EROSION AND SEDIMENT CONTROL REPORT IN SUPPORT OF DPOS & OPA

12245 TORBRAM ROAD
TULLAMORE LANDS

TOWN OF CALEDON
REGION OF PEEL

PREPARED FOR:

TULLAMORE INDUSTRIAL GP LIMITED

PREPARED BY:

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OCTOBER 2023

CFCA FILE NO. 2022-5842-7

CROZIER
CONSULTING ENGINEERS

Revision Number	Date	Comments
Rev.0	November 2022	Issued for Topsoil Stripping Permit - TRCA
Rev. 1	December 2022	Issued for Topsoil Stripping Permit - TRCA
Rev. 2	April 2023	Issued for Topsoil Stripping Permit - Town
Rev. 3	October 2023	Issued for DPoS & OPA

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1.0 Introduction

C.F. Crozier & Associates Inc. (Crozier) was retained by Tullamore Industrial GP Limited (the Owner) to prepare this Erosion and Sediment Control Report in support of a proposed Business Park at 12245 Torbram Road (the Tullamore Lands). This report is in support of the Draft Plan of Subdivision and Official Plan Amendment applications for the proposed development.

1.1 Site Description

The subject lands (Site) consist of approximately 202.9 hectares (ha). The Site is bound by Mayfield Road to the south, Airport Road to the east, greenfield lands to the north, and Torbram Road to the west. The Site is owned by Tullamore Industrial GP Limited and consists of primarily agricultural lands and contains a Greenbelt area as well as two tributaries of the West Humber River.

The Greenbelt area of the Site is located north of the Torbram Road and Mayfield Road intersection. A tributary of the West Humber River is conveyed through this Greenbelt area. A second tributary of the West Humber River flows through the middle of the Site. Both tributaries convey stormwater southwards through existing culverts under Mayfield Road.

Note, the Site was granted a Minister's Zoning Order (MZO) by the provincial government earlier this year.

1.2 Proposed Development

The Site is proposed to be developed into an industrial business park. The current development plan according to the Draft Plan of Subdivision (Weston Consulting, 2023) includes industrial buildings, two stormwater management facilities and three (3) 26.0m Right-of-Ways (ROWs).

1.3 Phasing

Topsoil stripping and earthworks activities on Site are proposed in three phases – please refer to **Drawing TSP-01**. Phase 1 is comprised of Block 1, including the portion of Toronto and Region Conservation Authority (TRCA) regulated that has been approved to be worked in, and extends down to Mayfield Road.

Phase 2 includes the Phase 1 areas and the remainder of the Site, except for the natural features and the associated buffers that have been delineated by GEI. The silt fences will be installed along the borders of these features however, two crossings are proposed over existing wetlands on Site. These crossings will provide access to the center of the property.

Phase 3 includes the portion of the natural features that separate Phase 1 and Phase 2. Note, prior to work commencing in the Phase 3 area, a permit is required from TRCA that allows for the removal of the natural features and their associated buffers.

Activities during all phases include installation of silt fences, installation of the mud mats at the construction and employee entrances, the construction of two (2) hauling roads, and the construction of interceptor swales and temporary sediment basins.

2.0 Previous Studies and Reports

The following background studies provide the basis for the materials provided in the topsoil stripping permit package. These reports have been reviewed to identify constraints that inform the erosion and sediment control (ESC) measures proposed within the Site.

The reports are as follows:

- Erosion and Sediment Control Guide for Urban Construction, Toronto and Region Conservation Authority (TRCA) (2019);
- Stormwater Management Planning and Design Manual, Ministry of the Environment, Conservation, and Parks (March 2003);
- Scoped Subwatershed Study – Final Report, Wood Environment & Infrastructure Solutions (January 2022);
- Geotechnical Investigation 0 & 12245 Torbram Road, Toronto Inspection (June 2021);
- Comprehensive Environmental Impact Study and Management Plan Tullamore Employment Lands, GEI Consultants (2023).

3.0 Condition of Existing Receiving Water

All in-stream works must be completed in accordance with MNRF's Construction Timing Window of July 1st to March 31st (no in-stream works between April 1st and June 30th) per the guidelines below. The Site is located within the Humber River Watershed and is "contributing" habitat for Redside Dace, therefore making the classification a coldwater creek.

MNR's Fisheries Construction Timing Guideline (MNR, 1989)

Creek Classification	Construction Permitted
WARMWATER CREEK (supports or contributes to warm water fisheries)	July 1 to March 31
COLDWATER CREEK (supports or contributes to coldwater fisheries)	June 15 to September 15
WARMWATER/COLDWATER SPECIES (both encountered in a watercourse and/or evidence of Redside Dace)	July 1 to September 15

4.0 Environmental Features

The information presented in Sections 4.1 and 4.2 is from the Comprehensive Environmental Impact Study and Management Plan Tullamore Employment Lands, GEI Consultants.

4.1 Wetlands

The Site consists primarily of anthropogenic vegetation cover, such as agricultural fields and old field meadows. The agricultural fields are actively managed (row crop or actively browsed pasturelands). Wetlands are present, associated with Headwater Drainage Features (HDFs) and ponds.

Surveys completed by GEI show that wetland is present. The community types observed all have mineral soils and consist of marsh and thicket swamp. These wetlands and associated boundaries were confirmed by GEI staff using the '50/50 rule', where features having over 50% cover of wetland plants were classified as wetland. These boundaries (excluding wetland within the Greenbelt) were

later verified by the TRCA on July 5 and October 22, 2021. All wetland communities present within the Subject Lands are regulated by TRCA; no wetland features exceed 2 ha in size.

Note, wetlands are proposed to be removed from the Site, however, wetland compensation area will be provided within the Environmental Protection Area (Block 12) on the Site.

4.2 Woodlands

Two forested Ecological Land Classification (ELC) community types were identified within the Site. These forested units are located within the Greenbelt and are considered significant. The significant woodland will be retained and enhanced through the establishment of the 30 m vegetated buffers.

4.3 Drainage Areas to Wetlands

As requested by TRCA, delineation of areas draining to each existing wetland on Site was completed by Crozier under existing conditions and during topsoil stripping activities. Best efforts were made to provide balance of areas directed to each wetland during topsoil stripping. **Figure 1** demonstrates the existing wetland drainage areas.

5.0 Soils

The following information is from the Preliminary Hydrogeological Investigation Tullamore Lands, prepared by Toronto Inspection Ltd.:

- The overburden material generally consists of topsoil or fill up to depth of approximately 1 m below ground and is underlain by fine-grained glacial deposits of clayey silt to sandy silt. There is an isolated deposit of sand and gravel at the north boundary of the Site.

- The underlying conditions of the Site describe an unconfined clayey silt to sandy silt aquitard formation of very low permeability.

Additional details on the borehole logs, soil classifications, grain size distribution analyses, etc. can be found in the detailed hydrogeological report by Toronto Inspection Ltd..

The predominant soil types for this project are sandy silt to clayey silt glacial till. In accordance with the Erosion and Sediment Control Guidelines for Urban Construction (TRCA, 2019) this soil type has a "medium to high" soil erodibility rating (refer to Table 6.2). Additionally, according to Table 6.3, the erosion potential for graded slopes and graded conveyance channels with less than 2% slope and slope lengths greater than 30 m, are considered "moderate". Overall, the Site is categorized as "moderate" from an erosion perspective.

6.0 Stabilization/Construction Staging

The topsoil stripping permit application is for the entire Site (excluding the Greenbelt as well as areas in TRCA regulated limits and the associated buffers). The sequence of construction activities is described in **Table 2**.

Table 2: Construction Sequencing

ESC Measure	Timing for Installation	Inspection / Maintenance Requirements
Phase 1 Works		
Step 1 – Permits		
Ensure that Permit is secured (Town)		
Step 2 – ESC Measures		
• Install Silt Fence and Mud Mats	Prior to stripping works	Environmental Consultant to provide weekly inspections / reports and after each rainfall event. Regular maintenance to remove accumulated sediment and repair ESC measures as required.
Step 3 – Topsoil Stripping		
• Remove topsoil and stock on-site • Construct temporary drainage swales • Construct temporary sediment basins		Environmental Consultant to provide weekly inspections / reports and after each rainfall event. Regular maintenance to remove accumulated sediment and repair ESC measures as required.
Phase 2 Works		
Step 1 – Permits		
• Ensure that Topsoil Stripping Permit is secured (TRCA and Town)		
Step 2 – ESC Measures		
• Install additional Silt Fence • Construct temporary crossings of the TRCA regulated area	Prior to stripping works	Environmental Consultant to provide weekly inspections / reports and after each rainfall event. Regular maintenance to remove accumulated sediment and repair ESC measures as required.
Step 3 – Topsoil Stripping		
• Remove topsoil and stock on-site • Construct temporary drainage swales • Construct temporary sediment basins		Environmental Consultant to provide weekly inspections / reports and after each rainfall event. Regular maintenance to remove accumulated sediment and repair ESC measures as required.

Refer to the Topsoil Stripping Drawings for additional details on ESC measures.

7.0 Design Details of Erosion and Sediment Control Measures

The following erosion and sediment control features will be implemented for the project.

7.1 Erosion Control Measures

Interceptor Swales – Interceptor swales have been designed with reduced slope gradients to reduce erosion potential during the construction period. The interceptor swales have been designed to convey the 100-year storm event. Refer to **Appendix A** and the Topsoil Stripping Drawings for additional details and calculations related to the interceptor swale design.

7.2 Sediment Control Measures

Stone Mud Mat – A stone mud mat will be provided to minimize the migration of unwanted material on to the adjacent ROWs. The construction access must be maintained (cleaned, swept and flushed) to minimize any disruption to the municipal ROW. Construction access for the Site is provided through Airport Road and Mayfield Road only. The access provided through Torbram Road is an employee access only and will not be utilized by construction vehicles. Refer to **Drawing TSP-01** for the location of the proposed mud mats.

Silt Fence – Sediment control fence will be installed in accordance with the Topsoil Stripping Drawings. The erosion and sediment control fencing will be monitored on a regular basis and repaired/replaced as required.

Temporary Sediment Basins – The temporary sediment basins have been designed to intercept sediment laden water and allow for settling of suspended soil particles. Refer to **Appendix A** and Topsoil Stripping Drawings for additional details and calculations related to the permanent pool, active storage, and outlet structure designs. The pond outlets are designed to discharge flows upstream of the silt fence where feasible to promote additional removal of sediment as water travels through the silt fence and vegetated areas prior to entering the existing watercourse on Site.

Sediment Curtain – Sediment curtains will be installed in each temporary sediment basin and will be located between the swale inlets and basin outlet. The curtain keeps sediment contained to the area between the curtain and the pond bank and slows the movement of water in the isolated area, providing additional sediment control within the temporary sediment basins. The sediment curtains will be monitored on a regular basis and repaired/replaced as required.

8.0 Record Keeping Procedure

In accordance with the Erosion and Sediment Control Guidelines for Urban Construction (TRCA, 2019), the frequency of erosion and sediment control inspections will be conducted as follows:

- On a weekly basis
- After every major rainfall event (greater than 10 mm)
- After every significant snowmelt event
- Daily during extended rain or snowmelt periods

Erosion and sediment control inspections, along with the required record keeping, will be completed by the project environmental consultant in conjunction with the overall environmental monitoring for the project.

9.0 Temporary Crossings

The temporary crossings proposed over the existing wetlands on Site have been sized to convey the 25-year storm event as it is the nearest design storm event to the determined flood level that needs to be protected during instream works. A return period (T) of 20 years was determined according to the equation in Appendix A of the Erosion and Sediment Control Guide for Urban Construction (TRCA, 2019):

$$T = \frac{1}{1 - \sqrt[L]{1 - R}} = \frac{1}{1 - \sqrt[1]{1 - 0.05}} = 20\ year$$

In the equation above, L is the anticipated service life of the culvert in units of years and R is the specific risk, which is unitless. Refer to **Appendix A** and Topsoil Stripping Drawings for additional details and calculations related to the sizing of the proposed culverts.

10.0 Stockpile Details

The topsoil stockpile locations (if necessary) will be constructed in conformance with the following criteria:

- Maximum Topsoil Pile Height: 3.0 m
- Maximum Pile Side Slopes: 2:1
- Any stockpiles left for more than 30 days will be stabilized. All other areas will be stabilized immediately upon completion of works.
- Any topsoil stockpiled for over six (6) months should be amended with compost.
- Plant material and leaf litter, except for invasive species, that are generated by clearing the Site, are to be chipped and removed from the Site.

11.0 Emergency Contacts

Rice Group
Contact: Michael Mendes, Vice President, Development
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Cell: 416-899-5877
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Project Manager – Civil Consultant: C.F. Crozier & Associates Inc.
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Project Manager – Environmental Consultant: GEI
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Email: slohnes@geiconsultants.com

We trust the information provided above satisfies the requirements for erosion and sediment control measures within the indicated topsoil stripping area and we recommend the approval of the topsoil stripping permit.

Respectfully submitted,

C.F. CROZIER & ASSOCIATES INC.

Julie Scott, P.Eng.
Project Manager

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APPENDIX A

Supporting Calculations

PROJECT#: 2022-5842-3
PROJECT: TULLAMORE LANDS
ESC SWALE SIZING

RATIONAL METHOD - 100 YEAR

Computed 100-year peak flow to interceptor swale Type A

These calculations are based upon the flatest swale grade

Outlet ID	Drainage Area (ha)	Runoff Coefficient	Time t_c (min)	Intensity $i=a/(t_c+b)$ (mm/hr)	Flow $Q=CiA/360$ (m^3/s)
Swale 1A	4.65	0.50	10	167.1	1.08
Swale 2A	1.59	0.50	10	167.1	0.37
Swale 3A	1.61	0.50	10	167.1	0.37
Swale 4A	5.85	0.50	10	167.1	1.36
Swale 5A	3.72	0.50	10	167.1	0.86
Swale 6A	3.65	0.50	10	167.1	0.85
Swale 7A	2.56	0.50	10	167.1	0.59
Swale 8A	7.00	0.50	10	167.1	**1.62**
Swale 9A	0.64	0.50	10	167.1	0.15
Swale 10A	3.98	0.50	10	167.1	0.92
Swale 11A	4.56	0.50	10	167.1	1.06
Swale 12A	3.27	0.50	10	167.1	0.76

Where: a, b, c = rainfall equation coefficients

a =	4688	100-Year Storm IDF Parameters as per Town of Caledon
b =	17	
c =	0.9624	

***Dimensions of swale - Excluding 0.2 m Filtrex check dams**

Trapezoidal Channel Mannings' Equation				
Flow Depth (m) =	0.20		Top width	
Side Slope Ratio (H:V) =	3.0	/1	2.20	m
Bed Width (m)=	1.00		Hyd. Rad, 'R'	
Area (m^2)=	0.320		0.14	m
Wetted Perimeter (m)=	2.265	m	Friction Slope Sf	
Slope (%) =	0.30		0.003	m/m
Manning 'n' =	0.017		Velocity	
Channel Capacity, Q =	0.28	m^3/sec	0.874	m/s

***Actual Conveyance Capacity of Swale (above the Filtrex check dam)**

Trapezoidal Channel Mannings' Equation				
Flow Depth (m) =	0.37		Top width	
Side Slope Ratio (H:V) =	3.0	/1	4.42	m
Bed Width (m)=	2.20		Hyd. Rad, 'R'	
Area (m^2)=	1.225		0.27	m
Wetted Perimeter (m)=	4.540	m	Friction Slope Sf	
Slope (%) =	0.30		0.003	m/m
Manning 'n' =	0.017		Velocity	
Channel Capacity, Q =	1.65	m^3/sec	1.345	m/s

PROJECT#: 2022-5842-3
PROJECT: TULLAMORE LANDS
ESC SWALE SIZING

RATIONAL METHOD - 100 YEAR

Computed 100-year peak flow to interceptor swale Type B

These calculations are based upon the flatest swale grade

Outlet ID	Drainage Area (ha)	Runoff Coefficient	Time t_c (min)	Intensity $i=a/(t_c+b)^c$ (mm/hr)	Flow $Q=CiA/360$ (m^3/s)
Swale 1B	4.42	0.50	10	167.1	1.03
Swale 2B	2.47	0.50	10	167.1	0.57
Swale 3B	2.33	0.50	10	167.1	0.54
Swale 4B	6.56	0.50	10	167.1	**1.52**
Swale 5B	5.25	0.50	10	167.1	1.22
Swale 6B	1.40	0.50	10	167.1	0.32
Swale 7B	4.03	0.50	10	167.1	0.94
Swale 8B	2.84	0.50	10	167.1	0.66
Swale 9B	3.61	0.50	10	167.1	0.84

Where: a, b, c = rainfall equation coefficients

a =	4688	100-Year Storm IDF Parameters as per Town of Caledon
b =	17	
	0.9624	

***Dimensions of swale - Excluding 0.2 m Filtrex check dams**

Trapezoidal Channel Mannings' Equation				
Flow Depth (m) =	0.20		Top width	
Side Slope Ratio (H:V) =	3.0	/1	2.20	m
Bed Width (m)=	1.00		Hyd. Rad, 'R'	
Area (m^2)=	0.320		0.14	m
Wetted Perimeter (m)=	2.265	m	Friction Slope Sf	
Slope (%) =	0.70		0.007	m/m
Manning 'n' =	0.017		Velocity	
Channel Capacity, Q =	0.43	m^3/sec	1.335	m/s

***Actual Conveyance Capacity of Swale (above the Filtrex check dam)**

Trapezoidal Channel Mannings' Equation				
Flow Depth (m) =	0.29		Top width	
Side Slope Ratio (H:V) =	3.0	/1	3.94	m
Bed Width (m)=	2.20		Hyd. Rad, 'R'	
Area (m^2)=	0.890		0.22	m
Wetted Perimeter (m)=	4.034	m	Friction Slope Sf	
Slope (%) =	0.70		0.007	m/m
Manning 'n' =	0.017		Velocity	
Channel Capacity, Q =	1.60	m^3/sec	1.797	m/s

