

Stormwater Management Report

Final

Smiths Falls Compost Site Drummond/North Elmsley, Ontario

July 9, 2025

Client Project # [Client number]

Jp2g Project # 25-5229A



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1 Introduction

Jp2g Consultants Inc. (Jp2g) was retained by the Town of Smiths Falls to provide an updated stormwater management analysis and report for the Smiths Falls Compost Site (hereafter referred to as the “site”). The site was initially established under a previous stormwater management assessment, which is now required to be updated due to requirements from the Ontario Ministry of Environment, Conservation, and Parks (MECP).

This report provides details of the updated stormwater management analysis and modelling that was completed for the site, and any necessary remediation measures.

2 Site Location and Features


The site location is shown on Figure 1, it is located just west of the Town of Smiths Falls in the Township of Drummond/North Elmsley (Lot 1, Concession 5, Elmsley). The site is accessed via an unnamed road which extends north from Cornelia Street West (Highway 43) between Spinelli Lane to the west and Mazie Street West to the east. The unnamed road has a locked gate at the turnoff from Cornelia Street West.

The site is surrounded by the “swale wetland” to the north, east, and west. The wetland areas generally drain in a southerly direction towards the Rideau River. The compost site itself has no natural surface drainage or wetland features, however it does contain a stormwater management pond along the eastern side of the site. The compost site is separated from the surrounding wetland areas by a series of berms, as described in further sections.

The site is located within the jurisdiction of the Rideau Valley Conservation Authority (RVCA). Based on a review of RVCA online regulatory mapping, the site is not located within a floodplain. The site may be regulated based on its proximity to the swale wetland, however it is assumed that the existing berms provide adequate separation from the wetland.

DWG NAME: C:\USERS\KURTIS ROMAN\CHUK\DOCUMENTS\UP2G PROJECTS\LOCAL\25-5229A-LOCAL SMITHS FALLS COMPOST FACILITY\05 DRAWINGS\11 ONGOING\25-5229A SMITHS FALLS COMPOST FACILITY.DWG LAYOUT: FIG-1 SITE LOCATION SAVED ON 2025-07-07



 Jp2g PROJECT No.: 25-5229A	SMITHS FALLS COMPOST SITE TOWNSHIP OF DRUMMOND/NORTH ELMSLEY, ONTARIO	DESCRIPTION: SITE LOCATION	
		DRAFTED: K.R.	CLIENT No.:
	SITE LOCATION	DESIGNED: K.R.	DATE: 2025/07/02
		REVIEWED: S.A.	SHEET# FIG-1
		APPROVED: S.A.	

3 Hydrologic Analysis

The hydrologic analysis to determine the stormwater management runoff flows and pond performance was completed using the PCSWMM modelling platform.

3.1 Design Criteria

As per the MECP guidelines, composting facilities should be designed and operated with the objective of minimizing the production of leachate and preventing its release to the environment. In order to minimize the release of leachate from the site, the stormwater management facility will be assessed with respect to its ability to retain stormwater events up to the 100-year event on site without release to the environment.

The MECP guidelines also note that stormwater which does not come into contact with waste, compost, or leachate should be separately controlled. As described in further sections, site areas which are beyond the limits of the composting operations continue to flow as per the existing condition and are not directed towards the stormwater management pond.

3.2 Storm Events

For this analysis, three different 100-year storm event patterns were considered: a 6 hour SCS Type II storm event, 12 hour SCS Type II storm event, and 24 hour SCS Type II storm events. The SCS Type II storm events are typically appropriate for rural areas and due to the large volume tend to provide a conservative assessment of stormwater management pond performance.

The SCS Type II storm events were created using the PCSWMM Design Storm Creator tool based on the Intensity-Duration-Frequency (IDF) data shown in Table 1 below. IDF values were obtained for this area using the MTO Online IDF Curve Lookup Tool, and are shown in Table 1 below along with rainfall intensities and durations computed for various storm durations.

