459 COMMERCIAL_PARKING_LOT	CBMH
402	1460 COMMERCIAL_PARKING_LOT	MH
403	1461 COMMERCIAL_PARKING_LOT	MH
404	1462 COMMERCIAL_PARKING_LOT	MH
405	1463 COMMERCIAL_PARKING_LOT	MH
406	1464 COMMERCIAL_PARKING_LOT	CBMH
407	1465 COMMERCIAL_PARKING_LOT	CB
408	1466 COMMERCIAL_PARKING_LOT	MH
409	1467 COMMERCIAL_PARKING_LOT	MH
410	1468 COMMERCIAL_PARKING_LOT	MH
411	1469 COMMERCIAL_PARKING_LOT	MH
412	1470 COMMERCIAL_PARKING_LOT	MH
413	1471 COMMERCIAL_PARKING_LOT	MH
414	1472 COMMERCIAL_PARKING_LOT	CBMH
415	1473 COMMERCIAL_PARKING_LOT	DICB
416	1474 COMMERCIAL_PARKING_LOT	MH
417	1475 COMMERCIAL_PARKING_LOT	MH
418	1476 COMMERCIAL_PARKING_LOT	CB
419	1477 COMMERCIAL_PARKING_LOT	DCB
420	1478 COMMERCIAL_PARKING_LOT	MH
421	1479 COMMERCIAL_PARKING_LOT	CB
422	1480 COMMERCIAL_PARKING_LOT	CB
423	1481 COMMERCIAL_PARKING_LOT	CB
424	1482 COMMERCIAL_PARKING_LOT	CB
425	1483 COMMERCIAL_PARKING_LOT	CBMH
426	1484 COMMERCIAL_PARKING_LOT	CB
427	1485 COMMERCIAL_PARKING_LOT	MH
428	1486 COMMERCIAL_PARKING_LOT	MH
429	1487 COMMERCIAL_PARKING_LOT	MH
430	1488 COMMERCIAL_PARKING_LOT	MH
431	1489 COMMERCIAL_PARKING_LOT	CB
432	1491 RIDGE_RD	MH
433	1492 RIDGE_RD	MH
434	1493 SHOPPERS_PARKING_LOT	CBMH
435	1494 SHOPPERS_PARKING_LOT	MH
436	1495 MUSKOKA_ROAD_SOUTH	MH
437	1496 MUSKOKA_ROAD_SOUTH	CBMH
438	1497 FIRST_MUSKOKA	CB
439	1498 FIRST_MUSKOKA	MH
440	1499 FIRST_ST_S	MH
441	1502 BETHUNE_DR	MH
442	1509 KELLY_HAHNE	CB
443	1510 KELLY_HAHNE	CB
444	1511 KELLY_HAHNE	CB
445	1512 KELLY_HAHNE	CB
446	1513 KELLY_HAHNE	CB
447	1514 HAHNE_DR	CB
448	1515 HAHNE_DR	CB
449	1516 HAHNE_DR	CB
450	1521 FAIRVIEW_DR	CBMH
451	1522 FAIRVIEW_DR	CBMH
452	1523 FAIRVIEW_DR	CBMH
453	1524 FAIRVIEW_DR	CB
454	1525 FAIRVIEW_DR	CB

455	1526 FAIRVIEW_DR	CB
456	1527 FAIRVIEW_DR	CB
457	1528 RIDGE_RD	CB
458	1529 RIDGE_RD	CB
459	1530 RIDGE_RD	CB
460	1531 JOHN_ST_S	MH
461	1532 JOHN_ST_S	MH
462	1533 JOHN_ST_S	MH
463	1534 JOHN_ST_S	MH
464	1535 JOHN_ST_S	MH
465	1536 MUSKOKA_ROAD_SOUTH	MH
466	1537 MUSKOKA_ROAD_SOUTH	MH
467	1538 MUSKOKA_ROAD_SOUTH	MH
468	1539 MUSKOKA_ROAD_SOUTH	MH
469	1540 MUSKOKA_ROAD_SOUTH	MH
470	1541 MUSKOKA_ROAD_SOUTH	MH
471	1542 MUSKOKA_ROAD_SOUTH	MH
472	1543 MUSKOKA_ROAD_SOUTH	MH
473	1544 MUSKOKA_ROAD_SOUTH	MH
474	1545 FIRST_ST_S	CB
475	1546 FIRST_ST_S	CB
476	1548 FIRST_ST_S	CB
477	1549 DAVID_ST	CB
478	1550 DAVID_ST	CB
479	1551 DAVID_ST	CB
480	1552 FIRST_ST_S	CB
481	1554 HAHNE_DR	CB
482	1555 HAHNE_DR	CB
483	1556 HAHNE_DR	CB
484	1557 HAHNE_DR	CB
485	1558 KINGSWOOD_DR	CB
486	1559 KINGSWOOD_DR	CB
487	1560 KINGSWOOD_DR	CB
488	1561 HAHNE_DR	CB
489	1562 HAHNE_DR	CB
490	1563 HAHNE_DR	CB
491	1564 FAIRVIEW_DR	CB
492	1565 JOHN_ST_S	CB
493	1566 PHILLIP_ST_W	MH
494	1567 PHILLIP_ST_W	CB
495	1568 PHILLIP_ST_W	CB
496	1569 MUSKOKA_ROAD_SOUTH	MH
497	1570 MUSKOKA_ROAD_SOUTH	MH

Appendix 6 - SOP PW-1-11

STANDARD OPERATING PROCEDURE DIVISION		
SOP PW-1-11 Catchbasin Cleaning and Maintenance		
Town of Gravenhurst **Infrastructure Services Department**	**Effective date:**	**Page:** 1 of 2

Description:
The cleaning of stormwater catchbasins and manholes, including the removal of snow and ice, winter sand and debris and the disposal of waste material

Purpose:

1. To assure the proper functioning of stormwater catchbasins and inlets in the rapid removal of surface water from the roadway and road allowance.
2. All stormwater catchbasin and inlets shall be **cleaned once every year**, typically in the spring / summer, but no later than August 31 of each year.

Quality Guidelines:
The Level of Service for **CATCHBASIN CLEANING** shall be in accordance with the following:

a) Obstructions restricting the flow of water into catchbasins shall be removed.
b) Sediment within the catchbasin shall be removed.
c) Catchbasins should also be inspected prior to and after a heavy rainfall or periods of high runoff, with corrective measures taken if required. During storms or floods , critical areas shall be patrolled and culvert inlets kept clear and open.
d) Catchbasins, manholes and ditch inlet covers shall be checked before the winter season for interference with snowplowing operations. During period of thaw conditions in the winter season, key structures shall be cleared of ice and snow buildup to alleviate flooding conditions.
e) Damaged catchbasins shall be reported to the Foreman (or designate) for repair or replacement as soon as possible.

Materials:
Not Applicable

Equipment:	**Hand Tools:**
Mechanical removal 1 Vac Truck (contracted) 1 Pick Up Truck	Shovels, Rakes, Pry bars etc.

Personnel:
1 Vac Truck Operator
1 Truck Operator
2 Labourer

Health and Safety:	**Productivity:**	**Metric:**
All required PPE, including but not limited to safety boots, safety vest; gloves etc.	Each catchbasin cleaned	Cleaned Annually More frequently if restricted sump capacities; planned frequency of road cleaning; area susceptible to flooding; excessive dirt and debris reaching the road surface. 100 to 125 Catchbasins per day.

Training:

- Typically, catchbasin cleaning is outsourced, so not staff specific training is required.

Methods and Procedures:

1. Under no circumstances shall personnel enter the catchbasin structures as part of these operations.
2. Conduct Circle Check of Vehicle(s). Ensure equipment is in good working order.
3. Wear all required PPE.
4. Foreman shall be knowledgeable where all the Town-owned catchbasins are and to develop an efficient route for cleaning.
5. Place safety devices and signs as needed, as per OTM Book 7 requirements.
6. Assess the catchbasin prior to opening the lid. Use the assessment to determine proper procedures to use for each catchbasin.
7. Clean around the lid with a pick prior to opening the sewer lid.
8. Use proper equipment and lifting techniques when removing lid.
9. Always use proper manhole cover lifting tools.
10. Be aware that the spoon handle is very long and can be a potential hazard. Ensure the spoon does not cause a hazard on the roadway.
11. Always be aware of your surroundings.
12. Remove obstructions and debris from catchbasin sumps using vacuum unit and hand shovels.
13. Remove sediment from all catchbasin pumps.
14. Clean grate seat area on frame and replace grate making note of any damaged grates or frames needing repairs or replacement and advise Foreman accordingly.
15. Clean up debris from each site.
16. Replace cover, ensure it fit properly an use proper tools to replace lid.
17. Dispose of removed material at an approved disposal site.
18. Remove safety devices and signs.

Appendix 7 - Storm Sewer Inventory

ID	Outlet	Length (m)	Description	Ex. Dia. (m)
2002	1	35.9	CSP	0.400
2003	1	39.8	CSP	0.400
2004	1	15.4	CSP	0.400
2005	1	47.7	CSP	0.400
2006	1	49.5	CSP	0.300
2007	1	27.3	CSP	0.400
2008	1	31.0	CSP	0.400
2491	1	45.0	PVC	0.900
2492	1	93.2	PVC	0.900
2493	1	36.0	HDPE	0.750
2494	1	41.9	CSP	1.050
2495	1	27.2	CSP	1.050
2496	1	39.0	CSP	1.050
2500	1	12.2	CSP	0.900
2502	1	97.8	CSP	1.200
2503	1	54.0	CSP	0.825
2505	1	13.7	CSP	0.900
2515	1	21.7	PVC	0.900
2516	1	18.7	PVC	0.900
2517	1	23.2	PVC	0.900
2519	1	53.1	HDPE	0.900
2521	1	71.6	CONC	0.750
2522	1	72.6	CONC	0.750
2523	1	35.8	CONC	0.750
2524	1	70.6	CSP	0.375
2525	1	38.7	CSP	0.375
2526	1	14.3	CSP	0.375
2527	1	25.7	CSP	0.375
2528	1	2.3	PVC	0.375
2529	1	46.5	PVC	0.300
2530	1	36.9	PVC	0.300
2531	1	81.7	CONC	0.600
2532	1	41.6	CONC	0.450
2533	1	64.2	PVC	0.450
2534	1	40.4	PVC	0.450
2535	1	56.1	PVC	0.400
2536	1	36.7	CONC	0.675
2537	1	55.6	CONC	0.675
2538	1	102.8	CONC	0.675
2539	1	100.2	CONC	0.525
2540	1	102.2	CONC	0.450
2541	1	98.5	CONC	0.375
2542	1	56.2	CONC	0.300
2543	1	24.2	CONC	0.300

2545	1	51.1	CSP	0.300
2546	1	10.6	HDPE_RIBBED	0.300
2547	1	33.7	CSP	0.300
2548	1	54.3	CSP	0.375
2549	1	10.4	CSP	0.375
2550	1	13.1	CSP	0.375
2551	1	33.3	CSP	0.375
2552	1	22.0	CSP	0.375
2554	1	42.4	CSP	0.400
2555	1	16.7	STEEL	0.350
2556	1	40.3	STEEL	0.350
2557	1	10.4	PVC	0.250
2558	1	41.4	CONC	0.350
2559	1	8.2	PVC	0.250
2560	1	34.0	PVC	0.250
2561	1	18.5	CSP	0.400
2562	1	29.5	CSP	0.400
2563	1	50.1	CSP	0.300
2564	1	39.8	CSP	0.375
2565	1	10.6	HDPE	0.250
2566	1	9.3	PVC	0.300
2567	1	25.4	CSP	0.400
2568	1	8.0	PVC	0.375
2569	1	9.0	PE	0.450
2570	1	13.1	CONC	0.300
2280	2	17.0	CSP	0.600
2282	2	30.7	CSP	0.600
2284	2	8.1	CSP	0.600
2286	2	14.0	PVC	0.300
2287	2	76.7	PVC	0.300
2288	2	45.3	PVC	0.300
2289	2	91.5	PVC	0.300
2410	3	16.0	CONC	0.900
2411	3	60.3	CONC	0.825
2412	3	48.9	CONC	0.825
2413	3	21.5	CONC	0.825
2414	3	22.0	CONC	0.825
2415	3	33.5	CONC	0.825
2416	3	66.0	CONC	0.825
2417	3	25.4	CONC	0.825
2418	3	45.7	CONC	0.750
2419	3	35.3	CONC	0.750
2420	3	64.5	CONC	0.675
2421	3	30.1	CONC	0.675
2422	3	100.3	CONC	0.600

2423	3	46.0	CONC	0.450
2424	3	53.5	CONC	0.375
2425	3	9.7	CONC	0.375
2426	3	12.7	CONC	0.375
2427	3	36.8	CONC	0.300
2428	3	20.0	CONC	0.300
2119	4	20.8	CONC	0.900
2120	4	46.3	CONC	0.900
2121	4	73.5	CONC	0.675
2122	4	48.3	CONC	0.675
2123	4	83.3	CONC	0.675
2124	4	54.2	CONC	0.675
2125	4	55.3	CONC	0.675
2126	4	34.7	CONC	0.675
2127	4	22.5	CONC	0.525
2128	4	34.1	CONC	0.525
2129	4	13.1	CONC	0.450
2130	4	37.9	STEEL	0.375
2131	4	12.3	CSP	0.400
2132	4	46.0	CSP	0.375
2133	4	60.4	CSP	0.375
2134	4	58.6	CSP	0.375
2135	4	55.7	CSP	0.375
2136	4	14.4	CSP	0.300
2137	4	5.2	CSP	0.300
2138	4	32.0	CONC	0.300
2139	4	31.0	CONC	0.300
2143	4	77.5	CSP	0.400
2144	4	9.9	CONC	0.375
2145	4	21.5	CONC	0.375
2146	4	13.5	CONC	0.450
2147	4	34.5	CONC	0.450
2148	4	80.9	CONC	0.450
2149	4	7.8	CONC	0.375
2150	4	49.9	CONC	0.375
2151	4	62.1	CONC	0.375
2152	4	6.7	CONC	0.375
2153	4	108.1	CONC	0.375
2154	4	49.2	CSP	0.375
2155	4	58.3	CSP	0.375
2156	4	11.6	CSP	0.375
2157	4	108.9	CSP	0.375
2158	4	14.4	CSP	0.300
2159	4	42.7	CSP	0.300
2160	4	59.3	CSP	0.300

2163	4	15.7	STEEL	0.875
2164	4	41.7	STEEL	0.675
2165	4	45.7	CSP	0.300
2166	4	4.0	CSP	0.300
2059	5	60.4	CONC	0.600
2060	5	68.6	CONC	0.450
2061	5	87.5	CONC	0.450
2062	5	87.8	CONC	0.450
2063	5	27.5	CONC	0.450
2064	5	5.5	CONC	0.450
2065	5	37.8	STEEL	0.350
2066	5	13.5	STEEL	0.375
2067	5	21.1	STEEL	0.375
2068	5	28.8	STEEL	0.375
2069	5	22.3	HDPE	0.450
2070	5	71.9	HDPE	0.450
2071	5	37.3	HDPE	0.450
2073	5	44.0	HDPE	0.900
2074	5	32.7	HDPE	0.900
2075	5	66.1	HDPE	0.900
2076	5	24.6	CONC	0.600
2077	5	42.8	CONC	0.600
2078	5	17.3	HDPE	0.450
2079	5	27.8	CSP	0.450
2080	5	10.6	CSP	0.450
2081	5	49.7	CONC	0.450
2082	5	11.7	CONC	0.450
2083	5	63.6	CONC	0.450
2084	5	61.3	CONC	0.450
2085	5	14.9	STEEL	0.450
2086	5	48.6	STEEL	0.300
2087	5	36.8	STEEL	0.300
2088	5	19.3	STEEL	0.375
2089	5	3.1	CONC	0.200
2090	5	31.9	CONC	0.200
2091	5	42.8	CONC	0.450
2092	5	51.6	CONC	0.300
2093	5	6.8	CONC	0.300
2094	5	28.5	CONC	0.450
2095	5	58.5	RIBBED_HDPE	0.900
2096	5	12.6	HDPE	0.450
2097	5	59.9	PVC	0.300
2098	5	12.7	PVC	0.300
2099	5	20.4	PVC	0.300
2100	5	49.5	PVC	0.300

2101	5	7.4	CSP	0.300
2102	5	11.5	PVC	0.300
2254	6	9.8	PE	0.900
2255	6	32.1	PE	0.900
2256	6	49.5	PE	0.900
2257	6	44.0	PE	0.900
2258	6	29.7	PE	0.900
2259	6	35.0	PE	0.900
2260	6	36.8	PE	0.900
2261	6	65.5	PE	0.750
2262	6	68.1	PE	0.825
2263	6	59.0	PE	0.750
2264	6	60.0	PE	0.750
2265	6	51.2	PE	0.750
2266	6	25.5	PE	0.750
2267	6	78.0	PE	0.750
2268	6	70.4	PE	0.750
2269	6	91.3	PE	0.750
2270	6	69.8	PE	0.750
2271	6	64.3	PE	0.750
2272	6	72.0	PE	0.750
2273	6	62.8	PE	0.525
2274	6	26.5	PE	0.450
2275	6	82.0	PE	0.375
2276	6	87.1	PE	0.375
2277	6	13.0	PE	0.300
2278	6	93.7	PE	0.525
2211	7	34.2	HDPE	0.900
2212	7	5.9	HDPE	0.900
2213	7	16.4	HDPE	0.900
2214	7	34.3	HDPE	0.750
2215	7	52.0	PVC	0.600
2216	7	15.5	PVC	0.600
2217	7	59.6	HDPE	0.600
2218	7	46.1	HDPE	0.600
2219	7	11.2	PVC	0.450
2220	7	91.2	CSP	0.400
2221	7	35.2	CSP	0.400
2222	7	34.9	CSP	0.300
2223	7	53.8	CSP	0.400
2224	7	30.0	CSP	0.400
2225	7	34.7	CSP	0.400
2226	7	44.3	CSP	0.300
2227	7	11.7	CSP	0.300
2228	7	9.5	HDPE	0.600

2229	7	99.6	CSP	0.400
2230	7	7.4	CSP	0.400
2231	7	122.6	CSP	0.400
2232	7	65.2	CSP	0.300
2233	7	45.9	CSP	0.300
2234	7	91.4	CSP	0.375
2235	7	12.3	CSP	0.300
2236	7	18.8	CSP	0.300
2237	7	74.3	CSP	0.375
2238	7	47.4	CONC	0.300
2239	7	29.4	CONC	0.400
2240	7	53.2	CONC	0.400
2241	7	21.0	CONC	0.375
2242	7	70.7	CONC	0.250
2243	7	20.0	CONC	0.250
2244	7	21.7	CONC	0.250
2304	8	36.4	CSP	0.600
2305	8	9.4	RIBBED_HDPE	0.550
2307	8	42.4	CSP	0.450
2308	8	56.7	CSP	0.350
2309	8	100.6	PVC	0.300
2310	8	47.1	CONC	0.375
2311	8	54.4	CONC	0.375
2312	8	46.4	CONC	0.375
2313	8	11.1	HDPE	0.450
2314	8	18.4	HDPE	0.450
2315	8	43.5	PVC	0.450
2316	8	61.5	PVC	0.450
2317	8	8.8	PVC	0.450
2318	8	10.1	PVC	0.450
2319	8	8.1	PVC	0.450
2320	8	30.8	PVC	0.450
2321	8	29.1	PVC	0.450
2322	8	34.5	PVC	0.450
2323	8	21.9	CSP	0.250
2324	8	61.7	PVC	0.300
2325	8	44.1	PVC	0.450
2326	8	13.5	PVC	0.450
2327	8	33.1	PVC	0.450
2328	8	30.1	PVC	0.450
2329	8	42.2	PVC	0.450
2330	8	10.7	PVC	0.450
2331	8	2.3	PVC	0.450
2332	8	3.6	PVC	0.450
2333	8	17.0	PVC	0.450

2334	8	30.6	PVC	0.450
2335	8	36.4	PVC	0.450
2336	8	33.7	PVC	0.300
2010	Minor	54.2	CSP	0.375
2011	Minor	13.4	CONC	0.300
2012	Minor	24.0	CSP	0.300
2014	Minor	20.8	CONC	0.300
2015	Minor	67.3	CONC	0.300
2016	Minor	12.7	CONC	0.300
2017	Minor	8.6	PVC	0.200
2019	Minor	9.6	CONC	0.300
2020	Minor	8.5	PVC	0.300
2021	Minor	47.5	CONC	0.375
2022	Minor	35.4	CONC	0.375
2024	Minor	18.6	CONC	0.350
2026	Minor	6.4	CONC	0.525
2027	Minor	10.2	CONC	0.450
2029	Minor	52.1	CSP	0.300
2030	Minor	60.0	CSP	0.300
2031	Minor	10.2	CSP	0.400
2033	Minor	50.2	CONC	0.600
2034	Minor	7.4	CONC	0.600
2035	Minor	14.4	CONC	0.375
2036	Minor	49.0	CONC	0.375
2037	Minor	101.3	CONC	0.375
2038	Minor	70.9	PVC	0.300
2039	Minor	63.7	CONC	0.250
2040	Minor	9.2	CONC	0.300
2041	Minor	11.2	CONC	0.300
2042	Minor	61.0	CONC	0.300
2043	Minor	76.6	CONC	0.250
2044	Minor	62.0	CONC	0.250
2046	Minor	74.8	CSP	0.400
2047	Minor	23.2	CONC	0.300
2049	Minor	62.6	CSP	0.300
2050	Minor	36.4	CSP	0.300
2051	Minor	18.6	CSP	0.300
2053	Minor	42.5	CSP	0.250
2055	Minor	18.4	CSP	0.250
2104	Minor	5.8	CONC	0.350
2105	Minor	8.6	CONC	0.250
2107	Minor	22.9	CONC	0.350
2108	Minor	10.4	CONC	0.350
2110	Minor	13.2	CSP	0.600
2111	Minor	25.6	CSP	0.150

2112	Minor	21.6	HDPE	0.150
2113	Minor	37.7	CONC	0.375
2114	Minor	9.2	CONC	0.375
2115	Minor	12.6	CSP	0.525
2168	Minor	70.7	PVC	0.900
2169	Minor	8.1	PVC	0.900
2170	Minor	32.9	PVC	0.750
2171	Minor	15.2	PVC	0.600
2172	Minor	63.3	PVC	0.600
2173	Minor	28.3	HDPE_RIBBED	0.300
2175	Minor	31.0	PVC	0.900
2176	Minor	44.9	PVC	0.800
2177	Minor	8.6	PVC	0.800
2178	Minor	48.7	PVC	0.625
2179	Minor	41.2	PVC	0.600
2180	Minor	30.4	PVC	0.375
2181	Minor	25.9	PVC	0.375
2182	Minor	47.8	PVC	0.375
2183	Minor	35.0	PVC	0.600
2185	Minor	61.8	HDPE	0.300
2186	Minor	0.8	HDPE	0.375
2187	Minor	49.5	HDPE	0.300
2188	Minor	0.9	HDPE	0.300
2189	Minor	60.1	HDPE	0.300
2190	Minor	0.8	HDPE	0.300
2191	Minor	58.3	HDPE	0.300
2193	Minor	7.3	HDPE	0.300
2194	Minor	88.5	HDPE	0.300
2195	Minor	76.9	HDPE	0.300
2197	Minor	16.3	HDPE	0.300
2198	Minor	0.8	HDPE	0.300
2199	Minor	37.1	HDPE	0.300
2200	Minor	0.8	HDPE	0.300
2201	Minor	59.0	HDPE	0.300
2202	Minor	0.8	HDPE	0.300
2203	Minor	60.3	HDPE	0.300
2205	Minor	14.5	CSP	0.300
2206	Minor	48.4	CSP	0.300
2207	Minor	10.3	CSP	0.300
2208	Minor	50.6	CSP	0.300
2246	Minor	40.5	HDPE	0.400
2247	Minor	14.0	PVC	0.450
2248	Minor	32.5	PVC	0.450
2249	Minor	32.2	PVC	0.450
2250	Minor	19.9	HDPE	0.300

2251	Minor	57.1	CSP	0.300
2252	Minor	54.9	CSP	0.300
2292	Minor	59.4	PVC	0.450
2293	Minor	13.7	PVC	0.450
2294	Minor	102.3	PVC	0.450
2295	Minor	47.4	PVC	0.375
2296	Minor	35.1	PVC	0.375
2298	Minor	9.6	CONC	0.600
2299	Minor	8.5	UNKNOWN	0.400
2300	Minor	39.4	STEEL	0.200
2301	Minor	24.1	HDPE	0.150
2302	Minor	19.1	HDPE	0.150
2338	Minor	65.1	PE	0.450
2339	Minor	29.5	PE	0.450
2340	Minor	31.5	PE	0.300
2341	Minor	17.2	PE	0.300
2342	Minor	14.2	PE	0.300
2344	Minor	28.9	PVC	0.825
2345	Minor	41.1	PVC	0.900
2346	Minor	45.0	CONC	0.750
2347	Minor	58.0	CONC	0.750
2348	Minor	54.0	CONC	0.525
2349	Minor	34.4	CONC	0.525
2350	Minor	26.3	CONC	0.450
2352	Minor	19.6	CONC	0.450
2353	Minor	34.2	CONC	0.450
2354	Minor	29.1	PVC	0.250
2355	Minor	12.9	PVC	0.250
2356	Minor	40.8	PVC	0.650
2357	Minor	42.3	PVC	0.450
2358	Minor	69.8	PVC	0.300
2359	Minor	21.0	PVC	0.300
2360	Minor	19.8	PVC	0.375
2361	Minor	36.0	PVC	0.250
2362	Minor	22.4	PVC	0.375
2363	Minor	36.5	PVC	0.375
2364	Minor	31.8	PVC	0.250
2365	Minor	33.0	PVC	0.250
2366	Minor	4.4	PVC	0.250
2367	Minor	14.1	PVC	0.300
2369	Minor	4.2	PVC	0.250
2370	Minor	48.2	PVC	0.250
2371	Minor	28.9	PVC	0.250
2373	Minor	76.5	CSP	0.500
2374	Minor	6.5	PE	0.450

2375	Minor	16.0	PE	0.450
2376	Minor	45.7	PE	0.450
2377	Minor	23.0	PE	0.450
2378	Minor	76.0	PE	0.450
2379	Minor	39.5	PE	0.450
2380	Minor	37.3	PE	0.450
2381	Minor	67.0	PE	0.375
2382	Minor	54.7	PE	0.375
2384	Minor	10.0	PE	0.375
2385	Minor	6.8	PE	0.375
2386	Minor	34.0	PE	0.300
2387	Minor	72.5	PE	0.300
2389	Minor	75.1	CSP	0.375
2390	Minor	23.5	PE	0.375
2391	Minor	89.0	PE	0.300
2393	Minor	88.0	PE	0.900
2394	Minor	86.0	PE	0.300
2395	Minor	14.5	PE	0.300
2396	Minor	60.5	PE	0.300
2397	Minor	16.1	CSP	0.300
2398	Minor	103.2	PVC	0.375
2399	Minor	8.7	PVC	0.300
2401	Minor	85.0	PE	0.525
2402	Minor	12.0	PE	0.525
2403	Minor	76.5	PE	0.375
2404	Minor	63.5	PE	0.300
2405	Minor	34.0	PE	0.300
2406	Minor	31.4	PE	0.300
2407	Minor	14.0	PE	0.300
2408	Minor	26.0	PE	0.300
2430	Minor	41.6	CONC	0.600
2431	Minor	97.0	CONC	0.600
2432	Minor	93.0	CONC	0.600
2433	Minor	11.0	CONC	0.600
2434	Minor	38.5	CONC	0.600
2435	Minor	25.5	CONC	0.525
2436	Minor	52.5	CONC	0.300
2437	Minor	35.0	CONC	0.300
2438	Minor	33.0	CONC	0.300
2439	Minor	19.1	CONC	0.300
2441	Minor	23.0	CONC	1.050
2442	Minor	7.4	CONC	1.050
2443	Minor	81.1	CONC	0.900
2444	Minor	26.4	CONC	0.900
2445	Minor	51.0	CONC	0.825

2446	Minor	47.0	CONC	0.825
2447	Minor	69.6	CONC	0.750
2448	Minor	71.8	CONC	0.675
2449	Minor	24.4	CONC	0.525
2450	Minor	19.1	CONC	0.450
2451	Minor	23.1	CONC	0.750
2452	Minor	98.1	CONC	0.750
2453	Minor	85.3	CONC	0.600
2454	Minor	41.4	CONC	0.600
2455	Minor	63.6	CONC	0.525
2456	Minor	33.2	CONC	0.450
2457	Minor	60.5	CONC	0.750
2458	Minor	86.5	CONC	0.675
2459	Minor	60.5	CONC	0.600
2460	Minor	30.0	CONC	0.525
2461	Minor	30.8	CONC	0.525
2462	Minor	56.5	CONC	0.525
2463	Minor	44.6	PVC	0.375
2464	Minor	31.4	PVC	0.250
2465	Minor	31.5	PVC	0.250
2466	Minor	22.7	PVC	0.375
2467	Minor	34.8	PVC	0.300
2468	Minor	61.7	CONC	0.450
2469	Minor	25.0	PVC	0.375
2470	Minor	27.5	PVC	0.375
2471	Minor	27.7	PVC	0.375
2472	Minor	28.1	PVC	0.300
2473	Minor	12.6	PVC	0.250
2474	Minor	16.6	PVC	0.250
2475	Minor	37.6	PVC	0.250
2476	Minor	7.9	PVC	0.250
2477	Minor	19.3	PVC	0.300
2478	Minor	20.4	CONC	0.450
2479	Minor	25.5	PVC	0.250
2480	Minor	33.9	PVC	0.250
2481	Minor	31.2	PVC	0.250
2482	Minor	46.0	PVC	0.250
2483	Minor	11.3	PVC	0.300
2484	Minor	29.1	PVC	0.250
2485	Minor	16.9	PVC	0.250
2486	Minor	45.0	PVC	0.250
2487	Minor	9.9	PVC	0.250
2488	Minor	38.8	PVC	0.250
2489	Minor	2.9	PVC	0.250
2109_1	Minor	38.6	HDPE	0.400