PROJECT#: 2022-5842-3
PROJECT: TULLAMORE LANDS
ESC SWALE SIZING

RATIONAL METHOD - 100 YEAR

Computed 100-year peak flow to interceptor swale Type C

These calculations are based upon the flatest swale grade

Outlet ID	Drainage Area (ha)	Runoff Coefficient	Time t_c (min)	Intensity $i=a/(t_c+b)^c$ (mm/hr)	Flow $Q=CiA/360$ (m^3/s)
Swale 1C	5.00	0.50	10	167.1	1.16
Swale 2C	1.33	0.50	10	167.1	0.31
Swale 3C	1.26	0.50	10	167.1	0.29
Swale 4C	3.55	0.50	10	167.1	0.82
Swale 5C	4.35	0.50	10	167.1	1.01
Swale 6C	3.04	0.50	10	167.1	0.71
Swale 7C	6.39	0.50	10	167.1	1.48
Swale 8C	2.68	0.50	10	167.1	0.62
Swale 9C	6.99	0.50	10	167.1	**1.62**
Swale 10C	2.62	0.50	10	167.1	0.61

Where: a, b, c = rainfall equation coefficients

a =	4688	100-Year Storm
b =	17	IDF Parameters as per
	0.9624	Town of Caledon

***Dimensions of swale - Excluding 0.2 m Filtrex check dams**

Trapezoidal Channel Mannings' Equation				
Flow Depth (m) =	0.30		Top width	
Side Slope Ratio (H:V) =	3.0	/1	2.80	m
Bed Width (m)=	1.00		Hyd. Rad, 'R'	
Area (m^2)=	0.570		0.20	m
Wetted Perimeter (m)=	2.897	m	Friction Slope Sf	
Slope (%) =	1.10		0.011	m/m
Manning 'n' =	0.017		Velocity	
Channel Capacity, Q =	1.19	m^3/sec	2.087	m/s

***Actual Conveyance Capacity of Swale (above the Filtrex check dam)**

Trapezoidal Channel Mannings' Equation				
Flow Depth (m) =	0.23		Top width	
Side Slope Ratio (H:V) =	3.0	/1	4.18	m
Bed Width (m)=	2.80		Hyd. Rad, 'R'	
Area (m^2)=	0.803		0.19	m
Wetted Perimeter (m)=	4.255	m	Friction Slope Sf	
Slope (%) =	1.10		0.011	m/m
Manning 'n' =	0.017		Velocity	
Channel Capacity, Q =	1.63	m^3/sec	2.029	m/s

PROJECT#: 2022-5842-3
PROJECT: TULLAMORE LANDS
ESC SWALE SIZING

RATIONAL METHOD - 100 YEAR

Computed 100-year peak flow to interceptor swale Type D

These calculations are based upon the flatest swale grade

Outlet ID	Drainage Area (ha)	Runoff Coefficient	Time t_c (min)	Intensity $i=a/(t_c+b)^c$ (mm/hr)	Flow $Q=CiA/360$ (m^3/s)
Swale 1D	1.66	0.50	10	167.1	0.39
Swale 2D	1.32	0.50	10	167.1	0.31
Swale 3D	3.16	0.50	10	167.1	0.73
Swale 4D	3.15	0.50	10	167.1	0.73
Swale 5D	2.88	0.50	10	167.1	0.67
Swale 6D	6.56	0.50	10	167.1	**1.52**

Where: a, b, c = rainfall equation coefficients

a = 4688
b = 17
0.9624

} 100-Year Storm IDF Parameters as per Town of Caledon

***Dimensions of swale - Excluding 0.2 m Filtrex check dams**

Trapezoidal Channel Mannings' Equation				
Flow Depth (m) =	0.30		Top width	
Side Slope Ratio (H:V) =	3.0	/1	2.80	m
Bed Width (m)=	1.00		Hyd. Rad, 'R'	
Area (m^2)=	0.570		0.20	m
Wetted Perimeter (m)=	2.897	m	Friction Slope Sf	
Slope (%) =	1.50		0.015	m/m
Manning 'n' =	0.017		Velocity	
Channel Capacity, Q =	1.39	m^3/sec	2.437	m/s

***Actual Conveyance Capacity of Swale (above the Filtrex check dam)**

Trapezoidal Channel Mannings' Equation				
Flow Depth (m) =	0.21		Top width	
Side Slope Ratio (H:V) =	3.0	/1	4.06	m
Bed Width (m)=	2.80		Hyd. Rad, 'R'	
Area (m^2)=	0.720		0.17	m
Wetted Perimeter (m)=	4.128	m	Friction Slope Sf	
Slope (%) =	1.50		0.015	m/m
Manning 'n' =	0.017		Velocity	
Channel Capacity, Q =	1.62	m^3/sec	2.250	m/s

Filtrex Check Dam Spacing Calculations					
Interceptor Swale	Length of Channel Between Check Dams	Swale Slope (%)	Swale/Channel Slope m/m	Change in Elevation from U/S to D/S Dam	Check Dam Height
A	65	0.30	0.0030	0.20	0.20
B	28	0.70	0.0070	0.20	0.20
C	27	1.10	0.0110	0.30	0.30
D	20	1.50	0.0150	0.30	0.30

CROZIER CONSULTING ENGINEERS

PROJECT: Tullamore
PROJECT NO.: 2022-5842-3
CREATED BY: AM/IC/MJ
CHECKED BY: JS
DATE: 2022.08.30
UPDATED: 2023.04.06

Temporary Settlement Basin - Required Volume Specifications - POND 1

Specifications

Active Storage Design Requirement:	125	m^3/ha
Permanent Pool Design Requirement:	185	m^3/ha
Drawdown Time:	48	hrs
Minimum Depth of Basin:	1	m
Maximum Depth of Basin:	5	m
Length to Width Ratio	4:1	L:W
Maximum Internal Side Slopes	4:1	H:V
Maximum External Side Slopes	2:1	H:V

Required Volume Calculations

Temporary Drainage Area:		9.79	ha
Permanent Pool Volume:		**1,811**	m^3
Active Storage Volume:		**1,224**	m^3
	Total:	**3,035**	m^3

References/Notes

TRCA Erosion and Sediment Control Guide - Appendix B

CROZIER CONSULTING ENGINEERS

PROJECT: Tullamore **CREATED BY:** AM/IC/MJ **DATE:** 2022.08.30
PROJECT NO.: 2022-5842-3 **CHECKED BY:** JS **UPDATED:** 2023.04.06

Temporary Settlement Basin Sizing - POND 1

Proposed Basin Dimensions

Depth

Freeboard:	0.30	m
Active Storage:	0.80	m
Permanent Pool:	3.00	m
Total Depth of Basin:	**4.10**	m

Side Slope

Freeboard:	4 :1
Active Storage:	4 :1
Permanent Pool:	4 :1

Length

Top of Basin:	45.5	m
Bottom of Freeboard:	43.1	m
Bottom of Active Storage:	36.7	m
Bottom of Basin:	12.7	m
Buffer:	0.0	m
Total Top Length of Basin:	**45.5**	m

Elevations

Top of Pond / Freeboard:	245.00	m
Active Storage:	244.70	m
Permanent Pool:	243.90	m
Bottom of Basin:	240.90	m

Width

Top of Basin:	45.5	m
Bottom Freeboard:	43.1	m
Bottom of Active Storage:	36.7	m
Bottom of Basin:	12.7	m
Buffer:	0	m
Total Top Width of Basin:	**45.5**	m

Total Basin Surface Area:	2,070	m^2
	0.21	ha
Total Active Storage Area:	1,858	m^2
Total Permanent Pool Area:	1,347	m^2

Basin Volume Calculation

	Provided		Required	
Freeboard Volume:	589	m^3	-	m^3
Active Storage Volume:	1,274	m^3	1,224	m^3
Permanent Pool Volume:	1,830	m^3	1,811	m^3
Total Basin Volume:	**3,693**	m^3	3,035	m^3

CROZIER CONSULTING ENGINEERS

PROJECT: Tullamore | **CREATED BY:** MJ | **DATE:** 2022.08.30
PROJECT NO.: 2022-5842-3 | **CHECKED BY:** JS | **UPDATED:** 2023.04.06

Temporary Forebay Sizing - POND 1

Proposed Forebay Dimensions

Depth of Forebay:	1.0	m	Minimum of 1m per TRCA Erosion and Sediment Control Guidelines
Spill Elevation:	243.9	m	
Forebay Length:	12.2	m	
Forebay Width:	12.2	m	
Bottom Length:	4.2	m	
Bottom Width:	4.2	m	
Forebay Volume:	67.8	m^3	
Forebay Volume/PP Volume*100:	3.7	%	Must be less than 33% per TRCA Erosion and Sediment Control Guidelines

Minimum Forebay Length for Settling

Catchment Area:	97900	m^2	
Extended Detension Volume:	2447.5	m^3	Based on 25mm event
Drawdown Time:	48.0	hours	Per TRCA Erosion and Sediment Control Guidelines
Peak Flowrate:	0.014	m^3/s	From pond during quality design storm
Length to Width Ratio of Forebay:	1.0	:1	
Settling Velocity:	0.0003	m/s	
Minimum Forebay Length for Settling:	**6.9**	**m**	
Provided Forebay Length for Settling:	**12.2**	**m**	

CROZIER CONSULTING ENGINEERS

Project: Tullamore
Project No.: 2022-5842-3
Created By: MJ
Checked By: JS
Date: 2022.12.14
Updated: 2023.04.06

Modified Rational & Weir Calculations - POND 1

Storm Data: Town of Caledon

Time of Concentration: T_c = **10** **min** (per Town of Caledon standards)

Return Period	A	B	C	I (mm/hr)
100 yr	4688	17.00	0.9624	167.10

Pond 1 Catchment			
Catchment	**Area** (ha)	**Area** (m^2)	**Weighted Average C**
Pond1	9.79	97900	0.50

Intensity
$i(T_d) = A / (T + B)^C$

Peak Flow
$Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A$

Storm Event (yr)	Peak Flow Rate (m3/s)
100	2.29

Emergency Overflow Weir	
Flow (100-year) (m3/s)	2.29
Maximum Head (m)	0.30
Required Length (m)	8.17
Provided Length (m)	9.00
Calculated Flow (m3/s)	2.52

CROZIER CONSULTING ENGINEERS

PROJECT: Tullamore | **CREATED BY:** AM/IC/MJ | **DATE:** 2022.08.30
PROJECT NO.: 2022-5842-3 | **CHECKED BY:** JS | **UPDATED:** 2023.04.06

Hickenbottom Drawdown Time - ESC Pond - POND 1

Calculations

REQUIRED Pond Active Storage Volume		1,224	m^3
Depth for Active Storage		0.80	m
Target Drawdown Time		48	hrs
Hickenbottom Specifications	**0.127m intake with 24 - 25mm holes per 0.305m**		
Hickenbottom Capacity		25.24	L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications
http://www.hickenbottominc.com/index.html

Hickenbottom Drawdown Time	48483	s
Hickenbottom Drawdown Time	**13**	**hrs**

PROVIDED Pond Active Storage Volume		1,274	m^3
Depth for Active Storage		0.80	m
Target Drawdown Time		48	hrs
Hickenbottom Specifications	**0.127m intake with 24 - 25mm holes per 0.305m**		
Hickenbottom Capacity		25.24	L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications
http://www.hickenbottominc.com/index.html

Hickenbottom Drawdown Time	50459	s
Hickenbottom Drawdown Time	**14**	**hrs**

CROZIER CONSULTING ENGINEERS

PROJECT: Tullamore
PROJECT NO.: 2022-5842-3
CREATED BY: AM/IC/MJ
CHECKED BY: JS
DATE: 2022.08.30
UPDATED: 2023.04.06

Temporary Settlement Basin - Required Volume Specifications - POND 2

Specifications

Active Storage Design Requirement:	125	m^3/ha
Permanent Pool Design Requirement:	185	m^3/ha
Drawdown Time:	48	hrs
Minimum Depth of Basin:	1	m
Maximum Depth of Basin:	5	m
Length to Width Ratio	4:1	L:W
Maximum Internal Side Slopes	4:1	H:V
Maximum External Side Slopes	2:1	H:V

Required Volume Calculations

Temporary Drainage Area:		8.26	ha
Permanent Pool Volume:		**1,528**	m^3
Active Storage Volume:		**1,033**	m^3
	Total:	**2,561**	m^3

References/Notes

TRCA Erosion and Sediment Control Guide - Appendix B

CROZIER CONSULTING ENGINEERS

PROJECT: Tullamore **CREATED BY:** AM/IC/MJ **DATE:** 2022.08.30
PROJECT NO.: 2022-5842-3 **CHECKED BY:** JS **UPDATED:** 2023.04.06

Temporary Settlement Basin Sizing - POND 2

Proposed Basin Dimensions

Depth			Side Slope		
Freeboard:	0.30	m	Freeboard:	4	:1
Active Storage:	0.80	m	Active Storage:	4	:1
Permanent Pool:	3.00	m	Permanent Pool:	4	:1
Total Depth of Basin:	**4.10**	m			

Length			Elevations		
Top of Basin:	43.5	m	Top of Pond / Freeboard:	242.20	m
Bottom of Freeboard:	41.1	m	Active Storage:	241.90	m
Bottom of Active Storage:	34.7	m	Permanent Pool:	241.10	m
Bottom of Basin:	10.7	m	Bottom of Basin:	238.10	m
Buffer:	0.0	m			
Total Top Length of Basin:	**43.5**	m			

Width					
			Total Basin Surface Area:	1,892	m^2
Top of Basin:	43.5	m		**0.19**	ha
Bottom Freeboard:	41.1	m			
Bottom of Active Storage:	34.7	m			
Bottom of Basin:	10.7	m	**Total Active Storage Area:**	1,689	m^2
Buffer:	0	m	**Total Permanent Pool Area:**	1,204	m^2
Total Top Width of Basin:	**43.5**	m			

Basin Volume Calculation

	Provided		Required	
Freeboard Volume:	537	m^3	-	m^3
Active Storage Volume:	1,149	m^3	1,033	m^3
Permanent Pool Volume:	1,546	m^3	1,528	m^3
Total Basin Volume:	**3,232**	m^3	2,561	m^3

CROZIER CONSULTING ENGINEERS

PROJECT: Tullamore | **CREATED BY:** MJ | **DATE:** 2022.08.30
PROJECT NO.: 2022-5842-3 | **CHECKED BY:** JS | **UPDATED:** 2023.04.06

Temporary Forebay Sizing - POND 2

Proposed Forebay Dimensions

Depth of Forebay:	1.0	m	Minimum of 1m per TRCA Erosion and Sediment Control Guidelines
Spill Elevation:	241.10	m	
Forebay Length:	11.6	m	
Forebay Width:	11.6	m	
Bottom Length:	3.6	m	
Bottom Width:	3.6	m	
Forebay Volume:	57.3	m^3	
Forebay Volume/PP Volume*100:	3.7	%	Must be less than 33% per TRCA Erosion and Sediment Control Guidelines

Minimum Forebay Length for Settling

Catchment Area:	82600	m^2	
Extended Detension Volume:	2065.0	m^3	Based on 25mm event
Drawdown Time:	48.0	hours	Per TRCA Erosion and Sediment Control Guidelines
Peak Flowrate:	0.012	m^3/s	From pond during quality design storm
Length to Width Ratio of Forebay:	1.0	:1	
Settling Velocity:	0.0003	m/s	
Minimum Forebay Length for Settling:	**6.3**	**m**	
Provided Forebay Length for Settling:	**11.6**	**m**	

CROZIER CONSULTING ENGINEERS

Project: Tullamore
Project No.: 2022-5842-3
Created By: MJ
Checked By: JS
Date: 2022.12.14
Updated: 2023.04.06

Modified Rational & Weir Calculations - POND 2

Storm Data: Town of Caledon

Time of Concentration: T_c = **10** **min** (per Town of Caledon standards)

Return Period	A	B	C	I (mm/hr)
100 yr	4688	17.00	0.9624	167.10

Pond 2 Catchment			
Catchment	**Area** (ha)	**Area** (m^2)	**Weighted Average C**
Pond2	8.26	82600	0.50

Intensity
$i(T_d) = A / (T + B)^C$

Peak Flow
$Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A$

Storm Event (yr)	Peak Flow Rate (m3/s)
100	1.93

Emergency Overflow Weir	
Flow (100-year) (m3/s)	1.93
Maximum Head (m)	0.30
Required Length (m)	6.90
Provided Length (m)	7.00
Calculated Flow (m3/s)	1.96

CROZIER CONSULTING ENGINEERS

PROJECT: Tullamore
PROJECT NO.: 2022-5842-3
CREATED BY: AM/IC/MJ
CHECKED BY: JS
DATE: 2022.08.30
UPDATED: 2023.04.06

Hickenbottom Drawdown Time - ESC Pond - POND 2

Calculations

REQUIRED Pond Active Storage Volume		1,033	m^3
Depth for Active Storage		0.80	m
Target Drawdown Time		48	hrs
Hickenbottom Specifications	**0.127m intake with 24 - 25mm holes per 0.305m**		
Hickenbottom Capacity		25.24	L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications
http://www.hickenbottominc.com/index.html

Hickenbottom Drawdown Time	40906	s
Hickenbottom Drawdown Time	**11**	**hrs**

PROVIDED Pond Active Storage Volume		1,149	m^3
Depth for Active Storage		0.80	m
Target Drawdown Time		48	hrs
Hickenbottom Specifications	**0.127m intake with 24 - 25mm holes per 0.305m**		
Hickenbottom Capacity		25.24	L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications
http://www.hickenbottominc.com/index.html

Hickenbottom Drawdown Time	45527	s
Hickenbottom Drawdown Time	**13**	**hrs**

CROZIER CONSULTING ENGINEERS

PROJECT: Tullamore
PROJECT NO.: 2022-5842-3
CREATED BY: AM/IC/MJ
CHECKED BY: JS
DATE: 2022.08.30
UPDATED: 2023.04.06

Temporary Settlement Basin - Required Volume Specifications - POND 3

Specifications

Active Storage Design Requirement:	125	m^3/ha
Permanent Pool Design Requirement:	185	m^3/ha
Drawdown Time:	48	hrs
Minimum Depth of Basin:	1	m
Maximum Depth of Basin:	5	m
Length to Width Ratio	4:1	L:W
Maximum Internal Side Slopes	4:1	H:V
Maximum External Side Slopes	2:1	H:V