Table 1: IDF Values & Precipitation Volumes

Return Period:	2yr	5yr	10yr	25yr	50yr	100yr	Source
IDF Curve Value 'A'	20.3	27.0	31.4	37.0	41.1	45.2	MTO IDF Curve Lookup Tool
IDF Curve Value 'B'	-0.699	-0.699	-0.699	-0.699	-0.699	-0.699	MTO IDF Curve Lookup Tool
6 hr. Intensity (mm/hr.)	5.802	7.717	8.974	10.575	11.747	12.918	Calculated from IDF Curve for t = 6 hr.
6 hr. Rainfall Depth (mm)	34.811	46.301	53.846	63.449	70.480	77.511	Calculated from IDF Curve for t = 6 hr.
12 hr. Intensity (mm/hr.)	3.574	4.754	5.528	6.514	7.236	7.958	Calculated from IDF Curve for t = 12 hr.
12 hr. Rainfall Depth (mm)	42.887	57.042	66.338	78.169	86.831	95.493	Calculated from IDF Curve for t = 12 hr.
24 hr. Intensity (mm/hr.)	2.202	2.928	3.405	4.013	4.457	4.902	Calculated from IDF Curve for t = 24 hr.
24 hr. Rainfall Depth (mm)	52.837	70.276	81.728	96.304	106.976	117.647	Calculated from IDF Curve for t = 24 hr.

3.3 Drainage Area Analysis

The drainage area for the stormwater management pond was determined as described below.

3.3.1 Subcatchment Delineation

Subcatchment delineations were determined using the PCSWMM Watershed Delineation Tool (WDT) to analyze the Ontario Lidar-Derived Digital Terrain Model (DTM). The Ontario Lidar DTM is a provincial raster dataset collected by the MNRF, and available online through the Ontario GeoHub. The Ontario Lidar DTM is a compilation of various topographic Lidar data collections over multiple years, and includes Lidar for Eastern Ontario from 2021-22. The Ontario Lidar DTM has a 0.5m cell resolution, which is suitable for hydrologic modelling. The DTM has been processed to remove obstructions such as trees and vegetation, and is intended to represent the bare-earth ground surface, which is ideal for hydrologic modelling and establishing drainage direction.

The PCSWMM WDT uses a series of computations to establish watershed delineations based on the DSM including flow direction, flow accumulation, stream definition, and watershed delineation based on a target discretization level (i.e. target watershed size) input by the user. For this analysis, the PCSWMM WDT was executed using a target discretization of 0.1 ha, and resultant watersheds were then manually reviewed and combined into a single subcatchment for the stormwater pond.

The stormwater pond subcatchment is shown in Figure 2, with properties summarized in Table 2 below. Contours based on the Ontario Lidar DTM are also shown in Figure 2. As shown on the figure, the site drainage is controlled by a series of berms surrounding the composting area to ensure that any runoff which comes into contact with compost is directed towards the pond. Areas outside of the berms continue to flow as per the existing condition and have been ignored for the stormwater management pond analysis.

3.3.2 Flow Length & Slope

The flow path for the subcatchment was manually delineated based on the Ontario Lidar DTM surface contours, and measured using PCSWMM. The average slope along the flow path was determined based on the Ontario LiDAR DTM using PCSWMM tools. The flow length and slope are shown in Table 2 below.

