TOWN OF CALEDON
PLANNING
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October 29, 2026

Technical Memorandum

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To:	Mauro Peverini and Derrick Canete, United Holdings Inc.
From:	Bethany Gruber and Natalie Dunn, GEI Consultants Canada Ltd.
cc:	Agenta Szabo and Noel Boucher, GEI Consultants Canada Ltd.
Date:	October 23, 2026
Re:	Wetland Feature-Based Water Balance Assessment – Submission 1 Mount Hope West Caledon, Ontario
Project No.	2407713

1. Water Availability Assessment

GEI Consultants Canada Ltd. (GEI) has prepared this memorandum on behalf of United Holdings Inc. to complete a water availability assessment for the Mount Hope West Secondary Plan Area lands located in the Town of Caledon, Ontario. The lands owned by United Holdings Inc. are located north of Columbia Way and west of Mount Hope Road (hereafter referred to as the "Land Holdings"), as shown in **Appendix A**. The eastern portion of the Land Holdings is located within the Secondary Plan Area, and the western portion is located within the Greenbelt Plan Area (MMA 2017a).

GEI previously completed a Wetland Water Balance Risk Evaluation (WWBRE) as part of the Local Subwatershed Study (LSS; Schaeffers et al. 2026) for the proposed development to identify wetlands that may be affected by the proposed development, assess the magnitude of potential hydrological change, evaluate wetland sensitivity to hydrological change, and characterize the associated risk to wetland hydrological integrity **(Appendix B)**.

Following the WWBRE, a feature-based water balance (FBWB) analysis was also completed by Schaeffers using the TRCA Water Balance Tool and Thornthwaite methodology, provided in Functional Servicing and Stormwater Management Report (FSSR) in Appendix A.5.2 of the LSS (Schaeffers et al. 2026). This analysis found that the proposed stormwater management (SWM) strategy is sufficient to maintain the hydrological function of the retained wetlands, with no additional mitigation measures required.

However, the WWBRE and the FSSR's FBWB did not assess the water supply to the proposed compensation wetland area. Thus, a water availability assessment is needed to determine the quantity of water available to the compensation wetland under post-development conditions, and whether the available water will support the target wetland communities. The proposed compensation wetland area is hydrologically and spatially connected to the retained MAS2-1/MAM2-2 wetland within the W7 catchment area **(Appendix B)**. Therefore, this water availability assessment carries forward the catchment mapping and mitigation measures identified in the WWBRE and the FSSR's FBWB.

Using available wetland mapping, drainage plans, and wetland restoration design drawings prepared by GEI, a FBWB assessment has been completed using the Thornthwaite and Mather method under post-development conditions for the combined proposed compensation MAM/MAS wetland and the retained MAS2-1/MAM2-2 wetland within the W7 catchment area. The retained wetland footprint under proposed conditions was measured in AutoCAD from GEI's Ecological Land Classification (ELC) from the LSS (Schaeffers et al. 2026). The proposed wetland footprint was measured in AutoCAD from GEI's restoration drawings (GEI 2026), and the proposed vegetation cover and topography were also obtained from the restoration drawings. Contributing drainage areas under proposed conditions were obtained from Figure 5.6 of Schaeffers' FSSR (Schaeffers et al. 2026); flow from the WT4, WT5, WT6 and WT7 catchment areas are expected to feed the compensation wetland (and attached retained wetland) under proposed conditions. Soil conditions are expected to remain consistent with existing conditions and have been characterized using information from the hydrogeological assessment by Soil Engineers Ltd., provided in Appendix A.4.1 of the LSS (Schaeffers et al. 2026).

Precipitation and temperature data were obtained from the nearest Environment and Climate Change Canada (ECCC) climate station. The results are used to calculate the post-development water balance for the combined proposed compensation wetland and attached retained wetland within catchment W7 and to assess whether the required hydroperiod can be achieved under proposed conditions. Infiltration and runoff have been calculated and presented as monthly and annual outputs. The post-development FBWB results for W7 have been compared to the typical hydroperiod requirements of the target wetland vegetation communities to assess whether the wetland can be supported under proposed conditions. The detailed results of the FBWB are documented in the following sections.