Required Volume Calculations

Temporary Drainage Area:		3.18	ha
Permanent Pool Volume:		**588**	m^3
Active Storage Volume:		**398**	m^3
	Total:	**986**	m^3

References/Notes

TRCA Erosion and Sediment Control Guide - Appendix B

CROZIER CONSULTING ENGINEERS

PROJECT: Tullamore **CREATED BY:** AM/IC/MJ **DATE:** 2022.08.30
PROJECT NO.: 2022-5842-3 **CHECKED BY:** JS **UPDATED:** 2023.04.06

Temporary Settlement Basin Sizing - POND 3

Proposed Basin Dimensions

Depth			Side Slope		
Freeboard:	0.30	m	Freeboard:	4	:1
Active Storage:	0.40	m	Active Storage:	4	:1
Permanent Pool:	3.00	m	Permanent Pool:	4	:1
Total Depth of Basin:	**3.70**	m			

Length			Elevations		
Top of Basin:	35.8	m	Top of Pond / Freeboard:	243.70	m
Bottom of Freeboard:	33.4	m	Active Storage:	243.40	m
Bottom of Active Storage:	30.2	m	Permanent Pool:	243.00	m
Bottom of Basin:	6.2	m	Bottom of Basin:	240.00	m
Buffer:	0.0	m			
Total Top Length of Basin:	**35.8**	m			

Width					
Top of Basin:	35.8	m	**Total Basin Surface Area:**	1,282	m^2
Bottom Freeboard:	33.4	m		**0.13**	ha
Bottom of Active Storage:	30.2	m			
Bottom of Basin:	6.2	m	**Total Active Storage Area:**	1,116	m^2
Buffer:	0	m	**Total Permanent Pool Area:**	912	m^2
Total Top Width of Basin:	**35.8**	m			

Basin Volume Calculation

	Provided		Required	
Freeboard Volume:	359	m^3	-	m^3
Active Storage Volume:	404	m^3	398	m^3
Permanent Pool Volume:	994	m^3	588	m^3
Total Basin Volume:	**1,757**	m^3	986	m^3

CROZIER CONSULTING ENGINEERS

PROJECT: Tullamore | **CREATED BY:** MJ | **DATE:** 2022.08.30
PROJECT NO.: 2022-5842-3 | **CHECKED BY:** JS | **UPDATED:** 2023.04.06

Temporary Forebay Sizing - POND 3

Proposed Forebay Dimensions

Depth of Forebay:	1.0	m	Minimum of 1m per TRCA Erosion and Sediment Control Guidelines
Spill Elevation:	243.00	m	
Forebay Length:	10.1	m	
Forebay Width:	10.1	m	
Bottom Length:	2.1	m	
Bottom Width:	2.1	m	
Forebay Volume:	36.8	m^3	
Forebay Volume/PP Volume*100:	3.7	%	Must be less than 33% per TRCA Erosion and Sediment Control Guidelines

Minimum Forebay Length for Settling

Catchment Area:	31800	m^2	
Extended Detension Volume:	795.0	m^3	Based on 25mm event
Drawdown Time:	48.0	hours	Per TRCA Erosion and Sediment Control Guidelines
Peak Flowrate:	0.005	m^3/s	From pond during quality design storm
Length to Width Ratio of Forebay:	1.0	:1	
Settling Velocity:	0.0003	m/s	
Minimum Forebay Length for Settling:	**3.9**	**m**	
Provided Forebay Length for Settling:	**10.1**	**m**	

CROZIER CONSULTING ENGINEERS

Project: Tullamore
Project No.: 2022-5842-3
Created By: MJ
Checked By: JS
Date: 2022.12.14
Updated: 2023.04.06

Modified Rational & Weir Calculations - POND 3

Storm Data: Town of Caledon

Time of Concentration: T_c = **10** **min** (per Town of Caledon standards)

Return Period	A	B	C	I (mm/hr)
100 yr	4688	17.00	0.9624	167.10

Pond 3 Catchment			
Catchment	**Area** (ha)	**Area** (m^2)	**Weighted Average C**
Pond3	3.18	31800	0.50

Intensity
$i(T_d) = A / (T + B)^C$

Peak Flow
$Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A$

Storm Event (yr)	Peak Flow Rate (m3/s)
100	0.74

Emergency Overflow Weir	
Flow (100-year) (m3/s)	0.74
Maximum Head (m)	0.30
Required Length (m)	2.66
Provided Length (m)	3.00
Calculated Flow (m3/s)	0.84

CROZIER CONSULTING ENGINEERS

PROJECT: Tullamore
PROJECT NO.: 2022-5842-3
CREATED BY: AM/IC/MJ
CHECKED BY: JS
DATE: 2022.08.30
UPDATED: 2023.04.06

Hickenbottom Drawdown Time - ESC Pond - POND 3

Calculations

REQUIRED Pond Active Storage Volume		398	m^3
Depth for Active Storage		0.40	m
Target Drawdown Time		48	hrs
Hickenbottom Specifications	**0.127m intake with 24 - 25mm holes per 0.305m**		
Hickenbottom Capacity		8.91	L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications
http://www.hickenbottominc.com/index.html

Hickenbottom Drawdown Time	44599		s
Hickenbottom Drawdown Time	**12**		**hrs**

PROVIDED Pond Active Storage Volume		404	m^3
Depth for Active Storage		0.40	m
Target Drawdown Time		48	hrs
Hickenbottom Specifications	**0.127m intake with 24 - 25mm holes per 0.305m**		
Hickenbottom Capacity		8.91	L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications
http://www.hickenbottominc.com/index.html

Hickenbottom Drawdown Time	45384		s
Hickenbottom Drawdown Time	**13**		**hrs**

CROZIER CONSULTING ENGINEERS

PROJECT: Tullamore
PROJECT NO.: 2022-5842-3
CREATED BY: AM/IC/MJ
CHECKED BY: JS
DATE: 2022.08.30
UPDATED: 2023.04.11

Temporary Settlement Basin - Required Volume Specifications - POND 4

Specifications

Active Storage Design Requirement:	125	m^3/ha
Permanent Pool Design Requirement:	185	m^3/ha
Drawdown Time:	48	hrs
Minimum Depth of Basin:	1	m
Maximum Depth of Basin:	5	m
Length to Width Ratio	4:1	L:W
Maximum Internal Side Slopes	4:1	H:V
Maximum External Side Slopes	2:1	H:V

Required Volume Calculations

Temporary Drainage Area:		9.58	ha
Permanent Pool Volume:		**1,772**	m^3
Active Storage Volume:		**1,198**	m^3
	Total:	**2,970**	m^3

References/Notes

TRCA Erosion and Sediment Control Guide - Appendix B

CROZIER CONSULTING ENGINEERS

PROJECT: Tullamore **CREATED BY:** AM/IC/MJ **DATE:** 2022.08.30
PROJECT NO.: 2022-5842-3 **CHECKED BY:** JS **UPDATED:** 2023.04.11

Temporary Settlement Basin Sizing - POND 4

Proposed Basin Dimensions

Depth

Freeboard:	0.30	m
Active Storage:	0.80	m
Permanent Pool:	3.00	m
Total Depth of Basin:	**4.10**	m

Side Slope

Freeboard:	4 :1
Active Storage:	4 :1
Permanent Pool:	4 :1

Length

Top of Basin:	47.3	m
Bottom of Freeboard:	44.9	m
Bottom of Active Storage:	38.5	m
Bottom of Basin:	14.5	m
Buffer:	0.0	m
Total Top Length of Basin:	**47.3**	m

Elevations

Top of Pond / Freeboard:	237.10	m
Active Storage:	236.80	m
Permanent Pool:	236.00	m
Bottom of Basin:	233.00	m

Width

Top of Basin:	47.3	m
Bottom Freeboard:	44.9	m
Bottom of Active Storage:	38.5	m
Bottom of Basin:	14.5	m
Buffer:	0	m
Total Top Width of Basin:	**47.3**	m

Total Basin Surface Area:	2,237	m^2
	0.22	ha
Total Active Storage Area:	2,016	m^2
Total Permanent Pool Area:	1,482	m^2

Basin Volume Calculation

	Provided		Required	
Freeboard Volume:	638	m^3	-	m^3
Active Storage Volume:	1,391	m^3	1,198	m^3
Permanent Pool Volume:	2,107	m^3	1,772	m^3
Total Basin Volume:	**4,135**	m^3	2,970	m^3

CROZIER CONSULTING ENGINEERS

PROJECT: Tullamore | **CREATED BY:** MJ | **DATE:** 2022.08.30
PROJECT NO.: 2022-5842-3 | **CHECKED BY:** JS | **UPDATED:** 2023.04.11

Temporary Forebay Sizing - POND 4

Proposed Forebay Dimensions

Depth of Forebay:	1.0	m	Minimum of 1m per TRCA Erosion and Sediment Control Guidelines
Spill Elevation:	236.00	m	
Forebay Length:	12.8	m	
Forebay Width:	12.8	m	
Bottom Length:	4.8	m	
Bottom Width:	4.8	m	
Forebay Volume:	78.0	m^3	
Forebay Volume/PP Volume*100:	3.7	%	Must be less than 33% per TRCA Erosion and Sediment Control Guidelines

Minimum Forebay Length for Settling

Catchment Area:	95800	m^2	
Extended Detension Volume:	2395.0	m^3	Based on 25mm event
Drawdown Time:	48.0	hours	Per TRCA Erosion and Sediment Control Guidelines
Peak Flowrate:	0.014	m^3/s	From pond during quality design storm
Length to Width Ratio of Forebay:	1.0	:1	
Settling Velocity:	0.0003	m/s	
Minimum Forebay Length for Settling:	**6.8**	**m**	
Provided Forebay Length for Settling:	**12.8**	**m**	

CROZIER
CONSULTING ENGINEERS

Project: Tullamore
Project No.: 2022-5842-3
Created By: MJ
Checked By: JS
Date: 2022.12.14
Updated: 2023.04.11

Modified Rational & Weir Calculations - POND 4

Storm Data: Town of Caledon

Time of Concentration: T_c = **10** **min** (per Town of Caledon standards)

Return Period	A	B	C	I (mm/hr)
100 yr	4688	17.00	0.9624	167.10

Pond 4 Catchment			
Catchment	**Area** (ha)	**Area** (m^2)	**Weighted Average C**
Pond4	9.85	98500	0.50

Intensity
$i(T_d) = A / (T + B)^C$

Peak Flow
$Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A$

Storm Event (yr)	Peak Flow Rate (m3/s)
100	2.30

Emergency Overflow Weir	
Flow (100-year) (m3/s)	2.30
Maximum Head (m)	0.30
Required Length (m)	8.23
Provided Length (m)	9.00
Calculated Flow (m3/s)	2.52

CROZIER CONSULTING ENGINEERS

PROJECT: Tullamore | **CREATED BY:** AM/IC/MJ | **DATE:** 2022.08.30
PROJECT NO.: 2022-5842-3 | **CHECKED BY:** JS | **UPDATED:** 2023.04.11

Hickenbottom Drawdown Time - ESC Pond - POND 4

Calculations

REQUIRED Pond Active Storage Volume		1,198	m^3
Depth for Active Storage		0.80	m
Target Drawdown Time		48	hrs
Hickenbottom Specifications	**0.127m intake with 24 - 25mm holes per 0.305m**		
Hickenbottom Capacity		22.91	L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications
http://www.hickenbottominc.com/index.html

Hickenbottom Drawdown Time	52272		s
Hickenbottom Drawdown Time	**15**		**hrs**

PROVIDED Pond Active Storage Volume		1,391	m^3
Depth for Active Storage		0.80	m
Target Drawdown Time		48	hrs
Hickenbottom Specifications	**0.127m intake with 24 - 25mm holes per 0.305m**		
Hickenbottom Capacity		22.91	L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications
http://www.hickenbottominc.com/index.html

Hickenbottom Drawdown Time	60723		s
Hickenbottom Drawdown Time	**17**		**hrs**

CROZIER CONSULTING ENGINEERS

PROJECT: Tullamore
PROJECT NO.: 2022-5842-3
CREATED BY: AM/IC/MJ
CHECKED BY: JS
DATE: 2022.08.30
UPDATED: 2023.04.06

Temporary Settlement Basin - Required Volume Specifications - POND 5

Specifications

Active Storage Design Requirement:	125	m^3/ha
Permanent Pool Design Requirement:	185	m^3/ha
Drawdown Time:	48	hrs
Minimum Depth of Basin:	1	m
Maximum Depth of Basin:	5	m
Length to Width Ratio	4:1	L:W
Maximum Internal Side Slopes	4:1	H:V
Maximum External Side Slopes	2:1	H:V

Required Volume Calculations

Temporary Drainage Area:		3.17	ha
Permanent Pool Volume:		**586**	m^3
Active Storage Volume:		**396**	m^3
	Total:	**983**	m^3

References/Notes

TRCA Erosion and Sediment Control Guide - Appendix B

CROZIER CONSULTING ENGINEERS

PROJECT: Tullamore **CREATED BY:** AM/IC/MJ **DATE:** 2022.08.30
PROJECT NO.: 2022-5842-3 **CHECKED BY:** JS **UPDATED:** 2023.04.06

Temporary Settlement Basin Sizing - POND 5

Proposed Basin Dimensions

Depth

Freeboard:	0.30	m
Active Storage:	0.50	m
Permanent Pool:	3.00	m
Total Depth of Basin:	**3.80**	m

Side Slope

Freeboard:	4 :1
Active Storage:	4 :1
Permanent Pool:	4 :1

Length

Top of Basin:	32.9	m
Bottom of Freeboard:	30.5	m
Bottom of Active Storage:	26.5	m
Bottom of Basin:	2.5	m
Buffer:	0.0	m
Total Top Length of Basin:	**32.9**	m

Elevations

Top of Pond / Freeboard:	236.45	m
Active Storage:	236.15	m
Permanent Pool:	235.65	m
Bottom of Basin:	232.65	m

Width

Top of Basin:	32.9	m
Bottom Freeboard:	30.5	m
Bottom of Active Storage:	26.5	m
Bottom of Basin:	2.5	m
Buffer:	0	m
Total Top Width of Basin:	**32.9**	m

Total Basin Surface Area:	1.082	m^2
	0.11	ha
Total Active Storage Area:	930	m^2
Total Permanent Pool Area:	702	m^2

Basin Volume Calculation

	Provided		Required	
Freeboard Volume:	301	m^3	-	m^3
Active Storage Volume:	406	m^3	396	m^3
Permanent Pool Volume:	631	m^3	586	m^3
Total Basin Volume:	**1,338**	m^3	983	m^3

CROZIER CONSULTING ENGINEERS

PROJECT: Tullamore | **CREATED BY:** MJ | **DATE:** 2022.08.30
PROJECT NO.: 2022-5842-3 | **CHECKED BY:** JS | **UPDATED:** 2023.04.06

Temporary Forebay Sizing - POND 5

Proposed Forebay Dimensions

Depth of Forebay:	1.0	m	Minimum of 1m per TRCA Erosion and Sediment Control Guidelines
Spill Elevation:	235.7	m	
Forebay Length:	8.8	m	
Forebay Width:	8.8	m	
Bottom Length:	0.8	m	
Bottom Width:	0.8	m	
Forebay Volume:	23.4	m^3	
Forebay Volume/PP Volume*100:	3.7	%	Must be less than 33% per TRCA Erosion and Sediment Control Guidelines

Minimum Forebay Length for Settling

Catchment Area:	31700	m^2	
Extended Detension Volume:	792.5	m^3	Based on 25mm event
Drawdown Time:	48.0	hours	Per TRCA Erosion and Sediment Control Guidelines
Peak Flowrate:	0.005	m^3/s	From pond during quality design storm
Length to Width Ratio of Forebay:	1.0	:1	
Settling Velocity:	0.0003	m/s	
Minimum Forebay Length for Settling:	**3.9**	**m**	
Provided Forebay Length for Settling:	**8.8**	**m**	

CROZIER CONSULTING ENGINEERS

Project: Tullamore
Project No.: 2022-5842-3
Created By: MJ
Checked By: JS
Date: 2022.12.14
Updated: 2023.04.06

Modified Rational & Weir Calculations - POND 5

Storm Data: Town of Caledon

Time of Concentration: T_c = **10** **min** (per Town of Caledon standards)

Return Period	A	B	C	I (mm/hr)
100 yr	4688	17.00	0.9624	167.10

Pond 5 Catchment			
Catchment	**Area** (ha)	**Area** (m^2)	**Weighted Average C**
Pond5	3.17	31700	0.50

Intensity
$i(T_d) = A / (T + B)^C$

Peak Flow
$Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A$

Storm Event (yr)	Peak Flow Rate (m3/s)
100	0.74

Emergency Overflow Weir	
Flow (100-year) (m3/s)	0.74
Maximum Head (m)	0.30
Required Length (m)	2.65
Provided Length (m)	3.00
Calculated Flow (m3/s)	0.84

CROZIER CONSULTING ENGINEERS

PROJECT: Tullamore
PROJECT NO.: 2022-5842-3
CREATED BY: AM/IC/MJ
CHECKED BY: JS
DATE: 2022.08.30
UPDATED: 2023.04.06

Hickenbottom Drawdown Time - ESC Pond - POND 5

Calculations

REQUIRED Pond Active Storage Volume		396	m^3
Depth for Active Storage		0.50	m
Target Drawdown Time		48	hrs
Hickenbottom Specifications	**0.127m intake with 24 - 25mm holes per 0.305m**		
Hickenbottom Capacity		12.46	L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications
http://www.hickenbottominc.com/index.html

Hickenbottom Drawdown Time	31799		s
Hickenbottom Drawdown Time	**9**		**hrs**

PROVIDED Pond Active Storage Volume		406	m^3
Depth for Active Storage		0.50	m
Target Drawdown Time		48	hrs
Hickenbottom Specifications	**0.127m intake with 24 - 25mm holes per 0.305m**		
Hickenbottom Capacity		12.46	L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications
http://www.hickenbottominc.com/index.html