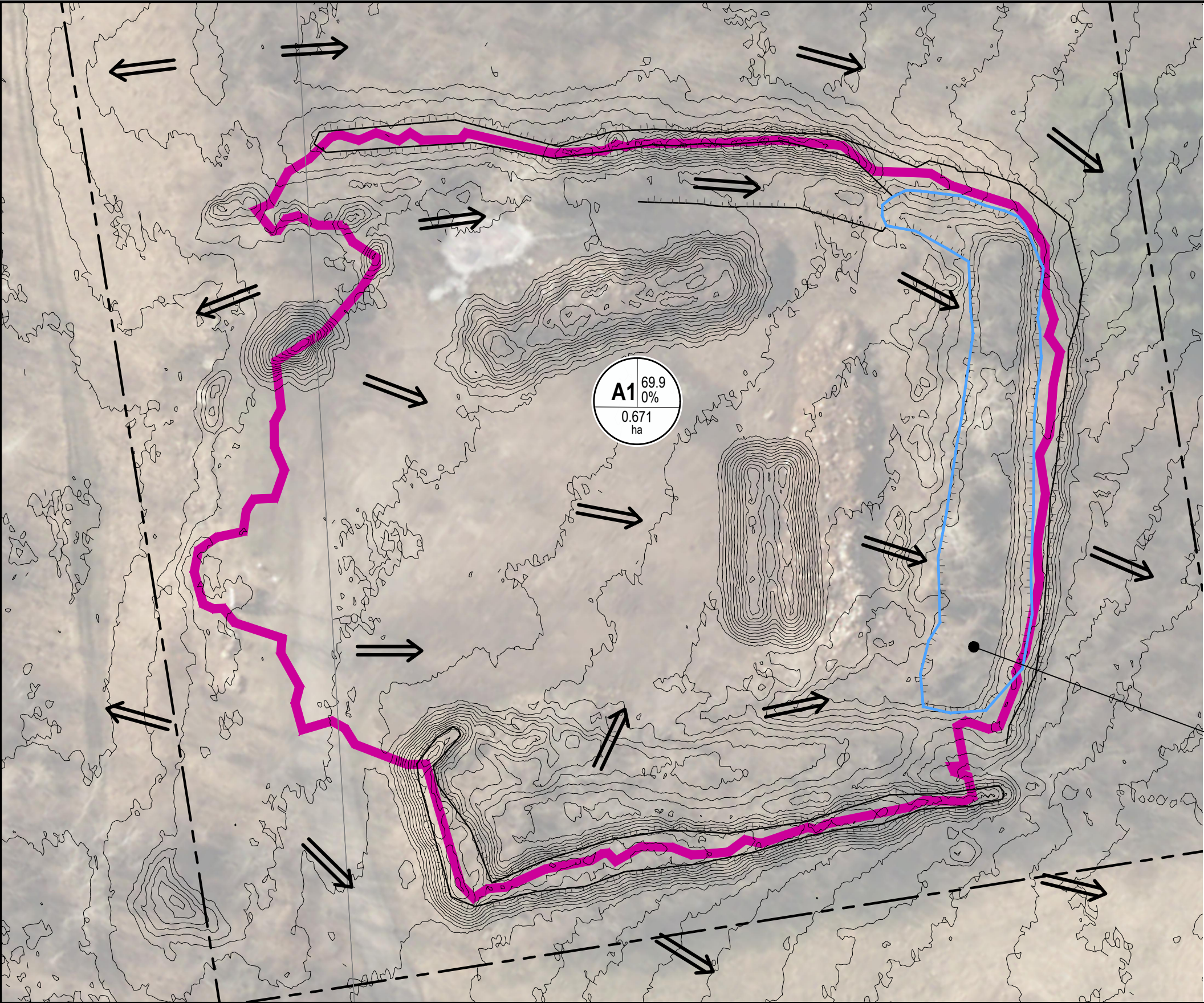
3.3.3 Curve Number (CN)

The subcatchment Curve Number (CN) was determined based on the land use and soil type. Based on the Ontario Ministry of Agriculture, Food, and Agribusiness (OMAFRA) online Agmaps, the site is located within an area of Tennyson sandy loam soil. The online Agmaps indicate that this soil region is hydrologic soil group “B”, which corresponds with sandy loam soil. CN for the subcatchment was determined using an area-weighted calculation of the various land cover types present in the subcatchment, based on the Ontario Ministry of Transportation (MTO) *Drainage Management Manual* (DMM) Design Chart 1.09. Refer to Appendix 1 for details of this calculation. The resulting CN is shown Table 2 below.