2109_2	Minor	37.0	HDPE	0.400
2306_2	Minor	1.5	CSP	0.550
2509_1	Minor	22.1	CSP	0.600
2509_2	Minor	23.1	CSP	0.600
2510_1	Minor	26.6	CSP	0.600
2510_2	Minor	26.6	CSP	0.600

Appendix 8 - Storm Drainage Infrastructure Plan Drawings SI-1 to SI-8

DISCLAMER AND COPYRIGHT

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No.	REVISION DESCRIPTION	DATE
1.	MECP CLI-ECA APPLICATION	JAN 2022

ENGINEERS STAMP

TOWN OF GRAVENHURST CLI-ECA APPLICATION

STORM DRAINAGE INFRASTRUCTURE PLAN

TATHAM ENGINEERING

DESIGN: CW	FILE: 220536	DWG:	
DRAWN: CW	DATE: JANUARY 2022	**SI-1**	
CHECK: DRT	SCALE: 1:2,500		

No.	REVISION DESCRIPTION	DATE
1.	MECP CLI-ECA APPLICATION	JAN 2022

ENGINEERS STAMP

TOWN OF GRAVENHURST
CLI-ECA APPLICATION

STORM DRAINAGE
INFRASTRUCTURE PLAN

TATHAM ENGINEERING

DESIGN: CW	FILE: 220536	DWG:
DRAWN: CW	DATE: JANUARY 2022	**SI-2**
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TOWN OF GRAVENHURST
CLI-ECA APPLICATION

STORM DRAINAGE INFRASTRUCTURE PLAN

TATHAM ENGINEERING

DESIGN: CW	FILE: 220536	DWG:	
DRAWN: CW	DATE: JANUARY 2022	**SI-3**	
CHECK: DRT	SCALE: 1:2,500		

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No.	REVISION DESCRIPTION	DATE
1.	MECP CLI-ECA APPLICATION	JAN 2022

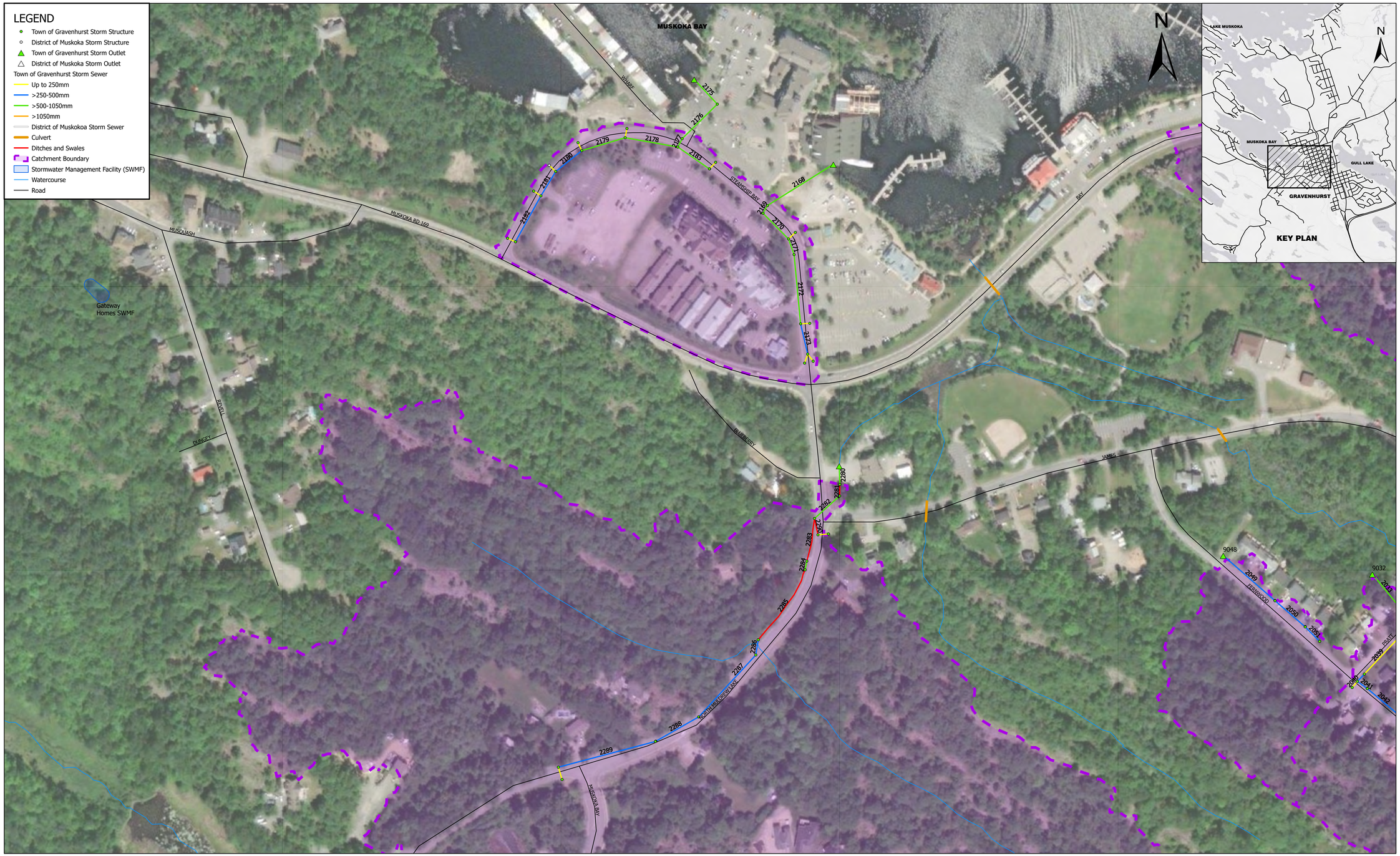
ENGINEERS STAMP

TOWN OF GRAVENHURST
CLI-ECA APPLICATION

STORM DRAINAGE INFRASTRUCTURE PLAN

TATHAM ENGINEERING

DESIGN: CW	FILE: 220536	DWG:	
DRAWN: CW	DATE: JANUARY 2022	**SI-4**	
CHECK: DRT	SCALE: 1:2,500		



50 25 0 50 100 150 200 METRES

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No.	REVISION DESCRIPTION	DATE
1.	MECP CLI-ECA APPLICATION	JAN 2022

ENGINEERS STAMP

TOWN OF GRAVENHURST
CLI-ECA APPLICATION

STORM DRAINAGE INFRASTRUCTURE PLAN

TATHAM ENGINEERING

DESIGN: CW	FILE: 220536	DWG:	
DRAWN: CW	DATE: JANUARY 2022		**SI-5**
CHECK: DRT	SCALE: 1:1,600		

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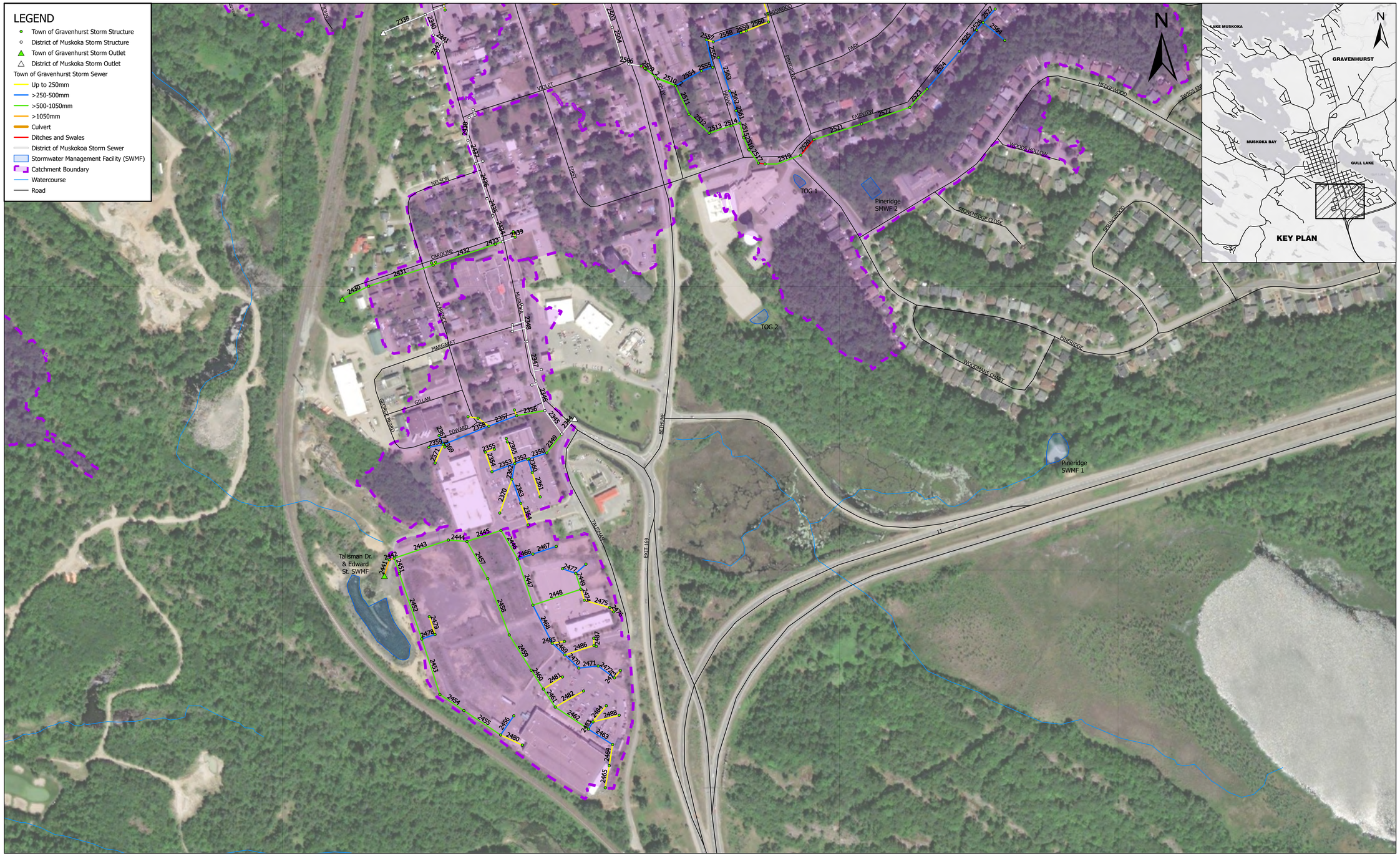
ENGINEERS STAMP

TOWN OF GRAVENHURST CLI-ECA APPLICATION

TATHAM ENGINEERING

STORM DRAINAGE INFRASTRUCTURE PLAN

DESIGN: CW	FILE: 220536	DWG:	SI-6
DRAWN: CW	DATE: JANUARY 2022		
CHECK: DRT	SCALE: 1:2,500		



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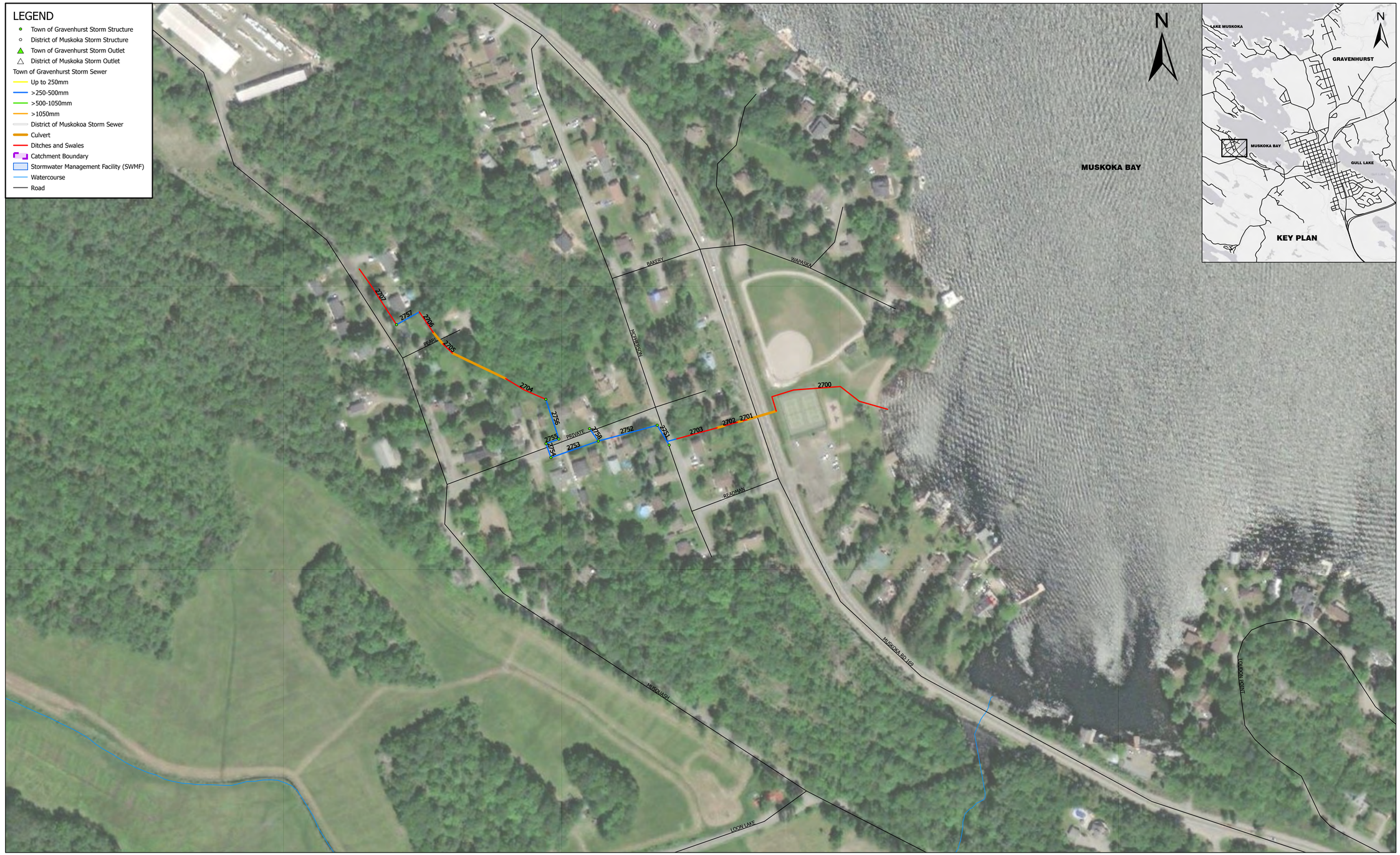
STORM DRAINAGE INFRASTRUCTURE PLAN

TATHAM ENGINEERING

DESIGN: CW	FILE: 220536	DWG:	
DRAWN: CW	DATE: JANUARY 2022	**SI-7**	
CHECK: DRT	SCALE: 1:2,500		



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No.	REVISION DESCRIPTION	DATE
1.	MECP CLI-ECA APPLICATION	JAN 2022

ENGINEERS STAMP

TOWN OF GRAVENHURST CLI-ECA APPLICATION

STORM DRAINAGE INFRASTRUCTURE PLAN

TATHAM ENGINEERING

DESIGN: CW	FILE: 220536	DWG:	
DRAWN: CW	DATE: JANUARY 2022	**SI-8**	
CHECK: DRT	SCALE: 1:1,500		

Appendix 9 – Stormwater Management Facility Drawings

309-03 – Stormwater Management Detention Pond Drawing

TOWN OF GRAVENHURST

PINERIDGE GATE
STORMWATER MANAGEMENT POND
CONTRACT No. 2015-11

KEY PLAN

INDEX

DWG.NO.	DESCRIPTION
214519-1 TP/IN	TITLE PAGE / INDEX SHEET
214519-1 OP-1	OVERALL PLAN
214519-1 DE-1	NOTES
214519-1 DE-2	DETAILS

GRAVENHURST
GATEWAY TO MUSKOKA

C.C. Tatham & Associates Ltd.
Consulting Engineers

Collingwood Bracebridge Orillia Barrie

FOR TENDER-NOTE: ALL BIDDERS MUST BE REGISTERED

CCTA FILE No. 214519-1

LOT 25
LOT 26
LOT 27
LOT 28
LOT 29
LOT 30
LOT 31
WOODSMAN CHART
PINERIDGE GATE
SANITARY PUMPING STATION
BM1
EX. EDGE OF ASPHALT
PROPERTY LINE
SILT FENCE TO OPSD 219.130
MATCH TO EXISTING EDGE OF GRAVEL
REMOVE AND REPLACE EXISTING BOULDERS TO OBTAIN ACCESS
CONSTRUCT ACCESS ROAD 4.0m WIDE c/w 50mm GRANULAR 'A' SURFACE
MATCH TO EXISTING PATH AT 256.65
600 x 600 x 50mm THICK CONCRETE PATIO STONES PLACED 1.8m WIDE
LIMIT OF GRADING
LIMIT OF RIP RAP
TOE OF SLOPE
LIMIT OF CLEARING
24.6m - 300mmØ STM OUTLET INV. = 251.60
RIP RAP APRON SEE SECTION C-C
REMOVE AND DISPOSE OF EXISTING DITCH INLET CATCH BASIN AND STORM OUTLET
LEVEL SPEADER SEE SECTION C-C, DWG DE-1
MATCH TO EXISTING GRADE
REINSTATE PATH WITH 50mm WOOD CHIPS
TOP OF BANK
MATCH TO EXISTING PATH AT 256.00
EX. DITCH
EX. TOP OF BANK
EX. BOTTOM OF BANK
EX. EDGE OF BUSH
EX. SIDEWALK
EX. PATH
3:1 (MAX.)

FOR TENDER-NOTE: ALL BIDDERS MUST BE REGISTERED

LEGEND

CONTRACT DRAWINGS

CONTRACTOR MUST VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER BEFORE COMMENCING WORK. DRAWINGS ARE NOT TO BE SCALED.

BENCHMARK INFORMATION

BM1 – 258.661m

CUT CROSS LOCATED ON SEWAGE PUMPING STATION LID ON SOUTH WEST EDGE AND ON SOUTH SIDE OF WOODSMAN CHART.

NO.	REVISIONS	DATE	INITIAL
1.	ISSUED FOR TENDER	APR/15	JA

APPROVED

LICENSED PROFESSIONAL ENGINEER — PROVINCE OF ONTARIO

TOWN OF GRAVENHURST
PINERIDGE GATE
STORM WATER MANAGEMENT POND

OVERALL PLAN

C.C. Tatham & Associates Ltd.
Consulting Engineers
Collingwood Bracebridge Orillia Barrie

SCALE: 1:250		JOB NO.	214519-1
DESIGN: RTM	CHECKED: BVR/JA	DWG.	**OP-1**
DRAWN: DFT	DATE: JUNE/14		

A. GENERAL CONSTRUCTION

1. ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH TOWN OF GRAVENHURST (TOWN) STANDARDS AND OPSS. WHERE CONFLICT OCCURS, TOWN STANDARDS GOVERN.
2. ALL DIMENSIONS ARE IN METRES (m) OR MILLIMETRES (mm) UNLESS SPECIFIED OTHERWISE.
3. ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH OCCUPATIONAL HEALTH AND SAFETY ACT.
4. DEWATERING TO BE CARRIED OUT IN ACCORDANCE WITH OPSS 517 AND 518 TO MAINTAIN ALL TRENCHES IN A DRY CONDITION.
5. ALL ENGINE DRIVEN PUMPS TO BE ADEQUATELY SILENCED, SUITABLE FOR OPERATION IN A RESIDENTIAL DISTRICT.
6. DISTURBED AREAS TO BE REINSTATED TO PREVIOUS CONDITION OR BETTER AND TO THE SATISFACTION OF THE CONTRACT ADMINISTRATOR.
7. REMOVAL AND RESTORATION LIMITS SHOWN ON DRAWINGS ARE APPROXIMATE ONLY AND TO BE CONFIRMED BY CONTRACT ADMINISTRATOR DURING CONSTRUCTION.
8. THE CONTRACTOR IS RESPONSIBLE FOR ALL LAYOUT. THE CONTRACTOR SHALL PROTECT SURVEY MONUMENTS AND BENCHMARKS ENCOUNTERED DURING THE WORK. ALL SURVEY MONUMENTS AND BENCHMARKS DISTURBED DURING CONSTRUCTION SHALL BE REPLACED BY AN ONTARIO LAND SURVEYOR, AT THE CONTRACTOR'S EXPENSE.
9. THE CONTRACTOR IS REQUIRED TO CONFIRM EXISTING GRADES AND REPORT ANY DISCREPANCIES TO THE CONTRACT ADMINISTRATOR BEFORE COMMENCING WORK.
10. THE CONTRACTOR SHALL MAINTAIN ADEQUATE ACCESS\EGRESS TO ALL PRIVATE AND PUBLIC PROPERTY AT ALL TIMES. ALL DRIVEWAYS DISTURBED DURING CONSTRUCTION SHALL BE REINSTATED TO EXISTING CONDITION OR BETTER IN A TIMELY MANNER.
11. THE CONTRACTOR SHALL SUPPLY ALL NECESSARY WATER AND/OR CALCIUM CHLORIDE AS REQUIRED FOR COMPACTION AND/OR DUST CONTROL.
12. CLEARING AND GRUBBING DEBRIS TO BE REMOVED FROM THE SITE AND DISPOSED IN A LICENSED FACILITY APPROVED TO ACCEPT THE WASTE AS PER ONTARIO REGULATION 347. TREES OR SHRUBS REQUIRED TO BE REMOVED BY THE CLEARING AND GRUBBING OPERATION WILL NOT BE REPLACED AS PART OF STANDARD RESTORATION.
13. THE CONTRACTOR SHALL PROVIDE A TRAFFIC CONTROL PLAN PRIOR TO START OF THE WORK. ROAD OCCUPANCY PERMITS FROM THE TOWN SHALL BE OBTAINED AS REQUIRED. TRAFFIC CONTROL AND SIGNAGE DURING CONSRUCTION SHALL CONFORM TO TOWN REQUIREMENTS AND THE MOST CURRENT ONTARIO CONSTRUCTION REGULATIONS INCLUDING REGULATION NO. 213 UNDER OHSA AND REFERENCE TO MTO TEMPORARY CONDITIONS MANUAL BOOK NO. 7.
14. THE CONTRACTOR SHALL MAKE HIS OWN ARRANGEMENTS FOR THE SUPPLY OF TEMPORARY WATER AND/OR POWER.
15. TRENCH BACKFILL SHALL BE IMPORTED SELECT SUBGRADE MATERIAL WITH MINIMUM 20% PASSING THE #200 SIEVE. BEDDING AND COVER MATERIAL SHALL BE GRANULAR 'A' FOR ALL PIPE.
16. BEDDING COVER AND BACKFILL TO CONFORM TO OPSD 802.010, 802.013, 802.014, 802.030, 802.031, 802.032, 802.033, AND 802.034 BASED ON PIPE MATERIAL AND SOIL CONDITIONS AND TO BE COMPACTED TO A DRY DENSITY OF AT LEAST 95% OF THE MATERIALS SPMDD.
17. TOWN OF GRAVENHURST AND DISTRICT OF MUSKOKA OPERATIONS DEPARTMENTS TO BE NOTIFIED OF ALL CONSTRUCTION ACTIVITIES A MINIMUM OF 72 HOURS PRIOR TO COMMENCEMENT OF CONSTRUCTION.
18. ALL PRIVATE LANDSCAPE FEATURES DISTURBED DURING CONSTRUCTION, INCLUDING TREES, SHRUBS AND WALLS SHALL BE REINSTATED OR REPLACED TO EXISTING CONDITION OR BETTER AND APPROVED BY THE CONTRACT ADMINISTRATOR.

B. STORM SEWER

1. CORRUGATED STEEL PIPE INLET STRUCTURE SHALL COME FROM THE FACTORY COMPLETE WITH OPENING FOR OUTLET PIPING. OPENING SHALL BE NO MORE THAN 25mm WIDER THAN THE OUTLET PIPE'S OUTSIDE DIAMETER. OUTLET STRUCTURE LID SHALL BE EITHER THE SAME MATERIAL AND COATING AS THE RISER SECTION OR SHALL BE STAINLESS STEEL. LID SHALL HAVE MINIMUM 25mmØ OPENINGS ON 200mm GRID PATTERN. LID SHALL BE CAPABLE OF BEING SECURELY FASTENED AND LOCKED TO RISER SECTION.
2. IF SEPARATION BETWEEN PROPOSED STORM SEWER AND OTHER STRUCTURES OR PIPING OR UTILITIES IS LESS THAN 300mm VERTICALLY, INSTALL MIN. 50mm HI-60 INSULATION AS DIRECTED BY CONTRACT ADMINISTRATOR.

C. MATERIALS

1. ALL MATERIALS, PIPES, STRUCTURES, APPURTENANCES TO BE CSA APPROVED.
2. STORM SEWER – CORRUGATED POLYETHYLENE PIPE – ADS N-12 SMOOTH WALL HIGH DENSITY POLYETHYLENE, WITH BELL AND SPIGOT JOINTS COMPLETE WITH GASKET, MINIMUM PIPE STIFFNESS 320KPa, OR APPROVED EQUAL.
3. FILTER FABRIC – TERRAFIX 400 R. OR APPROVED EQUAL WITH 300mm OVERLAP.
4. EROSION CONTROL BLANKET – CURLEX II BY AMERICAN EXCELSIOR CO. OR APPROVED EQUAL.

D. UTILITIES

1. LOCATION OF EXISTING UTILITIES ARE APPROXIMATE ONLY, ACTUAL LOCATION TO BE ESTABLISHED BY CONTRACTOR.
2. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR LOCATING, SUPPORTING AND PROTECTING ALL UNDERGROUND AND OVERHEAD UTILITIES AND STRUCTURES EXISTING AT THE TIME OF CONSTRUCTION IN THE AREA OF THE CONTRACTORS WORK, WHETHER SHOWN ON THE PLANS OR NOT, AND FOR ALL REPAIRS AND CONSEQUENCES RESULTING FROM DAMAGE TO SAME.
3. ANY AREA OF POSSIBLE CONFLICTS WITH EXISTING UTILITIES SHALL BE EXCAVATED BY HAND PRIOR TO CONSTRUCTION.
4. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE TO GIVE 72 HOURS WRITTEN NOTICE TO UTILITY CORPORATIONS PRIOR TO CROSSING UTILITIES FOR THE PURPOSE OF INSPECTION BY THE CONCERNED CORPORATION. THIS INSPECTION WILL BE FOR THE DURATION OF CONSTRUCTION WITH THE CONTRACTOR RESPONSIBLE FOR ALL COSTS ARISING FROM SUCH INSPECTION.

E. SILTATION AND EROSION CONTROL

1. SILTATION AND EROSION CONTROL WORKS TO BE INSTALLED PRIOR TO COMMENCING WORK AND MAINTAINED DURING CONSTRUCTION TO ENSURE NO MIGRATION OF SEDIMENT OFF SITE.
2. THE CONTRACTOR SHALL PROVIDE A DETAILED SILTATION AND EROSION CONTROL STRATEGY FOR APPROVAL BY THE CONTRACT ADMINISTRATOR PRIOR TO CONSTRUCTION. SUFFICIENT SILTATION AND EROSION CONTROL MEASURES SHALL BE INSTALLED TO PREVENT EROSION AND SEDIMENT MIGRATION DURING CONSTRUCTION. ALL SEDIMENT CONTROL MEASURES SHALL BE INSPECTED AFTER EACH SIGNIFICANT STORM EVENT AND REPAIRED/REPLACED AS NECESSARY. THE CONTRACTOR SHALL SUBMIT A WEEKLY REPORT ON SEDIMENT CONTROL MEASURES, INDICATING ALL CORRECTIVE ACTION TAKEN DURING THE REPORTING PERIOD AND ITEMIZING CONTROL MEASURES CURRENTLY IN PLACE. ALL SILTATION AND EROSION CONTROL MEASURES TO BE IN PLACE PRIOR TO CONSTRUCTION ACTIVITIES COMMENCING AND MAINTAINED UNTIL GROUND COVER IS WELL ESTABLISHED, AS DETERMINED BY THE CONTRACT ADMINISTRATOR.
3. HEAVY DUTY SILT FENCE BARRIER TO OPSD 219.130.
4. STRAW BALE FLOW CHECK TO OPSD 219.180.
5. ROCK CHECK DAMS IN ACCORDANCE WITH OPSD 219.210 AND OPSD 219.211 AND SHALL BE CONSTRUCTED IN DITCHES AT A SPACING OF 100 METRES MAXIMUM.
6. DEWATERING EQUIPMENT SHALL BE DISCHARGED TO GRASSED AREAS, INFILTRATION PITS OR FILTRATION BAGS AS DIRECTED BY THE CONTRACT ADMINISTRATOR.
7. FOR AREAS WHERE REINSTATEMENT WITH TOPSOIL AND SEED IS ACCEPTABLE AND CONSTRUCTION HAS EXTENDED INTO THE FALL SEASON AND SEED HAS NOT BEEN APPLIED BEFORE OCTOBER 1, THE AREA SHALL BE REINSTATED WITH TOPSOIL AND SOD OR HIGH VELOCITY CURLEX BLANKET.