Hickenbottom Drawdown Time	32592		s
Hickenbottom Drawdown Time	**9**		**hrs**

CROZIER CONSULTING ENGINEERS

PROJECT: Tullamore
PROJECT NO.: 2022-5842-3
CREATED BY: AM/IC/MJ
CHECKED BY: JS
DATE: 2022.08.30
UPDATED: 2023.04.11

Temporary Settlement Basin - Required Volume Specifications - POND 6

Specifications

Active Storage Design Requirement:	125	m^3/ha
Permanent Pool Design Requirement:	185	m^3/ha
Drawdown Time:	48	hrs
Minimum Depth of Basin:	1	m
Maximum Depth of Basin:	5	m
Length to Width Ratio	4:1	L:W
Maximum Internal Side Slopes	4:1	H:V
Maximum External Side Slopes	2:1	H:V

Required Volume Calculations

Temporary Drainage Area:		5.17	ha
Permanent Pool Volume:		**956**	m^3
Active Storage Volume:		**646**	m^3
	Total:	**1,603**	m^3

References/Notes

TRCA Erosion and Sediment Control Guide - Appendix B

CROZIER CONSULTING ENGINEERS

PROJECT: Tullamore **CREATED BY:** AM/IC/MJ **DATE:** 2022.08.30
PROJECT NO.: 2022-5842-3 **CHECKED BY:** JS **UPDATED:** 2023.04.11

Temporary Settlement Basin Sizing - POND 6

Proposed Basin Dimensions

Depth			Side Slope		
Freeboard:	0.30	m	Freeboard:	4	:1
Active Storage:	0.65	m	Active Storage:	4	:1
Permanent Pool:	3.00	m	Permanent Pool:	4	:1
Total Depth of Basin:	**3.95**	m			

Length			Elevations		
Top of Basin:	37.6	m	Top of Pond / Freeboard:	233.50	m
Bottom of Freeboard:	35.2	m	Active Storage:	233.20	m
Bottom of Active Storage:	30.0	m	Permanent Pool:	232.55	m
Bottom of Basin:	6.0	m	Bottom of Basin:	229.55	m
Buffer:	0.0	m			
Total Top Length of Basin:	**37.6**	m			

Width					
Top of Basin:	37.6	m	**Total Basin Surface Area:**	1,414	m^2
Bottom Freeboard:	35.2	m		**0.14**	ha
Bottom of Active Storage:	30.0	m			
Bottom of Basin:	6.0	m	**Total Active Storage Area:**	1,239	m^2
Buffer:	0	m	**Total Permanent Pool Area:**	900	m^2
Total Top Width of Basin:	**37.6**	m			

Basin Volume Calculation

	Provided		Required	
Freeboard Volume:	397	m^3	-	m^3
Active Storage Volume:	691	m^3	646	m^3
Permanent Pool Volume:	972	m^3	956	m^3
Total Basin Volume:	**2,060**	m^3	1,603	m^3

CROZIER CONSULTING ENGINEERS

PROJECT: Tullamore | **CREATED BY:** MJ | **DATE:** 2022.08.30
PROJECT NO.: 2022-5842-3 | **CHECKED BY:** JS | **UPDATED:** 2023.04.11

Temporary Forebay Sizing - POND 6

Proposed Forebay Dimensions

Depth of Forebay:	1.0	m	Minimum of 1m per TRCA Erosion and Sediment Control Guidelines
Spill Elevation:	232.6	m	
Forebay Length:	10.0	m	
Forebay Width:	10.0	m	
Bottom Length:	2.0	m	
Bottom Width:	2.0	m	
Forebay Volume:	36.0	m^3	
Forebay Volume/PP Volume*100:	3.7	%	Must be less than 33% per TRCA Erosion and Sediment Control Guidelines

Minimum Forebay Length for Settling

Catchment Area:	51700	m^2	
Extended Detension Volume:	1292.5	m^3	Based on 25mm event
Drawdown Time:	48.0	hours	Per TRCA Erosion and Sediment Control Guidelines
Peak Flowrate:	0.007	m^3/s	From pond during quality design storm
Length to Width Ratio of Forebay:	1.0	:1	
Settling Velocity:	0.0003	m/s	
Minimum Forebay Length for Settling:	**5.0**	**m**	
Provided Forebay Length for Settling:	**10.0**	**m**	

CROZIER CONSULTING ENGINEERS

Project: Tullamore
Project No.: 2022-5842-3
Created By: MJ
Checked By: JS
Date: 2022.12.14
Updated: 2023.04.11

Modified Rational & Weir Calculations - POND 6

Storm Data: Town of Caledon

Time of Concentration: T_c = **10** **min** (per Town of Caledon standards)

Return Period	A	B	C	I (mm/hr)
100 yr	4688	17.00	0.9624	167.10

Pond 6 Catchment			
Catchment	**Area** (ha)	**Area** (m^2)	**Weighted Average C**
Pond6	5.17	51700	0.50

Intensity
$i(T_d) = A / (T + B)^C$

Peak Flow
$Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A$

Storm Event (yr)	Peak Flow Rate (m3/s)
100	1.21

Emergency Overflow Weir	
Flow (100-year) (m3/s)	1.21
Maximum Head (m)	0.30
Required Length (m)	4.32
Provided Length (m)	5.00
Calculated Flow (m3/s)	1.40

CROZIER CONSULTING ENGINEERS

PROJECT: Tullamore **CREATED BY:** AM/IC/MJ **DATE:** 2022.08.30
PROJECT NO.: 2022-5842-3 **CHECKED BY:** JS **UPDATED:** 2023.04.11

Hickenbottom Drawdown Time - ESC Pond - POND 6

Calculations

REQUIRED Pond Active Storage Volume		646	m^3
Depth for Active Storage		0.65	m
Target Drawdown Time		48	hrs
Hickenbottom Specifications	**0.127m intake with 24 - 25mm holes per 0.305m**		
Hickenbottom Capacity		18.48	L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications
http://www.hickenbottominc.com/index.html

Hickenbottom Drawdown Time	34973	s
Hickenbottom Drawdown Time	**10**	**hrs**

PROVIDED Pond Active Storage Volume		691	m^3
Depth for Active Storage		0.65	m
Target Drawdown Time		48	hrs
Hickenbottom Specifications	**0.127m intake with 24 - 25mm holes per 0.305m**		
Hickenbottom Capacity		18.48	L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications
http://www.hickenbottominc.com/index.html

Hickenbottom Drawdown Time	37383	s
Hickenbottom Drawdown Time	**10**	**hrs**

CROZIER CONSULTING ENGINEERS

PROJECT: Tullamore
PROJECT NO.: 2022-5842-3
CREATED BY: AM/IC/MJ
CHECKED BY: JS
DATE: 2022.08.30
UPDATED: 2023.04.11

Temporary Settlement Basin - Required Volume Specifications - POND 9

Specifications

Active Storage Design Requirement:	125	m^3/ha
Permanent Pool Design Requirement:	185	m^3/ha
Drawdown Time:	48	hrs
Minimum Depth of Basin:	1	m
Maximum Depth of Basin:	5	m
Length to Width Ratio	4:1	L:W
Maximum Internal Side Slopes	4:1	H:V
Maximum External Side Slopes	2:1	H:V

Required Volume Calculations

Temporary Drainage Area:		7.30	ha
Permanent Pool Volume:		**1,351**	m^3
Active Storage Volume:		**913**	m^3
	Total:	**2,263**	m^3

References/Notes

TRCA Erosion and Sediment Control Guide - Appendix B

CROZIER CONSULTING ENGINEERS

PROJECT: Tullamore **CREATED BY:** AM/IC/MJ **DATE:** 2022.08.30
PROJECT NO.: 2022-5842-3 **CHECKED BY:** JS **UPDATED:** 2023.04.11

Temporary Settlement Basin Sizing - POND 9

Proposed Basin Dimensions

Depth			Side Slope		
Freeboard:	0.30	m	Freeboard:	4	:1
Active Storage:	0.60	m	Active Storage:	4	:1
Permanent Pool:	3.00	m	Permanent Pool:	4	:1
Total Depth of Basin:	**3.90**	m			

Length			Elevations		
Top of Basin:	44.2	m	Top of Pond / Freeboard:	243.90	m
Bottom of Freeboard:	41.8	m	Active Storage:	243.60	m
Bottom of Active Storage:	37.0	m	Permanent Pool:	243.00	m
Bottom of Basin:	13.0	m	Bottom of Basin:	240.00	m
Buffer:	0.0	m			
Total Top Length of Basin:	**44.2**	m			

Width					
			Total Basin Surface Area:	1,954	m^2
Top of Basin:	44.2	m		**0.20**	ha
Bottom Freeboard:	41.8	m			
Bottom of Active Storage:	37.0	m			
Bottom of Basin:	13.0	m	**Total Active Storage Area:**	1,747	m^2
Buffer:	0	m	**Total Permanent Pool Area:**	1,369	m^2
Total Top Width of Basin:	**44.2**	m			

Basin Volume Calculation

	Provided		Required	
Freeboard Volume:	555	m^3	-	m^3
Active Storage Volume:	931	m^3	913	m^3
Permanent Pool Volume:	1,875	m^3	1,351	m^3
Total Basin Volume:	**3,361**	m^3	2,263	m^3

CROZIER CONSULTING ENGINEERS

PROJECT: Tullamore | **CREATED BY:** MJ | **DATE:** 2022.08.30
PROJECT NO.: 2022-5842-3 | **CHECKED BY:** JS | **UPDATED:** 2023.04.11

Temporary Forebay Sizing - POND 9

Proposed Forebay Dimensions

Depth of Forebay:	1.0	m	Minimum of 1m per TRCA Erosion and Sediment Control Guidelines
Spill Elevation:	243.0	m	
Forebay Length:	12.3	m	
Forebay Width:	12.3	m	
Bottom Length:	4.3	m	
Bottom Width:	4.3	m	
Forebay Volume:	69.4	m^3	
Forebay Volume/PP Volume*100:	3.7	%	Must be less than 33% per TRCA Erosion and Sediment Control Guidelines

Minimum Forebay Length for Settling

Catchment Area:	73000	m^2	
Extended Detension Volume:	1825.0	m^3	Based on 25mm event
Drawdown Time:	48.0	hours	Per TRCA Erosion and Sediment Control Guidelines
Peak Flowrate:	0.011	m^3/s	From pond during quality design storm
Length to Width Ratio of Forebay:	1.0	:1	
Settling Velocity:	0.0003	m/s	
Minimum Forebay Length for Settling:	**5.9**	**m**	
Provided Forebay Length for Settling:	**12.3**	**m**	

CROZIER
CONSULTING ENGINEERS

Project: Tullamore
Project No.: 2022-5842-3
Created By: MJ
Checked By: JS
Date: 2022.12.14
Updated: 2023.04.11

Modified Rational & Weir Calculations - POND 9

Storm Data: Town of Caledon

Time of Concentration: T_c = **10** **min** (per Town of Caledon standards)

Return Period	A	B	C	I (mm/hr)
100 yr	4688	17.00	0.9624	167.10

Pond 7 Catchment			
Catchment	**Area** (ha)	**Area** (m^2)	**Weighted Average C**
Pond7	7.30	73000	0.50

Intensity
$i(T_d) = A / (T + B)^C$

Peak Flow
$Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A$

Storm Event (yr)	Peak Flow Rate (m3/s)
100	1.71

Emergency Overflow Weir	
Flow (100-year) (m3/s)	1.71
Maximum Head (m)	0.30
Required Length (m)	6.10
Provided Length (m)	7.00
Calculated Flow (m3/s)	1.96

CROZIER CONSULTING ENGINEERS

PROJECT: Tullamore **CREATED BY:** AM/IC/MJ **DATE:** 2022.08.30
PROJECT NO.: 2022-5842-3 **CHECKED BY:** JS **UPDATED:** 2023.04.11

Hickenbottom Drawdown Time - ESC Pond - POND 9

Calculations

REQUIRED Pond Active Storage Volume		913	m^3
Depth for Active Storage		0.60	m
Target Drawdown Time		48	hrs
Hickenbottom Specifications	**0.127m intake with 24 - 25mm holes per 0.305m**		
Hickenbottom Capacity		16.39	L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications
http://www.hickenbottominc.com/index.html

Hickenbottom Drawdown Time	55689		s
Hickenbottom Drawdown Time	**15**		**hrs**

PROVIDED Pond Active Storage Volume		931	m^3
Depth for Active Storage		0.60	m
Target Drawdown Time		48	hrs
Hickenbottom Specifications	**0.127m intake with 24 - 25mm holes per 0.305m**		
Hickenbottom Capacity		16.39	L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications
http://www.hickenbottominc.com/index.html

Hickenbottom Drawdown Time	56843		s
Hickenbottom Drawdown Time	**16**		**hrs**

CROZIER CONSULTING ENGINEERS

PROJECT: Tullamore
PROJECT NO.: 2022-5842-3
CREATED BY: AM/IC/MJ
CHECKED BY: JS
DATE: 2022.08.30
UPDATED: 2023.04.06

Temporary Settlement Basin - Required Volume Specifications - POND 10

Specifications

Active Storage Design Requirement:	125	m^3/ha
Permanent Pool Design Requirement:	185	m^3/ha
Drawdown Time:	48	hrs
Minimum Depth of Basin:	1	m
Maximum Depth of Basin:	5	m
Length to Width Ratio	4:1	L:W
Maximum Internal Side Slopes	4:1	H:V
Maximum External Side Slopes	2:1	H:V

Required Volume Calculations

Temporary Drainage Area:		9.42	ha
Permanent Pool Volume:		**1,743**	m^3
Active Storage Volume:		**1,178**	m^3
	Total:	**2,920**	m^3

References/Notes

TRCA Erosion and Sediment Control Guide - Appendix B

CROZIER CONSULTING ENGINEERS

PROJECT: Tullamore **CREATED BY:** AM/IC/MJ **DATE:** 2022.08.30
PROJECT NO.: 2022-5842-3 **CHECKED BY:** JS **UPDATED:** 2023.04.06

Temporary Settlement Basin Sizing - POND 10

Proposed Basin Dimensions

Depth			Side Slope	
Freeboard:	0.30	m	Freeboard:	4 :1
Active Storage:	0.70	m	Active Storage:	4 :1
Permanent Pool:	3.00	m	Permanent Pool:	4 :1
Total Depth of Basin:	**4.00**	m		

Length			Elevations		
Top of Basin:	47.4	m	Top of Pond / Freeboard:	240.30	m
Bottom of Freeboard:	45.0	m	Active Storage:	240.00	m
Bottom of Active Storage:	39.4	m	Permanent Pool:	239.30	m
Bottom of Basin:	15.4	m	Bottom of Basin:	236.30	m
Buffer:	0.0	m			
Total Top Length of Basin:	**47.4**	m			

Width					
			Total Basin Surface Area:	2,247	m^2
Top of Basin:	47.4	m		**0.22**	ha
Bottom Freeboard:	45.0	m			
Bottom of Active Storage:	39.4	m			
Bottom of Basin:	15.4	m	**Total Active Storage Area:**	2,025	m^2
Buffer:	0	m	**Total Permanent Pool Area:**	1,552	m^2
Total Top Width of Basin:	**47.4**	m			

Basin Volume Calculation

	Provided		Required	
Freeboard Volume:	640	m^3	-	m^3
Active Storage Volume:	1,247	m^3	1,178	m^3
Permanent Pool Volume:	2,252	m^3	1,743	m^3
Total Basin Volume:	**4,139**	m^3	2,920	m^3

CROZIER CONSULTING ENGINEERS

PROJECT: Tullamore | **CREATED BY:** MJ | **DATE:** 2022.08.30
PROJECT NO.: 2022-5842-3 | **CHECKED BY:** JS | **UPDATED:** 2023.04.06

Temporary Forebay Sizing - POND 10

Proposed Forebay Dimensions

Depth of Forebay:	1.0	m	Minimum of 1m per TRCA Erosion and Sediment Control Guidelines
Spill Elevation:	239.3	m	
Forebay Length:	13.1	m	
Forebay Width:	13.1	m	
Bottom Length:	5.1	m	
Bottom Width:	5.1	m	
Forebay Volume:	83.4	m^3	
Forebay Volume/PP Volume*100:	3.7	%	Must be less than 33% per TRCA Erosion and Sediment Control Guidelines

Minimum Forebay Length for Settling

Catchment Area:	94200	m^2	
Extended Detension Volume:	2355.0	m^3	Based on 25mm event
Drawdown Time:	48.0	hours	Per TRCA Erosion and Sediment Control Guidelines
Peak Flowrate:	0.014	m^3/s	From pond during quality design storm
Length to Width Ratio of Forebay:	1.0	:1	
Settling Velocity:	0.0003	m/s	
Minimum Forebay Length for Settling:	**6.7**	**m**	
Provided Forebay Length for Settling:	**13.1**	**m**	

CROZIER CONSULTING ENGINEERS

Project: Tullamore
Project No.: 2022-5842-3
Created By: MJ
Checked By: JS
Date: 2022.12.14
Updated: 2023.04.06

Modified Rational & Weir Calculations - POND 10

Storm Data: Town of Caledon

Time of Concentration: T_c = **10** **min** (per Town of Caledon standards)

Return Period	A	B	C	I (mm/hr)
100 yr	4688	17.00	0.9624	167.10

Pond 8 Catchment			
Catchment	**Area** (ha)	**Area** (m^2)	**Weighted Average C**
Pond8	9.42	94200	0.50

Intensity
$i(T_d) = A / (T + B)^C$

Peak Flow
$Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A$

Storm Event (yr)	Peak Flow Rate (m3/s)
100	2.20

Emergency Overflow Weir	
Flow (100-year) (m3/s)	2.20
Maximum Head (m)	0.30
Required Length (m)	7.87
Provided Length (m)	8.00
Calculated Flow (m3/s)	2.24

CROZIER CONSULTING ENGINEERS

PROJECT: Tullamore | **CREATED BY:** AM/IC/MJ | **DATE:** 2022.08.30
PROJECT NO.: 2022-5842-3 | **CHECKED BY:** JS | **UPDATED:** 2023.04.06

Hickenbottom Drawdown Time - ESC Pond - POND 10

Calculations

REQUIRED Pond Active Storage Volume		1,178	m^3
Depth for Active Storage		0.70	m
Target Drawdown Time		48	hrs
Hickenbottom Specifications	**0.127m intake with 24 - 25mm holes per 0.305m**		
Hickenbottom Capacity		20.65	L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications
http://www.hickenbottominc.com/index.html