Table 2: Subcatchment Characteristics

AREA ID	AREA (ha)	CN	IMPERVIOUS %	SLOPE %	FLOW LENGTH (m)	Note
A1	0.671	69.9	0.0	2.33	86.2	Compost site drainage area to stormwater management pond.
TOTAL	0.671	69.9	0.0			

DWG NAME: C:\USERS\KURTIS ROMANCHUK\DOCUMENTS\JP2G PROJECTS\LOCAL\25-5229A-LOCAL SMITHS FALLS COMPOST FACILITY\05 DRAWINGS\10 ONGOING\25-5229A SMITHS FALLS COMPOST FACILITY.DWG LAYOUT: FIG-2 DRAINAGE AREAS SAVED ON 2025-07-07



LEGEND

DRAINAGE AREA BOUNDARY

STORMWATER MANAGEMENT POND

DRAINAGE FLOW DIRECTION

DRAINAGE AREA LABEL

REFERENCE NUMBER

CURVE NUMBER

PERCENT IMPERVIOUS

AREA

ID

CN

IMP%

AREA

ha

STORMWATER
MANAGEMENT
POND

				 Jp2g PROJECT No.: 25-5229A	PROJECT	SMITHS FALLS COMPOST SITE	CLIENT No.:		SCALE
					TOWNSHIP OF DRUMMOND/NORTH ELSLEY, ONTARIO	DRAFTED: K.R.			
					DRAWING	DESIGNED: K.R.	SHEET#		
No.	YYYY-MM-DD	BY	DESCRIPTION		DRAINAGE AREAS	REVIEWED: S.A.	FIG-2		
						APPROVED: S.A.			

3.4 Runoff Results

The modelled peak subcatchment runoff flows from PSCWMM for each storm event are shown in Table 3 below. Also shown in the table are the maximum ponding elevations and storage volumes for the stormwater management pond, which is described in more detail in sections below. As shown on the table, the pond is able to retain the 100-year event runoff from all modelled storm events without overtopping.

Table 3: Subcatchment Runoff Results

		100-Year Event		
		6 hr SCS II	12 hr SCS II	24 hr SCS II
Subcatchments	Area (ha)	Peak Runoff (m ³ /s)	Peak Runoff (m ³ /s)	Peak Runoff (m ³ /s)
A1	0.671	0.060	0.090	0.120
Total	0.671	0.060	0.090	0.120
Outfalls	Contributing Area (ha)	Peak Flow (m ³ /s)	Peak Flow (m ³ /s)	Peak Flow (m ³ /s)
Pond_Outfall	0.671	0.000	0.000	0.000
Total	0.671	0.000	0.000	0.000
Storage Elevations	Top Elevation (m)	Storage Elev. (m)	Storage Elev. (m)	Storage Elev. (m)
Pond	125.40	124.86	125.09	125.35
Storage Elevations	Maximum Volume (m ³)	Storage Vol. (m ³)	Storage Vol. (m ³)	Storage Vol. (m ³)
Pond	398	176	262	374

4 Stormwater Management Pond

4.1 Storage Volume

Storage volumes for the stormwater management pond have been computed based on contours generated from the topographic survey data, as shown on the attached Site Plan (drawing C1 in Appendix 2).

The stage-storage data is shown in Table 4 below at 0.05m intervals. Based on the survey the pond bottom is approximately elevation 123.75m, and has a total storage volume of 398m³ up to its overtopping elevation of 125.395m. At elevation 125.395m, there is a low point on the southeast side of the pond, which would cause flow to overtop the pond and flow overland in a southeasterly direction.