F. REINSTATEMENT

1. REINSTATE ASPHALT ROADWAYS TO EXISTING CONDITION OR BETTER AS APPROVED BY THE CONTRACT ADMINISTRATOR.
2. SIGNS REMOVED DURING CONSTRUCTION SHALL BE REINSTATED TO TOWN STANDARDS.
3. SUBGRADE TO BE COMPACTED TO 95% OF THE MATERIAL'S SPMDD AND WITHIN 500mm OF THE SUBGADE ELEVATION, AT LEAST 98% OF THE MATERIAL'S SPMDD.
4. LAWN AREAS DISTURBED BY CONSTRUCTION SHALL BE REINSTATED WITH A MINIMUM 100MM OF TOPSOIL (OPSS 570) AND SOD (OPSS 571). SOD SHALL BE TO THE ONTARIO SOD GROWERS ASSOCIATION SPECIFICATION FOR NO. 1 BLUE GRASS FESCUE SOD CUT TO A MINIMUM THICKNESS OF 20MM. THE CONTRACTOR SHALL WATER THE SOD FOR A MINIMUM OF 2 MONTHS AND BE RESPONSIBLE FOR THE FIRST TWO CUTTINGS.
5. WHERE REQUIRED, RIP RAP TO BE 300mm DEEP, 150mm TO 200mmØ IN SIZE PLACED OVER TERRAFIX 270R FILTER FABRIC. PLACEMENT TO CONFORM WITH OPSS 511 AND OPSD 810.01 UNLESS OTHERWISE SPECIFIED.
6. CONTRACTOR TO RECORD EXISTING GRADES AND CONDITIONS ALONG CONSTRUCTION ROUTE SUFFICIENT TO REINSTATE ALL DITCHES, CULVERTS, HEADWALLS, DRIVEWAYS, ROADS, ETC. WHICH MAY BE DISTURBED DURING CONSTRUCTION OF THE WORKS. A COPY OF CONTRACTORS RECORDS TO BE PROVIDED TO THE CONTRACT ADMINISTRATOR PRIOR TO CONSTRUCTION.
7. ANY PRIVATE PROPERTY ELEMENTS DISTURBED DUE TO CONSTRUCTION ACTIVITIES TO BE REPLACED WITH NEW ELEMENT OF SIMILAR TYPE AS DIRECTED BY THE CONTRACT ADMINISTRATOR. THE CONTRACTOR MUST ENTER INTO AN AGREEMENT WITH THE PROPERTY OWNER PRIOR TO WORKING ON PRIVATE PROPERTY.

FOR TENDER-NOTE: ALL BIDDERS MUST BE REGISTERED

LEGEND

CONTRACT DRAWINGS

CONTRACTOR MUST VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER BEFORE COMMENCING WORK. DRAWINGS ARE NOT TO BE SCALED.

BENCHMARK INFORMATION

BM1 – 258.661m

CUT CROSS LOCATED ON SEWAGE PUMPING STATION LID ON SOUTH WEST EDGE AND ON SOUTH SIDE OF WOODSMAN CHART.

NO.	REVISIONS	DATE	INITIAL
1.	ISSUED FOR TENDER	APR/15	JA

APPROVED

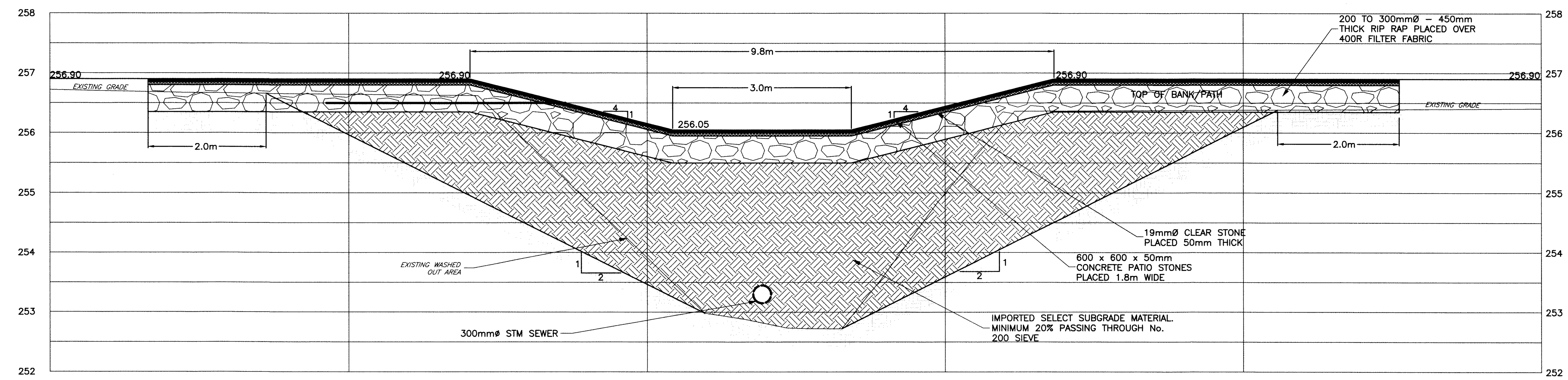
LICENSED PROFESSIONAL ENGINEER J. R. ASH 100123062 PROVINCE OF ONTARIO

TOWN OF GRAVENHURST
PINERIDGE GATE
STORM WATER MANAGEMENT POND

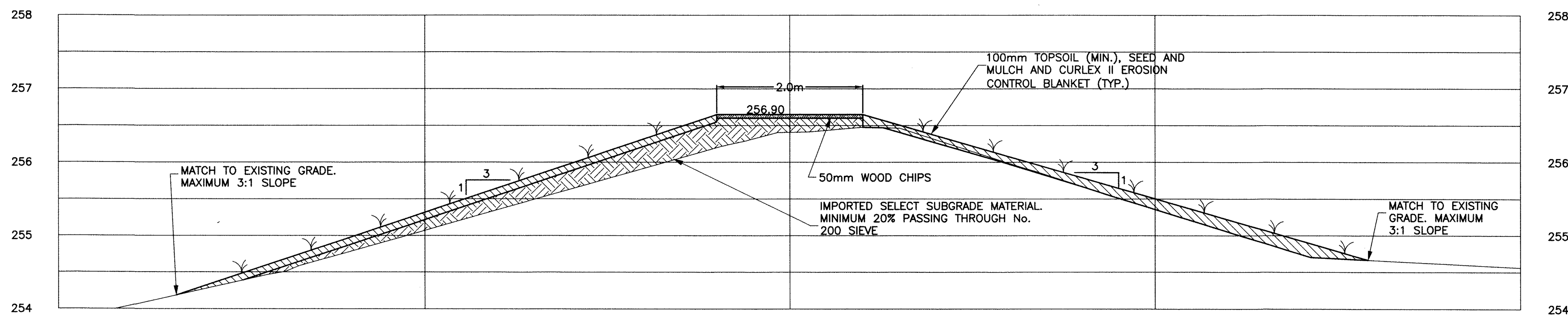
NOTES

C.C. Tatham & Associates Ltd.
Consulting Engineers
Collingwood Bracebridge Orillia Barrie

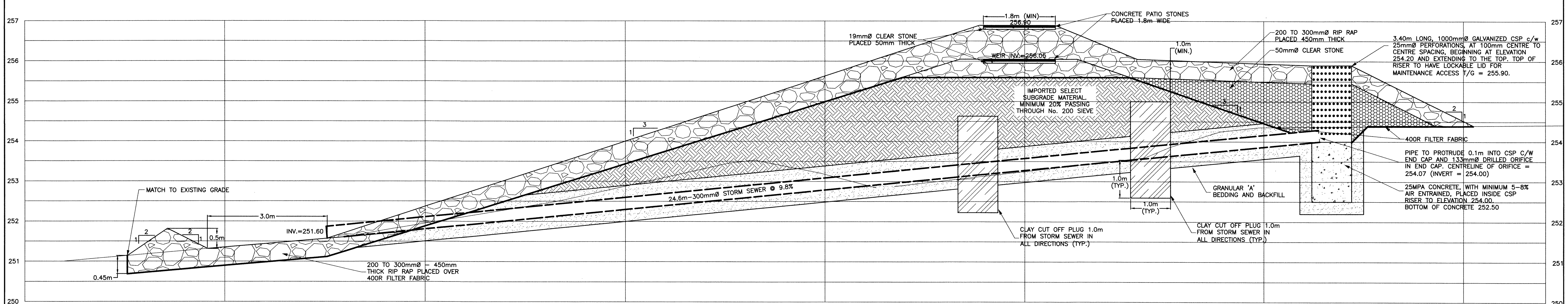
SCALE: AS SHOWN		JOB NO.	214519-1
DESIGN: RTM	CHECKED: BVR/JA	DWG.	**DE-1**
DRAWN: DFT	DATE: JUNE/14		



A–A / DE–2 **WEIR SECTION**
SCALE 1:50



B–B / DE–2 **BERM SECTION**
SCALE 1:50



C–C / DE–2 **STORM OUTLET SECTION**
SCALE 1:50

FOR TENDER-NOTE: ALL BIDDERS MUST BE REGISTERED

LEGEND

CONTRACT DRAWINGS

CONTRACTOR MUST VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER BEFORE COMMENCING WORK. DRAWINGS ARE NOT TO BE SCALED.

BENCHMARK INFORMATION

BM1 – 258.661m
CUT CROSS LOCATED ON SEWAGE PUMPING STATION LID ON SOUTH WEST EDGE AND ON SOUTH SIDE OF WOODSMAN CHART.

NO.	REVISIONS	DATE	INITIAL
1.	ISSUED FOR TENDER	APR/15	JA

APPROVED
LICENSED PROFESSIONAL ENGINEER — PROVINCE OF ONTARIO — 100123082 — April 14 2015

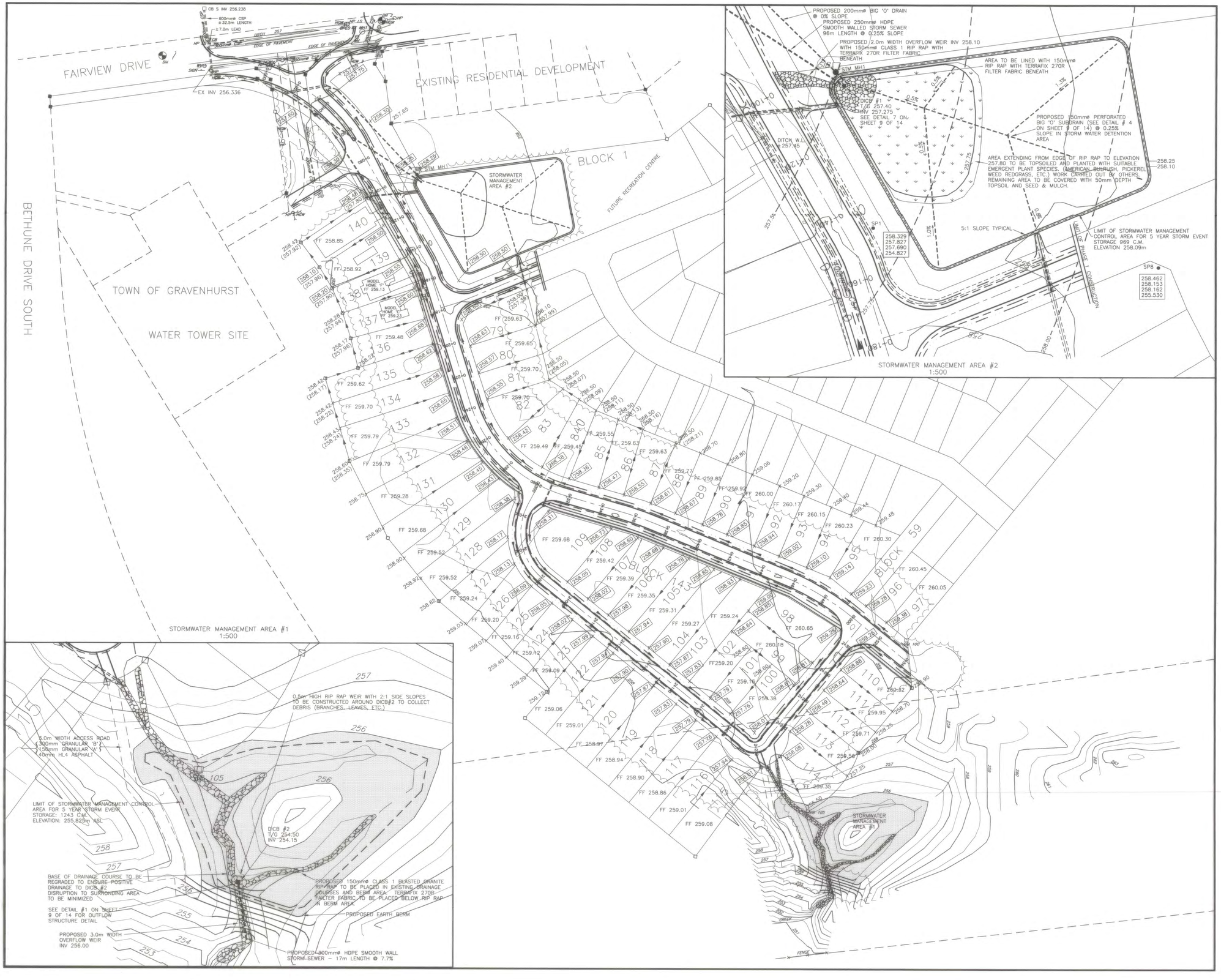
TOWN OF GRAVENHURST
PINERIDGE GATE
STORM WATER MANAGEMENT POND

DETAILS

C.C. Tatham & Associates Ltd.
Consulting Engineers
Collingwood Bracebridge Orillia Barrie

SCALE: AS SHOWN		JOB NO.	214519-1
DESIGN: RTM	CHECKED: BVR/JA	DWG.	DE-2
DRAWN: DFT	DATE: JUNE/14		

309-04 – Dry Detention Pond Drawing



NORTH

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NOTES

258.20 – EXISTING GRADE TO REMAIN

258.34 – PROPOSED GRADE

(257.95) – PROPOSED INVERT OF SWALE GRADE

FF 259.15 – FINISHED FLOOR

FINISHED FLOOR ELEVATION MAY REQUIRE ADJUSTMENT AS A RESULT OF ONSITE GROUNDWATER CONDITIONS. THE SOILS CONSULTANT HAS RECOMMENDED THAT THE LOWER FLOOR ELEVATIONS BE MAINTAINED 0.6m ABOVE GROUNDWATER LEVEL. FIRST FLOOR ELEVATION TO BE REVIEWED BY THE ENGINEER PRIOR TO BUILDING CONSTRUCTION.

DIRECTION OF DITCH FLOW

DIRECTION OF LOT DRAINAGE

LIMIT OF WOODED AREA TO REMAIN NATURAL

GROUNDWATER CONTOURS DERIVED FROM APRIL 4 1996 G.W.L.

SP8 STANDPIPE AND NUMBER

258.462 TOP OF STANDPIPE
258.153 GROUND LEVEL
258.162 W.L. APRIL 4 1996
----- BOTTOM OF STANDPIPE

SUMP PUMPS TO DISCHARGE TO ROADSIDE DITCHES

RAIN FROM ROOF LEADERS TO DISCHARGE TO GROUND SURFACE ON SPLASH PADS

ALL FOUNDATIONS TO BE CONSTRUCTED AS CRAWL SPACES MAXIMUM FOUNDATION DEPTH OF 0.97m BELOW FINISHED GRADE UNLESS OTHERWISE APPROVED BY ENGINEER.

NO.	REVISION	BY	DATE
4	REVISED FF E;EVATIONS (ALL LOTS)	GBH	96.07.08
3	REVISED PER DISTRICT COMMENTS	GBH	96.05.02
2	REVISED SWM AREA #2	GBH	96.04.15
1	STREET THREE REALIGNMENT & SWM	GBH	96.04.08

PENEX GRAVENHURST LTD.

PARAGON ENGINEERING LIMITED
CONSULTING ENGINEERS
6-4 DOMINION STREET BRACEBRIDGE ONTARIO P1L 2A6

PINERIDGE
TOWN OF GRAVENHURST
PHASE 1 CONSTRUCTION
STORMWATER MANAGEMENT, AND GRADING PLAN

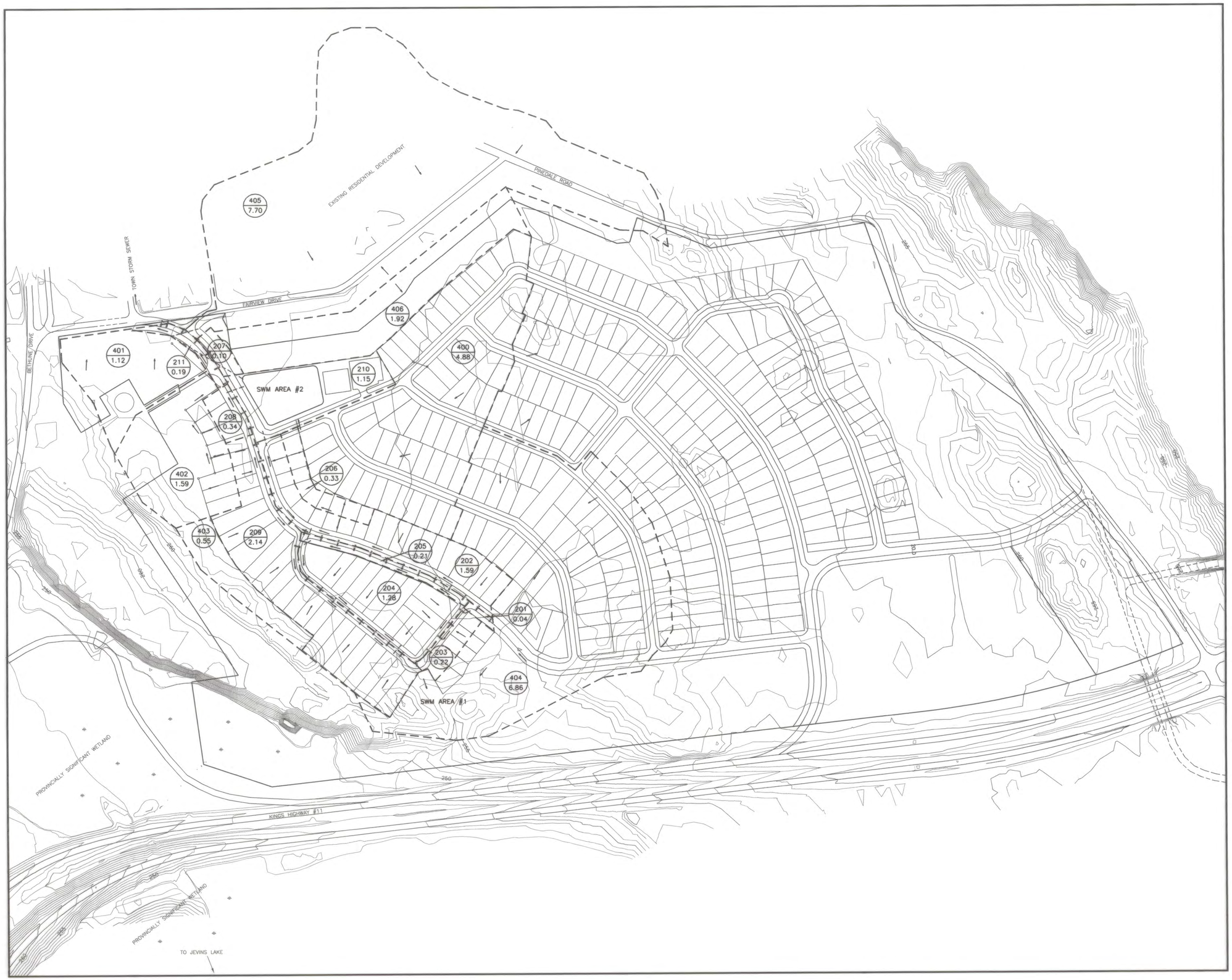
REGISTERED PROFESSIONAL ENGINEER D.E. BROUILLETTE DEC 8/97 PROVINCE OF ONTARIO

DWN. BY: GBH	CHK'D BY: DEB
DATE: 95.10.10	DSGN. BY: DEL
SCALE: 1:1000	

PROJECT NO.	SHEET NO.	REV. NO.
5714	5 of 14	4

GBH/96.05.02/5714SM1.DWG

Thu Dec 18 13:02:32 1997



NORTH

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NOTES

TOPOGRAPHIC BASE MAPPING IS COMPILED FROM DIGITIZED MAPPING PROVIDED BY NORTHWAY MAP TECHNOLOGY LIMITED FROM AERIAL PHOTOGRAPHY CONDUCTED IN 1970. AS SUCH, NEWLY CONSTRUCTED FEATURES MAY NOT BE DEPICTED ON THIS PLAN. CONTOUR INFORMATION IS APPROXIMATELY 1.0m HIGHER THAN PARAGON ENGINEERING LIMITED TOPOGRAPHIC SURVEY INFORMATION BASED ON GEODETIC ELEVATION. HOWEVER CONTOUR ELEVATION IS REPRESENTATIVE OF SITE TOPOGRAPHY AND SUITABLE FOR ESTABLISHING EXTERNAL DRAINAGE CATCHMENTS.

202 / 1.32 — CATCHMENT NUMBER / CATCHMENT AREA (Ha)

→ DIRECTION OF OVERLAND FLOW

NO.	REVISION	BY	DATE
2	REVISED SWM AREA #2	GBH	96.04.12
1	STREET THREE REALIGNMENT & SWM	GBH	96.04.08

PENEX GRAVENHURST LTD.

PARAGON ENGINEERING LIMITED
CONSULTING ENGINEERS
6-4 DOMINION STREET BRACEBRIDGE ONTARIO P1L 2A6

PINERIDGE
TOWN OF GRAVENHURST
PHASE 1 CONSTRUCTION

SWM PLAN
POST DEVELOPMENT CONDITIONS

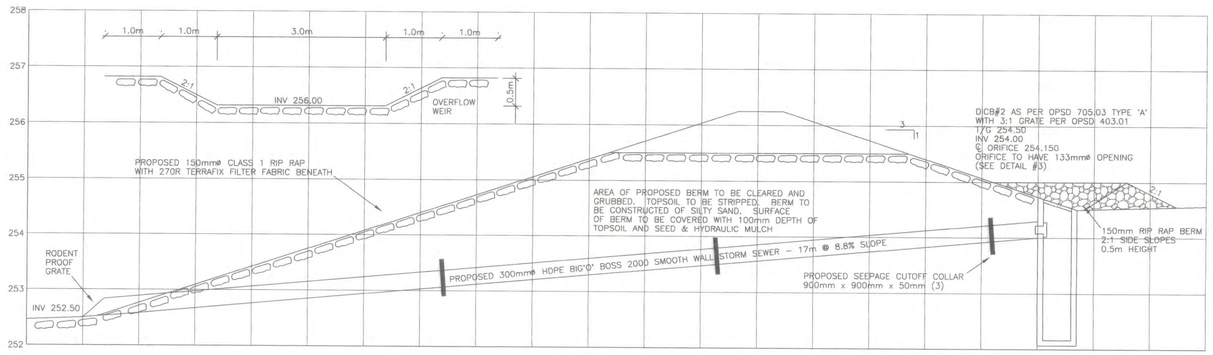
REGISTERED PROFESSIONAL ENGINEER — D.E. BROUILLETTE — DEC 18/97 — PROVINCE OF ONTARIO

DWN. BY: GBH	CHK'D BY: DEB
DATE: 96.01.30	DSGN. BY: DEL
SCALE: 1:2000	

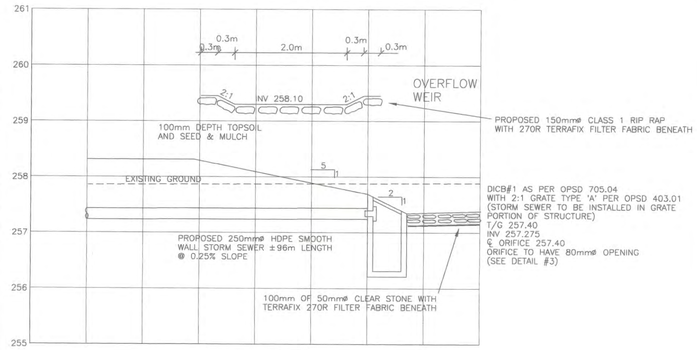
PROJECT NO.	SHEET NO.	REV. NO.
5714	6 of 14	2

GBH/96.04.12/5714SM2.DWG

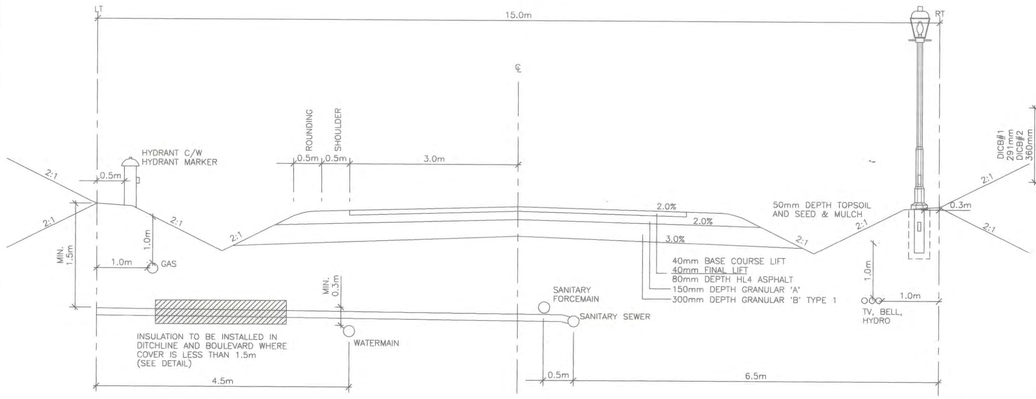
Thu Dec 18 13:17:15 1997



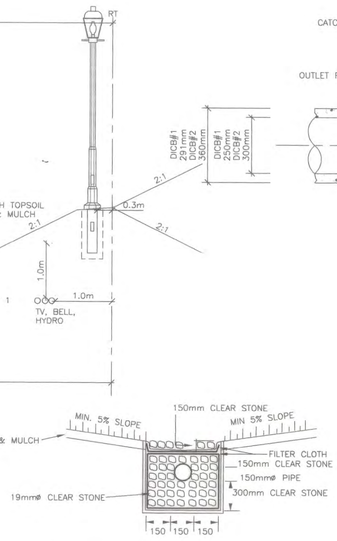
DETAIL #1
OUTFLOW STRUCTURE – STORMWATER MANAGEMENT POND #1
SCALE 1:50



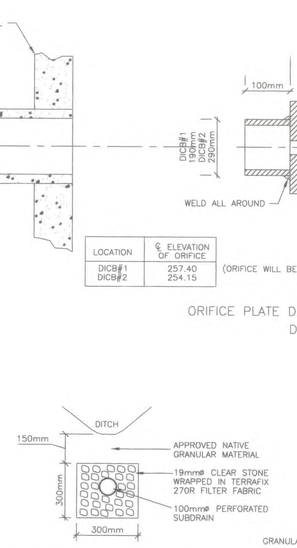
DETAIL #2
OUTFLOW STRUCTURE – STORMWATER MANAGEMENT POND #2
SCALE 1:50



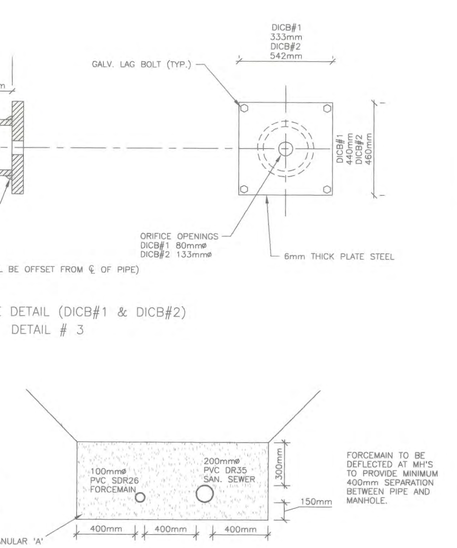
TYPICAL ROAD SECTION
15.0m RIGHT OF WAY (STREET TWO)
SCALE 1:50



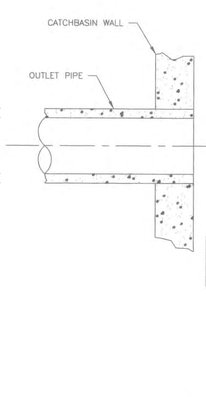
SUBDRAIN DETAIL FOR SWM AREA #2



SUBDRAIN IN DITCH DETAIL



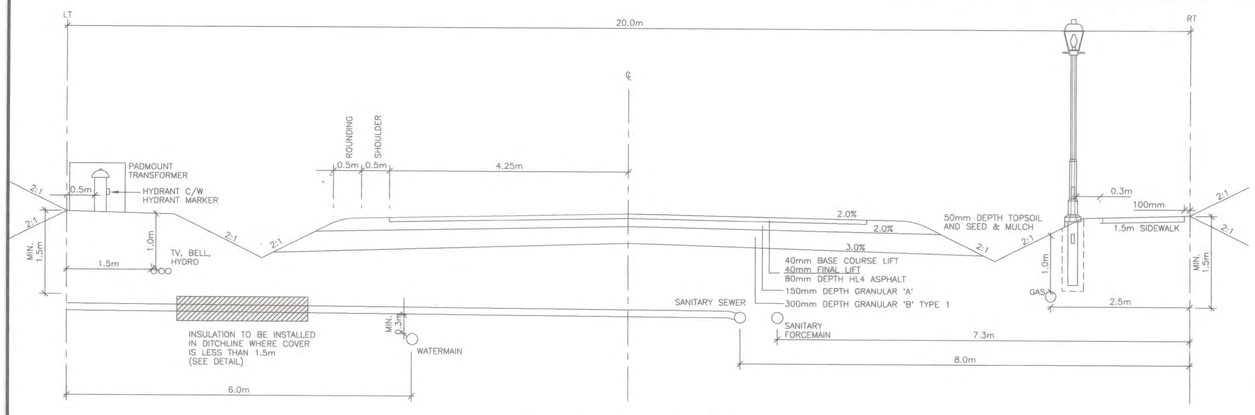
SANITARY SEWER & FORCEMAIN
IN JOINT TRENCH DETAIL
(FROM SAN MH10 TO SAN MH13)



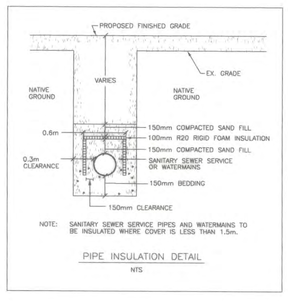
LOCATION	℄ ELEVATION OF ORIFICE
DICB#1	257.40
DICB#2	254.15

(ORIFICE WILL BE OFFSET FROM ℄ OF PIPE)

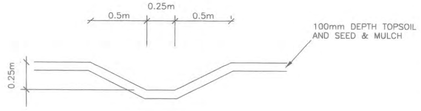
ORIFICE PLATE DETAIL (DICB#1 & DICB#2)
DETAIL # 3



TYPICAL ROAD SECTION
20.0m RIGHT OF WAY (STREET ZERO)
STATION 0+180 to 0+540
SCALE 1:50



PIPE INSULATION DETAIL
NTS



DETAIL #4
REAR LOT DRAINAGE SWALE
LOTS 77 TO 86 & LOTS 133 TO 140
SCALE 1:25

NORTH

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NOTES

See sheet 10 of 13 for notes.