Hickenbottom Drawdown Time	57010	s
Hickenbottom Drawdown Time	**16**	**hrs**

PROVIDED Pond Active Storage Volume		1,247	m^3
Depth for Active Storage		0.70	m
Target Drawdown Time		48	hrs
Hickenbottom Specifications	**0.127m intake with 24 - 25mm holes per 0.305m**		
Hickenbottom Capacity		20.65	L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications
http://www.hickenbottominc.com/index.html

Hickenbottom Drawdown Time	60355	s
Hickenbottom Drawdown Time	**17**	**hrs**

CROZIER CONSULTING ENGINEERS

PROJECT: Tullamore
PROJECT NO.: 2022-5842-3
CREATED BY: AM/IC/MJ
CHECKED BY: JS
DATE: 2022.08.30
UPDATED: 2023.04.06

Temporary Settlement Basin - Required Volume Specifications - POND 11

Specifications

Active Storage Design Requirement:	125	m^3/ha
Permanent Pool Design Requirement:	185	m^3/ha
Drawdown Time:	48	hrs
Minimum Depth of Basin:	1	m
Maximum Depth of Basin:	5	m
Length to Width Ratio	4:1	L:W
Maximum Internal Side Slopes	4:1	H:V
Maximum External Side Slopes	2:1	H:V

Required Volume Calculations

Temporary Drainage Area:		9.01	ha
Permanent Pool Volume:		**1,667**	m^3
Active Storage Volume:		**1,126**	m^3
	Total:	**2,793**	m^3

References/Notes

TRCA Erosion and Sediment Control Guide - Appendix B

CROZIER CONSULTING ENGINEERS

PROJECT: Tullamore **CREATED BY:** AM/IC/MJ **DATE:** 2022.08.30
PROJECT NO.: 2022-5842-3 **CHECKED BY:** JS **UPDATED:** 2023.04.06

Temporary Settlement Basin Sizing - POND 11

Proposed Basin Dimensions

Depth			Side Slope		
Freeboard:	0.30	m	Freeboard:	4	:1
Active Storage:	0.60	m	Active Storage:	4	:1
Permanent Pool:	3.00	m	Permanent Pool:	4	:1
Total Depth of Basin:	**3.90**	m			

Length			Elevations		
Top of Basin:	48.2	m	Top of Pond / Freeboard:	240.65	m
Bottom of Freeboard:	45.8	m	Active Storage:	240.35	m
Bottom of Active Storage:	41.0	m	Permanent Pool:	239.75	m
Bottom of Basin:	17.0	m	Bottom of Basin:	236.75	m
Buffer:	0.0	m			
Total Top Length of Basin:	**48.2**	m			

Width					
			Total Basin Surface Area:	2,323	m^2
Top of Basin:	48.2	m		**0.23**	ha
Bottom Freeboard:	45.8	m			
Bottom of Active Storage:	41.0	m			
Bottom of Basin:	17.0	m	**Total Active Storage Area:**	2,098	m^2
Buffer:	0	m	**Total Permanent Pool Area:**	1,681	m^2
Total Top Width of Basin:	**48.2**	m			

Basin Volume Calculation

	Provided		Required	
Freeboard Volume:	663	m^3	-	m^3
Active Storage Volume:	1,130	m^3	1,126	m^3
Permanent Pool Volume:	2,523	m^3	1,667	m^3
Total Basin Volume:	**4,316**	m^3	2,793	m^3

CROZIER CONSULTING ENGINEERS

PROJECT: Tullamore | **CREATED BY:** MJ | **DATE:** 2022.08.30
PROJECT NO.: 2022-5842-3 | **CHECKED BY:** JS | **UPDATED:** 2023.04.06

Temporary Forebay Sizing - POND 11

Proposed Forebay Dimensions

Depth of Forebay:	1.0	m	Minimum of 1m per TRCA Erosion and Sediment Control Guidelines
Spill Elevation:	239.8	m	
Forebay Length:	13.7	m	
Forebay Width:	13.7	m	
Bottom Length:	5.7	m	
Bottom Width:	5.7	m	
Forebay Volume:	93.4	m^3	
Forebay Volume/PP Volume*100:	3.7	%	Must be less than 33% per TRCA Erosion and Sediment Control Guidelines

Minimum Forebay Length for Settling

Catchment Area:	90100	m^2	
Extended Detension Volume:	2252.5	m^3	Based on 25mm event
Drawdown Time:	48.0	hours	Per TRCA Erosion and Sediment Control Guidelines
Peak Flowrate:	0.013	m^3/s	From pond during quality design storm
Length to Width Ratio of Forebay:	1.0	:1	
Settling Velocity:	0.0003	m/s	
Minimum Forebay Length for Settling:	**6.6**	**m**	
Provided Forebay Length for Settling:	**13.7**	**m**	

CROZIER CONSULTING ENGINEERS

Project: Tullamore
Project No.: 2022-5842-3
Created By: MJ
Checked By: JS
Date: 2022.12.14
Updated: 2023.04.06

Modified Rational & Weir Calculations - POND 11

Storm Data: Town of Caledon

Time of Concentration: T_c = **10** **min** (per Town of Caledon standards)

Return Period	A	B	C	I (mm/hr)
100 yr	4688	17.00	0.9624	167.10

Pond 9 Catchment			
Catchment	**Area** (ha)	**Area** (m^2)	**Weighted Average C**
Pond9	9.01	90100	0.50

Intensity
$i(T_d) = A / (T + B)^C$

Peak Flow
$Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A$

Storm Event (yr)	Peak Flow Rate (m3/s)
100	2.11

Emergency Overflow Weir	
Flow (100-year) (m3/s)	2.11
Maximum Head (m)	0.30
Required Length (m)	7.52
Provided Length (m)	8.00
Calculated Flow (m3/s)	2.24

CROZIER CONSULTING ENGINEERS

PROJECT: Tullamore
PROJECT NO.: 2022-5842-3
CREATED BY: AM/IC/MJ
CHECKED BY: JS
DATE: 2022.08.30
UPDATED: 2023.04.06

Hickenbottom Drawdown Time - ESC Pond - POND 11

Calculations

REQUIRED Pond Active Storage Volume		1,126	m^3
Depth for Active Storage		0.60	m
Target Drawdown Time		48	hrs
Hickenbottom Specifications	**0.127m intake with 24 - 25mm holes per 0.305m**		
Hickenbottom Capacity		16.39	L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications
http://www.hickenbottominc.com/index.html

Hickenbottom Drawdown Time	68733	s
Hickenbottom Drawdown Time	**19**	**hrs**

PROVIDED Pond Active Storage Volume		1,130	m^3
Depth for Active Storage		0.60	m
Target Drawdown Time		48	hrs
Hickenbottom Specifications	**0.127m intake with 24 - 25mm holes per 0.305m**		
Hickenbottom Capacity		16.39	L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications
http://www.hickenbottominc.com/index.html

Hickenbottom Drawdown Time	68971	s
Hickenbottom Drawdown Time	**19**	**hrs**

CROZIER CONSULTING ENGINEERS

PROJECT: Tullamore
PROJECT NO.: 2022-5842-3

CREATED BY: AM/IC/MJ
CHECKED BY: JS

DATE: 2022.08.30
UPDATED: 2023.04.06

Temporary Settlement Basin - Required Volume Specifications - POND 12

Specifications

Active Storage Design Requirement:	125	m^3/ha
Permanent Pool Design Requirement:	185	m^3/ha
Drawdown Time:	48	hrs
Minimum Depth of Basin:	1	m
Maximum Depth of Basin:	5	m
Length to Width Ratio	4:1	L:W
Maximum Internal Side Slopes	4:1	H:V
Maximum External Side Slopes	2:1	H:V

Required Volume Calculations

Temporary Drainage Area:		9.07	ha
Permanent Pool Volume:		**1,678**	m^3
Active Storage Volume:		**1,134**	m^3
	Total:	**2,812**	m^3

References/Notes

TRCA Erosion and Sediment Control Guide - Appendix B

CROZIER CONSULTING ENGINEERS

PROJECT: Tullamore **CREATED BY:** AM/IC/MJ **DATE:** 2022.08.30
PROJECT NO.: 2022-5842-3 **CHECKED BY:** JS **UPDATED:** 2023.04.06

Temporary Settlement Basin Sizing - POND 12

Proposed Basin Dimensions

Depth			Side Slope		
Freeboard:	0.30	m	Freeboard:	4	:1
Active Storage:	0.70	m	Active Storage:	4	:1
Permanent Pool:	3.00	m	Permanent Pool:	4	:1
Total Depth of Basin:	**4.00**	m			

Length			Elevations		
Top of Basin:	46.0	m	Top of Pond / Freeboard:	238.50	m
Bottom of Freeboard:	43.6	m	Active Storage:	238.20	m
Bottom of Active Storage:	38.0	m	Permanent Pool:	237.50	m
Bottom of Basin:	14.0	m	Bottom of Basin:	234.50	m
Buffer:	0.0	m			
Total Top Length of Basin:	**46.0**	m			

Width					
			Total Basin Surface Area:	2,116	m^2
Top of Basin:	46.0	m		**0.21**	ha
Bottom Freeboard:	43.6	m			
Bottom of Active Storage:	38.0	m			
Bottom of Basin:	14.0	m	**Total Active Storage Area:**	1,901	m^2
Buffer:	0	m	**Total Permanent Pool Area:**	1,444	m^2
Total Top Width of Basin:	**46.0**	m			

Basin Volume Calculation

	Provided		Required	
Freeboard Volume:	602	m^3	-	m^3
Active Storage Volume:	1,165	m^3	1,134	m^3
Permanent Pool Volume:	2,028	m^3	1,678	m^3
Total Basin Volume:	**3,795**	m^3	2,812	m^3

CROZIER CONSULTING ENGINEERS

PROJECT: Tullamore | **CREATED BY:** MJ | **DATE:** 2022.08.30
PROJECT NO.: 2022-5842-3 | **CHECKED BY:** JS | **UPDATED:** 2023.04.06

Temporary Forebay Sizing - POND 12

Proposed Forebay Dimensions

Depth of Forebay:	1.0	m	Minimum of 1m per TRCA Erosion and Sediment Control Guidelines
Spill Elevation:	237.5	m	
Forebay Length:	12.7	m	
Forebay Width:	12.7	m	
Bottom Length:	4.7	m	
Bottom Width:	4.7	m	
Forebay Volume:	75.1	m^3	
Forebay Volume/PP Volume*100:	3.7	%	Must be less than 33% per TRCA Erosion and Sediment Control Guidelines

Minimum Forebay Length for Settling

Catchment Area:	90700	m^2	
Extended Detension Volume:	2267.5	m^3	Based on 25mm event
Drawdown Time:	48.0	hours	Per TRCA Erosion and Sediment Control Guidelines
Peak Flowrate:	0.013	m^3/s	From pond during quality design storm
Length to Width Ratio of Forebay:	1.0	:1	
Settling Velocity:	0.0003	m/s	
Minimum Forebay Length for Settling:	**6.6**	**m**	
Provided Forebay Length for Settling:	**12.7**	**m**	

CROZIER
CONSULTING ENGINEERS

Project: Tullamore
Project No.: 2022-5842-3
Created By: MJ
Checked By: JS
Date: 2022.12.14
Updated: 2023.04.06

Modified Rational & Weir Calculations - POND 12

Storm Data: Town of Caledon

Time of Concentration: T_c = **10** **min** (per Town of Caledon standards)

Return Period	A	B	C	I (mm/hr)
100 yr	4688	17.00	0.9624	167.10

Pond 10 Catchment			
Catchment	**Area** (ha)	**Area** (m^2)	**Weighted Average C**
Pond10	9.07	90700	0.50

Intensity
$i(T_d) = A / (T + B)^C$

Peak Flow
$Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A$

Storm Event (yr)	Peak Flow Rate (m3/s)
100	2.12

Emergency Overflow Weir	
Flow (100-year) (m3/s)	2.12
Maximum Head (m)	0.30
Required Length (m)	7.57
Provided Length (m)	8.00
Calculated Flow (m3/s)	2.24

CROZIER CONSULTING ENGINEERS

PROJECT: Tullamore | **CREATED BY:** AM/IC/MJ | **DATE:** 2022.08.30
PROJECT NO.: 2022-5842-3 | **CHECKED BY:** JS | **UPDATED:** 2023.04.06

Hickenbottom Drawdown Time - ESC Pond - POND 12

Calculations

REQUIRED Pond Active Storage Volume		1,134	m^3
Depth for Active Storage		0.70	m
Target Drawdown Time		48	hrs
Hickenbottom Specifications	**0.127m intake with 24 - 25mm holes per 0.305m**		
Hickenbottom Capacity		20.65	L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications
http://www.hickenbottominc.com/index.html

Hickenbottom Drawdown Time	54892		s
Hickenbottom Drawdown Time	**15**		**hrs**

PROVIDED Pond Active Storage Volume		1,165	m^3
Depth for Active Storage		0.70	m
Target Drawdown Time		48	hrs
Hickenbottom Specifications	**0.127m intake with 24 - 25mm holes per 0.305m**		
Hickenbottom Capacity		20.65	L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications
http://www.hickenbottominc.com/index.html

Hickenbottom Drawdown Time	56417		s
Hickenbottom Drawdown Time	**16**		**hrs**

Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, Nov 17 2022

West Culvert

Invert Elev Dn (m)	=	238.5000
Pipe Length (m)	=	48.0000
Slope (%)	=	0.8333
Invert Elev Up (m)	=	238.9000
Rise (mm)	=	900.0
Shape	=	Circular
Span (mm)	=	900.0
No. Barrels	=	1
n-Value	=	0.012
Culvert Type	=	Circular Corrugate Metal Pipe
Culvert Entrance	=	Projecting
Coeff. K,M,c,Y,k	=	0.034, 1.5, 0.0553, 0.54, 0.9

Embankment

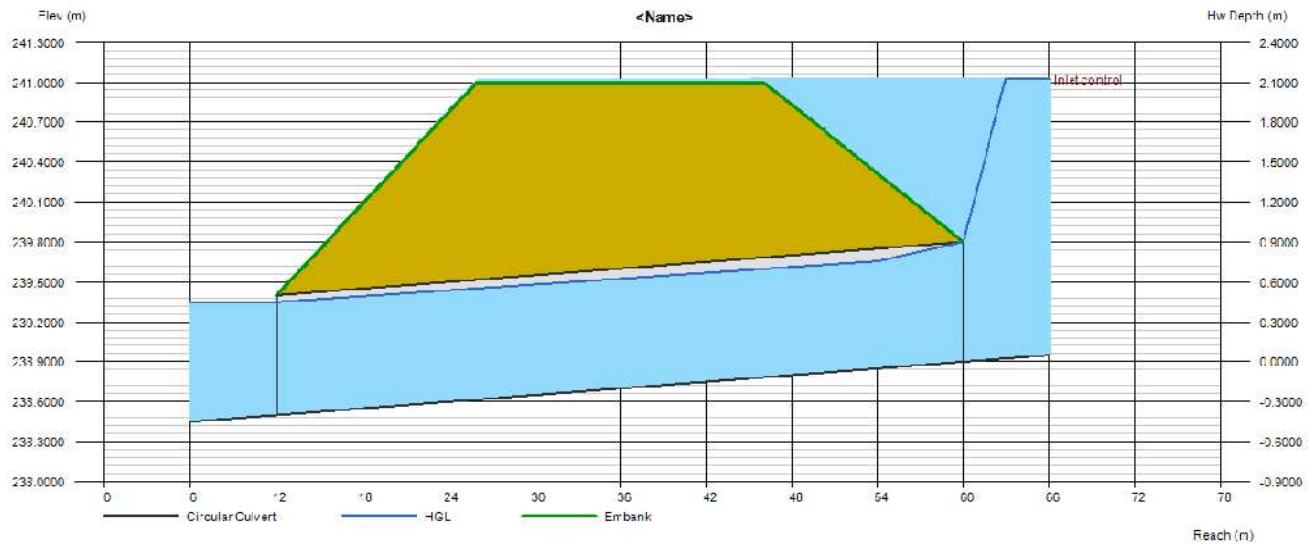
Top Elevation (m)	=	241.0000
Top Width (m)	=	20.0000
Crest Width (m)	=	50.0000

Calculations

Qmin (cms)	=	0.0000
Qmax (cms)	=	3.0000
Tailwater Elev (m)	=	(dc+D)/2

Highlighted

Qtotal (cms)	=	2.2500
Qpipe (cms)	=	1.9130
Qovertop (cms)	=	0.3370
Veloc Dn (m/s)	=	3.0762
Veloc Up (m/s)	=	3.2031
HGL Dn (m)	=	239.3490
HGL Up (m)	=	239.6994
Hw Elev (m)	=	241.0227
Hw/D (m)	=	2.3586
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, Nov 17 2022

East

Invert Elev Dn (m)	=	236.7000
Pipe Length (m)	=	27.0000
Slope (%)	=	1.8519
Invert Elev Up (m)	=	237.2000
Rise (mm)	=	600.0
Shape	=	Circular
Span (mm)	=	600.0
No. Barrels	=	1
n-Value	=	0.012
Culvert Type	=	Circular Corrugate Metal Pipe
Culvert Entrance	=	Projecting
Coeff. K,M,c,Y,k	=	0.034, 1.5, 0.0553, 0.54, 0.9