1.1. Water Balance Components

A water balance is an accounting of the water resources within a given area. A water balance analysis is conducted to assess the post-development (proposed) conditions with respect to infiltration and runoff conditions for the proposed compensation wetland and attached retained wetland. The water balance equates the precipitation (P) over a given area to the summation of the change in groundwater storage (S), evapotranspiration / evaporation (ET), surface water runoff (R) and infiltration (I) using the following equation from Thornthwaite and Mather (1957):

$$P = S + I + ET + R$$

The components of the water balance vary in space and time and depend on climatic conditions as well as the soil and land cover conditions (i.e., rainfall intensity, land slope, soil hydraulic conductivity and vegetation). For example, runoff occurs at a higher percentage during periods of snowmelt when the ground is frozen or during intense rainfall events.

Precise measurement of the water balance components is difficult, as such, approximations and simplifications are made to characterize the water balance of a feature. Field observations of the land cover, soil types, groundwater levels and local climatic records can be important input to the water balance calculations. The following water balance components were calculated based on the Thornthwaite and Mather monthly water balance model.

Precipitation (P): For the purposes of approximating the monthly and annual precipitation value (807 mm/yr) for the feature catchment area, the monthly rainfall data published in the Toronto Pearson (Airport) 1991-2020 Climate Normals was used. The weather station is located approximately 27 km from the site.

Storage (S): Although there are groundwater storage gains and losses on a short-term basis, the net change in groundwater storage on a long-term basis is assumed to be zero. This assumption must be used in the water balance calculations in order to calculate the conditions needed to maintain the groundwater storage long-term (i.e., no loss of groundwater on site).

Evapotranspiration/Evaporation (PET): The evapotranspiration and evaporation components vary based on the characteristics of the land surface cover (i.e., type of vegetation, soil moisture conditions, perviousness of surfaces, etc.). Potential evapotranspiration refers to the water loss from a vegetated surface to the atmosphere under conditions of an unlimited water supply. For the purposes of this assessment, adjusted monthly PET was estimated based on the Thornthwaite and Mather (1957) formula, using information from the Toronto Pearson (Airport) climate station. The unadjusted PET was then adjusted using factor of U to account for variation in daylight hours and solar radiation based on the site latitude.

Water Surplus (R+ I): The difference between the mean precipitation and evapotranspiration is referred to as the water surplus. The water surplus is divided into two parts: surface or overland runoff (R) and infiltration into the surficial soil (I). The infiltration and runoff conditions depend on a number of factors including soil types, vegetation cover and slope of the site. To estimate the infiltration, and infiltration factor was estimated based on the Ontario Stormwater Management Planning and Design Manual (March 2003). According to this Manual, a series of infiltration factors can be applied to a site, based on its slope, soil type and vegetation coverage. The cumulative value of these factors is termed the infiltration factor, with the values ranging from 0 to 1. The difference between the value 1 and the infiltration factor is referred to as the runoff factor.

1.2. Approach and Methodology

The analytical approach used to calculate the water balance involves monthly soil-moisture balance calculations to determine and compare pre- and post-development infiltration and runoff volumes. The detailed water balance calculations are provided in **Appendix C**, which are summarized in this and subsequent sections of the report. The following assumptions were used as part of the soil-moisture balance calculations.

- A soil moisture balance approach assumes that soil does not release water as potential recharge while a soil moisture deficit exists;
- During wetter periods, any excess of precipitation over evapotranspiration first goes to restore soil moisture. Considering the nature of the current near surface soils and vegetation cover, varying soil moisture storage capacities were assumed for the post-development (proposed) scenario based on specific land surface characteristics. The factors which determine the water holding capacity are given in **Table 1** (below); and
- Once the soil moisture deficit is overcome, any further excess water can then pass through the soil as infiltration and either become interflow (indirect runoff) or recharge (deep infiltration).

Table 1. Determination of Water Holding Capacity

	Urban Lawns/Shallow Rooted Crops	Moderately Rooted Crops	Pasture and Shrubs	Mature Forests	Hydrologic Soil Group
Fine Sand	50	75	100	250	A
Fine Sandy Loam	75	150	150	300	B
Silt Loam	125	200	250	400	C
Clay Loam	100	200	250	400	CD
Clay	75	150	200	350	D

The Ministry of Environment, Conservation and Parks (MECP) SWM Planning and Design Manual (2003) methodology for calculating total infiltration based on topography, soil type, and land cover was used, and a corresponding infiltration factor was calculated for post-development (proposed) conditions. Land surface conditions and corresponding infiltration factors are given in **Table 2** (below). The water surplus was multiplied by the infiltration factor to determine annual runoff and infiltration volumes for the wetland under post-development conditions.