The pavement granular materials should conform to OPS specifications for select granular materials. The granular material should be spread in maximum 150mm thick lifts and uniformly compacted to at least 98% Standard Proctor maximum dry density. Asphaltic concrete should be compacted to a minimum 96% Marshall density.

NO.	REVISION	BY	DATE
4	REVISED BERM CONSTRUCTION NOTE	GBH	96.07.08
3	REVISED PER DISTRICT COMMENTS	GBH	96.05.03
2	REV'D DETAIL #2, #3 & SUBDRAIN	GBH	96.04.15
1	ADD SUBDRAIN DETAIL, REV DETAIL 2	GBH	96.04.08

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PARAGON ENGINEERING LIMITED
CONSULTING ENGINEERS
6-4 DOMINION STREET BRACEBRIDGE ONTARIO P1L 2A6

PINERIDGE
TOWN OF GRAVENHURST
PHASE 1 CONSTRUCTION

DETAILS PAGE

REGISTERED PROFESSIONAL ENGINEER PROVINCE OF ONTARIO
D.E. BROUILLETTE
DEC 13/97

DWN. BY: GBH	CHK'D BY: DEB
DATE: 96.01.31	DSGN. BY: DEL
SCALE: 1:50	

PROJECT NO.	SHEET NO.	REV. NO.
5714	9 of 14	4

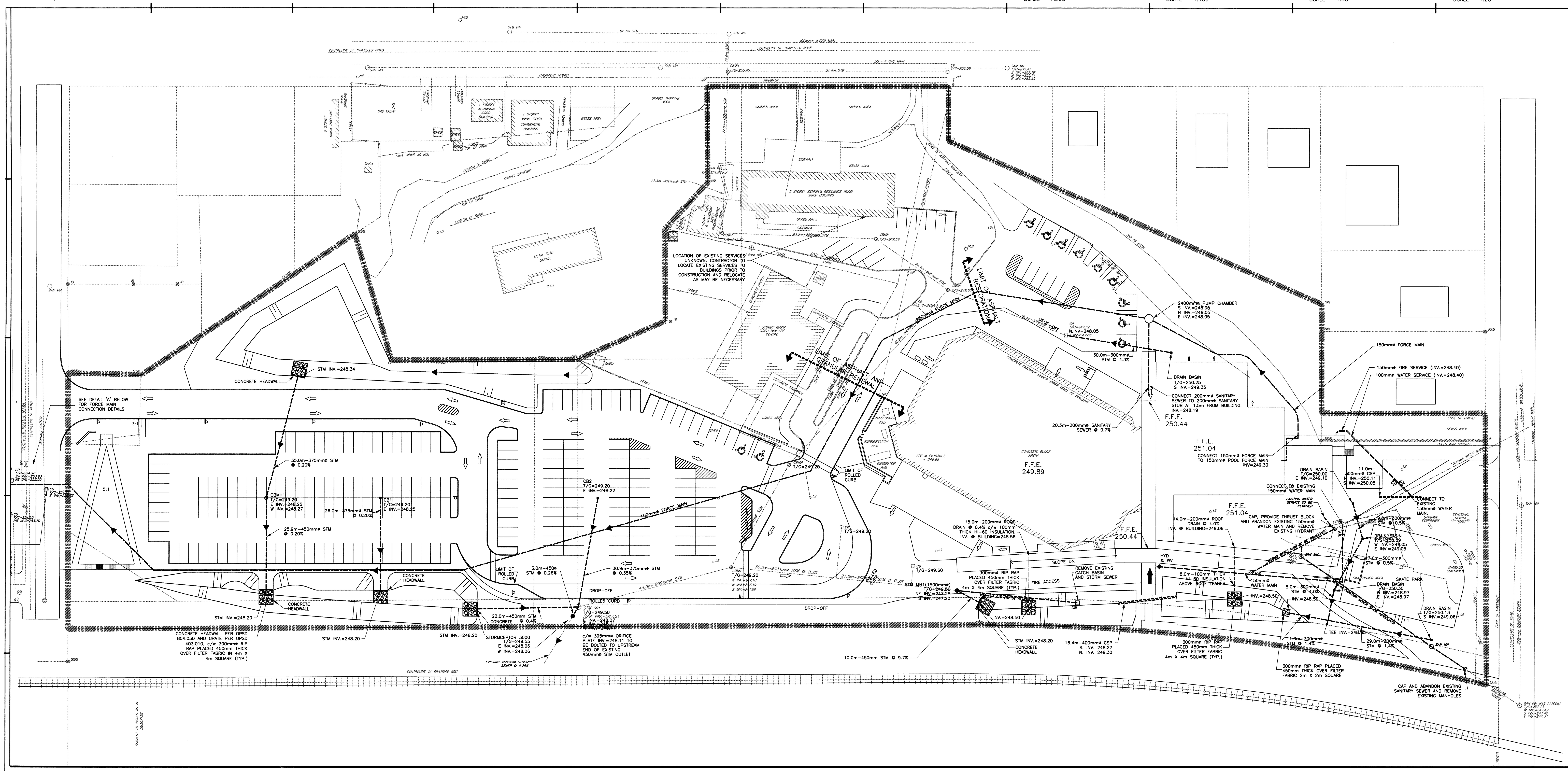
GBH/96.07.08/5714DT.DWG

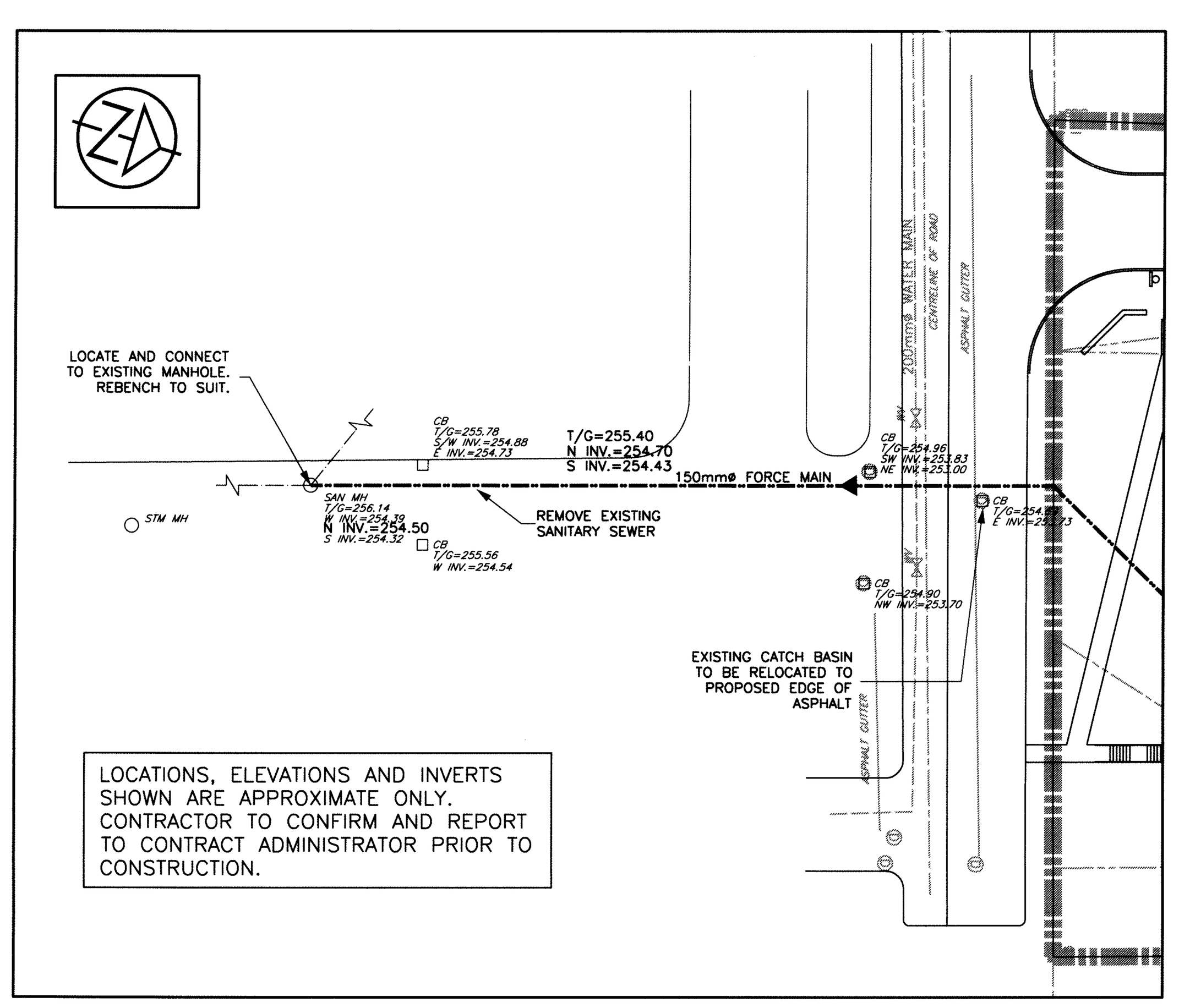
Thu Dec 18 13:47:59 1997

309-06 – Dry Detention Pond Drawing

SCALE 1/16"=1'-0" | SCALE 1/8"=1'-0" | SCALE 1/4"=1'-0" | SCALE 3/8"=1'-0" | SCALE 1/2"=1'-0" | SCALE 1:200 | SCALE 1:100 | SCALE 1:50 | SCALE 1:20

IF THIS SHEET IS NOT 32 1/4" X 49 3/4" (820 X 1265 MM) IT IS A REDUCED PRINT – READ DWG. ACCORDINGLY





LOCATIONS, ELEVATIONS AND INVERTS SHOWN ARE APPROXIMATE ONLY. CONTRACTOR TO CONFIRM AND REPORT TO CONTRACT ADMINISTRATOR PRIOR TO CONSTRUCTION.

DETAIL 'A' – FORCEMAIN CONNECTION DETAIL

1:400

DRAWING LAST EDITED: 20JAN10 17:28:41

KEY TO DETAIL LOCATION

No. — DETAIL NUMBER / No. — DRAWING NUMBER

CONTRACTORS MUST CHECK AND VERIFY ALL DIMENSIONS ON THE JOB AND REPORT ANY DISCREPANCIES TO THE ARCHITECT BEFORE PROCEEDING WITH THE WORK.

ALL PRINTS AND SPECIFICATIONS ARE THE PROPERTY OF THE ARCHITECT AND MUST BE RETURNED AT THE COMPLETION OF THE WORK.

DRAWINGS SHOULD NOT BE SCALED.

NO.	REVISION/ISSUE	DATE
1	ISSUED FOR TENDER PACKAGE No. 4	22FEB2010
2	ISSUED FOR PACKAGE No. 4 – ADD. No. 1	26MAR2010
3	ISSUED FOR PACKAGE No. 4 – ADD. No. 2	19APR2010
4	ISSUED FOR PACKAGE No. 15 – FOR TENDER AND PERMIT	7MAY2010
5	ISSUED FOR CONSTRUCTION	4JUN2010
6	REVISED STORM SEWER	15JUN2010

C.C. Tatham & Associates Ltd.
Consulting Engineers
Collingwood Bracebridge Orillia Barrie

LICENSED PROFESSIONAL ENGINEER W. G. VAN RYN PROVINCE OF ONTARIO

Canada

Ontario

Architectural:
CS&P Architects
2345 Yonge Street, Suite 200
Toronto, Ontario M4P 2E5
416.482.5002 Fax 416.482.5040

Structural:
Halcrow Yolles
207 Queen's Quay West,
Suite 550, P.O. Box 132
Toronto, Ontario M5J 1A7
416.363.8123 Fax 416.363.0341

Electrical / Mechanical:
MCW Consultant Ltd.
150 Front street West, #600
Toronto, Ontario M5J 2I6
416.598.2920 Fax 416.598.5394

Civil Engineering:
C.C. Tatham & Associates Ltd.
8 Baron Drive
Bracebridge, Ontario P1L 0A1
705.645.7756 Fax 705.645.8159

Landscape:
Graham Hess and Associates Inc.
482 Dorland
Oakville, Ontario L6J 6B1
519.439.4451 Fax 519.439.3217

Pool:
Aqua Plans
1244 Victoria St. N. Unit J
Kitchener, Ontario
519.743.6760 FAX 519.743.7971

Kitchen:
LTD Consulting Group Inc.
181 Groh Avenue, Suite 103
Cambridge, Ontario N3C 1Y8
519.658.0004 Fax 519.658.0048

CS&P Architects

DRAWN BY: DFT

CHECKED BY: BVR/JAW

DATE: FEBRUARY 2010

PROJECT TITLE:

GRAVENHURST CENTENNIAL CENTRE EXPANSION AND AQUATIC FACILITY

GRAVENHURST GATEWAY TO MUSKOKA

YMCA of Simcoe/Muskoka

GRAVENHURST ONTARIO

DRAWING TITLE:

SITE SERVICING PLAN

SCALE: 1:400

PROJECT NO. 09036

DWG. NO. SS–1

Revision: 0

SCALE 1/16"=1'-0" | SCALE 1/8"=1'-0" | SCALE 1/4"=1'-0" | SCALE 3/8"=1'-0" | SCALE 1/2"=1'-0" | SCALE 1:200 | SCALE 1:100 | SCALE 1:50 | SCALE 1:20

IF THIS SHEET IS NOT 32 1/4" X 49 3/4" (820 X 1265 MM) IT IS A REDUCED PRINT – READ DWG. ACCORDINGLY

KEY TO DETAIL LOCATION

No. (DETAIL NUMBER) / No. (DRAWING NUMBER)

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NO.	REVISION/ISSUE	DATE
1	ISSUED FOR TENDER PACKAGE No. 4	22FEB2010
2	ISSUED FOR PACKAGE No. 4 – ADD. No. 1	26MAR2010
3	ISSUED FOR PACKAGE No. 4 – ADD. No. 2	19APR2010
4	ISSUED FOR PACKAGE No. 15 – FOR TENDER AND PERMIT	7MAY2010
5	ISSUED FOR CONSTRUCTION	4JUN2010
6	REVISED STORM SEWER	15JUN2010

C.C. Tatham & Associates Ltd.
Consulting Engineers
Collingwood Bracebridge Orillia Barrie

LICENSED PROFESSIONAL ENGINEER
W. G. VAN RYN
PROVINCE OF ONTARIO

Canada
Ontario

Architectural:
CS&P Architects
2345 Yonge Street, Suite 200
Toronto, Ontario M4P 2E5
416.482.5002 Fax 416.482.5040

Structural:
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207 Queen's Quay West,
Suite 550, P.O. Box 132
Toronto, Ontario M5J 1A7
416.363.8123 Fax 416.363.0341

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MCW Consultant Ltd.
150 Front street West, #600
Toronto, Ontario M5J 2I6
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Civil Engineering:
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1244 Victoria St. N. Unit J
Kitchener, Ontario
519.743.6760 FAX 519.743.7971

Kitchen:
LTD Consulting Group Inc.
181 Groh Avenue, Suite 103
Cambridge, Ontario N3C 1Y8
519.658.0004 Fax 519.658.0048

DRAWN BY: DFT

CHECKED BY: BVR/JAW

DATE: FEBRUARY 2010

PROJECT TITLE:

GRAVENHURST CENTENNIAL CENTRE EXPANSION AND AQUATIC FACILITY

YMCA of Simcoe/Muskoka GRAVENHURST ONTARIO

DRAWING TITLE:

GRADING PLAN

SCALE: 1:400

PROJECT NO.	DWG. NO.
09036	GP–1

Revision: 0

DRAWING LAST EDITED: 20JAN10 17:28:41

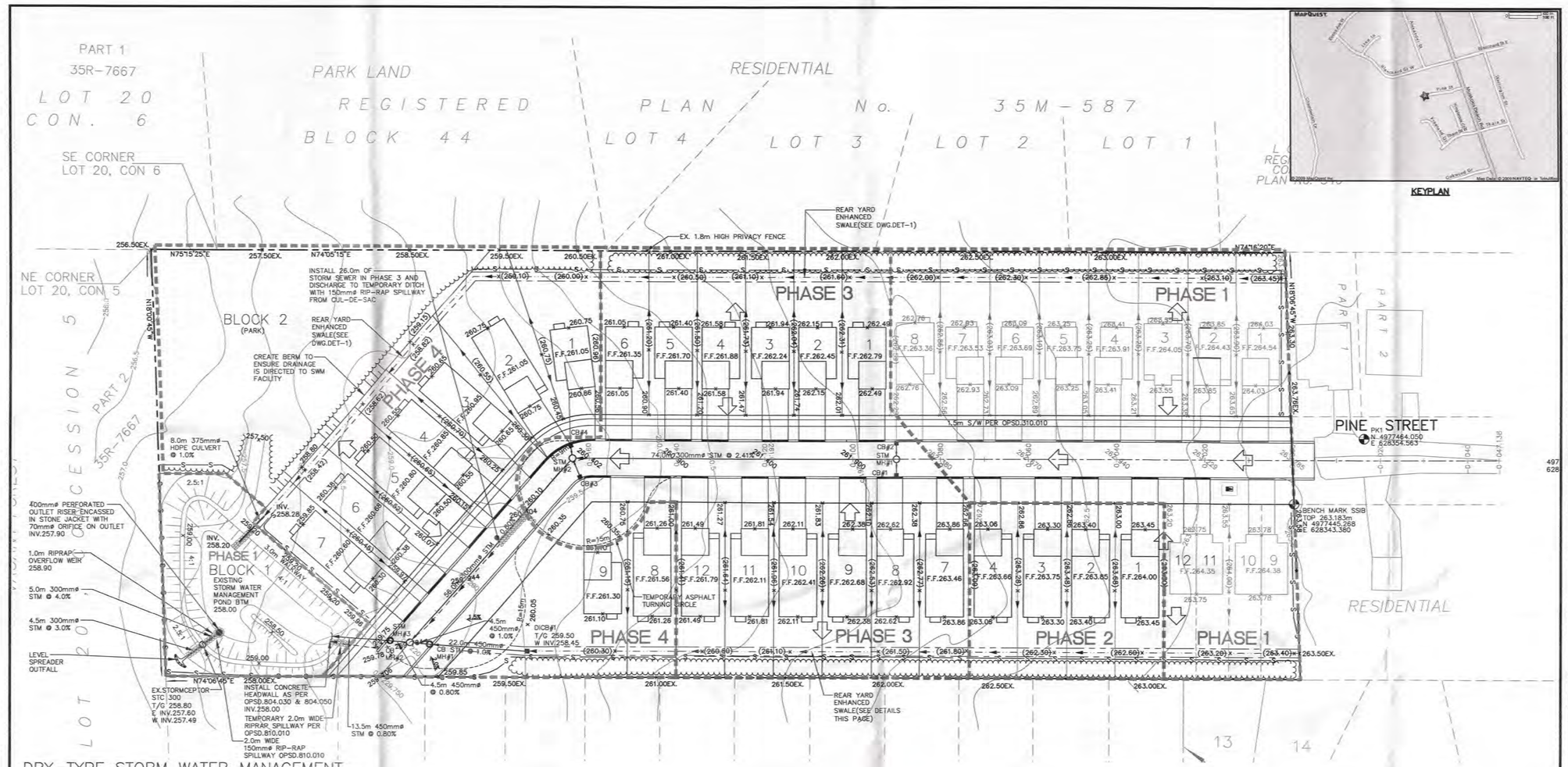
SECTION A–A
SCALE: HOR.1:400, VERT1:40

SECTION B–B
SCALE: HOR.1:400, VERT1:40

SECTION C–C
SCALE 1:100

SECTION D–D
SCALE 1:100

309-10 – Dry Detention Pond Drawing



KEYPLAN

PEL
PINESTONE ENGINEERING LIMITED | www.pel.ca

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Any errors and/or omissions shall be reported to Pinestone Engineering Ltd. without delay.

NOTES

1. LEGAL SURVEY INFORMATION PROVIDED BY T.A. BUNKER SURVEYING LTD.
2. CATCHBASIN LEADS TO BE 250mmø UNLESS OTHERWISE NOTED.
3. ROAD STRUCTURE TO BE:
   40mm HL3 ASPHALT
   50mm HL8 ASPHALT
   150mm GRANULAR 'A'
   300mm GRANULAR 'B'

LEGEND

- S —— S SILT FENCE
- ■ PROPOSED CATCHBASIN
- ● PROPOSED STORM MANHOLE
- PROPOSED OIL/GRIT TREATMENT UNIT
- x 263.00 PROPOSED ELEVATION
- x (263.00) PROPOSED SWALE ELEVATION
- PROPOSED DIRECTION OF LOT LINE SWALE
- DIRECTION OF OVERLAND FLOW
- TEMPORARY DITCH
- ENHANCED SWALE
- PIPE INSULATION
- EXISTING VEGETATION TO BE MAINTAINED

BENCHMARK

TOP OF SIB ELEVATION 263.183

NO.	YY.MM.DD	REVISION	BY
10	15.11.20	DRAFTPLAN REDLINE REVISIONS	J.L.
9	14.04.24	FOR CONSTRUCTION	J.L.
8	14.03.13	DRAFT PLAN REVISION	J.L.
7	13.11.11	TOWN COMMENTS	J.L.
6	13.11.04	PHASING LIMIT AND SIDEWALK REVISION	J.L.
5	13.10.08	ISSUED FOR CONSTRUCTION	J.L.
4	13.10.08	SAN SEWER/SWM POND REVISIONS	J.L.
3	13.03.26	DISTRICT OF MUSKOKA COMMENTS	J.L.
2	12.11.19	DRAFT PLAN REVISION	J.L.
1	12.07.03	DRAFT PLAN REVISION	J.L.

SEAL

PROFESSIONAL ENGINEER PROVINCE OF ONTARIO T.H. HARVEY Jan 2016

NORTH ARROW

DESIGN BY:	B.S.
DRAWN BY:	J.L.
CHECKED	T.H.
DATE:	JANUARY 2016
SCALE:	1:500

CLIENT/PROJECT

LOON CALL MUSKOKA INC.
PINE STREET SUBDIVISION
(KESTREL GLEN)
PHASE 3 AND 4
GRAVENHURST

DRAWING TITLE

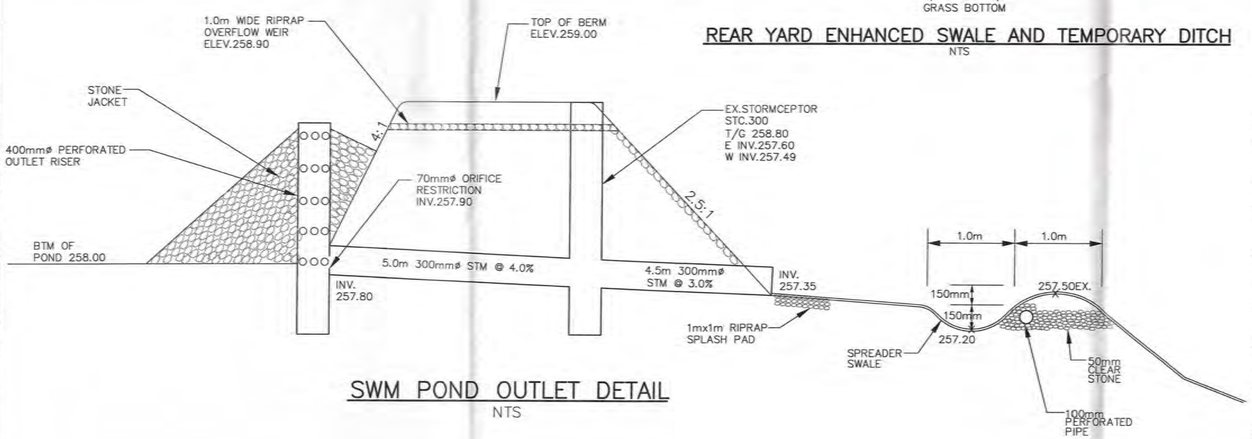
ULTIMATE
STORMWATER MANAGEMENT/GRADING AND CONSTRUCTION MITIGATION PLAN

PROJECT NO.	DRAWING NO.	REVISION
09-10902.6	SWM-1	10

10902BASE-9

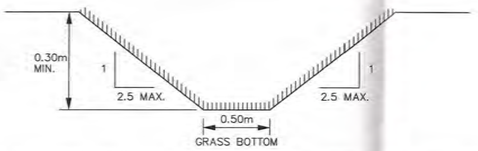
DRY-TYPE STORM WATER MANAGEMENT FACILITY DETAILS

DESIGN STORM EVENT	EXTENDED DETENTION STORAGE REQUIRED (m3)	EXTENDED DETENTION STORAGE PROVIDED (m3)	MAXIMUM PONDING ELEVATION(m) 100 YEAR STORM
100 YR	240.9m³	535.8m³	258.81m



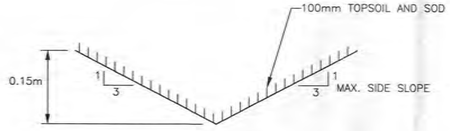
SWM POND OUTLET DETAIL

NTS



REAR YARD ENHANCED SWALE AND TEMPORARY DITCH

NTS

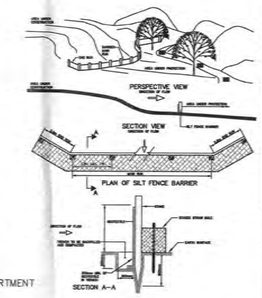


TYPICAL LOTLINE SWALE

N.T.S.

EROSION CONTROL NOTES:

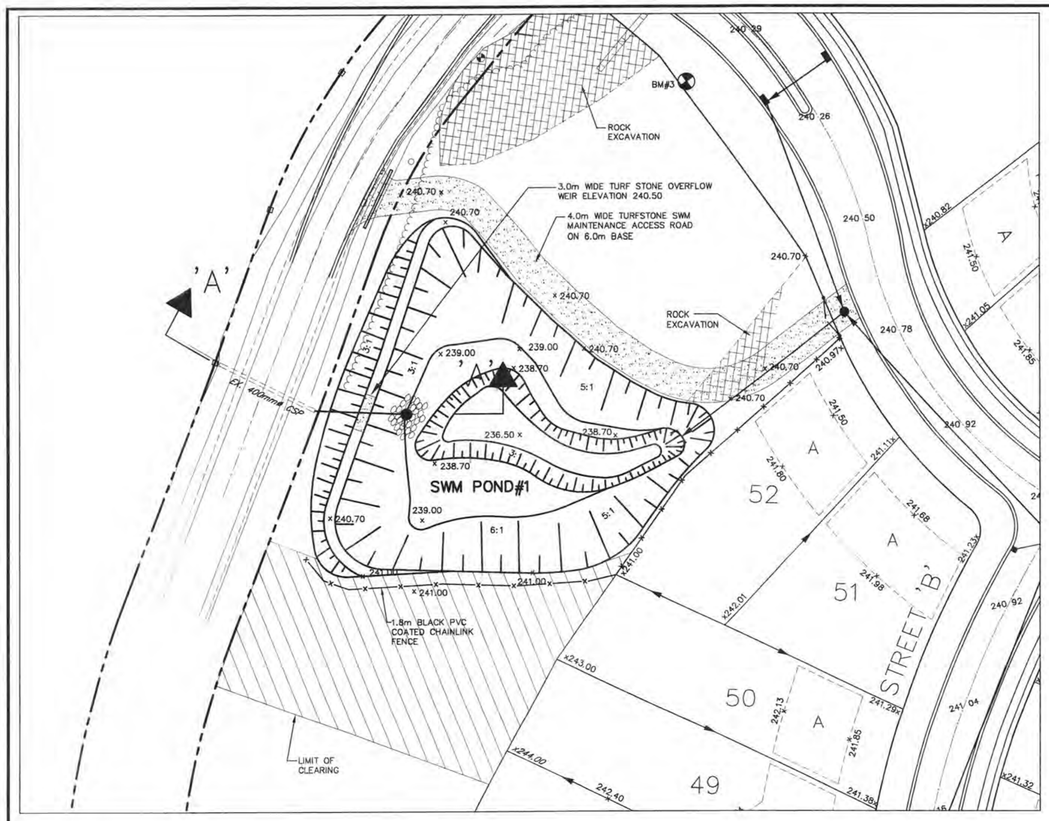
1. ALL SILT FENCING TO BE INSTALLED PRIOR TO ANY GRADING OR EXCAVATION.
2. EROSION CONTROL FENCING TO BE INSTALLED AROUND THE BASE OF ALL STOCKPILES.
3. ADDITIONAL EROSION CONTROL MEASURES MAY BE REQUIRED AS SITE DEVELOPMENT PROGRESSES. CONTRACTOR TO PROVIDE ALL ADDITIONAL EROSION CONTROL STRUCTURES.
4. PINESTONE ENGINEERING LTD. TO MONITOR EROSION CONTROL STRUCTURES TO ENSURE FENCING IS INSTALLED AND MAINTENANCE IS PERFORMED TO TOWN REQUIREMENTS.
5. EROSION CONTROL STRUCTURES TO BE MONITORED REGULARLY AND ANY DAMAGE REPAIRED IMMEDIATELY. SEDIMENTS TO BE REMOVED WHEN ACCUMULATIONS REACH A MAXIMUM OF 1/2 THE HEIGHT OF THE FENCE.
6. ALL EROSION CONTROL STRUCTURES TO REMAIN IN PLACE UNTIL ALL DISTURBED GROUND HAS BEEN RESTABLIZED EITHER BY PAVING OR RESTORATION OF VEGETATIVE GROUND COVER.
7. NO ALTERNATE METHODS OF EROSION PROTECTION SHALL BE PERMITTED UNLESS APPROVED BY PINESTONE ENGINEERING LTD. AND THE TOWN OF GRAVENHURST DEPARTMENT OF PUBLIC WORKS.
8. CONTRACTOR IS RESPONSIBLE FOR MUNICIPAL ROADWAY TO BE CLEARED OF ALL SEDIMENTS FROM VEHICULAR TRACKING ETC. AT THE END OF EACH DAY.