Embankment

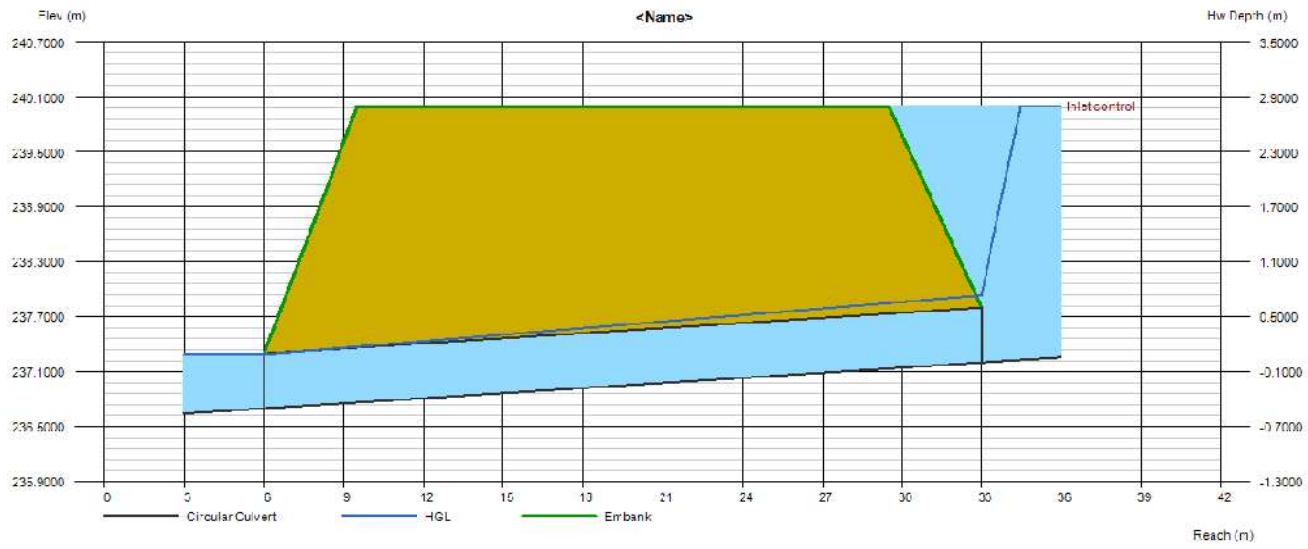
Top Elevation (m)	=	240.0000
Top Width (m)	=	20.0000
Crest Width (m)	=	50.0000

Calculations

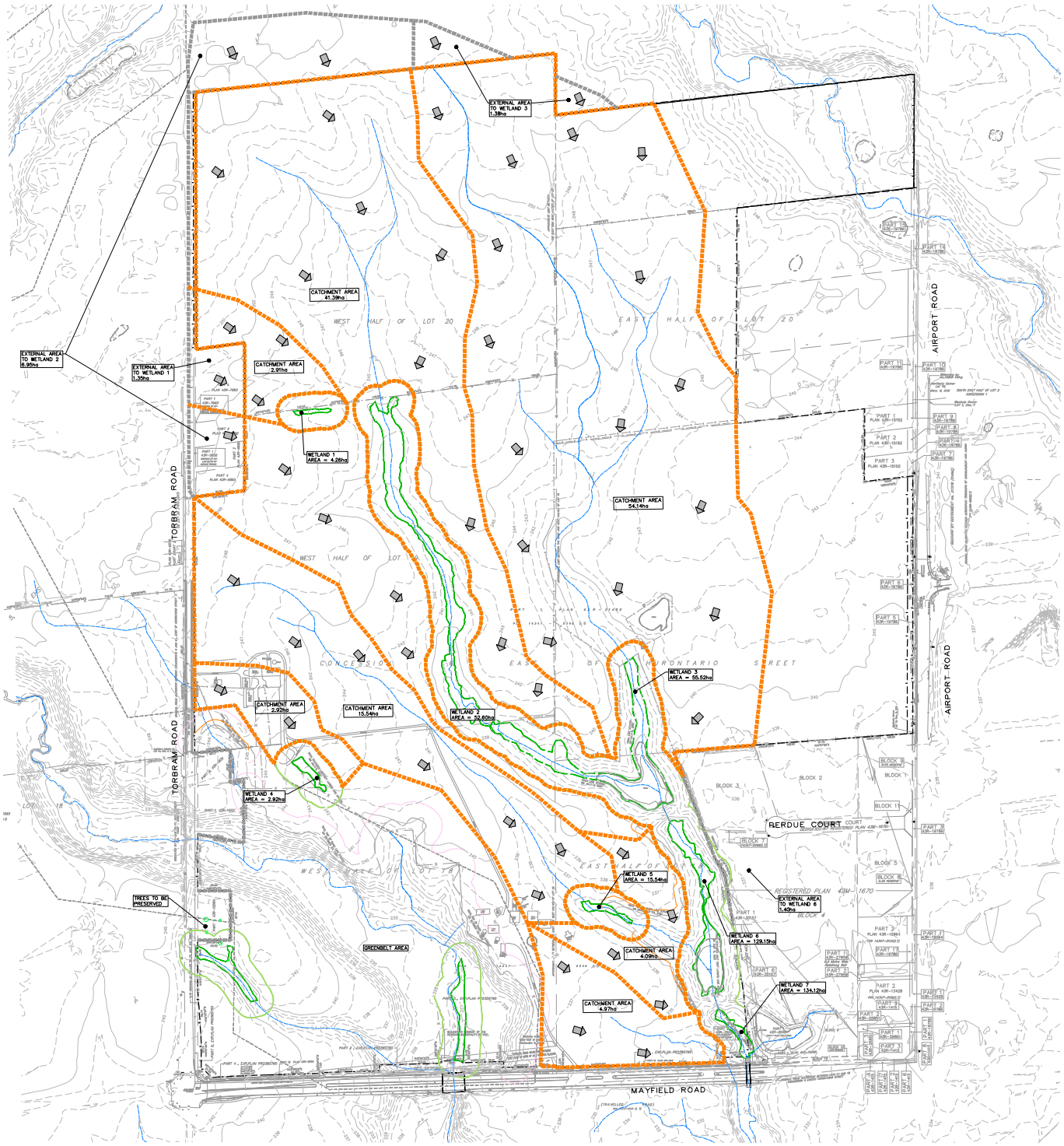
Qmin (cms)	=	0.0000
Qmax (cms)	=	3.0000
Tailwater Elev (m)	=	(dc+D)/2

Highlighted

Qtotal (cms)	=	2.0000
Qpipe (cms)	=	1.0467
Qovertop (cms)	=	0.9533
Veloc Dn (m/s)	=	3.7124
Veloc Up (m/s)	=	3.7019
HGL Dn (m)	=	237.2916
HGL Up (m)	=	237.9339
Hw Elev (m)	=	240.0049
Hw/D (m)	=	4.6748
Flow Regime	=	Inlet Control



DRAWINGS



LEGEND

- PROPERTY LINE
- EXISTING CONTOUR (1.0m)
- EXISTING CONTOUR (5.0m)
- EXISTING WETLAND CATCHMENTS
- EXTERNAL WETLAND CATCHMENTS
- WETLAND LIMIT (30m BUFFER, GD, 2022)
- WETLAND LIMIT (GD, 2022)
- EX. WATERCOURSES
- EXISTING OVERLAND FLOW DIRECTION

TOWN OF CALEDON
PLANNING
RECEIVED

October 31, 2023

SCALE: 1:2500

No.	ISSUE / REVISION	YYYY/MM/DD
7	ISSUED FOR DPoS & OPA	2023/OCT/20
6	ISSUED FOR TOPSOIL STRIPPING PERMIT	2023/MAY/24
5	ISSUED FOR TOPSOIL STRIPPING PERMIT	2023/MAY/16
4	ISSUED FOR TOPSOIL STRIPPING PERMIT	2023/MAY/10

Stamp

Stamp

BEARING NOTE:
BEARINGS ARE UTM GRID, DERIVED FROM GPS OBSERVATION USING THE "TOPNET" GPS NETWORK OBSERVATIONS, UTM ZONE 17, NAD83 (CSRS) (1997.0)

ELEVATION NOTE:
ELEVATIONS HEREIN ARE GEODETIC IN ORIGIN AND WERE DERIVED FROM GPS OBSERVATION USING THE "TOPNET" GPS NETWORK AND REFERED TO THE CGVD-1928: 1997 DATUM.

SITE BENCHMARK:
A CUT CROSS HAVING ELEVATION 240.61 m, WAS SET ON THE NORTHEAST CORNER OF THE INTERSECTION BETWEEN MAYFIELD ROAD AND TORBRAM ROAD

DRAFT PLAN NOTES:
DESIGN ELEMENTS ARE BASED ON SITE PLAN BY WESTON CONSULTING INC.
PROJECT NO. TBD

DRAWING NOTES:
THIS DRAWING IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC. AND THE REPRODUCTION OF ANY PART OF IT WITHOUT PRIOR WRITTEN CONSENT OF THIS COMPANY IS PROHIBITED.
THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, LEVELS, AND DATUMS ON SITE AND REPORT ANY DISCREPANCIES OR OMISSIONS TO THIS OFFICE PRIOR TO CONSTRUCTION.
THIS DRAWING IS TO BE READ AND UNDERSTOOD IN CONJUNCTION WITH ALL OTHER PLANS AND DOCUMENTS APPLICABLE TO THIS PROJECT. DO NOT SCALE THIS DRAWING.
ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.

Project
TULLAMORE LANDS
TOWN OF CALEDON

Drawing
EXISTING DRAINAGE TO WETLANDS

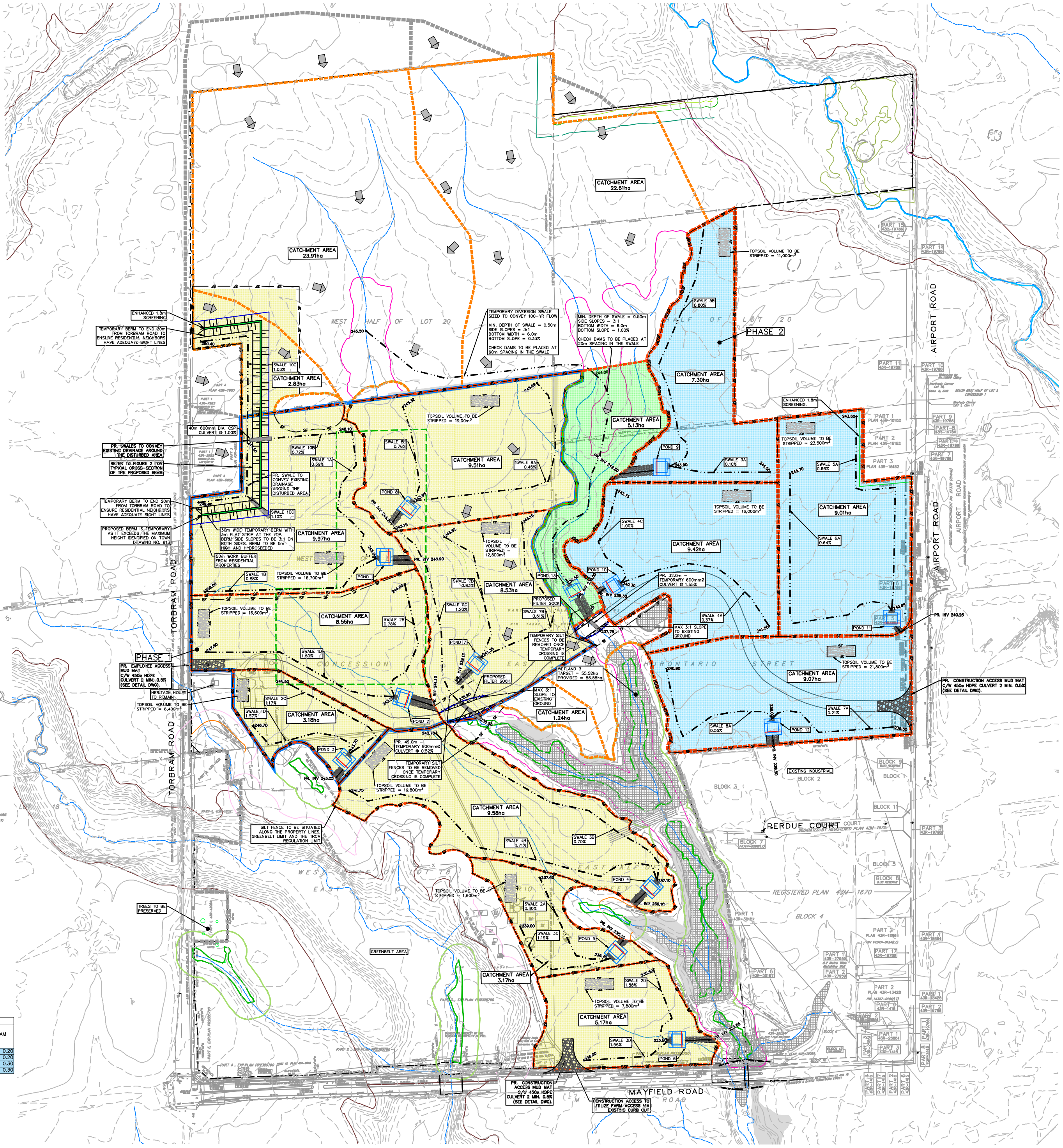
CROZIER CONSULTING ENGINEERS
2800 High Point Drive
Suite 100
Milton, ON L9T 6P4
905-875-0026 T
905-875-4913 F
WWW.CFCROZIER.CA

Drawn	L.F.	Design	L.C.	Project No.	2022-5842
Check	L.C.	Check	J.S.	Date	1:2500

Fig. FIGURE 1

CONTRUCTION SEQUENCING FOR TEMPORARY CULVERTS:

1. THIS WORK IS ONLY TO BE COMPLETED DURING DRY WEATHER.
2. INSTALL TEMPORARY SILT FENCE 20m UPSTREAM AND DOWNSTREAM OF THE TEMPORARY CULVERT LOCATIONS.
3. FOR NATURALLY OCCURRING STREAM FLOWS INSTALL TEMPORARY PUMP AND HOSE TO ROUTE ANY FLOWS PAST THE CULVERT AREA. NATURALLY OCCURRING STREAM FLOWS WITHIN THE NHS SHOULD BE MAINTAINED AT ALL TIMES, INCLUDING PRIOR TO AND DURING THE PROPOSED DISTURBANCE ASSOCIATED WITH THE INSTALLATION OF THE CULVERTS/TEMPORARY CROSSING, FROM UPSTREAM OF THE PROPOSED DISTURBANCE AREA TO DOWNSTREAM OF IT. THESE FLOWS ARE CLEAN STREAM FLOWS THAT SHOULD NOT BE TREATED.
4. FOR WET WEATHER FLOWS, INSTALL TEMPORARY PUMP AND HOSE TO ROUTE ANY WET WEATHER FLOWS AND WATER ACCUMULATION WITHIN THE DISTURBANCE AREA. THE WORK AREA FLOW WOULD NEED TO BE TREATED THROUGH A TREATMENT TRAIN BEFORE BEING DISCHARGED DOWNSTREAM. DEWATERING TREATMENT TRAIN SYSTEM IS ON DRAWING TSP-02
5. INSTALL TEMPORARY CULVERT.
6. CONSTRUCT TEMPORARY ROAD ON TOP OF THE CULVERT AND ASSOCIATED MATCH 3:1 GRADING.
7. INSTALL FILTER SOCK AT BASE OF 3:1 GRADING.
8. REMOVE TEMPORARY SILT FENCE UPSTREAM AND DOWNSTREAM OF THE CULVERTS



FILTREXX SPACING CALCULATIONS					
INTERCEPTOR SWALE	LENGTH OF CHANNEL BETWEEN CHECK DAMS	SWALE SLOPE (%)	SWALE/CHANNEL SLOPE m/m	CHANGE IN ELEVATION FROM U/S TO D/S DAM	CHECK DAM HEIGHT
A	65	0.30	0.0030	0.20	0.20
B	28	0.70	0.0070	0.20	0.20
C	27	1.10	0.0110	0.30	0.30
D	20	1.50	0.0150	0.30	0.30

NOTE: REFER TO DRAWINGS TSP-02 FOR FILTREXX DETAIL

LEGEND

- PROPERTY LINE
- PROPOSED SWALE
- EXISTING CONTOUR (1.0m)
- EXISTING CONTOUR (5.0m)
- GREENBELT BOUNDARY
- CURRENT PHASE TOPSOIL STRIPPING AREA CATCHMENTS
- SF — SILT FENCE (TOWN STD 304)
- HDSF — DOUBLE SILT FENCE (PER DETAIL ON DWG TSP-02)
- WETLAND LIMIT (30m BUFFER, GEI 2022)
- WETLAND LIMIT (GEI 2022)
- EX. WATERCOURSE
- PR. SEDIMENT CURTAIN (OPSS 219.260 AND OPSD 219.261)
- FLOODLINE
- FLOODLINE + 15m BUFFER
- ENCHANCED 1.8m SCREENING
- 50m WORK BUFFER FROM RESIDENTIAL PROPERTIES
- DRIPLINE (GEI 2023)
- WOODLAND + 10m BUFFER (GEI 2023)
- PROPOSED BUILDING OUTLINE
- TOPSOIL STRIPPING – BLOCK 1 AREA
- PROPOSED SLOPE (3:1 MAX.)
- EXISTING WETLANDS (GEI 2022)
- EXISTING WOODLANDS (GEI 2022)
- EXISTING OVERLAND FLOW DIRECTION
- +235.86 BELOW PROPOSED SURFACE
- +235.86 MATCH EXISTING ELEVATION
- TEMPORARY POND WITH FOREBAY
- STOCKPILE LOCATION SURROUNDED BY SILT FENCE (OPSD-219.100)
- 200mm DEPTH, 200mm DIAMETER RIP-RAP UNDERLAID WITH GEOTEXTILE
- FIRST PHASE OF TOPSOIL STRIPPING WORKS
- SECOND PHASE OF TOPSOIL STRIPPING WORKS
- THIRD PHASE OF TOPSOIL STRIPPING WORKS

NOTE:
1. CONTRACTOR TO ENSURE POSITIVE DRAINAGE FROM EXTERNAL PROPERTIES IS MAINTAINED AND DRAINAGE FROM EXTERNAL PROPERTIES IS NOT BLOCKED
2. STOCKPILE TO BE STABILIZED USING EROSION CONTROL MATS AND TERRA SEED WITH 50mm DEPTH OF MULCH

NOTE:
PLANT MATERIAL AND LEAF LITTER, EXCEPT FOR INVASIVE SPECIES, THAT ARE GENERATED BY CLEARING THE SITE, ARE TO BE CHIPPED AND REMOVED FROM THE SITE

NOTE:
ANY TOPSOIL STOCKPILED FOR OVER 6 MONTHS SHOULD BE AMENDED WITH COMPOST

NOTE:
STABILIZE STOCKPILE AND ANY OTHER EXPOSED SOILS ON AREAS INACTIVE FOR 30 DAYS. (REFER TO TSP-02)

NOTE:
SEED MIX AND COIR MATTING WILL BE REQUIRED TO STABILIZE DISTURBED SURFACES THAT ARE LEFT EXPOSED FOR 30 DAYS OR MORE. (REFER TO TSP-02)

NOTE:
TOPSOIL STOCKPILES ARE NOT TO EXCEED 3.0m IN HEIGHT, IF APPLICABLE.