Table 4: Stage-Storage Data and 100-Year Event Modelling Results

Elevation (m)	Incremental Depth (m)	Total Depth (from Bottom) (m)	End Area Method			PCSWMM Results			
			Area (m ²)	Incremental Volume (m ³)	Total Volume (m ³)	100-year Storm Type	Peak Volume (m ³)	Ponding Elevation (m)	Outflow (m ³ /s)
123.75	0.00	0.00	0.4	0.0	0.0				
123.80	0.05	0.05	2.3	0.1	0.1				
123.85	0.05	0.10	5.3	0.2	0.3				
123.90	0.05	0.15	10.8	0.4	0.7				
123.95	0.05	0.20	20.6	0.8	1.4				
124.00	0.05	0.25	32.7	1.3	2.8				
124.05	0.05	0.30	47.1	2.0	4.8				
124.10	0.05	0.35	63.8	2.8	7.5				
124.15	0.05	0.40	82.7	3.7	11.2				
124.20	0.05	0.45	102.5	4.6	15.8				
124.25	0.05	0.50	131.7	5.9	21.7				
124.30	0.05	0.55	168.1	7.5	29.2				
124.35	0.05	0.60	209.6	9.4	38.6				
124.40	0.05	0.65	221.3	10.8	49.4				
124.45	0.05	0.70	233.5	11.4	60.8				
124.50	0.05	0.75	245.4	12.0	72.7				
124.55	0.05	0.80	257.4	12.6	85.3				
124.60	0.05	0.85	269.5	13.2	98.5				
124.65	0.05	0.90	281.7	13.8	112.3				
124.70	0.05	0.95	293.9	14.4	126.6				
124.75	0.05	1.00	306.2	15.0	141.6				
124.80	0.05	1.05	318.7	15.6	157.3				
124.85	0.05	1.10	331.2	16.2	173.5	6 hr SCS II	176	124.86	0.000
124.90	0.05	1.15	343.9	16.9	190.4				
124.95	0.05	1.20	356.6	17.5	207.9				
125.00	0.05	1.25	369.4	18.1	226.1				
125.05	0.05	1.30	382.2	18.8	244.8				
125.10	0.05	1.35	395.2	19.4	264.3	12 hr SCS II	262	125.09	0.000
125.15	0.05	1.40	408.2	20.1	284.4				
125.20	0.05	1.45	421.3	20.7	305.1				
125.25	0.05	1.50	434.6	21.4	326.5				
125.30	0.05	1.55	499.2	23.3	349.8				
125.35	0.05	1.60	540.3	26.0	375.8	24 hr SCS II	374	125.35	0.000
125.40	0.05	1.65	580.8	28.0	403.9	Top of Pond	398	125.395	0.000
125.45	0.05	1.70	622.5	30.1	433.9				
125.50	0.05	1.75	670.0	32.3	466.3				
125.52	0.02	1.77	690.1	13.6	479.9				