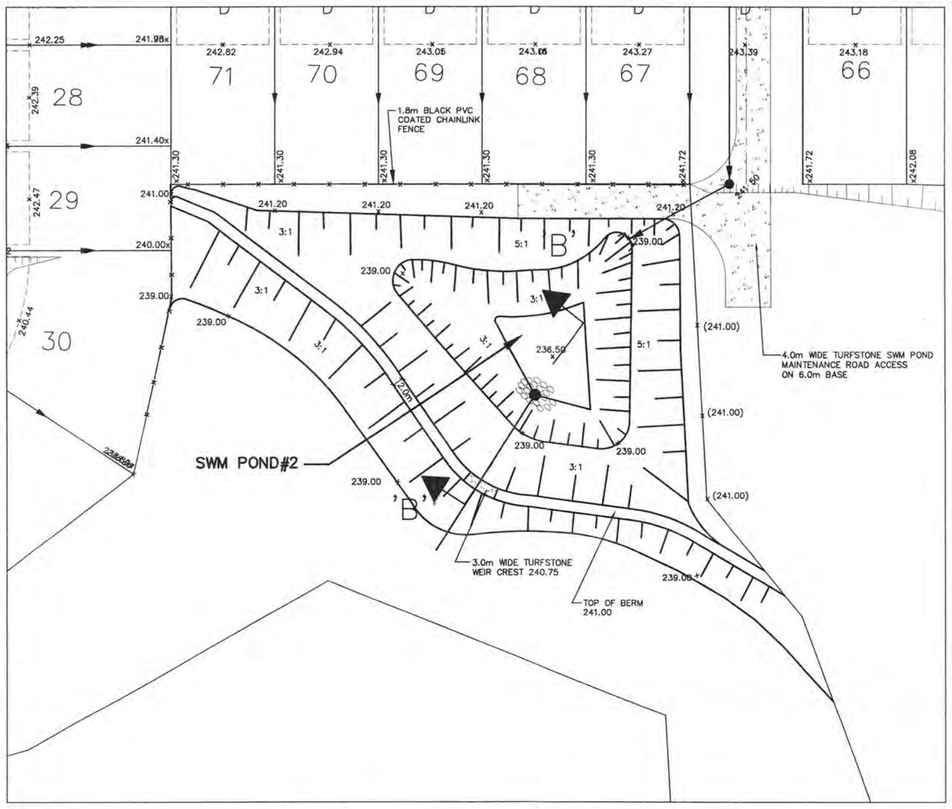


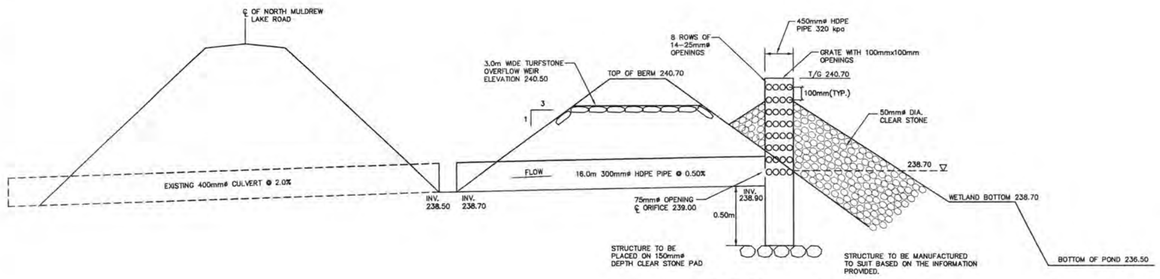
SILT FENCE DETAIL

NTS

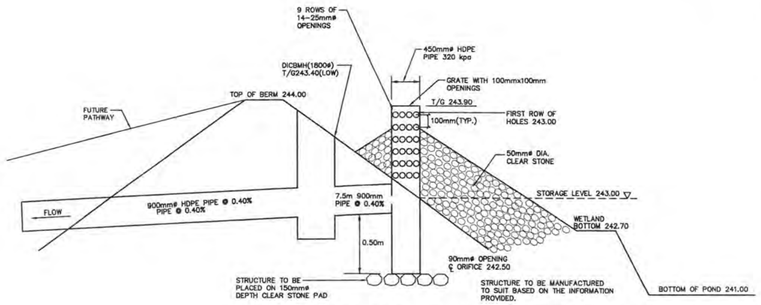
309-11 – Extended Detention Wet Pond Drawing



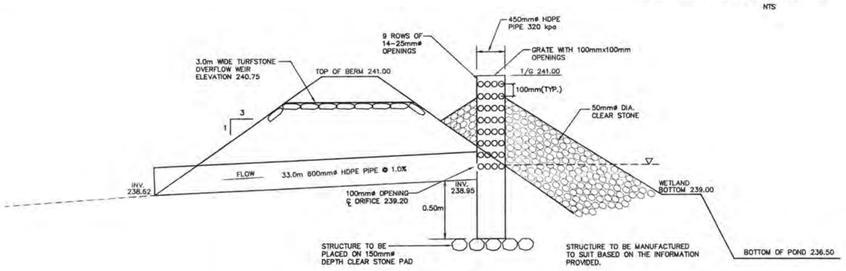




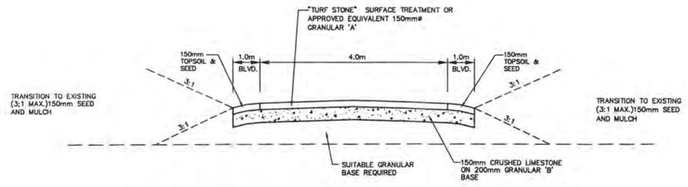
SECTION A–A
SWM POND#1 OUTLET DETAIL
NTS



SECTION C–C
SWM POND#3 OUTLET DETAIL(FUTURE)
NTS



SECTION B–B
SWM POND#2 OUTLET DETAIL
NTS



TYPICAL SWM POND MAINTENANCE ROAD SECTION
N.T.S.

PINESTONE ENGINEERING LTD.
Consulting Engineers
110 Kimberley Avenue
Bracebridge, ON P1L 1Z8
T: (705) 645-8853
F: (705) 645-7262
E: pinestone@pel.ca

LEGEND

REVIEWED AND APPROVED
MARCH 17, 2005
DAVE SAUNDERS C.E.T.
PUBLIC WORKS SUPERINTENDENT
TOWN OF GRAVENHURST
CERTIFIED ENGINEERING TECHNOLOGIST CACET ONTARIO DAVID SAUNDERS No. 064912

GEODETIC BENCHMARK

ELEVATION 257.827m

272-67 ROCK OUTCROP ON THE EAST SIDE OF BETHUNE DRIVE IN THE GROUNDS OF MUSKOKA NURSING HOME, 0.5km SOUTH OF THE INTERSECTION OF BETHUNE DR. AND PHILLIPS STREET IN THE TOWN OF GRAVENHURST, 119.8m SOUTH OF PINEDALE ROAD AND 43.6m EAST OF CENTERLINE OF BETHUNE DRIVE TABLET IS SET VERTICALLY IN TOP OF ROCK, 2.74m NORTH OF SOUTH END OF EXPOSED ROCK

BENCHMARK

BM#3 SIB SET IN ROCK 14.3m± WEST OF STREET 'A' 37.5m± FROM CENTERLINE OF MULDREW LAKE ROAD ELEVATION 241.706m

BM#4 TOP OF SIB SOUTHEAST CORNER OF MULDREW LAKE ROAD AND JAMES STREET ELEVATION 229.422m

NO.	YY.MM.DD	REVISION	BY
2	05.02.14	TOWN COMMENTS	J.L.
1	05.01.18	DISTRICT/TOWN COMMENTS	J.L.

SEAL
PROFESSIONAL ENGINEER LICENCED PROVINCE OF ONTARIO T.N. HARVEY

NORTH ARROW

DESIGN BY:	T.H.
DRAWN BY:	J.L.
CHECKED	D.E.B.
DATE:	JANUARY 2005
SCALE:	1:500

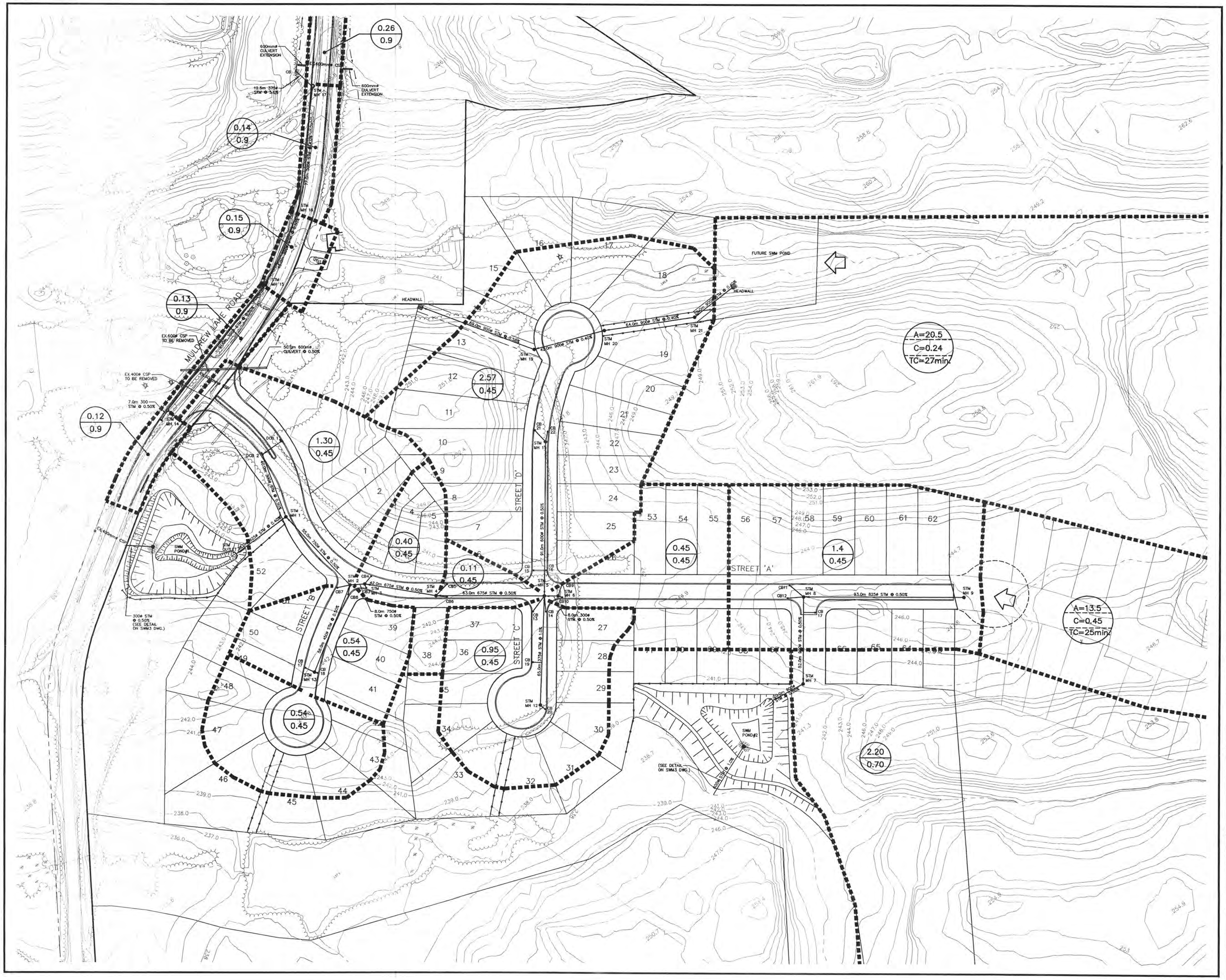
CLIENT/PROJECT
MUSKOKA BAY ESTATES PHASE 1

DRAWING TITLE
STORMWATER MANAGEMENT PONDS & DETAILS

PROJECT NO.	DRAWING NO.	REVISION
04-10514	SWM4	2

10514PH1-SWM4

309-12 – Extended Detention Wet Pond Drawing



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Bracebridge, ON P1L 1Z8

T: (705) 645-8853
F: (705) 645-7262
E: pinestone@pel.ca

LEGEND

0.81	CATCHMENT AREA
28	CATCHMENT NUMBER
▪▪▪▪▪▪	CATCHMENT BOUNDARY

REVIEWED AND APPROVED

David Saunders
March 17 2005

DAVE SAUNDERS C.E.T.
PUBLIC WORKS SUPERINTENDENT
TOWN OF GRAVENHURST

CERTIFIED ENGINEERING TECHNOLOGIST · OACETT · ONTARIO · DAVID J. SAUNDERS · No. 064912

GEODETIC BENCHMARK

ELEVATION 257.827m

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BM#4 TOP OF SIB SOUTHEAST CORNER OF MULDREW LAKE ROAD AND JAMES STREET ELEVATION 229.422m

NO.	YY.MM.DD	REVISION	BY
2	05.02.14	TOWN COMMENTS	J.L.
1	05.01.18	DISTRICT/TOWN COMMENTS	J.L.

SEAL

LICENSED PROFESSIONAL ENGINEER · T.N. HARVEY · PROVINCE OF ONTARIO

NORTH ARROW

DESIGN BY:	T.H.
DRAWN BY:	J.L.
CHECKED	D.E.B.
DATE:	JANUARY 2005
SCALE:	1:1000

CLIENT/PROJECT

MUSKOKA BAY ESTATES PHASE 1

DRAWING TITLE

STORM DRAINAGE AREAS

PROJECT NO.	DRAWING NO.	REVISION
04-10514	D2	2

10514PH1-02

PINESTONE ENGINEERING LTD.
Consulting Engineers
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Bracebridge, ON P1L 1Z8
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LEGEND

- 0.00 / 0.00 — CATCHMENT NO. / AREA (Ha)
- CATCHMENT BOUNDARY
- FUTURE CATCHMENT BOUNDARY
- DRAINAGE COURSE FLOW
- EXISTING CULVERT
- PERMANENT TRIBUTARY WITH POTENTIAL COLD WATER VALUE MIN.30m BUFFER PLUS ADJACENT VALLEY LANDS AND WETLAND FEATURES
- PERMANENT TO INTERMITTENT TRIBUTARY WITH WARM WATER FISH HABITAT MIN. 15m BUFFER, PLUS ADJACENT VALLEY LANDS AND WETLAND FEATURES.
- ADDITIONAL UNCONNECTED WETLAND FEATURES

NO.	YY.MM.DD	REVISION	BY

SEAL

PROFESSIONAL ENGINEER — LICENSED — T.N. HARVEY — PROVINCE OF ONTARIO

NORTH ARROW

DESIGN BY:	D.E.L.,Y.G.
DRAWN BY:	J.L.
CHECKED	D.E.B.
DATE:	NOVEMBER 2004
SCALE:	1:4000

CLIENT/PROJECT

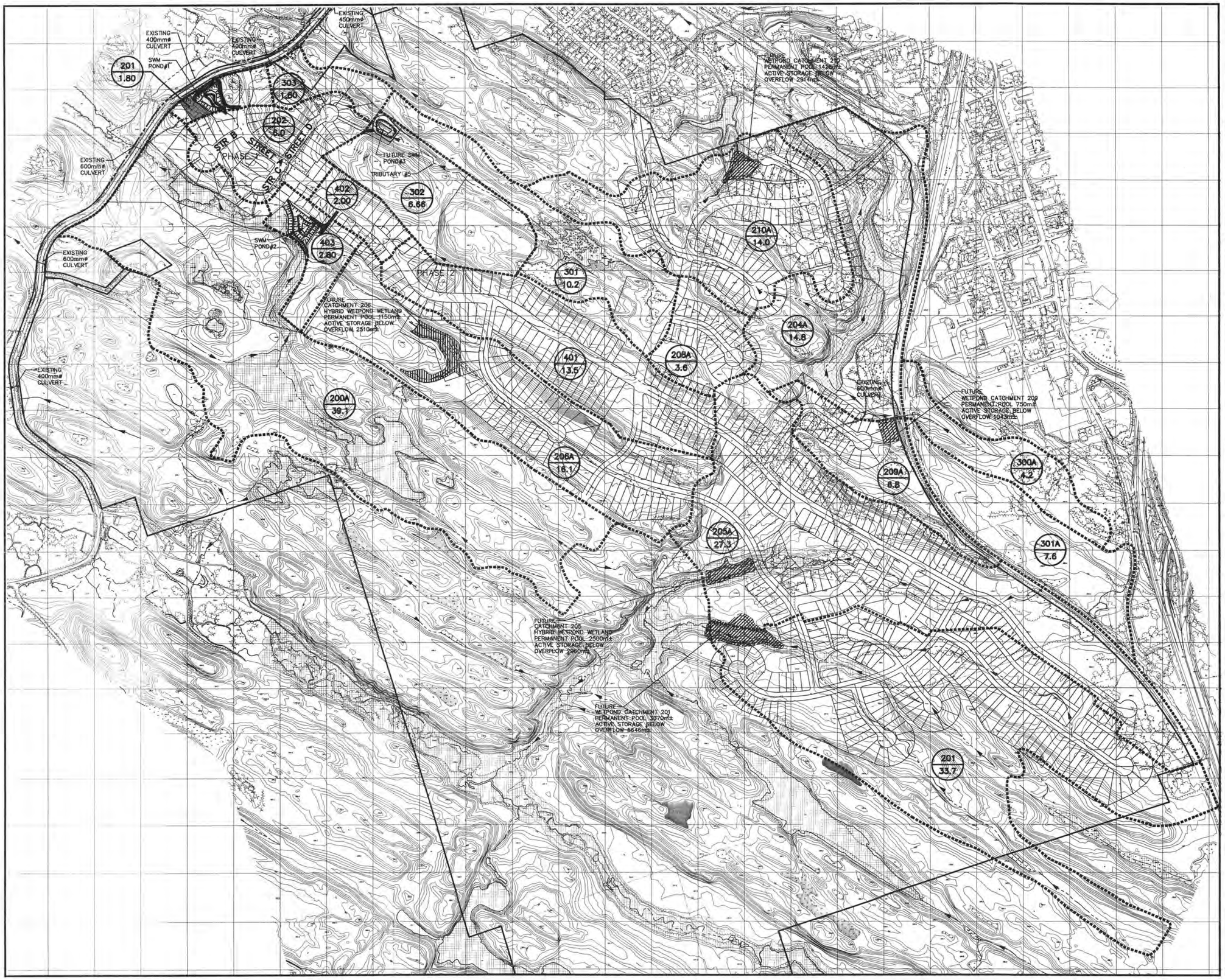
MUSKOKA BAY ESTATES PHASE 1

DRAWING TITLE

PRE-DEVELOPMENT DRAINAGE CATCHMENTS

PROJECT NO.	DRAWING NO.	REVISION
04-10514	SWM1	0

10514-PH1-SWM1



PINESTONE ENGINEERING LTD.

Consulting Engineers
110 Kimberley Avenue
Bracebridge, ON P1L 1Z8

T: (705) 645-8853
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LEGEND

- 0.00 / 0.00 — CATCHMENT NO. / AREA (Ha)
- 301A / 7.6 — FUTURE PHASE CATCHMENT
- CATCHMENT BOUNDARY
- DRAINAGE COURSE FLOW
- EXISTING CULVERT
- PERMANENT TRIBUTARY WITH POTENTIAL COLD WATER VALUE MIN.30m BUFFER PLUS ADJACENT VALLEY LANDS AND WETLAND FEATURES.
- PERMANENT TO INTERMITTENT TRIBUTARY WITH WARM WATER FISH HABITAT MIN. 15m BUFFER, PLUS ADJACENT VALLEY LANDS AND WETLAND FEATURES.
- ADDITIONAL UNCONNECTED WETLAND FEATURES
- STORM MANHOLE(CONCEPTUAL)
- CATCHBASIN(CONCEPTUAL)
- CATCHBASIN MANHOLE(CONCEPTUAL)
- STORM SEWER(CONCEPTUAL)

REVIEWED AND APPROVED
MARCH 17 2005
DAVE SAUNDERS C.E.T.
PUBLIC WORKS SUPERINTENDENT
TOWN OF GRAVENHURST

CERTIFIED ENGINEERING TECHNOLOGIST OSCET ONTARIO DAVID E. SAUNDERS

NO.	YY.MM.DD	REVISION	BY

SEAL

PROFESSIONAL ENGINEER T.N. HARVEY PROVINCE OF ONTARIO

NORTH ARROW

DESIGN BY:	D.E.L.,Y.G.
DRAWN BY:	J.L.
CHECKED:	D.E.B.
DATE:	NOVEMBER 2004
SCALE:	1:4000

CLIENT/PROJECT

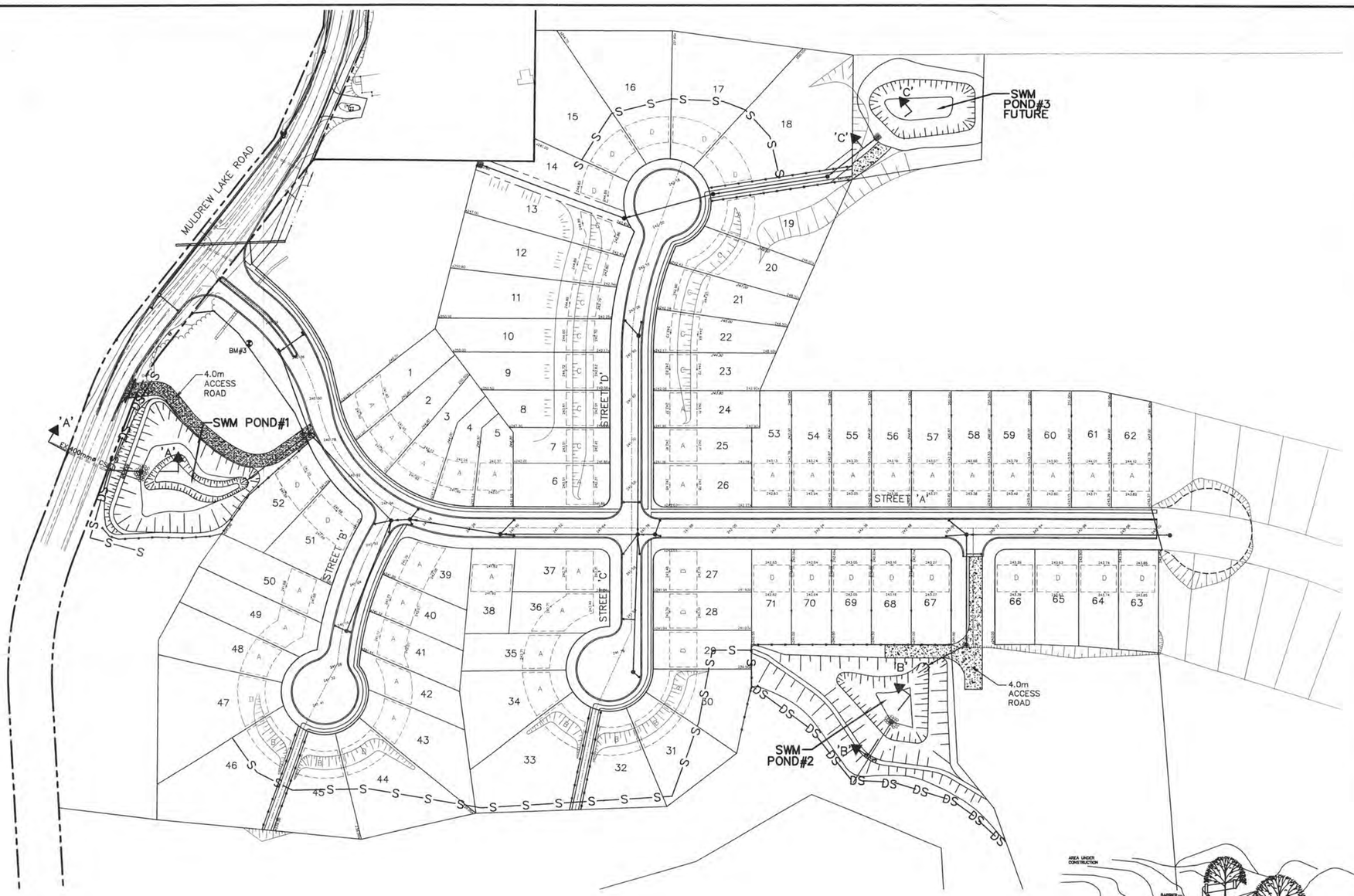
MUSKOKA BAY ESTATES
PHASE 1 PHASE 2

DRAWING TITLE

POST-DEVELOPMENT
CATCHMENTS SWM PLAN

PROJECT NO.	DRAWING NO.	REVISION
04-10514	SWM2	0

10514PH1--SWM2



EROSION CONTROL NOTES:

1. ALL SILT FENCING TO BE INSTALLED PRIOR TO ANY GRADING OR EXCAVATION.
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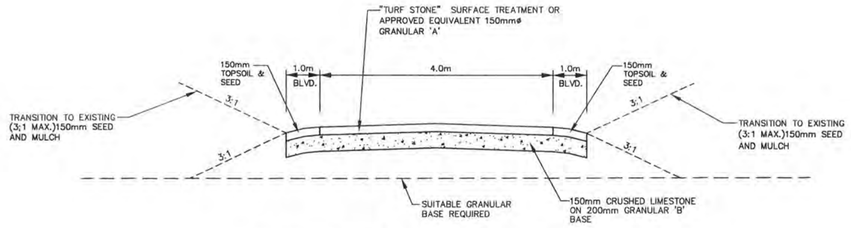
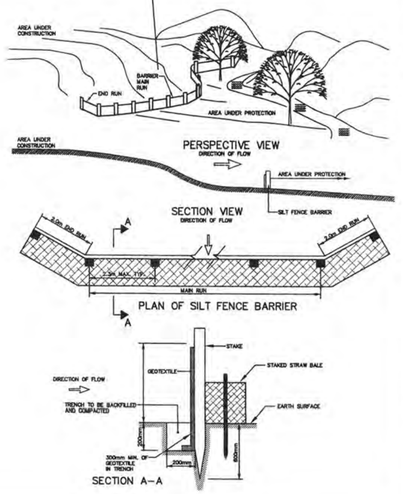


TYPICAL SWM POND MAINTENANCE ROAD SECTION

N.T.S.



PINESTONE ENGINEERING LTD.
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Bracebridge, ON P1L 1Z8
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Any errors and/or omissions shall be reported to Pinestone Engineering Ltd. without delay.

LEGEND

S—S—S SILT FENCE

DS—DS—DS DOUBLE ROW OF SILT FENCE

REVIEWED AND APPROVED
MARCH 17, 2005
DAVE SAUNDERS C.E.T.
PUBLIC WORKS SUPERINTENDENT
TOWN OF GRAVENHURST

CERTIFIED ENGINEERING TECHNOLOGIST ONTARIO DAVID J. SAUNDERS No. 060917

GEODETIC BENCHMARK

ELEVATION 257.827m

272-67 ROCK OUTCROP ON THE EAST SIDE OF BETHUNE DRIVE IN THE GROUNDS OF MUSKOKA NURSING HOME, 0.5km SOUTH OF THE INTERSECTION OF BETHUNE DR. AND PHILLIPS STREET IN THE TOWN OF GRAVENHURST, 119.8m SOUTH OF PINEDALE ROAD AND 43.6m EAST OF CENTERLINE OF BETHUNE DRIVE TABLET IS SET VERTICALLY IN TOP OF ROCK, 2.74m NORTH OF SOUTH END OF EXPOSED ROCK

BENCHMARK

BM#3 SIB SET IN ROCK 14.3m± WEST OF STREET 'A' 37.5m± FROM CENTERLINE OF MULDREW LAKE ROAD ELEVATION 241.706m

BM#4 TOP OF SIB SOUTHEAST CORNER OF MULDREW LAKE ROAD AND JAMES STREET ELEVATION 229.422m

NO.	YY.MM.DD	REVISION	BY
2	05.02.14	TOWN COMMENTS	J.L.
1	05.01.18	DISTRICT/TOWN COMMENTS	J.L.