NOTE: CATCHMENT AREAS & BLOCKS CAN BE PRE-GRADED AT DIFFERENT TIMES

NOTE: REFER TO DRAWINGS TSP-02 FOR POND AND SWALE DESIGN DETAILS

50 0m 50 100 150 200
SCALE: 1:2500

No.	ISSUE / REVISION	YYYY/MMM/DD
2	ISSUED TO TOWN	2023/OCT/30
1	ISSUED TO TRCA	2023/JUN/29

Stamp | Stamp

BEARING NOTE:

BEARINGS ARE UTM GRID, DERIVED FROM GPS OBSERVATION USING THE "TOPNET" GPS NETWORK OBSERVATIONS, UTM ZONE 17, NAD83 (CSRS) (1997.0)

ELEVATION NOTE:

ELEVATIONS HERON ARE GEODETIC IN ORIGIN AND WERE DERIVED FROM GPS OBSERVATION USING THE "TOPNET" GPS NETWORK AND REFERED TO THE CGVD-1928: 1987 DATUM

SITE BENCHMARK:

A CUT CROSS HAVING ELEVATION 242.51 m WAS SET ON THE NORTHEAST CORNER OF THE INTERSECTION BETWEEN MAYFIELD ROAD AND TORBRAM ROAD

DRAFT PLAN NOTES:

DESIGN ELEMENTS ARE BASED ON SITE PLAN BY WESTON CONSULTING INC.
DRAWING No.: TBD
PROJECT No.: TBD

DRAWING NOTES:

THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, LEVELS, AND DATUMS ON SITE AND REPORT ANY DISCREPANCIES OR OMISSIONS TO THIS OFFICE PRIOR TO CONSTRUCTION.

THIS DRAWING IS TO BE READ AND UNDERSTOOD IN CONJUNCTION WITH ALL OTHER PLANS AND DOCUMENTS APPLICABLE TO THIS PROJECT. DO NOT SCALE THIS DRAWING.

ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.

Project

TULLAMORE LANDS
TOWN OF CALEDON

Drawing

TOPSOIL STRIPPING BLOCK 1, PHASE 2 & 3 AREAS

CROZIER
CONSULTING ENGINEERS
2800 HIGH POINT DRIVE
SUITE 100
MILTON, ON L9T 6P4
905-875-0026 T
905-875-4915 F
WWW.CFCROZIER.CA

Drawn L.E.	Design I.C.	Project No.	2022-5842
Check I.C.	Check J.S.	Scale 1:2500	Fig. TSP-01

TOPSOIL AND EROSION AND SEDIMENT CONTROL (ESC) MANAGEMENT STRATEGY

THE EROSION AND SEDIMENT CONTROLS SHALL BE A MULTI BARRIER APPROACH TO PREVENT EROSION DURING CONSTRUCTION TO DEAL WITH SEDIMENT TRANSPORT AT SOURCE AND TO MINIMIZE SEDIMENT TRANSPORT FROM LEAVING THE SITE. THE MITIGATION MEASURES OUTLINED BELOW SHALL BE MAINTAINED BY THE CONTRACTOR THROUGH REGULAR INSPECTIONS, MONITORING AND MAINTENANCE UNTIL THE SOIL HAS BEEN STABILIZED. THE CONTRACTOR SHALL KEEP A COPY OF THE ESC PLANS AND THE TORONTO AND REGION CONSERVATION AUTHORITY, EROSION AND SEDIMENT CONTROL GUIDELINE, DECEMBER 2006, ON SITE AT ALL TIMES.

GENERAL NOTES

EROSION AND SEDIMENT CONTROL (ESC) MEASURES WILL BE IMPLEMENTED PRIOR TO, AND MAINTAINED DURING THE CONSTRUCTION PHASES TO PREVENT ENTRY OF SEDIMENT INTO THE WATER. ALL DAMAGED EROSION AND SEDIMENT CONTROL MEASURES SHOULD BE REPAIRED AND/OR REPLACED WITHIN 48 HOURS OF THE INSPECTION.

1. THE EROSION AND SEDIMENT CONTROL STRATEGIES OUTLINED ON THE PLANS ARE NOT STATIC AND MAY NEED TO BE UPGRADED / AMENDED AS SITE CONDITIONS CHANGE TO MINIMIZE SEDIMENT LADEN RUNOFF FROM LEAVING THE WORK AREAS. IF THE PRESCRIBED MEASURES ON THE PLANS ARE NOT EFFECTIVE IN PREVENTING THE RELEASE OF A DELETERIOUS SUBSTANCE, INCLUDING SEDIMENT, THEN ALTERNATIVE MEASURES MUST BE IMPLEMENTED IMMEDIATELY TO MINIMIZE POTENTIAL ECOLOGICAL IMPACTS. TRCA ENFORCEMENT OFFICER SHOULD BE IMMEDIATELY CONTACTED. ADDITIONAL ESC MEASURES ARE TO BE KEPT ON SITE AND USED AS NECESSARY.
2. AN ENVIRONMENTAL MONITOR WILL ATTEND THE SITE TO INSPECT ALL NEW CONTROLS, AS WELL AS ON A REGULAR BASIS, OR FOLLOWING RAIN/SNOWMELT EVENT, TO MONITOR ALL WORKS, AND IN PARTICULAR WORKS RELATED TO EROSION AND SEDIMENT CONTROLS. SHOULD CONCERNS ARISE ON SITE THE ENVIRONMENTAL MONITOR WILL CONTACT THE TRCA ENFORCEMENT OFFICER AS WELL AS THE CONTRACTOR.
3. ALL ACTIVITIES, INCLUDING MAINTENANCE PROCEDURES, WILL BE CONTROLLED TO PREVENT THE ENTRY OF PETROLEUM PRODUCTS, DEBRIS, RUBBLE, CONCRETE OR OTHER DELETERIOUS SUBSTANCES INTO THE WATER. VEHICULAR REFUELING AND MAINTENANCE WILL BE CONDUCTED A MINIMUM OF 30M FROM THE WATER.

EROSION CONTROLS

1. THE CONTRACTOR SHALL MONITOR THE WEATHER SEVERAL DAYS IN ADVANCE OF THE ONSET OF THE PROJECT TO ENSURE THAT THE WORKS WILL BE CONDUCTED DURING FAVOURABLE WEATHER CONDITIONS. SHOULD AN UNEXPECTED STORM ARISE, THE CONTRACTOR WILL REMOVE ALL UNFIXED ITEMS FROM THE STORM FLOOD PLAIN THAT WOULD HAVE THE POTENTIAL TO CAUSE A SPILL OR AN OBSTRUCTION TO FLOW, E.G., FUEL TANKS, PORTA-POTTIES, MACHINERY, EQUIPMENT, CONSTRUCTION MATERIALS, ETC.
2. ALL DEWATERING SHALL BE TREATED AND RELEASED TO THE ENVIRONMENT AT LEAST 30m FROM A WATERCOURSE OR WETLAND AND ALLOWED TO DRAIN THROUGH A WELL-VEGETATED AREA. NO DEWATERING EFFLUENT SHALL BE SENT DIRECTLY TO ANY WATERCOURSE, WETLAND OR FOREST, OR ALLOWED TO DRAIN ONTO DISTURBED SOILS WITHIN THE WORK AREA. THESE CONTROL MEASURES SHALL BE MONITORED FOR EFFECTIVENESS AND MAINTAINED OR REVISED TO MEET THE OBJECTIVE OF PREVENTING THE RELEASE OF SEDIMENT LADEN WATER.
3. THE CONTRACTOR SHALL MINIMIZE THE AREA OF DISTURBANCE AT ANY ONE TIME TO LIMIT THE DURATION OF SOIL EXPOSURE. CONSTRUCTION SHALL BE PHASED AS NECESSARY AND AREAS STABILIZED AS THE WORK PROGRESSES. AREAS DISTURBED AND LEFT EXPOSED FOR MORE THAN 15 DAYS TO BE PROTECTED WITH LAYER OF STRAW MULCH, TO THE SATISFACTION OF THE ENGINEER.
4. THE CONTRACTOR SHALL RETAIN AS MUCH EXISTING VEGETATION AS POSSIBLE BY LIMITING THE DISTURBANCE TO NON-ESSENTIAL AREAS AND STABILIZE EXPOSED SOILS QUICKLY. THE PROPOSED VEGETATION SPECIFICATION INCLUDES A FAST GERMINATING SEED MIX TO QUICKLY ESTABLISH GROUND COVER AND SHALL BE APPLIED WITHIN 15 DAYS OF COMPLETING THE CONSTRUCTION ACTIVITY. THE CONTRACTOR SHALL ENSURE THAT THE PROPOSED VEGETATION GERMINATES AND ESTABLISHES QUICKLY AND SHALL REAPPLY THE GROUND COVER MIX AS DIRECTED BY THE ENGINEER UNTIL A SUITABLE VEGETATED GROUND COVER IS IN PLACE.
5. THE CONTRACTOR SHALL MINIMIZE THE SLOPE LENGTH AND GRADIENT OF DISTURBED AREAS, MAINTAIN OVERLAND SHEET FLOW AND AVOID CONCENTRATED FLOWS.

SEDIMENT CONTROLS

1. SILT FENCE TO BE INSTALLED IN LOCATIONS SHOWN ON PLAN AND AS DIRECTED BY SITE ENGINEER.
2. SILT FENCE MUST BE INSPECTED WEEKLY FOR RIPS OR TEARS, BROKEN STAKES, BLOW-OUTS AND ACCUMULATION OF SEDIMENT.
3. SILT FENCE MUST BE INSPECTED FOLLOWING ALL 15mm OR GREATER RAIN STORM EVENT OR AS DIRECTED BY SITE ENGINEER.
4. SEDIMENT MUST BE REMOVED FROM SILT FENCE WHEN ACCUMULATION REACHES 50% OF THE HEIGHT OF FENCE.
5. ALL SILT FENCES MUST BE REMOVED ONLY WHEN THE ENTIRE SITE IS STABILIZED AND AS DIRECTED BY THE SITE ENGINEER.
6. STONE MUD MAT TO BE INSTALLED PRIOR TO CONSTRUCTION ON SITE.
7. REMOVE ACCUMULATED SEDIMENT UPSTREAM OF ROCK CHECK DAM IF GREATER THAN ONE HALF OF DAM HEIGHT.
8. SILT REMOVAL FROM FILTREXX CHECK DAMS MUST BE UNDERTAKEN WITH CARE TO MINIMIZE DOWNSTREAM SEDIMENTATION IN SWALE OR DITCH.
9. SEDIMENT TO BE CLEANED FROM TEMPORARY POND ONCE ACCUMULATION REACHES 50% OF CAPACITY.
10. SEDIMENT SHALL BE CLEANED FROM PUBLIC ROADS AT THE END OF EACH DAY, OR AS DIRECTED BY THE ENGINEER

GENERAL NOTES

1. THE ESC STRATEGIES OUTLINED ON THE PLANS ARE NOT STATIC AND MAY NEED TO BE UPGRADED/AMENDED AS SITE CONDITIONS CHANGE TO PREVENT SEDIMENT RELEASES TO THE NATURAL ENVIRONMENT. ANY CHANGES FROM THE APPROVED ESC PLANS WILL BE DOCUMENTED AND REPORTED TO THE ENFORCEMENT OFFICE.
2. INSPECTION OF THE PROPOSED EROSION AND SEDIMENT CONTROL MEASURES WILL OCCUR AT THE FREQUENCY DEFINED IN SECTION 10.1.2.
3. DISTURBED AREAS LEFT FOR 30 DAYS OR LONGER MUST BE STABILIZED.
4. EROSION AND SEDIMENT CONTROL MEASURES SHOULD BE INSPECTED WEEKLY, AT A MINIMUM, AFTER RAIN AND SNOW MELT EVENTS AND DAILY DURING EXTENDED RAIN OR SNOWMELT PERIODS. DURING INACTIVE PERIODS, WHERE THE SITE IS INACTIVE FOR 30 DAYS OR LONGER, A MONTHLY INSPECTION SHOULD BE CONDUCTED.
5. ALL DAMAGED ESC MEASURES WILL BE REPAIRED AND/OR REPLACED WITHIN 48 HOURS OR SOONER IF ENVIRONMENTAL RECEPTORS ARE AT IMMINENT AND FORESEEABLE RISK OF ADVERSE IMPACT.
6. ALL SEDIMENT CONTROL MEASURES SUCH AS SEDIMENT CONTROL FENCE, TEMPORARY PONDS, CONSTRUCTION ACCESS MATS, SEDIMENT TRAPS, SWALES AND CHECK DAMS MUST BE INSTALLED PRIOR TO THE COMMENCEMENT OF SITE WORKS.
7. ADDITIONAL MATERIALS SUCH AS CLEAR STONE, FILTER FABRIC, PUMPS, HOSES AND SILTSOXX TO BE KEPT ONSITE AT ALL TIMES FOR CONDUCTING REPAIRS TO SEDIMENT CONTROL MEASURES.
8. ENGINEERED CHANGES TO THE ESC MEASURES MAY BE NEEDED AS SITE CONDITIONS CHANGE THROUGHOUT THE CONSTRUCTION PROCESS. THESE UPDATES MUST REFLECT BEST MANAGEMENT PRACTICES TO CONTROL SEDIMENT AND EROSION ONSITE AND SHOULD BE COMPLETED BASED ON DIRECION FROM THE SITE ENGINEER. ADDITIONAL MEASURES MAY BE REQUIRED AS DIRECTED BY AN ENGINEER THROUGHOUT THE CONSTRUCTION PROCESS.
9. THE CONSTRUCTION ENTRANCE MAT IS TO BE INSTALLED AS THE FIRST STEP IN THE SITE ALTERATION PROCESS.
10. SEDIMENT CONTROL FENCE IS TO BE INSTALLED DOWNSLOPE OF ALL DISTRUBED AREAS. A DOUBLE ROW OF SEDIMENT CONTROL FENCE IS TO BE INSTALLED SURROUNDING ALL NATURAL HERITAGE FEATURES AND AS DIRECTED BY THE SITE ENGINEER. SEDIMENT CONTROL FENCE IS TO BE AS PER THE STANDARDS ON THIS DRAWINGS AT A MINIMUM.
11. FILTEREXX SILTSOXX OR APPROVED EQUIVALENT TO BE INSTALLED DOWNSTREAM FROM OUTLET AND WITHIN DITCHES TO A MINIMUM HEIGH OF 300mm.
12. AN APPROVED SPILLS MANAGEMENT PLAN IS TO BE KEPT ON SITE.
13. SPILL CLEANUP EQUIPEMENT SUCH AS ABSORPTIVE MEDIA IS TO BE MAINTAINED ON SITE FOR IMMEDIATE USE IN THE EVENT OF A SPILL.
14. SPILLS ARE TO BE REPORTED IMMEDIATELY TO THE MECP SPILLS ACTION CENTRE AT 1-800-268-6060.
15. THE CONNTRACTOR WILL BE RESPONSIBLE FOR CLEAN-UP AND RESTORATION, INCLUDING ALL COST, DUE TO THE RELEASE OF SEDIMENT FROM THE SITE.
16. LOW IMPACT DEVELOPMENT (LID) MEASURES ARE NOT TO BE USED AS SEDIMENT CONTROL DEVICES.
17. ADDITIONAL SEDIMENT CONTROL DEVICES MAY BE DEEMED NECESSARY AND AS SITE CONDITIONS CHANGE AND SHALL BE INSTALLED AS DIRECTED BY THE SITE ENGINEER, CONTRACT ADMINISTRATOR OR LOCAL MUNICIPALITY.