4.2 Outlet

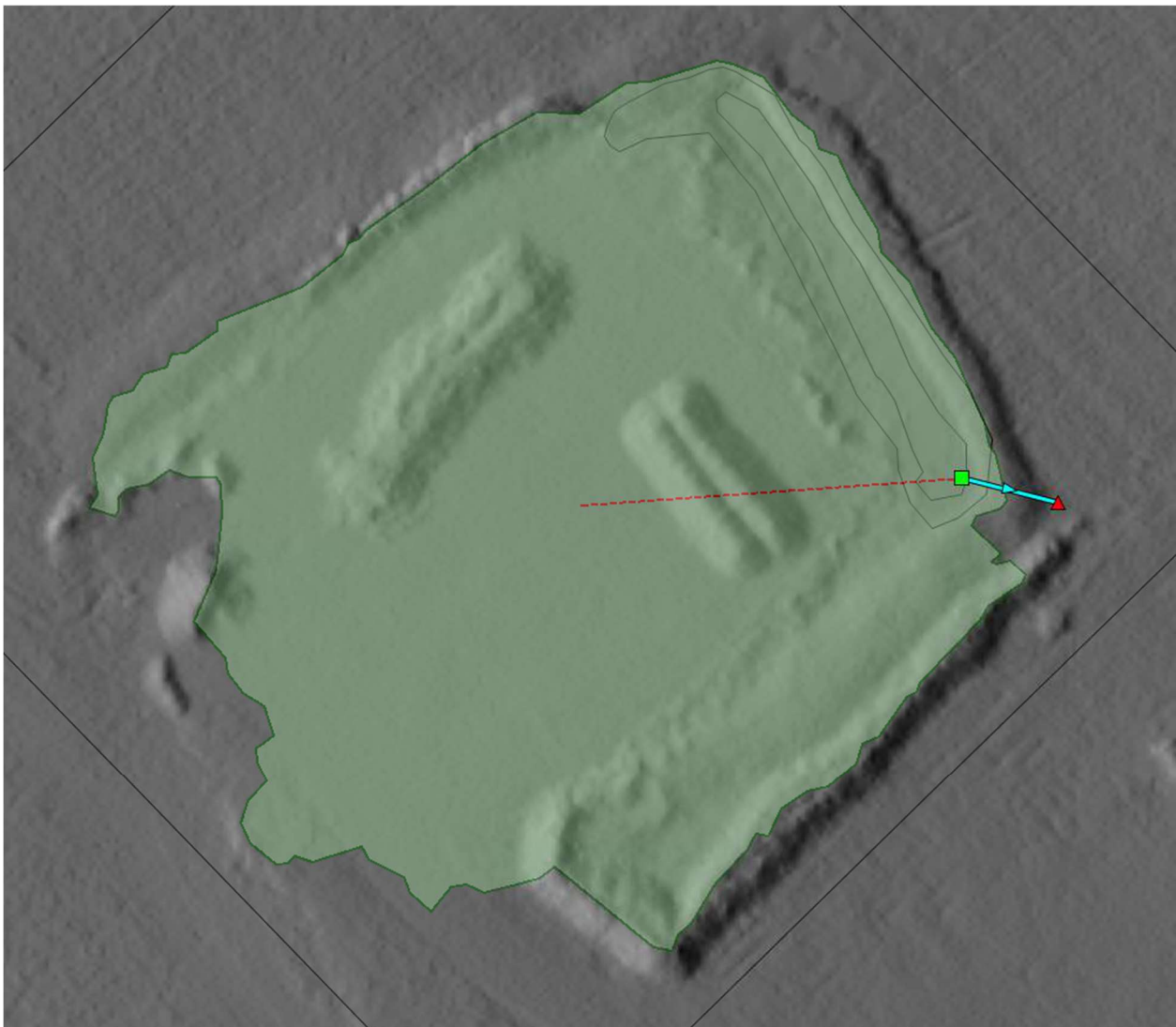
As described above, the pond overtops towards the southeast at elevation 125.395m, based on the low point of the topographic survey surrounding the pond. Based on the survey data, the outlet was modelled in PCSWMM as a V-shaped weir with a height of 0.13m (above elevation 125.52m the pond may additionally overtop to the south) and a length of 4.3m based on the survey data. If the modelled ponding elevation were to exceed 125.52m, additional outlets would have to be added to the pond in PCSWMM, but this was not the case.

4.3 Modelling Results

As shown by the outflow modelling results displayed in Table 4 above, there was no outflow from the pond in PCSWMM for any modelled 100-year storm event, as the pond has sufficient volume to contain the 100-year events without overtopping.

A screenshot of the PCSWMM model schematic is shown in Figure 3 below. The Ontario Lidar DTM is displayed as background imagery for the model, which shows the berms surrounding the site.

Figure 3: PCSWMM Model Schematic



5 Impact on Water Quality

5.1 Surface Water

As the stormwater pond on site is sufficient to contain surface runoff up to the 100-year storm event, the site is not expected to have any impact on surrounding surface water quality. Any runoff which has come into contact with the compost will be retained on site in the stormwater management pond.