SEAL

PROFESSIONAL ENGINEER PROVINCE OF ONTARIO T.N. HARVEY

NORTH ARROW

DESIGN BY:	T.H.
DRAWN BY:	J.L.
CHECKED	D.E.B.
DATE:	JANUARY 2005
SCALE:	1:1000

CLIENT/PROJECT

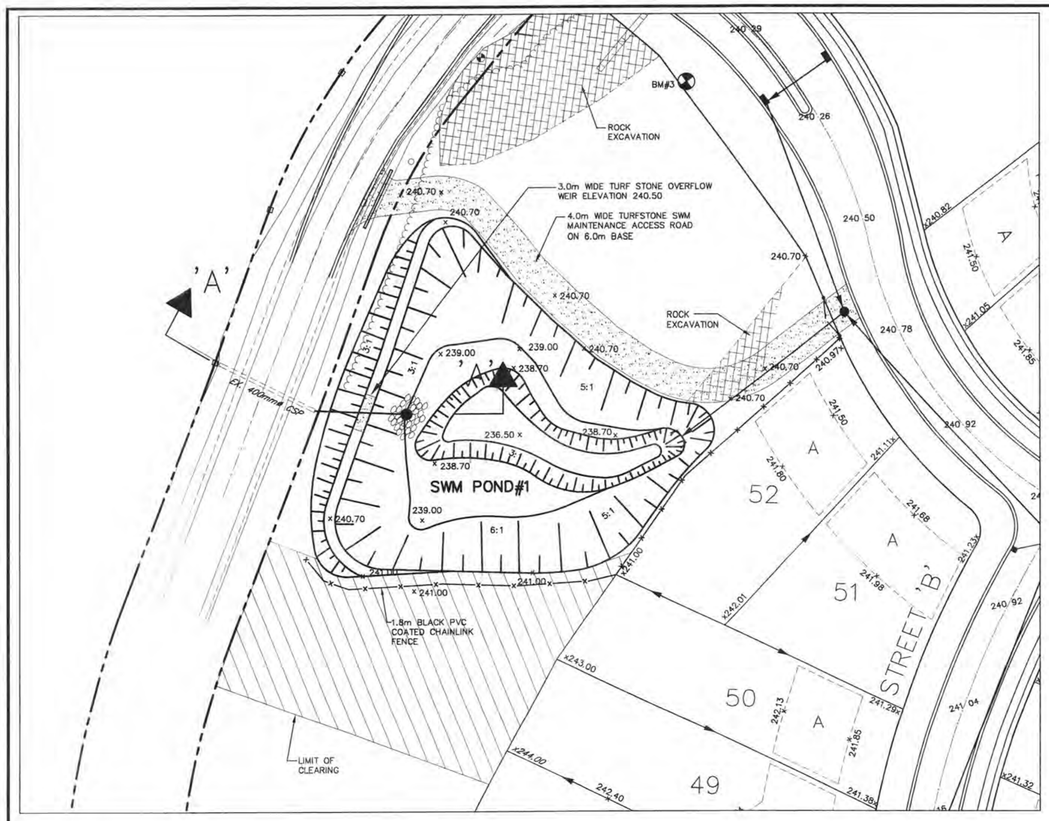
MUSKOKA BAY ESTATES PHASE 1

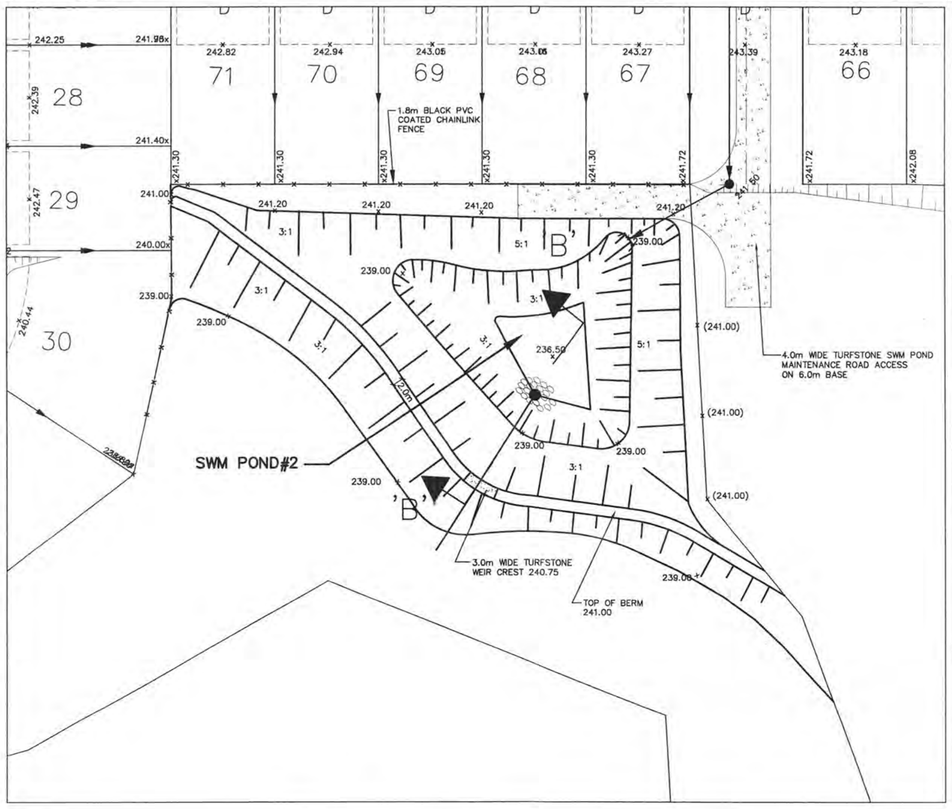
DRAWING TITLE

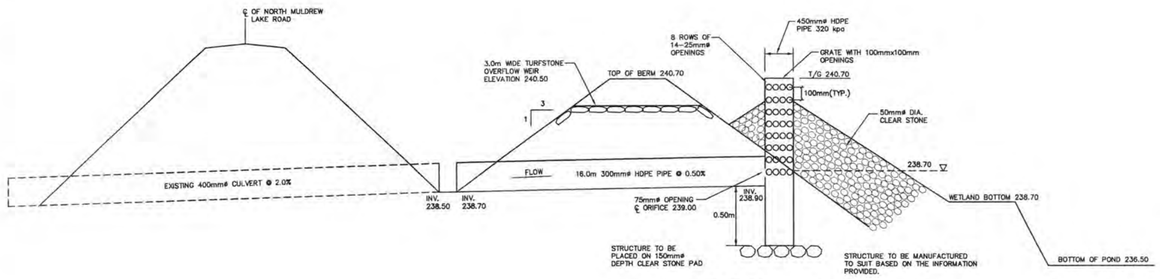
STORMWATER MANAGEMENT CONSTRUCTION MITIGATION PLAN

PROJECT NO.	DRAWING NO.	REVISION
04-10514	SWM3	2

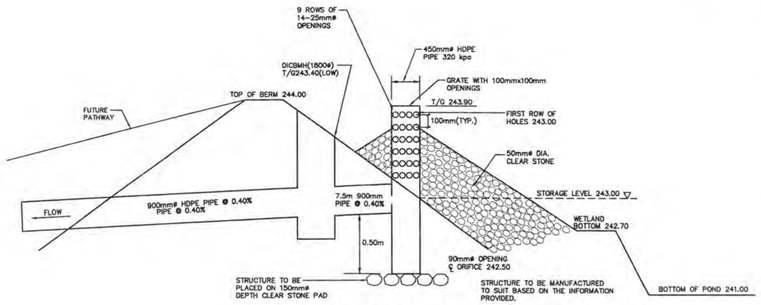
10514PH1-SWM3



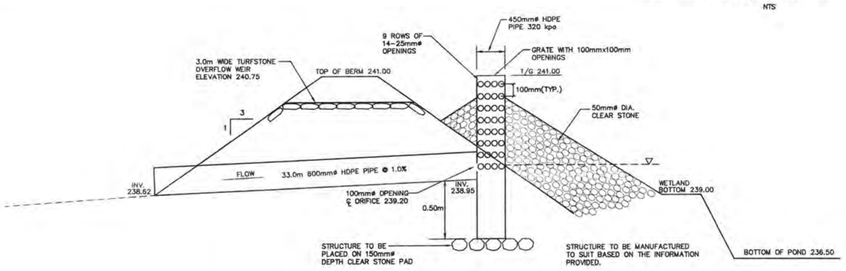




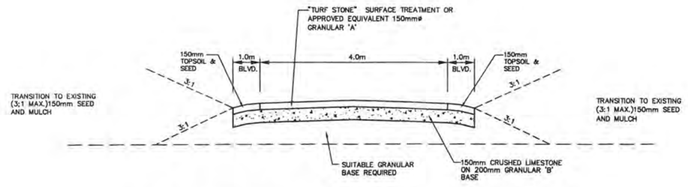
SECTION A–A
SWM POND#1 OUTLET DETAIL
NTS



SECTION C–C
SWM POND#3 OUTLET DETAIL(FUTURE)
NTS



SECTION B–B
SWM POND#2 OUTLET DETAIL
NTS



TYPICAL SWM POND MAINTENANCE ROAD SECTION
N.T.S.

PINESTONE ENGINEERING LTD.
Consulting Engineers
110 Kimberley Avenue
Bracebridge, ON P1L 1Z8
T: (705) 645-8853
F: (705) 645-7262
E: pinestone@pel.ca

LEGEND

REVIEWED AND APPROVED
MARCH 17, 2005
DAVE SAUNDERS C.E.T.
PUBLIC WORKS SUPERINTENDENT
TOWN OF GRAVENHURST
CERTIFIED ENGINEERING TECHNOLOGIST CACET ONTARIO DAVID SAUNDERS No. 064912

GEODETIC BENCHMARK

ELEVATION 257.827m

272-67 ROCK OUTCROP ON THE EAST SIDE OF BETHUNE DRIVE IN THE GROUNDS OF MUSKOKA NURSING HOME, 0.5km SOUTH OF THE INTERSECTION OF BETHUNE DR. AND PHILLIPS STREET IN THE TOWN OF GRAVENHURST, 119.8m SOUTH OF PINEDALE ROAD AND 43.6m EAST OF CENTERLINE OF BETHUNE DRIVE TABLET IS SET VERTICALLY IN TOP OF ROCK, 2.74m NORTH OF SOUTH END OF EXPOSED ROCK

BENCHMARK

BM#3 SIB SET IN ROCK 14.3m± WEST OF STREET 'A' 37.5m± FROM CENTERLINE OF MULDREW LAKE ROAD ELEVATION 241.706m

BM#4 TOP OF SIB SOUTHEAST CORNER OF MULDREW LAKE ROAD AND JAMES STREET ELEVATION 229.422m

NO.	YY.MM.DD	REVISION	BY
2	05.02.14	TOWN COMMENTS	J.L.
1	05.01.18	DISTRICT/TOWN COMMENTS	J.L.

SEAL
PROFESSIONAL ENGINEER LICENCED PROVINCE OF ONTARIO T.N. HARVEY

NORTH ARROW

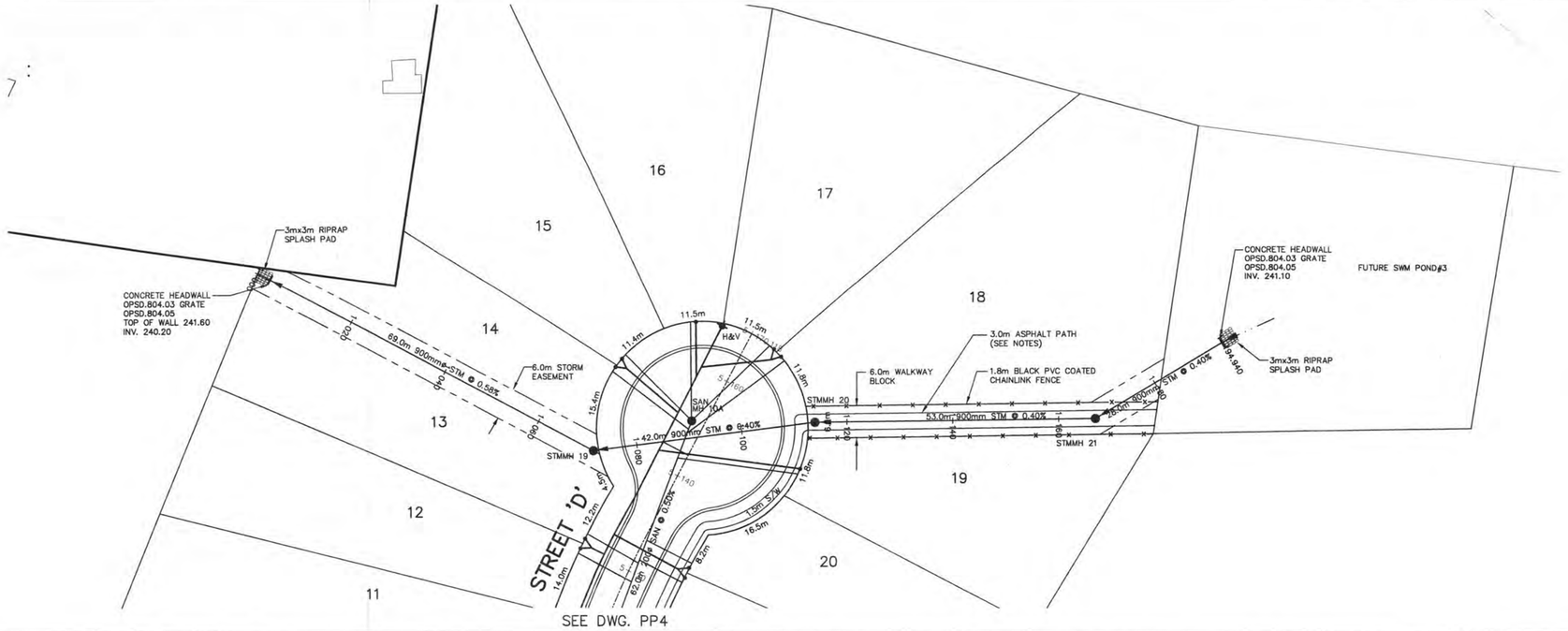
DESIGN BY:	T.H.
DRAWN BY:	J.L.
CHECKED	D.E.B.
DATE:	JANUARY 2005
SCALE:	1:500

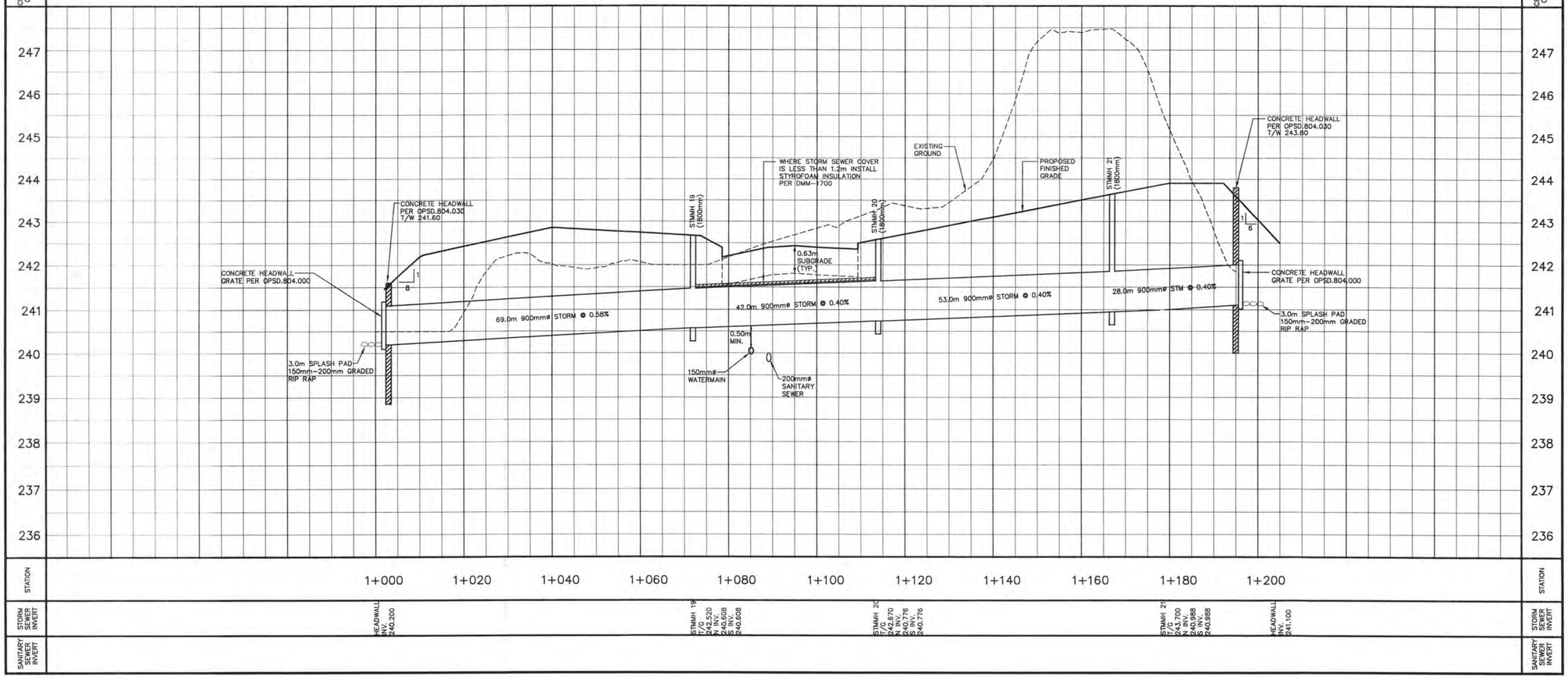
CLIENT/PROJECT
MUSKOKA BAY ESTATES PHASE 1

DRAWING TITLE
STORMWATER MANAGEMENT PONDS & DETAILS

PROJECT NO.	DRAWING NO.	REVISION
04-10514	SWM4	2

10514PH1-SWM4





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Bracebridge, ON P1L 1Z8

T: (705) 645-8853
F: (705) 645-7262
E: pinestone@pel.ca

NOTES

1. TOPOGRAPHIC SURVEY BY PINESTONE ENGINEERING LTD. DATED 2004.
2. LEGAL BOUNDARY INFORMATION PROVIDED BY COOTE HILEY, JEMMETT
3. REFER TO DRAWING DET 1 FOR TYPICAL DETAILS AND CONSTRUCTION NOTES.
4. FOUNDATION DRAINS SHALL NOT BE PERMITTED TO CONNECT TO THE SANITARY SEWERS.
5. ASPHALT PATH STRUCTURE TO BE
   200mm GRANULAR 'B'
   150mm GRANULAR 'A'
   50mm HL4 ASPHALT

REVIEWED AND APPROVED
MARCH 17, 2005
DAVE SAUNDERS C.E.T.
PUBLIC WORKS SUPERINTENDENT
TOWN OF GRAVENHURST

CERTIFIED ENGINEERING TECHNOLOGIST — C.E.T. — ONTARIO — DAVID J. SAUNDERS — No. 004912

GEODETIC BENCHMARK

ELEVATION 257.827m

272-87 ROCK OUTCROP ON THE EAST SIDE OF BETHUNE DRIVE IN THE GROUNDS OF MUSKOKA NURSING HOME, 0.5km SOUTH OF THE INTERSECTION OF BETHUNE DR. AND PHILLIPS STREET IN THE TOWN OF GRAVENHURST, 119.8m SOUTH OF PINEDALE ROAD AND 43.6m EAST OF CENTERLINE OF BETHUNE DRIVE TABLET IS SET VERTICALLY IN TOP OF ROCK, 2.74m NORTH OF SOUTH END OF EXPOSED ROCK

BENCHMARK

BM#3 SIB SET IN ROCK 14.3m± WEST OF STREET 'A' 37.5m± FROM CENTERLINE OF MULDREW LAKE ROAD ELEVATION 241.706m

BM#4 TOP OF SIB SOUTHEAST CORNER OF MULDREW LAKE ROAD AND JAMES STREET ELEVATION 229.422m

NO.	YY.MM.DD	REVISION	BY
2	05.02.14	TOWN COMMENTS	J.L.
1	05.01.17	DISTRICT/TOWN COMMENTS	J.L.

SEAL — PROFESSIONAL ENGINEER — LICENSED — T.N. HARVEY — PROVINCE OF ONTARIO

NORTH ARROW

DESIGN BY:	T.H.
DRAWN BY:	J.L.
CHECKED	T.H.
DATE:	JANUARY 2005
SCALE: HORIZ.:	1:500
VERT.:	1:50

CLIENT/PROJECT

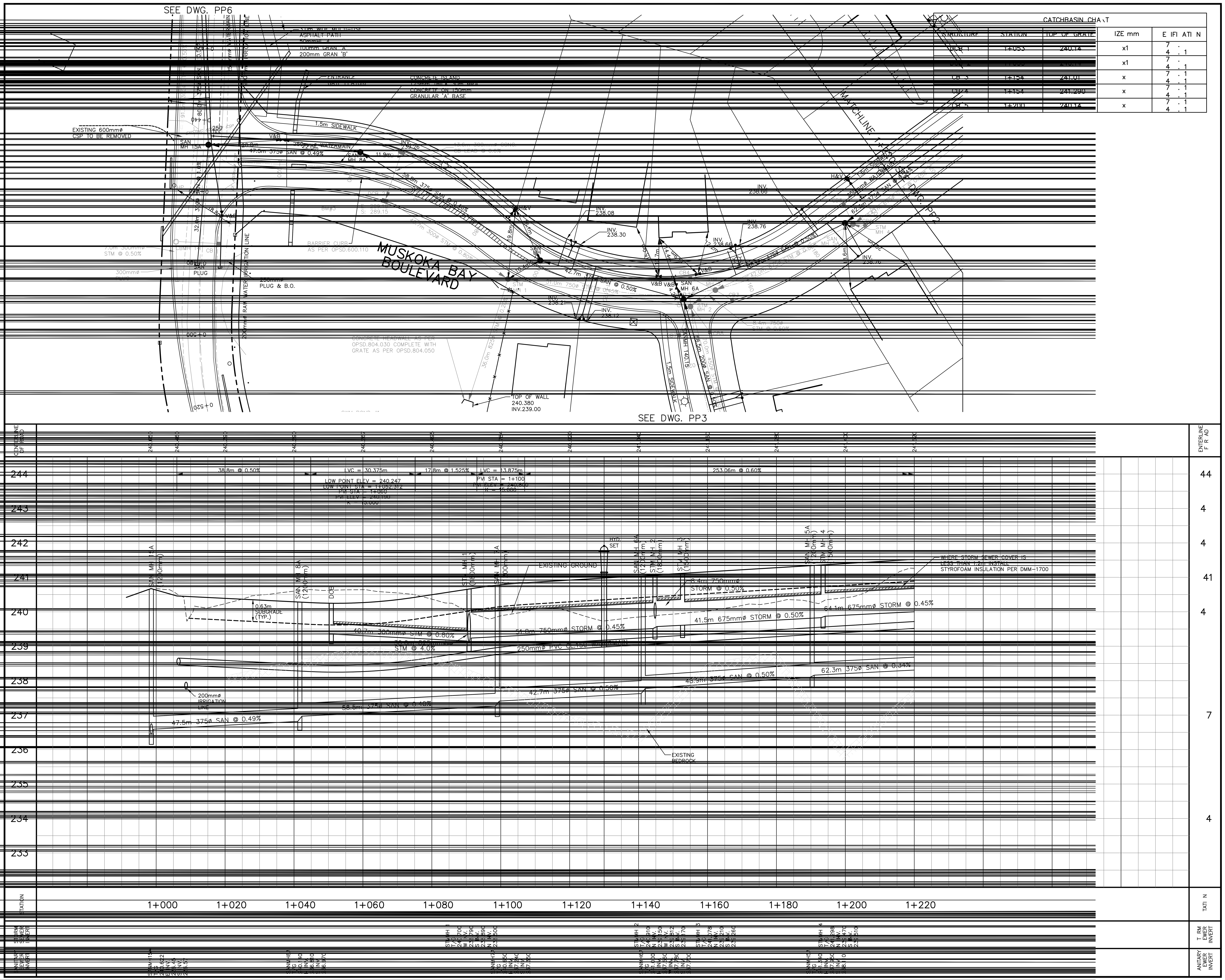
MUSKOKA BAY ESTATES PHASE 1

DRAWING TITLE

PLAN & PROFILE STORM EASEMENT STA. 1+000 TO STA. 1+204.710

PROJECT NO.	DRAWING NO.	REVISION
04-10514	PP7	2

10514PH1-PP7



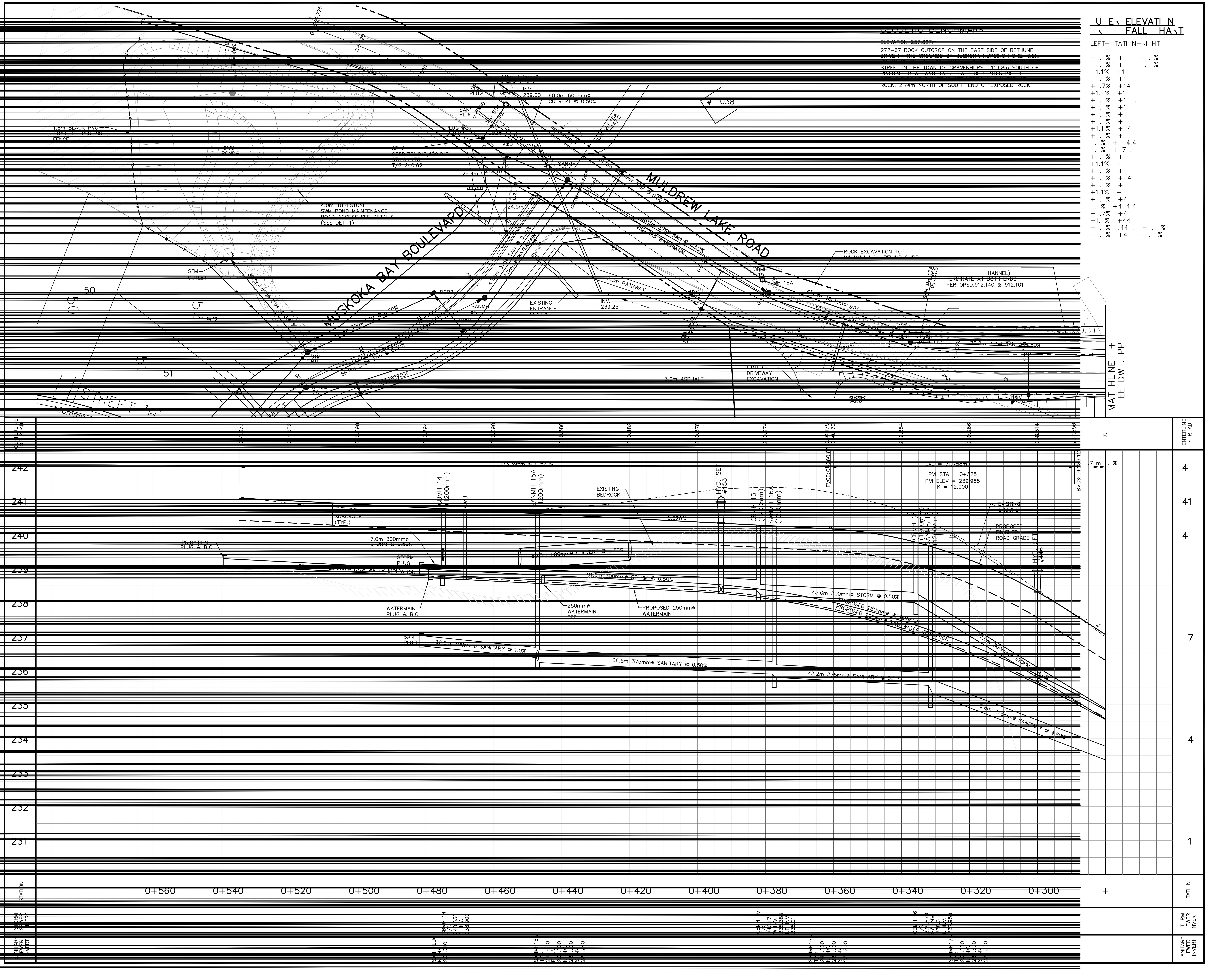
FINEST NE ENGINEERING LTD.

Consulting Engineers
11 Kimberley Avenue

MUSKOKA BAY ESTATES
PHASE 1

DRAWING TITLE: AS-CONSTRUCTED PLAN + PROFILE STREET 'A'

T.N. HARVEY


GEODETIC BENCHMARK
272-67 ROCK OUTCROP ON THE EAST SIDE OF BETHUNE
MUSKOKA BAY BOULEVARD
MULDREW LAKE ROAD
STREET 'B'
ROCK EXCAVATION TO MINIMUM 1.0m BEHIND CURB
TERMINATE AT BOTH ENDS PER OPSD.912.140 & 912.101
EXISTING ENTRANCE FEATURE
3.0m PATHWAY
3.0m ASPHALT
LIMIT OF DRIVEWAY EXCAVATION
4.0m TURFSTONE SWM POND MAINTENANCE ROAD ACCESS SEE DETAILS (SEE DET-1)
1.8m BLACK PVC COATED CHAINLINK FENCE
60.0m 600mmø CULVERT @ 0.50%
7.0m 300mmø STORM @ 0.50%
45.0m 300mmø STORM @ 0.50%
66.5m 375mmø SANITARY @ 0.50%
43.2m 375mmø SANITARY @ 0.50%
56.8m 375mmø SANITARY @ 4.80%
PROPOSED 250mmø WATERMAIN
250mmø WATERMAIN TEE
WATERMAIN PLUG & B.O.
IRRIGATION PLUG & B.O.
EXISTING BEDROCK
PROPOSED FINISHED ROAD GRADE
PVI STA = 0+325
PVI ELEV = 239.988
K = 12.000
CBMH 14 (1200mm)
SANMH 15A (1200mm)
CBMH 15 (1200mm)
SANMH 16A (1200mm)
242
241
240
239
238
237
236
235
234
233
232
231
0+560
0+540
0+520
0+500
0+480
0+460
0+440
0+420
0+400
0+380
0+360
0+340
0+320
0+300
STATION

FINES T NE
EN INEERIN LTD.

nsulting Engineers
11 Kiml erley Avenue
Bra el ri ge, N F1L 1Z

T: 7 4 -
F: 7 4 -7

N TE

1. T A HI U VEY Y INE T NE EN INEE IN LT . ATE 4.

. LE AL UN A Y INF MATI N VI E Y TE HILEY, JEMMETT

4. ALL EXI TIN T U TU E T E A JU TE T MAT H NEW FINI HE A E.

. EXI TIN WATE E VI E :

EVIEWE AN A VE

AVE AUN E .E.T.
U LI W K U E INTEN ENT
T WN F AVENHU T

EN HMA K

M# I ET IN K 14. m± WE T F T EET 'A' 7. m± F M ENTE LINE F MUL EW LAKE A ELEVATI N 41.7 m

M#4 T F I UTHEA T NE F MUL EW LAKE A AN JAME T EET ELEVATI N .4 m

N .	YY.MM.	EVI I N	Y
	.1 .1	A – N T U TE	.N.
	. .14	T WN MMENT	J.L.
1	. 1.1	I T I T/T WN MMENT	J.L.