SEDIMENT BASIN DECOMMISSIONING

1. PROVIDE SPLASH PAD AT BOTTOM OF VEGETATED AREA FOR PUMP DISCHARGE LOCATION.
2. CREATE STABLE INTAKE (TO AVOID PUMPING SEDIMENT). LOCATE INTAKE AS FAR FROM ACCUMULATED SEDIMENT AS POSSIBLE AND USE PERFORATED STANDPIPE TO HOUSE THE PUMP INTAKE. SURROUND PERFORATED STANDPIPE WITH FILTER FABRIC AND CLEAR STONE. PUMP INTAKE SHOULD BE FITTED WITH FILTER.
3. PUMP SLOWLY TO ENSURE THAT NO SEDIMENT IS ESCAPING TO THE WATERCOURSE;
4. MONITOR INTAKE REGULARLY TO ENSURE THAT PUMP IS PULLING WATER AND NOT SEDIMENT;
5. IF SEDIMENT IS OBSERVED TO BE REACHING THE WATERCOURSE, SHUT DOWN PIPES IMMEDIATELY AND CALL DESIGN ENGINEER;
6. CONTINUE TO PUMP UNTIL POND LEVELS ARE SUFFICIENTLY LOW TO ALLOW FOR SEDIMENT REMOVAL.
7. ONCE SEDIMENT HAS BEEN EXPOSED AND ALLOWED TO BEGIN DRYING, IT NEEDS TO BE TESTED TO DETERMINE DISPOSAL OPTIONS;
8. A QUALIFIED PERSON(S) (QP) WILL NEED TO SAMPLE THE SEDIMENT AND SUBMIT IT TO AN ACCREDITED LAB FOR CHEMICAL ANALYSIS WHILE MAINTAINING THE CHAIN OF CUSTODY;
9. ONCE THE SEDIMENT HAS BEEN CHARACTERIZED, SEDIMENT REMOVAL MAY BEGIN;
10. SEDIMENT MAY BE REMOVED USING AN EXCAVATOR OR A HEAVY DUTY VACUUM TRUCK. REMOVAL SHOULD CONTINUE UNTIL NATIVE MATERIAL IS ENCOUNTERED AND CONFIRMED BY A GEOTECHNICAL CONSULTANT;

MITIGATION MEASURES

1. WATER TRUCKS WILL BE USED TO SPRAY DOWN EXPOSED SOIL TO CONTROL DUST. THE SCHEDULE FOR THE WATER TRUCKS WILL BE WEATHER DEPENDENT. ON DAYS THAT ARE VERY DRY, THE WATER TRUCK WILL BE ON SITE EVERY MORNING, AND IF NEEDED THE TRUCK WILL COME BACK IN THE AFTERNOON. TYPICAL DRY MONTHS ARE JUNE, JULY AND AUGUST.
2. STOCKPILES WILL NOT BE LOCATED WITHIN 200 M OF RESIDENTIAL HOMES OR RIGHT-OF-WAYS (TORBRAM, AIRPORT & MAYFIELD).
3. RICE GROUP WILL ORGANIZE TO HAVE THE WINDOWS OF ABUTTING RESIDENTIAL HOUSES CLEANED TWICE A YEAR.
4. ALL WORK WILL BE COMPLETED WITHIN THE ACCEPTABLE HOURS AS DESCRIBED IN THE TOWN'S NOISE BY-LAW 86-110.
5. TO MINIMIZE DISTURBANCE, A WORK BUFFER OF 50 M WILL BE MAINTAINED AROUND RESIDENTIAL PROPERTIES UNTIL MASS GRADING OF THE BLOCK HAS BEEN COMPLETED. IN ADDITION, WORK WILL ONLY BE COMPLETED DURING THE HOURS OF 8AM – 6PM WITHIN 200 M OF THE RESIDENTIAL PROPERTIES. A SCREENING FENCE WILL BE INSTALLED AND MAINTAINED SURROUNDING THE RESIDENTIAL PROPERTIES. THE SCREENING FENCE WILL BE COMPRISED OF A 1.8 M HIGH CHAIN LINK COVERED WITH A PRIVACY SCREEN.
6. REFUELING OF CONSTRUCTION VEHICLES WILL BE VIA A PUMPER TRUCK WHICH WILL BE BY DAILY DELIVERY SERVICE. REFUELING ACTIVITIES WILL NOT TAKE PLACE WITHIN 1 KM OF RESIDENTIAL HOUSES.
7. TRAILERS AND ENCAMPMENT FOR THE OWNER AND WORKERS WILL BE LOCATED NEAR MAYFIELD AWAY FROM EXISTING RESIDENTIAL HOUSES

Species	Description	Application rate and Additional Instructions
Annual Rye - Lolium Multiflorum	Annual species. Suitable for a wide range of site and soil types. Oats are suitable for a wide range of sites, including both moist and dry sites. Some allelopathy effects are known to occur; however, the effects are anticipated to only last a few weeks after death. Seed March to October	Control may be required for spring/summer plantings (e.g. mowing, etc.) to prevent cover cropfrom impeding native seed mix and to deter seed production. Oats can be mowed in October before they set seed to reduce competition.Can reduce seeding ratio to limit mowing needs. Winterkill is adequate control for fall plantings.

Toronto and Region Conservation Authority - Seed Mix Guideline (V.2.0 January 2022)
Appendix B: Seed Mix Examples
Table 1 - Recommended species to be used as nurse and/or cover crops

TRCA Frugal Dry Mix (TRCA-SD-1)

L-Rank	Scientific Name	Common Name	%
L3	*Panicum virigatum*	Switch grass	15.0%
L2	*Sorghastrum nutans*	Indian grass	15.0%
L3	*Andropogon gerardii*	Big bluestem	15.0%
L4	*Elymus riparius*	Riverbank rye	3.0%
L5	*Elymus virginicus*	Virginia wild rye	7.0%
L4	*Elymus canadensis*	Canada wild rye	11.0%
L2	*Elymus trachycaulus*	Slender wheat grass	2.0%
L2	*Elymus villosus*	Silky Wild Rye*	2.0%
L5	*Oenothera biennis*	Evening primrose	2.0%
L2	*Heliopsis helianthoides*	Oxeye	2.0%
L4	*Rudbeckia hirta*	Black eyed Susan	5.0%
L2	*Schizachyrium scoparium*	Little bluestem	10.0%
L5	*Asclepias syriaca*	Common milkweed	5.0%
L3	*Penstemon digitalis*	Foxglove beardtongue	2.0%
L3	*Pycnanthemum virginianum*	Virginia mountain mint*	2.0%
L5	*Monarda fistulosa*	Wild bergamont	2.0%
		Total	**100.0%**

* If supply issues arise, please replace these species with reasonable substitute from Appendix C.

Minimum recommended ratio of 21.39 Kg/ha

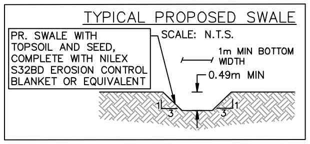
SWALE TYPE A
SLOPE = 0.30%
BOTTOM WIDTH = 1.0m
3:1 SIDE SLOPES TO MATCH EXISTING GROUND (MIN. HEIGHT = 0.57m)
CHECK DAMS (SILTSOXX) WITH MIN HEIGHT OF 0.20m TO BE PLACED EVERY 65m

SWALE TYPE B
SLOPE = 0.70%
BOTTOM WIDTH = 1.0m
3:1 SIDE SLOPES TO MATCH EXISTING GROUND (MIN. HEIGHT = 0.49m)
CHECK DAMS (SILTSOXX) WITH MIN HEIGHT OF 0.20m TO BE PLACED EVERY 28m

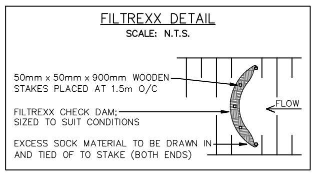
SWALE TYPE C
SLOPE = 1.10%
BOTTOM WIDTH = 1.0m
3:1 SIDE SLOPES TO MATCH EXISTING GROUND (MIN. HEIGHT = 0.53m)
CHECK DAMS (SILTSOXX) WITH MIN HEIGHT OF 0.30m TO BE PLACED EVERY 27m

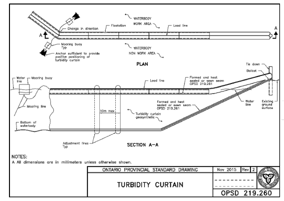
SWALE TYPE D
SLOPE = 1.50%
BOTTOM WIDTH = 1.0m
3:1 SIDE SLOPES TO MATCH EXISTING GROUND (MIN. HEIGHT = 0.51m)
CHECK DAMS (SILTSOXX) WITH MIN HEIGHT OF 0.30m TO BE PLACED EVERY 20m

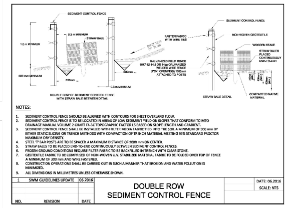
TYPICAL PROPOSED SWALE

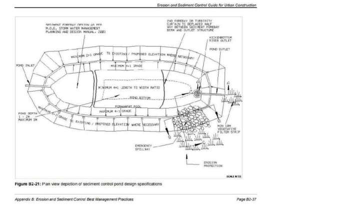


FILTREXX DETAIL









TOWN OF CALEDON
PLANNING
RECEIVED
October 31, 2023

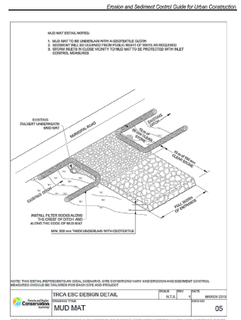


Figure B2-29: Design detail for mud mat for construction site vehicle access

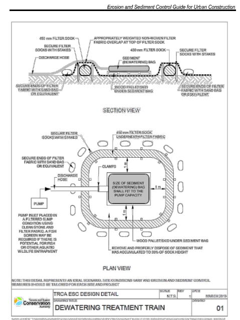
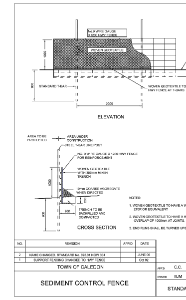
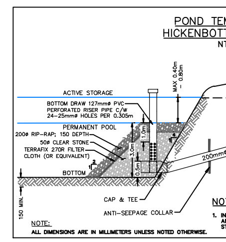


Figure B2-16: Dewatering bag treatment train (unfrozen conditions)



POND TEMPORARY HICKENBOTTOM DETAIL



NOTES:
1. INSTALL HICKENBOTTOM STRUCTURE AND OUTLET PIPE TO PROPOSED STILLING BASIN.
2. WHEN REMOVING THE TEMPORARY SEDIMENT POND UPON COMPLETION, ENSURE THE BOTTOM IS CLEANED AND COMPACTED TO 100% S.P.M.D.D. AND CERTIFIED BY A GEOTECHNICAL ENGINEER.

NOTE:
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE.

HICKENBOTTOM AND SEDIMENT BASIN DETAIL - POND 1

	ELEVATION (m)	AREA (m²)	DEPTH (m)	STORAGE REQUIRED (m³)	STORAGE PROVIDED (m³)	LENGTH (m)
TOP OF BERM	245.00	2079	0.30	-	591	-
ACTIVE STORAGE	244.70	1866	0.80	1246	1280	-
PERMANENT POOL	243.90	1354	3.00	1844	1845	-
BOTTOM	240.90	164	-	-	-	-
FOREBAY	243.90	150	1.00	-	68	-
EMERGENCY WEIR	-	-	0.30	-	-	9.00

HICKENBOTTOM AND SEDIMENT BASIN DETAIL - POND 2

	ELEVATION (m)	AREA (m²)	DEPTH (m)	STORAGE REQUIRED (m³)	STORAGE PROVIDED (m³)	LENGTH (m)
TOP OF BERM	242.20	1918	0.30	-	544	-
ACTIVE STORAGE	241.90	1714	0.80	1069	1167	-
PERMANENT POOL	241.10	1225	3.00	1582	1587	-
BOTTOM	238.10	121	-	-	-	-
FOREBAY	241.10	136	1.00	-	59	-
EMERGENCY WEIR	-	-	0.30	-	-	7.50

HICKENBOTTOM AND SEDIMENT BASIN DETAIL - POND 3

	ELEVATION (m)	AREA (m²)	DEPTH (m)	STORAGE REQUIRED (m³)	STORAGE PROVIDED (m³)	LENGTH (m)
TOP OF BERM	243.70	1282	0.30	-	359	-
ACTIVE STORAGE	243.40	1116	0.40	398	404	-
PERMANENT POOL	243.00	912	3.00	588	994	-
BOTTOM	240.00	38	-	-	-	-
FOREBAY	243.00	101	1.00	-	37	-
EMERGENCY WEIR	-	-	0.30	-	-	3.00

HICKENBOTTOM AND SEDIMENT BASIN DETAIL - POND 4

	ELEVATION (m)	AREA (m²)	DEPTH (m)	STORAGE REQUIRED (m³)	STORAGE PROVIDED (m³)	LENGTH (m)
TOP OF BERM	236.10	2237	0.30	-	638	-
ACTIVE STORAGE	235.80	2016	0.80	1198	1391	-
PERMANENT POOL	235.00	1482	3.00	1772	2107	-
BOTTOM	233.10	210	-	-	-	-
FOREBAY	235.00	165	1.00	-	165	-
EMERGENCY WEIR	-	-	-	-	-	9.00

HICKENBOTTOM AND SEDIMENT BASIN DETAIL - POND 5

	ELEVATION (m)	AREA (m²)	DEPTH (m)	STORAGE REQUIRED (m³)	STORAGE PROVIDED (m³)	LENGTH (m)
TOP OF BERM	236.45	1082	0.30	-	301	-
ACTIVE STORAGE	236.15	930	0.50	396	406	-
PERMANENT POOL	235.65	702	3.00	586	631	-
BOTTOM	232.65	6	-	-	-	-
FOREBAY	235.65	78	1.00	-	23	-
EMERGENCY WEIR	-	-	0.30	-	-	3.00

HICKENBOTTOM AND SEDIMENT BASIN DETAIL - POND 6

	ELEVATION (m)	AREA (m²)	DEPTH (m)	STORAGE REQUIRED (m³)	STORAGE PROVIDED (m³)	LENGTH (m)
TOP OF BERM	233.50	1414	0.30	-	397	-
ACTIVE STORAGE	233.20	1239	0.65	646	691	-
PERMANENT POOL	232.55	900	3.00	956	972	-
BOTTOM	229.55	36	-	-	-	-
FOREBAY	232.55	100	1.00	-	36	-
EMERGENCY WEIR	-	-	0.30	-	-	5.00

HICKENBOTTOM AND SEDIMENT BASIN DETAIL - POND 7

	ELEVATION (m)	AREA (m²)	DEPTH (m)	STORAGE REQUIRED (m³)	STORAGE PROVIDED (m³)	LENGTH (m)
TOP OF BERM	243.35	2025	0.30	-	576	-
ACTIVE STORAGE	243.05	1815	0.70	1066	1109	-
PERMANENT POOL	242.35	1369	3.00	1578	1875	-
BOTTOM	239.65	182	-	-	-	-
FOREBAY	242.35	152	1.00	-	69	-
EMERGENCY WEIR	-	-	0.30	-	-	7.50

HICKENBOTTOM AND SEDIMENT BASIN DETAIL - POND 8

	ELEVATION (m)	AREA (m²)	DEPTH (m)	STORAGE REQUIRED (m³)	STORAGE PROVIDED (m³)	LENGTH (m)
TOP OF BERM	243.95	2052	0.30	-	583	-
ACTIVE STORAGE	243.65	1840	0.80	1189	1261	-
PERMANENT POOL	242.85	1332	3.00	1759	1801	-
BOTTOM	236.30	237	-	-	-	-
FOREBAY	242.85	148	1.00	-	67	-
EMERGENCY WEIR	-	-	-	-	-	8.00

HICKENBOTTOM AND SEDIMENT BASIN DETAIL - POND 9

	ELEVATION (m)	AREA (m²)	DEPTH (m)	STORAGE REQUIRED (m³)	STORAGE PROVIDED (m³)	LENGTH (m)
TOP OF BERM	243.90	1954	0.30	-	555	-
ACTIVE STORAGE	243.60	1747	0.60	913	931	-
PERMANENT POOL	243.00	1369	3.00	1351	1875	-
BOTTOM	239.65	182	-	-	-	-
FOREBAY	243.00	152	1.00	-	69	-
EMERGENCY WEIR	-	-	0.30	-	-	7.00

HICKENBOTTOM AND SEDIMENT BASIN DETAIL - POND 10

	ELEVATION (m)	AREA (m²)	DEPTH (m)	STORAGE REQUIRED (m³)	STORAGE PROVIDED (m³)	LENGTH (m)
TOP OF BERM	240.30	2247	0.30	-	640	-
ACTIVE STORAGE	240.00	2025	0.70	1178	1247	-
PERMANENT POOL	239.30	1552	3.00	1743	2252	-
BOTTOM	236.30	237	-	-	-	-
FOREBAY	239.30	172	1.00	-	83	-
EMERGENCY WEIR	-	-	-	-	-	8.00

HICKENBOTTOM AND SEDIMENT BASIN DETAIL - POND 11

	ELEVATION (m)	AREA (m²)	DEPTH (m)	STORAGE REQUIRED (m³)	STORAGE PROVIDED (m³)	LENGTH (m)
TOP OF BERM	240.65	2323	0.30	-	663	-
ACTIVE STORAGE	240.35	2098	0.60	1126	1130	-
PERMANENT POOL	239.75	1681	3.00	1667	2523	-
BOTTOM	237.54	190	-	-	-	-
FOREBAY	239.75	187	1.00	-	93	-
EMERGENCY WEIR	-	-	0.30	-	-	8.00

HICKENBOTTOM AND SEDIMENT BASIN DETAIL - POND 12

	ELEVATION (m)	AREA (m²)	DEPTH (m)	STORAGE REQUIRED (m³)	STORAGE PROVIDED (m³)	LENGTH (m)
TOP OF BERM	238.50	2116	0.30	-	602	-
ACTIVE STORAGE	238.20	1901	0.70	1134	1165	-
PERMANENT POOL	237.50	1444	3.00	1678	2028	-
BOTTOM	235.00	240	-	-	-	-
FOREBAY	237.50	160	1.00	-	75	-
EMERGENCY WEIR	-	-	0.30	-	-	8.00

No.	ISSUE / REVISION	YYYY/MMM/DD
2	ISSUED TO TOWN	2023/OCT/30
1	ISSUED TO TRCA	2023/JUN/29

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BEARING NOTE:
BEARINGS ARE UTM GRID, DERIVED FROM GPS OBSERVATION USING THE "TOPNET" GPS NETWORK OBSERVATIONS, UTM ZONE 17, NAD83 (CSRS) (1997.0)

ELEVATION NOTE:
ELEVATIONS HERON ARE GEODETIC IN ORIGIN AND WERE DERIVED FROM GPS OBSERVATION USING THE "TOPNET" GPS NETWORK AND REFERED TO THE CGVD-1928. 1987 DATUM

SITE BENCHMARK:
A CUT CROSS HAVING ELEVATION 242.51 m WAS SET ON THE NORTHEAST CORNER OF THE INTERSECTION BETWEEN MAYFIELD ROAD AND TORBRAM ROAD

DRAFT PLAN NOTES:
DESIGN ELEMENTS ARE BASED ON SITE PLAN BY WESTON CONSULTING INC.
DRAWING No.: TBD
PROJECT No.: TBD

DRAWING NOTES:

THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, LEVELS, AND DATUMS ON SITE AND REPORT ANY DISCREPANCIES OR OMISSIONS TO THIS OFFICE PRIOR TO CONSTRUCTION.
THIS DRAWING IS TO BE READ AND UNDERSTOOD IN CONJUNCTION WITH ALL OTHER PLANS AND DOCUMENTS APPLICABLE TO THIS PROJECT. DO NOT SCALE THIS DRAWING.
ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.

Project
TULLAMORE LANDS
TOWN OF CALEDON

Drawing
TOPSOIL STRIPPING CONSTRUCTION
NOTES AND DETAILS

CROZIER
CONSULTING ENGINEERS
2800 HIGH POINT DRIVE
SUITE 100
MILTON, ON L9T 6P4
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Drawn	L.E.	Design	I.C.	Project No.	2022-5842
Check	I.C.	Check	J.S.	Scale 1:2500	Fig. TSP-02