Table 2. Infiltration Factors

Topography	
Condition	**Infiltration Factor**
Flat Land - Average Slope Less Than 0.6 m/km	0.3
Gently Rolling Land - Average Slope 0.6 to 2.8 m/km	0.25
Rolling Land - Average Slope 2.8 to 3.8 m/km	0.2
Steeply Rolling Land - Average Slope 3.8 m/km to 28 m/km	0.15
Hilly Land - Average Slope 28 to 47 m/km	0.1
Soils	
Condition	**Infiltration Factor**
Tight Impervious Clay	0.1
Tills	0.15
Medium Combinations of Clay and Loam	0.2
Silty Sand	0.3
Open Sandy Loam	0.4
Vegetation	
Condition	**Infiltration Factor**
Cultivated Land/AGR/ANTH/CGL	0.1
Wetland/Meadow/MAS/MEM/CUM	0.15
Woodland/FOM/FOD/FOC/SWM/SWD/CUT	0.2

Notes:
1. Adapted from MECP (2003)

The post-development water balance scenario was based on the ELC mapping (Schaeffers et al., 2026), restoration drawings (GEI 2026), and Figure 5.6 of Schaeffers' FSSR (Schaeffers et al., 2026).

Under the proposed conditions, the proposed compensation and retained wetlands are located within drainage area W7 which also receives drainage from WT4, WT5, and WT6. WT7 will be additionally fed by a Clean Water Collector system which will capture 0.73 ha of roof area and rear-yards and will deliver water to W7 at a rate of up to 1,560 m^3 per month (pers. Comm., October 2026). The exact monthly runoff is given in **Appendix C**. The catchment characterization for the wetland is provided in **Table 3** (below).

Table 3. Proposed Wetland Catchment Characterization

Post-Development (Proposed) Conditions					
Drainage Area	**Land Cover**	**Area (ha)**	**% Impervious**	**Water Holding Capacity (mm)**	**Infiltration Factor**
WT-7	Proposed MAS/MAM Wetland	0.54	0	250	0.55
	Retained MAS2-1/MAM2-2 Wetland in Compensation Area	0.35	0	250	0.55
	Meadow (Restored from Agriculture)	13.29	0	250	0.55
	Clean Water Collector Drainage to WT-7	0.73	-	100	0.50
WT-4	MAS2-1	0.09	0	250	0.55
	Meadow (Restored from Agriculture)	1.98	0	250	0.55
WT-5	Pond	0.19	100	250	0.55
	Meadow (Restored from Agriculture)	2.09	0	250	0.55
WT-6	Shallow Aquatic	0.04	100	250	0.55
	MAS2-1/MAM2-2	0.12	0	250	0.55
	Meadow (Restored from Agriculture)	0.50	0	250	0.55

It is noted that the infiltration and runoff values presented in **Appendix C** are estimates only. Single values are used for water balance calculations; however, infiltration rates are dependent upon the hydraulic conductivity of the surficial soils, which may vary over several orders of magnitude. As such, the margins of error for the calculated infiltration and runoff component values are potentially quite large. These margins of error are recognized, but for the purposes of this assessment, the values used in the water balance calculations are considered reasonable estimates based on the site-specific conditions and useful for comparing pre- to post-development conditions.

1.3. Results

The detailed FBWB calculations are included in **Appendix C**. The annual post-development calculations for the proposed wetland and attached retained wetland are summarized in **Table 4** (below).

Table 4. Feature-Based Post-Development Water Balance Results

Condition	Permeable Areas (m^2)	Impermeable Areas (m^2)	Average Annual Infiltration Volume (m^3/year)	Average Annual Runoff Volume (m^3/year)
Post-Development (Proposed)	189,628	2,272	23,207	23,916

To estimate the potential depth of water in each wetland, the monthly runoff volume was divided by the surface area of each wetland. It is noted that this method is a coarse estimate and does not account for the distribution of rain events over the month or micro-topography. However, it is considered a useful estimate of the potential maximum water level that could occur within the wetland. The monthly estimates are detailed in **Appendix C**, and the maximum and minimum results are summarized in **Table 5** below.