EAL: T.N. HA VEY — FE I NAL EN INEER — PR VIN E F NTARI

N TH A W

E I N Y:	T.H.
AWN Y:	J.L.
HE KE	.E. .
ATE:	JANUA Y
ALE:	H IZ.: 1: / VE T.: 1:

LIENT/ JE T

MU K KA AY E TATE
FHA E 1

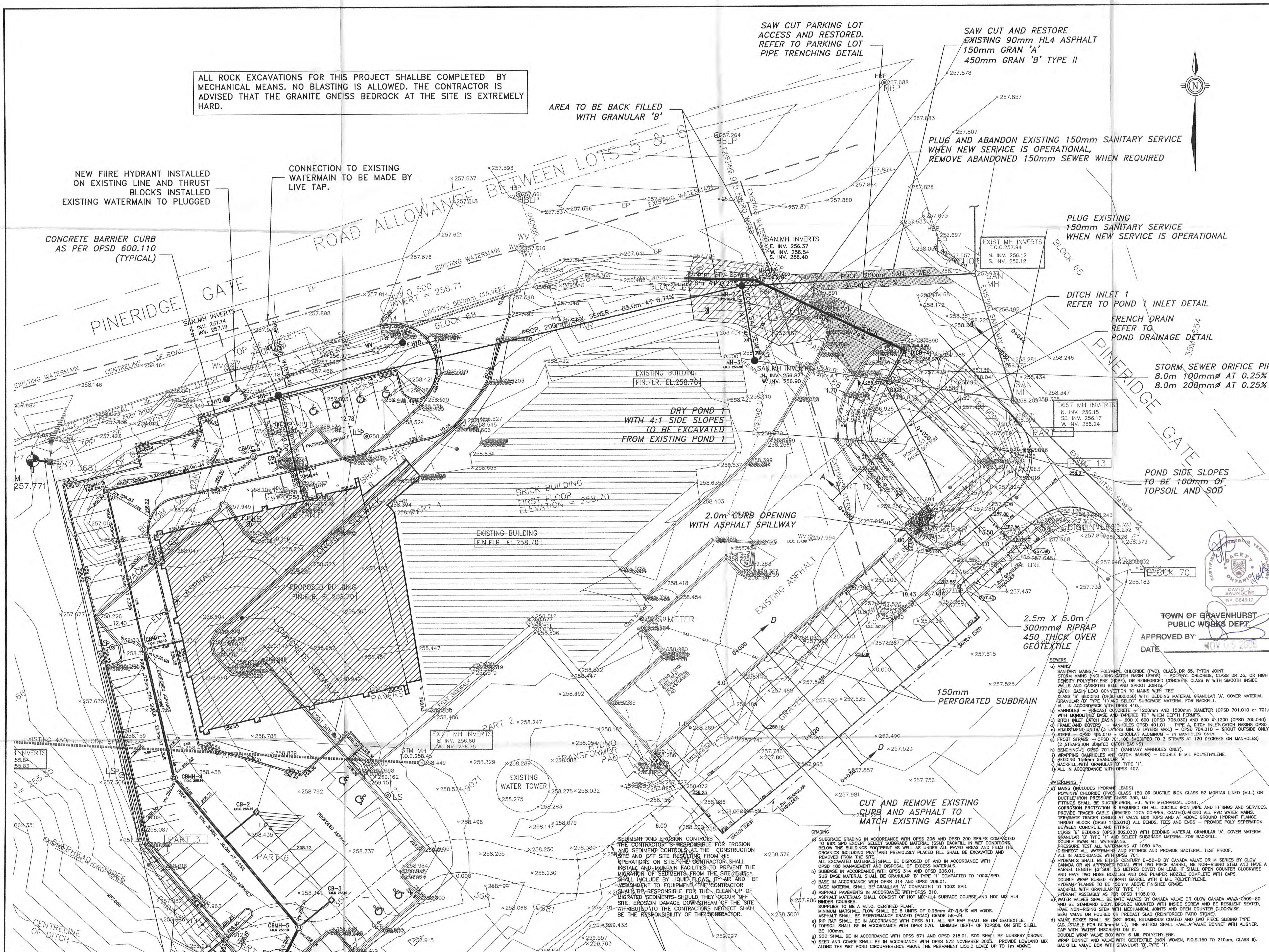
AWIN TITLE
A - NSTRU TED
FLAN + FR FILE
MUL REW LAKE R AD
TA. +2 T TA. +

JE T N .	AWIN N .	EVI I N
-1 14	FF -A	

1 14 H1- -A

309-13 & 309-14 – Stormwater Management Detention Pond Drawing


PINERIDGE GATE
ROAD ALLOWANCE BETWEEN LOTS 5 & 6
PINERIDGE
BETHUNE DRIVE SOUTH
SITE BM
ELEV=257.771
EXISTING WATERMAIN
CENTRELINE OF ROAD
EXISTING 500mm CULVERT
BIG 0 500
INVERT = 256.71
SAN.MH INVERTS
E. INV. 257.14
S. INV. 257.19
SAN.MH INVERTS
E. INV. 256.37
W. INV. 256.54
S. INV. 256.40
375mm STM SEWER
22.6m AT 0.27%
PROP. 200mm SAN. SEWER
41.5m AT 0.41%
200mm SAN. SEWER - 85.0m AT 0.71%
375mm STM SEWER
29.5m AT 0.24%
EXIST MH INVERTS
T.O.C.257.94
N. INV. 256.12
S. INV. 256.12
SAN.MH INVERTS
N. INV. 256.87
W. INV. 256.90
EXIST MH INVERTS
N. INV. 256.15
SE. INV. 256.17
W. INV. 256.24
EXISTING SANITARY SEWER
EXISTING BUILDING
FIN.FLR. EL.258.70
BRICK BUILDING
FIRST FLOOR
ELEVATION = 258.70
PROPOSED BUILDING
FIN.FLR. EL.258.70
EXISTING ASPHALT
GAS METER
HYDRO
TRANSFORMER
PAD
EXISTING
WATER TOWER
GRAVEL
TREE LINE
1.2m GRANULAR SHOULDER
EXISTING 450mm STORM SEWER
EXIST MH INVERTS
E. INV. 255.84
S. INV. 255.83
EXIST MH INVERTS
E. INV. 256.80
W. INV. 256.75
STM MH
T.O.C.258.45
CSP 600
INVERT = 255.66
CSP 600
INVERT = 255.35
EXISTING OVERHEAD HYDRO WIRES
CENTRELINE OF DITCH
CONCRETE CULVERT
INVERT = 254.46
TOP 0.5 CSP
TOP OF DITCH
BOTTOM OF DITCH
TOP OF PIPE
255.791
INV 255.591
EDGE OF ASPHALT
PROPOSED ASPHALT
PROPOSED SIDEWALK
POND BOTTOM
ANCHOR
ELEVATIONS REPORTED HEREON ARE REFERRED TO THE GEODETIC DATUM CGVD28 (Canadian Geodetic Vertical Datum 1928) FRAMEWORK.
SITE BENCHMARK IS THE RP AT THE NORTH WEST CORNER OF PART 4 PLAN 35R-19071, HAVING AN ELEVATION OF 257.77.
NOTES:
1. ALL MANHOLES UNLESS SHOWN OTHERWISE ARE 1200mm.
2. UNLESS INDICATED OTHERWISE MAINTAIN 2.2 METRES COVER OVER WATERMAINS.
5. WHERE A WATERMAIN CROSSES ABOVE A SEWER AND WITHIN 150mm, THE WATERMAIN SHALL BE BEDDED WITH LEAN CONCRETE THE FULL WIDTH OF THE WATERMAIN TRENCH AND TO A MINIMUM DISTANCE OF 1m FROM THE CENTRELINE OF THE SEWER.
6. WHERE A WATERMAIN CROSSES BELOW A SEWER 0.50m MINIMUM CLEAR SEPARATION MUST BE MAINTAINED. ALSO THE WATERMAIN COVER MATERIAL IS TO EXTEND UP TO THE BOTTOM OF THE SEWER BEDDING FOR THE FULL WIDTH OF THE WATERMAIN TRENCH. AS WELL KEEP PIPE JOINTS IN BOTH SEWER AND WATERMAIN AS FAR APART AS IS PRACTICAL FROM THE CROSSING
DATE | DESCRIPTION | REV | BY
Oct 27/08 | Adendum 3 | 1 | D.P.N.
REGISTERED PROFESSIONAL ENGINEER
D. A. RICHARDS
PROVINCE OF ONTARIO
TOWN OF GRAVENHURST
IN THE
MUNICIPALITY OF MUSKOKA
PROPOSED ADDITION
TO
COTTAGE COUNTRY FAMILY
HEALTH TEAM
SITE PLAN
Trow Associates Inc.
1850 Bond Street
North Bay Ontario
P1B-8G5
PHONE (705) 474-2720
FAX (705) 474-8515
DRAWN BY: G.L.H.
DATE: OCT 8, 2008
CHECKED BY: D.A.R.
SCALE: 1 : 500
CAD FILE: 4972
OFFICE: NORTH BAY
PROJECT No: NB-08-4972
DRAWING No: C-1
REV.: 0
LEGEND - SURVEY
DENOTES STANDARD IRON BAR (0.025mX0.025mX1.2m) SIB
DENOTES IRON BAR (0.016mX0.016mX0.60m) IB
DENOTES IRON BAR IN ROCK IBR
DENOTES ROCK POST RP
DENOTES ROCK PLUG RPL
DENOTES FOUND SURVEY MONUMENT
LEGEND - CIVIL
ORIGINAL GROUND ELEVATIONS
EXISTING LAMP POLE
EXISTING WATERMAIN VALVE
EXISTING MANHOLE
PROPOSED FINISHED ELEVATIONS
PROPOSED CATCHBASIN MANHOLE
T.O.C. DENOTES TOP OF COVER
TP DENOTES TEST PIT
AB DENOTES AUGER PROBE
BH DENOTES BOREHOLE
CERTIFIED ENGINEERING TECHNOLOGIST
ONTARIO
DAVID J. SAUNDERS
No 064812
TOWN OF GRAVENHURST
PUBLIC WORKS DEPT.
APPROVED BY
DATE NOV 06 2008



NOTES

1. UNLESS INDICATED OTHERWISE MAINTAIN 2.5 METRES COVER OVER WATERMAINS TO WITHIN 5 METRES OF CONNECTIONS TO EXISTING MAINS.
2. SANITARY SEWER PIPE IN A COMBINED TRENCH WITH A WATERMAIN AND WITHOUT THE REQUIRED VERTICAL CLEARANCE SHALL BE OF A PRESSURE CLASS (SERIES 160 OR DR 28) OF PIPE AND WITHSTAND PRESSURE TESTING OF 350 KPa.
3. WHERE A WATERMAIN CROSSES ABOVE A SEWER AND WITHIN 150mm, THE WATERMAIN SHALL BE BEDDED WITH LEAN CONCRETE THE FULL WIDTH OF THE WATERMAIN TRENCH AND TO A MINIMUM DISTANCE OF 1m FROM THE CENTRELINE OF THE SEWER.
4. WHERE A WATERMAIN CROSSES BELOW A SEWER 0.50m MINIMUM CLEAR SEPARATION MUST BE MAINTAINED. ALSO THE WATERMAIN COVER MATERIAL IS TO EXTEND UP TO THE BOTTOM OF THE SEWER BEDDING FOR THE FULL WIDTH OF THE WATERMAIN TRENCH. AS WELL KEEP PIPE JOINTS IN BOTH SEWER AND WATERMAIN AS FAR APART AS IS PRACTICAL FROM THE CROSSING.
5. THE LOCATIONS OR COMPLETENESS OF EXISTING UTILITIES (ABOVE AND BELOW GROUND) AS SHOWN IS APPROXIMATE. EXCAVATIONS TO VERIFY LOCATIONS OF SUCH UTILITIES MAY BE NECESSARY TO DETERMINE THEIR EXACT LOCATIONS.

LEGEND

BENCH MARK

BM 1 ELEV. = 257.771

North East corner property bar south of Pineridge Gate Road and East of Bethune Drive.

TOWN OF GRAVENHURST
PUBLIC WORKS DEPT.

APPROVED BY ________

DATE NOV 05 2008

SEDIMENT AND EROSION CONTROLS

THE CONTRACTOR IS RESPONSIBLE FOR EROSION AND SEDIMENT CONTROLS AT THE CONSTRUCTION SITE AND OFF SITE RESULTING FROM HIS OPERATIONS ON SITE. THE CONTRACTOR SHALL INSTALL AND MAINTAIN FACILITIES TO PREVENT THE MIGRATION OF SEDIMENTS FROM THE SITE. THIS SHALL INCLUDE BY LIQUID FLOWS, BY AIR AND BT ATTACHMENT TO EQUIPMENT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CLEAN UP OF MIGRATED SEDIMENTS SHOULD THEY OCCUR OFF SITE. EROSION DAMAGE DOWNSTREAM OF THE SITE ATTRIBUTED TO THE CONTRACTORS NEGLECT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

GRADING

a) SUBGRADE GRADING IN ACCORDANCE WITH OPSS 206 AND OPSD 200 SERIES COMPACTED TO 98% SPD EXCEPT SELECT SUBGRADE MATERIAL (SSM) BACKFILL IN WET CONDITIONS. BELOW THE BUILDINGS FOOTPRINT AS WELL AS UNDER ALL PAVED AREAS AND FILLS THE ORGANICS INCLUDING PEAT AND PREVIOUSLY PLACED FILL SHALL BE EXCAVATED AND REMOVED FROM THE SITE.
ALL EXCAVATED MATERIALS SHALL BE DISPOSED OF AND IN ACCORDANCE WITH OPSD 180 MANAGEMENT AND DISPOSAL OF EXCESS MATERIALS.
b) SUBBASE IN ACCORDANCE WITH OPSS 314 AND OPSD 206.01.
SUB BASE MATERIAL SHALL BE GRANULAR 'B' TYPE '1' COMPACTED TO 100% SPD.
c) BASE IN ACCORDANCE WITH OPSS 314 AND OPSD 206.01.
BASE MATERIAL SHALL BE GRANULAR 'A' COMPACTED TO 100% SPD.
d) ASPHALT PAVEMENTS IN ACCORDANCE WITH OPSS 310.
ASPHALT MATERIALS SHALL CONSIST OF HOT MIX HL4 SURFACE COURSE AND HOT MIX HL4 BINDER COURSES.
SUPPLIER TO BE A M.T.O. CERTIFIED PLANT.
MINIMUM MARSHALL FLOW SHALL BE 8 UNITS OF 0.25mm AT 3.5 % AIR VOIDS.
ASPHALT SHALL BE PERFORMANCE GRADED (PGAC) GRADE 58-34.
e) RIP RAP SHALL BE IN ACCORDANCE WITH OPSS 511. ALL RIP RAP SHALL BE ON GEOTEXTILE.
f) TOPSOIL SHALL BE IN ACCORDANCE WITH OPSS 570. MINIMUM DEPTH OF TOPSOIL ON SITE SHALL BE 100mm.
g) SOD SHALL BE IN ACCORDANCE WITH OPSS 571 AND OPSD 218.01. SOD SHALL BE NURSERY GROWN.
h) SEED AND COVER SHALL BE IN ACCORDANCE WITH OPSS 572 NOVEMBER 2003. PROVIDE LOWLAND MIX ALONG THE WET POND CIRCUMFERENCE ABOVE THE PERMANENT LIQUID LEVEL UP TO 1m ABOVE.

SEWERS

a) MAINS
SANITARY MAINS - POLYVINYL CHLORIDE (PVC), CLASS DR 35, TYTON JOINT.
STORM MAINS (INCLUDING CATCH BASIN LEADS) - POLYINYL CHLORIDE, CLASS DR 35, OR HIGH DENSITY POLYETHYLENE (HDPE), OR REINFORCED CONCRETE CLASS IV WITH SMOOTH INSIDE WALLS AND GASKETED BELL AND SPIGOT JOINTS.
CATCH BASIN LEAD CONNECTION TO MAINS WITH 'TEE'.
CLASS 'B' BEDDING (OPSD 802.030) WITH BEDDING MATERIAL GRANULAR 'A', COVER MATERIAL GRANULAR 'B' TYPE '1' AND SELECT SUBGRADE MATERIAL FOR BACKFILL.
ALL IN ACCORDANCE WITH OPSS 410.
b) MANHOLES - PRECAST CONCRETE - 1200mm AND 1500mm DIAMETER (OPSD 701.010 or 701.011), WITH MONOLITHIC BASE AND TAPERED TOP WHEN DEPTH PERMITS.
c) DITCH INLET CATCH BASINS - 600 X 600 (OPSD 705.030) AND 600 X 1200 (OPSD 705.040)
d) FRAME AND COVERS - MANHOLES OPSD 401.01 - TYPE A, DITCH INLET CATCH BASINS OPSD 403.01.
e) ADJUSTMENT UNITS (3 LAYERS MIN. 6 LAYERS MAX.) - OPSD 704.010 - GROUT OUTSIDE ONLY.
f) STEPS - OPSD 405.010 - CIRCULAR ALUMINUM - IN MANHOLES ONLY.
g) FROST STRAPS - OPSD 701.100 (MODIFIED TO 3 STRAPS AT 120 DEGREES ON MANHOLES) (2 STRAPS ON JOINTED CATCH BASINS)
h) BENCHING - OPSD 701.021 (SANITARY MANHOLES ONLY).
i) WRAPPING (MANHOLES AND CATCH BASINS) - DOUBLE 6 MIL POLYETHYLENE.
j) BEDDING 150mm GRANULAR 'A'.
k) BACKFILL WITH GRANULAR 'B' TYPE '1'.
l) ALL IN ACCORDANCE WITH OPSS 407.

WATERMAINS

a) MAINS (INCLUDES HYDRANT LEADS)
POYVINYL CHLORIDE (PVC), CLASS 150 OR DUCTILE IRON CLASS 52 MORTAR LINED (M.L.) OR DUCTILE IRON PRESSURE CLASS 350, M.L.
FITTINGS SHALL BE DUCTILE IRON, M.L. WITH MECHANICAL JOINT.
CORROSION PROTECTION IS REQUIRED ON ALL DUCTILE IRON PIPE AND FITTINGS AND SERVICES.
PROVIDE TRACER CABLE (BRAIDED 12GA COPPER, COATED) ALONG ALL PVC WATER MAINS.
TERMINATE TRACER CABLES AT VALVE BOX TOPS AND AT ABOVE GROUND HYDRANT FLANGE.
THRUST BLOCK (OPSD 1103.010) ALL BENDS, TEES AND ENDS - PROVIDE POLY SEPERATION BETWEEN CONCRETE AND FITTING.
CLASS 'B' BEDDING (OPSD 802.030) WITH BEDDING MATERIAL GRANULAR 'A', COVER MATERIAL GRANULAR 'B' TYPE '1' AND SELECT SUBGRADE MATERIAL FOR BACKFILL.
DOUBLE SWAB ALL WATERMAINS.
PRESSURE TEST ALL WATERMAINS AT 1050 KPa.
DISINFECT ALL WATERMAINS AND FITTINGS AND PROVIDE BACTERIAL TEST PROOF.
ALL IN ACCORDANCE WITH OPSS 701.
b) HYDRANTS SHALL BE EITHER CENTURY B-50-B BY CANADA VALVE OR M SERIES BY CLOW CANADA OR AN APPROVED EQUAL WITH TWO PIECE BARREL, BE NON-RISING STEM AND HAVE A BARREL LENGTH TO SUIT 2.5 METRES COVER ON LEAD, IT SHALL OPEN COUNTER CLOCKWISE AND HAVE TWO HOSE NOZZLES AND ONE PUMPER NOZZLE COMPLETE WITH CAPS.
DOUBLE WRAP BURIED HYDRANT BARREL WITH 6 MIL POLYETHYLENE.
HYDRANT FLANGE TO BE 150mm ABOVE FINISHED GRADE.
BACKFILL WITH GRANULAR 'B' TYPE '1'.
HYDRANT ASSEMBLY AS PER OPSD 1105.010.
c) WATER VALVES SHALL BE GATE VALVES BY CANADA VALVE OR CLOW CANADA AWWA C509-80 AND BE STANDARD BODY, BRONZE MOUNTED WITH INSIDE SCREW AND BE RESILIENT SEATED, HAVE NON-RISING STEM WITH MECHANICAL JOINTS AND OPEN COUNTER CLOCKWISE.
SEAT VALVE ON POURED OR PRECAST SLAB (REINFORCED PATIO STONE).
d) VALVE BOXES SHALL BE CAST IRON, BITUMINOUS COATED AND TWO PIECE SLIDING TYPE (ADJUSTABLE FOR 500mm MIN.), THE BOTTOM SHALL HAVE A VALVE BONNET WITH ALIGNER.
CAP WITH 'WATER' INSCRIBED ON IT.
DOUBLE WRAP VALVE BOX WITH 6 MIL POLYETHYLENE.
WRAP BONNET AND VALVE WITH GEOTEXTILE (NON-WOVEN, F.O.S.150 TO 210um, CLASS II).
BACKFILL VALVE BOX WITH GRANULAR 'B' TYPE '1'.

No.	DESCRIPTION	DATE	BY	APP'D
1	Addendum 3	Oct 27/08	D.P.N.	D.P.N.

REVISIONS

REGISTERED PROFESSIONAL ENGINEER D. A. RICHARDS PROVINCE OF ONTARIO 26/10/08

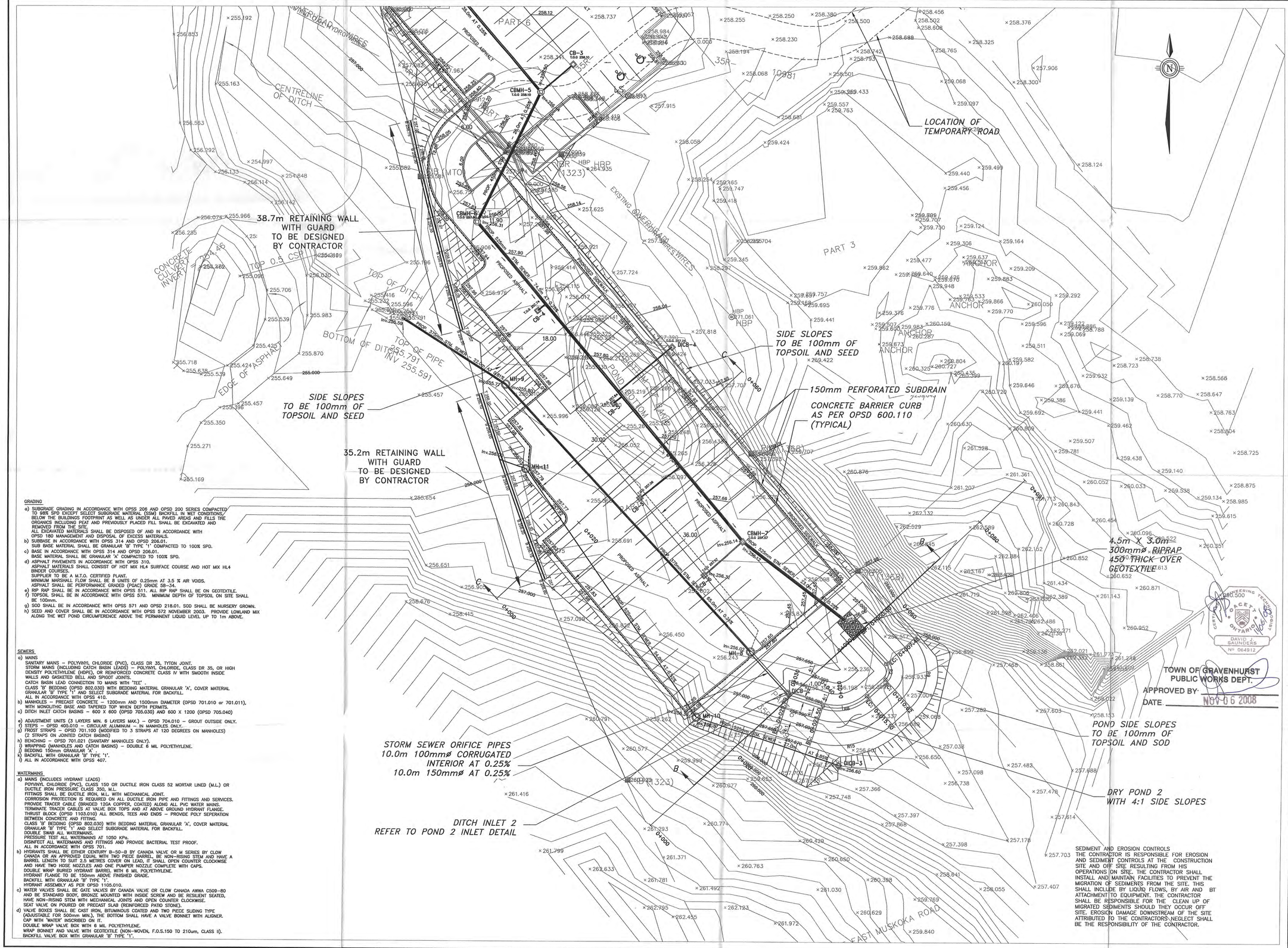
Trow Associates Inc.
1850 Bond Street
North Bay Ontario
P1B-8G5
PHONE (705) 474-2720
FAX (705) 474-8515

CLIENT: TOWN OF GRAVENHURST IN THE MUNICIPALITY OF MUSKOKA

PROJECT: BUILDING ADDITION TO COTTAGE COUNRTY FAMILY HEALTH TEAM

TITLE: SITE PLAN BUILDING AND EAST AND NORTH PARKING LOTS

design by	D.P.N. & G.L.H.	project no.	4972
drawn by	D.P.N. & G.L.H.	drawing no.	C-2
checked by	D.A.R.		
date	23/10/08		
scale	1:300		



GRADING

a) SUBGRADE GRADING IN ACCORDANCE WITH OPSS 206 AND OPSD 200 SERIES COMPACTED TO 98% SPD EXCEPT SELECT SUBGRADE MATERIAL (SSM) BACKFILL IN WET CONDITIONS, BELOW THE BUILDINGS FOOTPRINT AS WELL AS UNDER ALL PAVED AREAS AND FILLS THE ORGANICS INCLUDING PEAT AND PREVIOUSLY PLACED FILL SHALL BE EXCAVATED AND REMOVED FROM THE SITE.
ALL EXCAVATED MATERIALS SHALL BE DISPOSED OF AND IN ACCORDANCE WITH OPSD 180 MANAGEMENT AND DISPOSAL OF EXCESS MATERIALS.
b) SUBBASE IN ACCORDANCE WITH OPSS 314 AND OPSD 206.01.
SUB BASE MATERIAL SHALL BE GRANULAR 'B' TYPE '1' COMPACTED TO 100% SPD.
c) BASE IN ACCORDANCE WITH OPSS 314 AND OPSD 206.01.
BASE MATERIAL SHALL BE GRANULAR 'A' COMPACTED TO 100% SPD.
d) ASPHALT PAVEMENTS IN ACCORDANCE WITH OPSS 310.
ASPHALT MATERIALS SHALL CONSIST OF HOT MIX HL4 SURFACE COURSE AND HOT MIX HL4 BINDER COURSES.
SUPPLIER TO BE A M.T.O. CERTIFIED PLANT.
MINIMUM MARSHALL FLOW SHALL BE 8 UNITS OF 0.25mm AT 3.5 % AIR VOIDS.
ASPHALT SHALL BE PERFORMANCE GRADED (PGAC) GRADE 58-34.
e) RIP RAP SHALL BE IN ACCORDANCE WITH OPSS 511. ALL RIP RAP SHALL BE ON GEOTEXTILE.
f) TOPSOIL SHALL BE IN ACCORDANCE WITH OPSS 570. MINIMUM DEPTH OF TOPSOIL ON SITE SHALL BE 100mm.
g) SOD SHALL BE IN ACCORDANCE WITH OPSS 571 AND OPSD 218.01. SOD SHALL BE NURSERY GROWN.
h) SEED AND COVER SHALL BE IN ACCORDANCE WITH OPSS 572 NOVEMBER 2003. PROVIDE LOWLAND MIX ALONG THE WET POND CIRCUMFERENCE ABOVE THE PERMANENT LIQUID LEVEL UP TO 1m ABOVE.

SEWERS

a) MAINS
SANITARY MAINS - POLYVINYL CHLORIDE (PVC), CLASS DR 35, TYTON JOINT.
STORM MAINS (INCLUDING CATCH BASIN LEADS) - POLYVINYL CHLORIDE, CLASS DR 35, OR HIGH DENSITY POLYETHYLENE (HDPE), OR REINFORCED CONCRETE CLASS IV WITH SMOOTH INSIDE WALLS AND GASKETED BELL AND SPIGOT JOINTS.
CATCH BASIN LEAD CONNECTION TO MAINS WITH 'TEE'.
CLASS 'B' BEDDING (OPSD 802.030) WITH BEDDING MATERIAL GRANULAR 'A', COVER MATERIAL GRANULAR 'B' TYPE '1' AND SELECT SUBGRADE MATERIAL FOR BACKFILL.
ALL IN ACCORDANCE WITH OPSS 410.
b) MANHOLES - PRECAST CONCRETE - 1200mm AND 1500mm DIAMETER (OPSD 701.010 or 701.011), WITH MONOLITHIC BASE AND TAPERED TOP WHEN DEPTH PERMITS.
c) DITCH INLET CATCH BASINS - 600 X 600 (OPSD 705.030) AND 600 X 1200 (OPSD 705.040)
e) ADJUSTMENT UNITS (3 LAYERS MIN. 6 LAYERS MAX.) - OPSD 704.010 - GROUT OUTSIDE ONLY.
f) STEPS - OPSD 405.010 - CIRCULAR ALUMINUM - IN MANHOLES ONLY.
g) FROST STRAPS - OPSD 701.100 (MODIFIED TO 3 STRAPS AT 120 DEGREES ON MANHOLES)
(2 STRAPS ON JOINTED CATCH BASINS)
h) BENCHING - OPSD 701.021 (SANITARY MANHOLES ONLY).
i) WRAPPING (MANHOLES AND CATCH BASINS) - DOUBLE 6 MIL POLYETHYLENE.
j) BEDDING 150mm GRANULAR 'A'.
k) BACKFILL WITH GRANULAR 'B' TYPE '1'.
l) ALL IN ACCORDANCE WITH OPSS 407.