5.2 Groundwater

A groundwater monitoring well was established near the outlet of the stormwater management pond through the *Hydrogeological Assessment* completed by RLC-HydroG, report dated July 7, 2025 (MW7 in that report). The location of the monitoring well is shown on the attached Site Plan.

Based on the *Hydrogeological Assessment*, the groundwater quality at the monitoring well near the pond outlet is no worse, and in some cases better, than that at monitoring wells completed elsewhere in the surrounding area. Based on the *Hydrogeological Assessment* results it does not appear that the compost site is having a negative effect on groundwater quality.

6 Recommendations

Based on the analysis and results described above, the site does not appear to have had negative impacts on surface or groundwater quality in the area. It is therefore recommended that the Smiths Falls Compost Site continue its operations as it has previously done since the establishment of the site.

To ensure that the site does not have negative impacts on surface or groundwater quality in the future, it is further recommended that maintenance and monitoring of the site be completed as described below.

6.1 Compliance Approvals

6.1.1 Environmental Protection Act

The *Environmental Protection Act, R.S.O. 1990, c. E.19* (EPA) is intended to provide for the protection and conservation of the natural environment. Section 27(1) of the EPA states that:

27(1) No person shall use, operate, establish, alter, enlarge or extend a waste management system or a waste disposal site except under and in accordance with an environmental compliance approval.

Further, Section 41 of the EPA states that:

41 No person shall use, or cause, permit or arrange for the use of, any facilities or equipment for the storage, handling, treatment, collection, transportation, processing or disposal of waste that is not part of a waste management system for which an environmental compliance approval or renewable energy approval has been issued or a registration under Part II.2 is in effect and except in accordance with the terms and conditions of the approval or the regulations made for the purposes of Part II.2.

In this case, “waste” is defined in the EPA as: ashes, garbage, refuse, domestic waste, industrial waste, or municipal refuse and such other materials as are designated in the regulations. The recycling and composting of municipal waste is further regulated by *Ontario Regulation 101/94* of the EPA (O.Reg. 101/94). In addition to listing several requirements for the operation of leaf and yard waste composting sites in Section 31, Section 34 of O.Reg. 101/94 states that:

34. A leaf and yard waste composting site is exempt from sections 9, 27, 40 and 41 of the Act if all buildings and processing or storage areas that are part of the site are at least 100 metres



from the boundaries of the parcel of land upon which the buildings and processing or storage areas are located and from any lake, river, pond, stream, reservoir, spring or well.

Despite the nearby wetland areas, the compost processing area of the site does not appear to be within 100m of any defined lake, river, pond, stream, reservoir, spring, or well. However, the compost processing area is within 100m of the property line of the site, therefore the exemption under Section 34 of O.Reg. 101/94 may not apply. Therefore an ECA may be required under the EPA for the compost site.

6.1.2 Ontario Water Resources Act

The *Ontario Water Resources Act, R.S.O. 1990, c. O.40* (OWRA) is intended to provide for the conservation, protection and management of Ontario's waters and for their efficient and sustainable use, in order to promote Ontario's long-term environmental, social, and economic well-being. Section 53(1) of the OWRA states that:

53(1) Subject to section 47.3 of the Environmental Protection Act, no person shall use, operate, establish, alter, extend or replace new or existing sewage works except under and in accordance with an environmental compliance approval.

In this case, "sewage" is defined in the OWRA as: drainage, storm water, commercial wastes and industrial wastes and such other matter or substance as is specified by the regulations. Therefore, stormwater runoff and leachate from the compost site meets the definition of sewage under the OWRA, and an Environmental Compliance Approval (ECA) may be required. However, Section 53(6)(a) of the OWRA states that:

53(6) This section does not apply,

(a) to a sewage works from which sewage is not to drain or be discharged directly or indirectly into a ditch, drain or storm sewer or a well, lake, river, pond, spring, stream, reservoir or other water or watercourse;

As the stormwater pond is not designed to discharge to any surface water, and has sufficient volume to store the 100 year event runoff from the compost site, it is our understanding that the site is therefore exempt from Section 53 of the OWRA.