WATERMAINS

a) MAINS (INCLUDES HYDRANT LEADS)
POLYVINYL CHLORIDE (PVC), CLASS 150 OR DUCTILE IRON CLASS 52 MORTAR LINED (M.L.) OR DUCTILE IRON PRESSURE CLASS 350, M.L.
FITTINGS SHALL BE DUCTILE IRON, M.L. WITH MECHANICAL JOINT.
CORROSION PROTECTION IS REQUIRED ON ALL DUCTILE IRON PIPE AND FITTINGS AND SERVICES.
PROVIDE TRACER CABLE (BRAIDED 12GA COPPER, COATED) ALONG ALL PVC WATER MAINS.
TERMINATE TRACER CABLES AT VALVE BOX TOPS AND AT ABOVE GROUND HYDRANT FLANGE.
THRUST BLOCK (OPSD 1103.010) ALL BENDS, TEES AND ENDS - PROVIDE POLY SEPERATION BETWEEN CONCRETE AND FITTING.
CLASS 'B' BEDDING (OPSD 802.030) WITH BEDDING MATERIAL GRANULAR 'A', COVER MATERIAL GRANULAR 'B' TYPE '1' AND SELECT SUBGRADE MATERIAL FOR BACKFILL.
DOUBLE SWAB ALL WATERMAINS.
PRESSURE TEST ALL WATERMAINS AT 1050 KPa.
DISINFECT ALL WATERMAINS AND FITTINGS AND PROVIDE BACTERIAL TEST PROOF.
ALL IN ACCORDANCE WITH OPSS 701.
b) HYDRANTS SHALL BE EITHER CENTURY B-50-B BY CANADA VALVE OR M SERIES BY CLOW CANADA OR AN APPROVED EQUAL WITH TWO PIECE BARREL, BE NON-RISING STEM AND HAVE A BARREL LENGTH TO SUIT 2.5 METRES COVER ON LEAD, IT SHALL OPEN COUNTER CLOCKWISE AND HAVE TWO HOSE NOZZLES AND ONE PUMPER NOZZLE COMPLETE WITH CAPS.
DOUBLE WRAP BURIED HYDRANT BARREL WITH 6 MIL POLYETHYLENE.
HYDRANT FLANGE TO BE 150mm ABOVE FINISHED GRADE.
BACKFILL WITH GRANULAR 'B' TYPE '1'.
HYDRANT ASSEMBLY AS PER OPSD 1105.010.
c) WATER VALVES SHALL BE GATE VALVES BY CANADA VALVE OR CLOW CANADA AWWA C509-80 AND BE STANDARD BODY, BRONZE MOUNTED WITH INSIDE SCREW AND BE RESILIENT SEATED, HAVE NON-RISING STEM WITH MECHANICAL JOINTS AND OPEN COUNTER CLOCKWISE.
SEAT VALVE ON POURED OR PRECAST SLAB (REINFORCED PATIO STONE).
d) VALVE BOXES SHALL BE CAST IRON, BITUMINOUS COATED AND TWO PIECE SLIDING TYPE (ADJUSTABLE FOR 500mm MIN.), THE BOTTOM SHALL HAVE A VALVE BONNET WITH ALIGNER.
CAP WITH 'WATER' INSCRIBED ON IT.
DOUBLE WRAP VALVE BOX WITH 6 MIL POLYETHYLENE.
WRAP BONNET AND VALVE WITH GEOTEXTILE (NON-WOVEN, F.O.S.150 TO 210um, CLASS II).
BACKFILL VALVE BOX WITH GRANULAR 'B' TYPE '1'.

SEDIMENT AND EROSION CONTROLS
THE CONTRACTOR IS RESPONSIBLE FOR EROSION AND SEDIMENT CONTROLS AT THE CONSTRUCTION SITE AND OFF SITE RESULTING FROM HIS OPERATIONS ON SITE. THE CONTRACTOR SHALL INSTALL AND MAINTAIN FACILITIES TO PREVENT THE MIGRATION OF SEDIMENTS FROM THE SITE. THIS SHALL INCLUDE BY LIQUID FLOWS, BY AIR AND BY ATTACHMENT TO EQUIPMENT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CLEAN UP OF MIGRATED SEDIMENTS SHOULD THEY OCCUR OFF SITE. EROSION DAMAGE DOWNSTREAM OF THE SITE ATTRIBUTED TO THE CONTRACTORS NEGLECT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

NOTES

1. UNLESS INDICATED OTHERWISE MAINTAIN 2.5 METRES COVER OVER WATERMAINS TO WITHIN 5 METRES OF CONNECTIONS TO EXISTING MAINS.
2. SANITARY SEWER PIPE IN A COMBINED TRENCH WITH A WATERMAIN AND WITHOUT THE REQUIRED VERTICAL CLEARANCE SHALL BE OF A PRESSURE CLASS (SERIES 160 OR DR 28) OF PIPE AND WITHSTAND PRESSURE TESTING OF 350 KPa.
3. WHERE A WATERMAIN CROSSES ABOVE A SEWER AND WITHIN 150mm, THE WATERMAIN SHALL BE BEDDED WITH LEAN CONCRETE THE FULL WIDTH OF THE WATERMAIN TRENCH AND TO A MINIMUM DISTANCE OF 1m FROM THE CENTRELINE OF THE SEWER.
4. WHERE A WATERMAIN CROSSES BELOW A SEWER 0.50m MINIMUM CLEAR SEPARATION MUST BE MAINTAINED. ALSO THE WATERMAIN COVER MATERIAL IS TO EXTEND UP TO THE BOTTOM OF THE SEWER BEDDING FOR THE FULL WIDTH OF THE WATERMAIN TRENCH. AS WELL KEEP PIPE JOINTS IN BOTH SEWER AND WATERMAIN AS FAR APART AS IS PRACTICAL FROM THE CROSSING.
5. THE LOCATIONS OR COMPLETENESS OF EXISTING UTILITIES (ABOVE AND BELOW GROUND) AS SHOWN IS APPROXIMATE. EXCAVATIONS TO VERIFY LOCATIONS OF SUCH UTILITIES MAY BE NECESSARY TO DETERMINE THEIR EXACT LOCATIONS.

LEGEND

BENCH MARK

BM 1 ELEV. = 257.771

North East corner property bar south of Pineridge Gate Road and East of Bethune Drive.

No.	DESCRIPTION	DATE	BY	APP'D
1	Addendum 3	Oct 27/08	D.P.N.	D.P.N.

REVISIONS

REGISTERED PROFESSIONAL ENGINEER D. A. RICHARDS PROVINCE OF ONTARIO

CERTIFICATE OF PROFESSIONAL ENGINEER PROVINCE OF ONTARIO DAVID J. SAUNDERS No. 064912

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CLIENT
TOWN OF GRAVENHURST IN THE MUNICIPALITY OF MUSKOKA

PROJECT
BUILDING ADDITION TO COTTAGE COUNRTY FAMILY HEALTH TEAM

TITLE
SITE PLAN
SOUTH PARKING LOT

design by	D.P.N. & G.L.H.	project no.	4972
drawn by	D.P.N. & G.L.H.	drawing no.	C-3
checked by	D.A.R.		
date	23/10/08		
scale	1:300		

SANITARY SEWER SCHEDULE

FROM	TO	Diam (mm)	Length (m)	Slope (%)	Inv Elev U/S	Inv Elev D/S
BLD	San MH-1	200	19.2	0.68	257.32	257.19
San MH-1	San MH-2	200	85.0	0.71	257.14	256.54
San MH-3	San MH-2	200	13.6	3.46	256.87	256.40
San MH-2	EXIST. MH	200	41.5	0.41	256.37	256.20

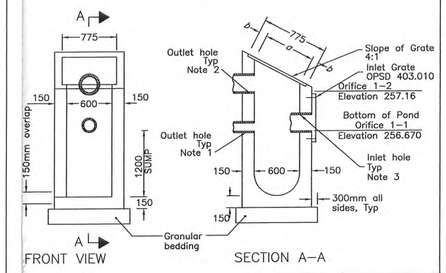
STORM SEWER SCHEDULE

FROM	TO	Diam (mm)	Length (m)	Slope (%)	Inv Elev U/S	Inv Elev D/S	
CBMH-1	CBMH-2	300	27.0	0.26	256.90	256.83	
CBMH-2	CBMH-3	300	29.0	1.28	256.77	256.40	
CBMH-3	CBMH-4	375	23.5	0.26	256.68	256.62	
CBMH-4	CBMH-5	450	35.0	0.26	256.59	256.50	
CBMH-5	CBMH-6	450	26.0	0.27	256.44	256.37	
CBMH-6	CBMH-7	525	74.5	0.23	256.31	256.14	
CBMH-7	Pond Inlet	525	23.0	0.26	256.12	256.06	
DICB-2	MH-8	100+150	10.0	0.25	256.09	256.07	ORIFICE PIPES
MH-8	MH-9	375	65.0	0.34	256.02	255.80	
MH-9	OUTLET	375	22.0	0.81	255.77	255.59	
DICB-3	MH-10	525	27.0	0.85	256.60	256.37	
MH-10	MH-11	525	54.0	0.52	256.34	256.06	
MH-11	OUTLET	525	5.0	0.60	256.03	256.00	
DICB-1	DICB-4	100+200	8.0	0.25	256.67	256.65	ORIFICE PIPES
DICB-4	MH-12	375	29.5	0.27	256.65	256.57	
MH-12	OUTLET	375	12.5	0.24	256.57	256.54	

STRUCTURE SCHEDULE

Structure ID	Type	Structure OPSD	Grate OPSD	Ground/Grate Elevation	Sump
CBMH-1	1200mm MH	701.010	400.020	258.22	Yes
CBMH-2	1200mm MH	701.010	400.020	258.15	Yes
CBMH-3	1200mm MH	701.010	400.020	258.15	Yes
CBMH-4	1200mm MH	701.010	400.020	258.14	Yes
CBMH-5	1200mm MH	701.010	400.020	258.10	Yes
CBMH-6	1200mm MH	701.010	400.020	257.80	Yes
CBMH-7	1200mm MH	701.010	400.020	257.57	Yes
DICB-2	Ditch Inlet Catchbasin	705.030	400.020	267.60	Yes
MH-8	1200mm MH	701.010	401.010	257.70	Yes
MH-9	1200mm MH	701.010	401.010	257.26	Yes
DICB-3	Ditch Inlet Catchbasin	705.030	400.020	257.70	Yes
MH-10	1200mm MH	701.010	401.010	258.00	Yes
MH-11	1200mm MH	701.010	401.010	257.94	Yes
DICB-1	Ditch Inlet Catchbasin	705.030	400.020	257.20	Yes
DICB-4	Ditch Inlet Catchbasin	705.030	400.020	256.97	Yes
MH-12	1200mm MH	701.010	401.010	257.80	Yes
CB-1	Catchbasin	705.010	400.020	257.22	Yes
CB-2	Catchbasin	705.010	400.020	258.14	Yes
CB-3	Catchbasin	705.010	400.020	258.10	Yes
CB-4	Catchbasin	705.010	400.020	257.74	Yes
CB-5	Catchbasin	705.010	400.020	257.64	Yes
CB-6	Catchbasin	705.010	400.020	257.56	Yes
CB-7	Catchbasin	705.010	400.020	257.57	Yes
San MH-1	1200mm MH	701.010	401.010	258.00	No
San MH-2	1200mm MH	701.010	401.010	257.80	No
San MH-3	1200mm MH	701.010	401.010	258.39	No

POND 1 INLET DETAIL



NOTES:
1 Hole size for 100mm diameter pvc pipe, location as required.
2 Hole size for 200mm diameter pvc pipe, location as required.
3 Hole size for 300mm diameter pvc pipe, location as required.

A Where inlet is placed across ditch and is accessible to vehicular traffic, grating slope is to be 6:1 or flatter.
B All reinforcing steel shall have 25mm minimum cover.
C Granular backfill to be placed to a minimum thickness of 300mm all around the ditch inlet.
D Grating according to OPSD-403.010.
E Pipe support according to OPSD-708.020.
F All dimensions are nominal.
G All dimensions are in millimetres or metres unless otherwise shown.

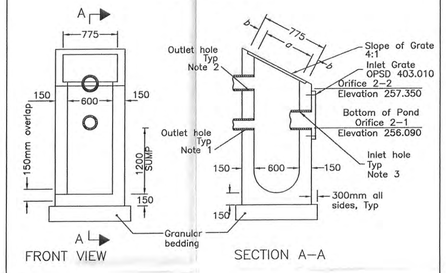
Opening Dimensions mm			
Grate Type	Slope	a	b
A	2:1	670	52
	3:1	632	72
	4:1	618	79
	6:1	605	83
	8:1	605	85
	10:1	603	86
	HOR	600	87

ONTARIO PROVINCIAL STANDARD DRAWING | 1996 09 15 | Rev | Date

PRECAST CONCRETE DITCH INLET
600mm x 600mm, DEPTH 4.0m MAX

OPSD – 705.030(M)

POND 2 INLET DETAIL



NOTES:
1 Hole size for 100mm diameter corrugated pipe, location as required.
2 Hole size for 150mm diameter pvc pipe, location as required.
3 Hole size for 300mm diameter pvc pipe, location as required.

A Where inlet is placed across ditch and is accessible to vehicular traffic, grating slope is to be 6:1 or flatter.
B All reinforcing steel shall have 25mm minimum cover.
C Granular backfill to be placed to a minimum thickness of 300mm all around the ditch inlet.
D Grating according to OPSD-403.010.
E Pipe support according to OPSD-708.020.
F All dimensions are nominal.
G All dimensions are in millimetres or metres unless otherwise shown.

Opening Dimensions mm			
Grate Type	Slope	a	b
A	2:1	670	52
	3:1	632	72
	4:1	618	79
	6:1	605	83
	8:1	605	85
	10:1	603	86
	HOR	600	87

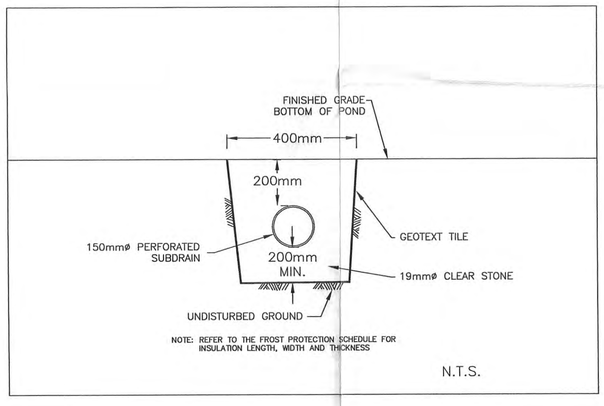
ONTARIO PROVINCIAL STANDARD DRAWING | 1996 09 15 | Rev | Date

PRECAST CONCRETE DITCH INLET
600mm x 600mm, DEPTH 4.0m MAX

OPSD – 705.030(M)

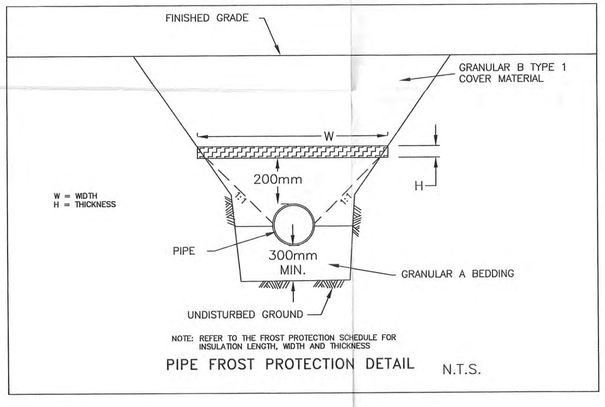
FROST PROTECTION SCHEDULE

FROM	TO	Frost Cover Ave. (m)	Length (m)	Thickness (mm)	Width (m)
CBMH-1	CBMH-2	1.0	27.0	125	3.60
CBMH-2	CBMH-3	1.2	29.0	100	3.20
CBMH-3	CBMH-4	1.1	23.5	125	3.20
CBMH-4	CBMH-5	1.1	35.0	125	3.20
CBMH-5	CBMH-6	1.0	26.0	125	3.60
CBMH-6	CBMH-7	0.9	74.5	125	3.90
CBMH-7	Pond Inlet	0.4	23.0	250	4.60
DICB-2	MH-8	0.9	10.0	125	3.90
MH-8	MH-9	1.2	65.0	100	3.20
MH-9	OUTLET	0.6	22.0	150	4.50
DICB-3	MH-10	0.8	27.0	150	4.00
MH-10	MH-11	1.3	54.0	100	3.00
MH-11	OUTLET	0.9	5.0	125	3.90
DICB-1	DICB-4	0.9	8.0	125	3.90
DICB-4	MH-12	0.8	29.5	125	3.90
MH-12	OUTLET	0.9	12.5	125	3.90
BLD	San MH-1	0.7	19.2	200	4.20
San MH-1	San MH-2	0.3	85.0	250	4.60
San MH-3	San MH-2	1.2	13.6	100	3.20
San MH-2	EXIST. MH	1.2	41.5	100	3.20



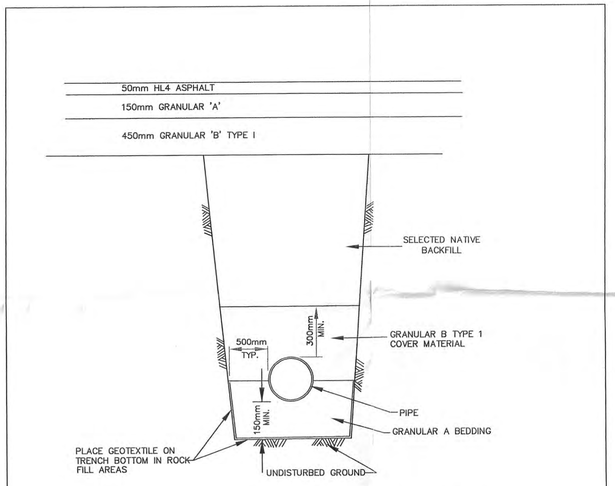
NOTE: REFER TO THE FROST PROTECTION SCHEDULE FOR INSULATION LENGTH, WIDTH AND THICKNESS

N.T.S.



NOTE: REFER TO THE FROST PROTECTION SCHEDULE FOR INSULATION LENGTH, WIDTH AND THICKNESS

PIPE FROST PROTECTION DETAIL N.T.S.



NOTE: PIPE INCLUDES STORM AND SANITARY SEWERS, WATERMAINS, ROOF DRAINS OVERFLOW PIPES AND CULVERTS.

PARKING LOT
PIPE TRENCH DETAIL N.T.S.

NOTES

LEGEND

BENCH MARK

BM 1 ELEV. = 257.771

North East corner property bar south of Pineridge Gate Road and East of Bethune Drive.

No.	DESCRIPTION	DATE	BY	APP'D
1	Addendum 3	Oct.27/08	D.P.N.	D.P.N.

REVISIONS

REGISTERED PROFESSIONAL ENGINEER D. A. RICHARDS PROVINCE OF ONTARIO

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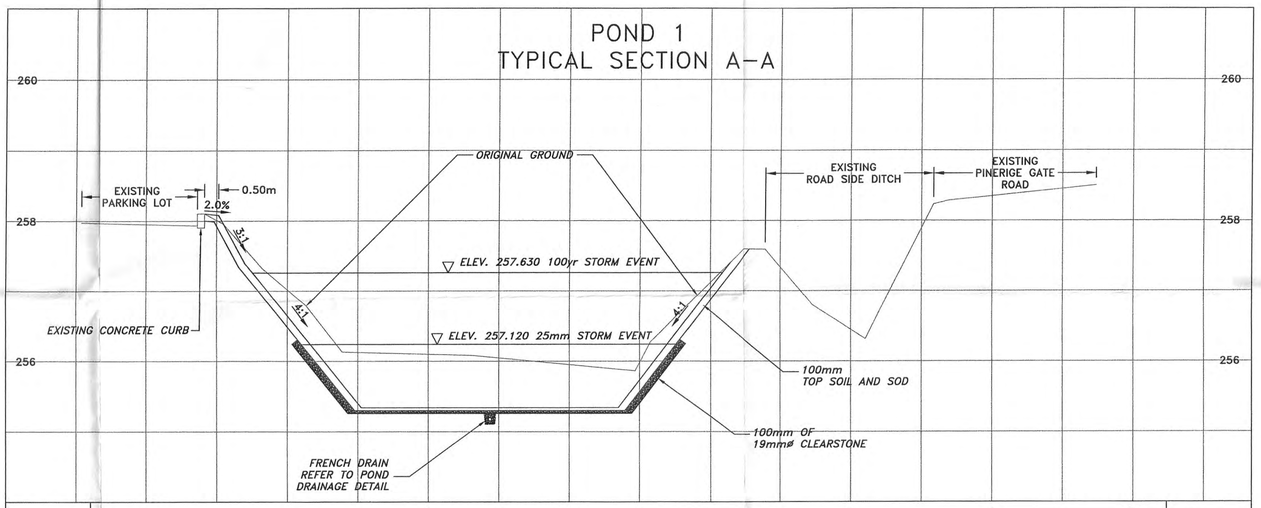
CLIENT
TOWN OF GRAVENHURST
IN THE
MUNICIPALITY OF MUSKOKA

PROJECT
BUILDING ADDITION TO
COTTAGE COUNRTY
FAMILY HEALTH TEAM

TITLE
DETAILS

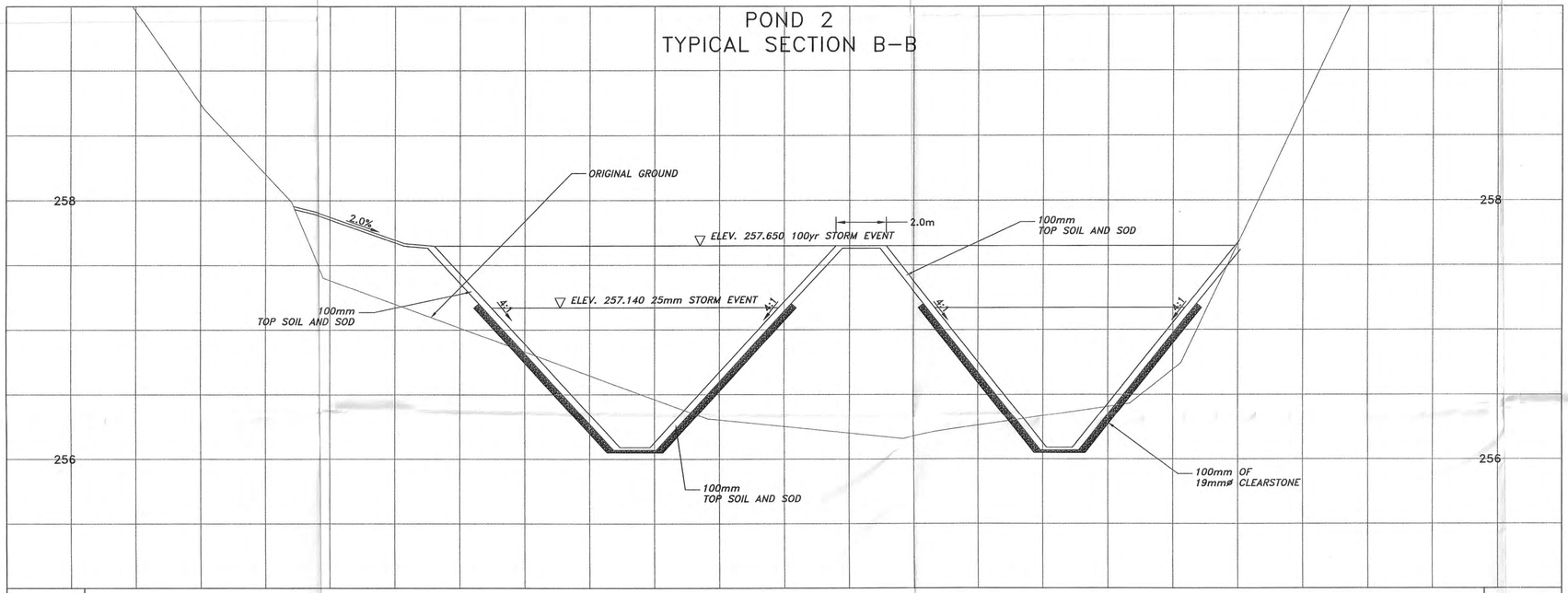
design by	D.P.N. & G.L.H.
drawn by	D.P.N. & G.L.H.
checked by	D.A.R.
date	23/10/08
scale	1:300
project no.	4972
drawing no.	C-4

POND 1
TYPICAL SECTION A–A



STATION	0+005	0+010	0+015	0+020	0+025	0+030	0+035	0+040	STATION
EXISTING ELEVATIONS	257.95	257.51	257.05	256.98	257.56	257.22	258.17	258.24	EXISTING ELEVATIONS
PROPOSED ELEVATIONS	257.950	257.509	257.050	256.976	257.560	257.224	258.174	258.241	PROPOSED ELEVATIONS

POND 2
TYPICAL SECTION B–B



STATION	0+015	0+020	0+025	0+030	0+035	0+040	0+045	0+050	0+055	0+060	0+065	STATION
EXISTING ELEVATIONS	259.46	258.20	257.20	256.83	256.46	256.25	256.18	256.34	256.69	258.73	260.86	EXISTING ELEVATIONS
PROPOSED ELEVATIONS	259.462	258.202	257.199	256.831	256.462	256.247	256.179	256.335	256.694	258.733	260.856	PROPOSED ELEVATIONS

TOWN OF GRAVENHURST
PUBLIC WORKS DEPT.
APPROVED BY:
DATE:

NOTES

LEGEND

BENCH MARK

BM 1 ELEV. = 257.771

North East corner property bar south of Pineridge Gate Road and East of Bethune Drive.

No.	DESCRIPTION	DATE	BY	APP'D
1	Addendum 3	Oct 27/08	D.P.N.	D.P.N.

REVISIONS

REGISTERED PROFESSIONAL ENGINEER
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PROVINCE OF ONTARIO

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CLIENT
TOWN OF GRAVENHURST
IN THE
MUNICIPALITY OF MUSKOKA

PROJECT
BUILDING ADDITION TO
COTTAGE COUNRTY
FAMILY HEALTH TEAM

TITLE
POND 1 & 2
TYPICAL SECTIONS

design by	D.P.N.	project no.	4972
drawn by	D.P.N.	drawing no.	C-5
checked by	D.A.R.		
date	23/10/08		
scale	1:100		

Appendix 10 - References

The following documentation were referenced and/or acknowledged in the preparation of this inspections and maintenance manual:

1. **Municipal Consolidated Linear Infrastructure Environmental Compliance Approvals** - Ministry of Environment, Conservation and Parks. Link: Municipal Consolidated Linear Infrastructure Environmental Compliance Approvals | ontario.ca
2. **Environmental Compliance Approval for a Municipal Stormwater Management Systems** - Ministry of Environment, Conservation and Parks; ECA Number: 309-S701 - Issue Number: 1 (October 6, 2022). Reference Appendix '1' of this document.
3. **Town of Gravenhurst –** GeoHub – Referenced for Area Image and Property Details
4. **Policy Review Policy Review of Municipal Stormwater Management in the Light of Climate Change** - Ministry of Environment, Conservation and Parks. Link: Policy Review of Municipal Stormwater Management in the Light of Climate Change | ontario.ca
5. **Sustainable Technologies Evaluation Program** – Inspection and Maintenance Guide for Stormwater Management Ponds and Constructed Wetlands; Toronto Region Conservation Authority and CH2M Hill Canada Ltd. (2018). Link: Inspection and Maintenance Guide for Stormwater Management Ponds and Constructed Wetlands - Search (bing.com)
6. **Technical Guidelines for Stormwater Management Submissions** – Lake Simcoe Region Conservation Authority (April 2022). Link: LSRCA SWM Guidelines w Appendices, April 2022
7. **Environmental Compliance Approval for the Design Criteria for Sanitary Sewers and Forcemains** – Ministry of Environment, Conservation and Parks (April 22, 2022).
8. **Design Guidelines for Sewage Works** - Ministry of Environment, Conservation and Parks Link: Stormwater Management Planning and Design Manual | Ontario.ca
9. **Stormwater Management Planning and Design Manual** - Ministry of Environment (March 2003). Link: Stormwater Management Planning and Design Manual | Ontario.ca
10. **Engineering Design Criteria and Standards Manual** - District of Muskoka and Area Municipalities - (January 2023). Link: 2023_The-District-Municipality-of-Muskoka-Design-Criteria-and-Standards-Manual.pdf
11. **The Ontario Climate Change Strategy -** Ministry of Environment, Conservation and Parks. Link: Ontario's Climate Change Strategy
12. **Stormceptor Owners Manual –** Imbrium Systems Inc & Imbrium Systems LLC. Link: https://www.imbriumsystems.com/Portals/0/documents/sc/technical_docs/Stormceptor%20Owners%20Manual.pdf

Appendix 11 - Applicable Legislation & Regulations

The regulatory framework for designing, constructing, monitoring and maintaining SWMFs encompasses federal, provincial and municipal levels of government. The legislation identified below encompasses applicable legislation for SWMFs, from the time they are designed to the time that they require maintenance and repairs.

1. Federal Fisheries Act (R.S.C. 1985). Link: Fisheries Act (justice.gc.ca)
2. Ontario Fish and Wildlife Conservation Act (S.O. 1997). Link: Fish and Wildlife Conservation Act, 1997 | Ontario Fishing – Ont. ORA
3. Ontario Water Resources Act (R.S.O. 1990). Link: Ontario Water Resources Act, R.S.O. 1990, c. O.40
4. Ontario Environmental Protection Act (R.S.O. 1990). Link: Environmental Protection Act, R.S.O. 1990, c. E.19 (ontario.ca)
5. Ontario Conservation Authorities Act (R.S.O. 1990). Link: Conservation Authorities Act, R.S.O. 1990, c. C.27 (ontario.ca)
6. Ontario Lakes and Rivers Improvement Act (R.S.O. 1990). Link: Lakes and Rivers Improvement Act, R.S.O. 1990, c. L.3 (ontario.ca)
7. Ontario Municipal Act (R.S.O. 1990). Link: Municipal Act, 2001, S.O. 2001, c. 25 (ontario.ca)
8. Ontario Planning Act (R.S.O. 1990). Link: Planning Act, R.S.O. 1990, c. P.13 (ontario.ca)
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10. Ontario Nutrient Management Act (R.S.O. 2002). Link: Nutrient Management Act, 2002, S.O. 2002, c. 4 (ontario.ca)
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