7 Maintenance and Monitoring Plan

7.1 Stormwater Management Pond Maintenance

The following maintenance operations activities for the stormwater management pond are suggested:

- Inspections
- Weed Control
- Sediment Removal
- Pollution Removal

These activities are discussed below. It is recommended to maintain a log of inspections and maintenance activities, which can help establish maintenance requirements.

7.1.1 Spring Inspection

7.1.1.1 Trash & Debris Removal

Once the danger of ice accumulation has passed, the stormwater management pond should be inspected each spring, and any trash or debris which has accumulated over the winter removed at that time.



7.1.1.2 Sediment Accumulation

During the spring inspection, the level of sediment accumulation in the pond should also be reviewed. In order to ensure that the pond functions as intended, it is important to maintain the available storage volume in the pond. If sediment accumulation is observed at a depth greater than 0.20m (approximately 8 inches), sediment removal is recommended.

As there is wild parsnip present on site, to avoid injury it is recommended to perform the sediment inspection in the spring before the wild parsnip has had time to grow. Information regarding risks and protection from wild parsnip should be obtained from relevant sources prior to inspecting the pond.

7.1.1.3 Sediment Removal

When sediment removal is deemed necessary, a backhoe and hand tools should be used. The equipment should be able to reach all sediment-covered areas. Care should be taken to minimize the impact on the existing vegetation surrounding the stormwater management pond. Any damage to the stormwater management pond berm or vegetation should be remediated as soon as possible.

7.1.2 Inspections following Large Storm Events

The stormwater management pond should be inspected following major storm events to ensure that it continues to function as intended. It is recommended that the inspections include observations of the elements described below.

7.1.2.1 Water Levels

As the stormwater management pond is intended to store the 100-year event with no runoff, water levels in the pond should be inspected following major storm events to ensure the pond is not at risk of overtopping. The water level in the pond should be checked against the low point at the southeastern end.

If water levels are reaching the top of the pond and additional rainfall is expected, pumping and proper disposal should be considered to remove effluent from the pond so it does not flow into the adjacent wetland.

7.1.2.2 Vegetation & Weed Control

Vegetation surrounding the stormwater management pond should be maintained in order to provide bank stability and nutrient uptake. However, excess vegetation that interferes with inspection of the pond and water levels is considered a nuisance and should be removed as necessary.

Particular attention should be paid to invasive plant species such as wild parsnip which post a hazard to both human health and the environment.

Pesticide and herbicide use are not recommended in the vicinity of the pond to avoid potential water quality problems.

7.1.3 Groundwater Monitoring

Periodic sampling should be conducted on a yearly basis from the newly established groundwater monitoring well near the pond outlet. The monitoring schedule should endeavor to sample at approximately the same time each year in order to provide comparable results over multiple years. Groundwater quality parameters should be recorded and compared to the baseline that has been established through the *Hydrogeological Assessment*.

End of report.



Appendix 1

Hydrologic Analysis

TABLE A-4: SUBCATCHMENT CALCULATIONS

					Land Cover - Area Weighted CN Calculation													
Name	Area (ha)	Impervious Area (m ²) (ha)		Impervious % (%)	Land Cover:	Gravel	Wooded	Grassed	Water	Total Pervious Area (ha)	Area-Weighted CN	Slope (%)	Flow Length (m)	Runoff Coeff. C	Time of Concentration (T _c)			
					CN:	85.00	58.00	65.00	50.00						Bransby-Williams (C > 0.4)		Airport (C < 0.4)	
					Area:	(m ²)	(m ²)	(m ²)	(m ²)						min.	hr.	min.	hr.
A1	0.671	0	0.000	0.0		2756	2765	986	206	0.671	69.9	2.332	86.201	0.35	4.3	0.0719	17.2	0.2861
TOTAL	0.671	0	0.000	0.0		2756	2765	986	206	0.671	69.9							



Appendix 2

Site Plan