Table 5. Potential Water Depth Range

Condition	Monthly Runoff (m^3)	Surface Area (m^2)	Potential Water Depth (m)
Maximum monthly runoff: April	10,433	8,910	1.17
Minimum monthly runoff: February	5	8,910	0.00

The maximum monthly runoff to the combined proposed and retained wetland is expected to occur in April, when 10,433 m^3 of runoff is expected; the minimum monthly runoff is expected to occur in February, when 5 m^3 of runoff is expected. Dividing by the proposed surface area of the combined retained and proposed wetland, a potential maximum water depth of 1.17 m is expected in May, and a potential minimum water depth of 0.00 m is expected in March. Note that a maximum water depth will be controlled by the wetland outflow point, and the maximum depth of 1.17 m will likely not be reached in reality. The proposed and retained wetlands contain meadow marsh and shallow marsh communities (MAM/MAS; GEI 2026c). The seasonal water level requirements for each community are compared to the seasonal water level ranges predicted by the water balance assessment below in **Table 6**.

Table 6. Hydroperiod Requirements

Wetland ID	Community	Time Period	Target Hydroperiod	Predicted Average Water Level
Proposed / Retained Wetland	Meadow Marsh (MAM)	Spring (late February to April 30)	0 to 30 cm water depth	0 to 117 cm
		Summer (May to August)	May go dry much of summer or periodically rewet (0 to 30 cm water depth)	7 to 34 cm

Wetland ID	Community	Time Period	Target Hydroperiod	Predicted Average Water Level
		Fall (September to November)	5 to 30 cm water depth	5 to 7 cm
		Winter (December to early February)	Frozen condition	0 cm
	Shallow Marsh (MAS)	Spring (late February to April 30)	30 to 55 cm water depth with peak events drying back down to 45 cm (or less) within 1.5 months	0 to 117 cm
		Summer (May to August)	30 to 55 cm water depth with peak events drying back down to 45 cm (or less) within 1.5 months; may have brief dry-down (several weeks to month)	7 to 34 cm
		Fall (September to November)	30 to 55 cm water depth with peak events drying back down to 45 cm (or less) within 1.5 months	5 to 7 cm
		Winter (December to Early February)	Frozen condition	0 cm

Within the proposed/retained wetland, it is expected that the lowest elevation areas will be consistently wet with water levels higher than the predicted average, while the higher elevation areas would have water levels equal to or lower than the predicted average and less consistent wet or standing water conditions. Within **Table 6** above, it is noted that the predicted average water levels during summer and fall are generally lower than the target hydroperiods for the shallow marsh community. However, it is expected that the shallow marsh community will be located within the lowest elevations and thus water levels are expected to be higher than the predicted average with more consistent standing water conditions supported by the water table in these communities. Thus, the range of 0 to 117 cm average water depth is expected to be sufficient to support the target wetland communities.

2. Standard Limitations and Disclaimer

This report was prepared exclusively for the use of United Holdings Inc. The findings and conclusions, if any provided by GEI in this report, are based solely on the information reported to GEI as of the date of this report. Future investigations or additional information not provided to GEI at the time of this report may result in modification of this report. GEI's scope of work did not include verifying the completeness or accuracy of information provided by others. Accordingly, GEI shall not be liable for any damages, costs, or other consequences resulting from reliance on such information if it is later determined to be inaccurate or incomplete. GEI's professional services for this project have been performed in a manner consistent with that degree of skill and care ordinarily exercised by members of the same profession currently practicing in the same locality, performing similar services under similar conditions. GEI makes no other representations and no warranties, express or implied.

If you have any questions, please feel free to contact the undersigned.

Sincerely,

GEI CONSULTANTS CANADA LTD.



Bethany Gruber, B.Sc., P.Geo.
Restoration Hydrogeologist



Natalie Dunn, B.Sc.
Senior Ecologist, Restoration Ecologist

Appendices

Appendix A Figures
Appendix B Drainage Plan
Appendix C Feature-Based Water Balance

BG/ND,AS:tw

References

GEI Consultants Canada Ltd. (GEI) (2026b). Conceptual Restoration Design. Drawing Sheets R1-R8. Mount Hope West, Caledon, Ontario.

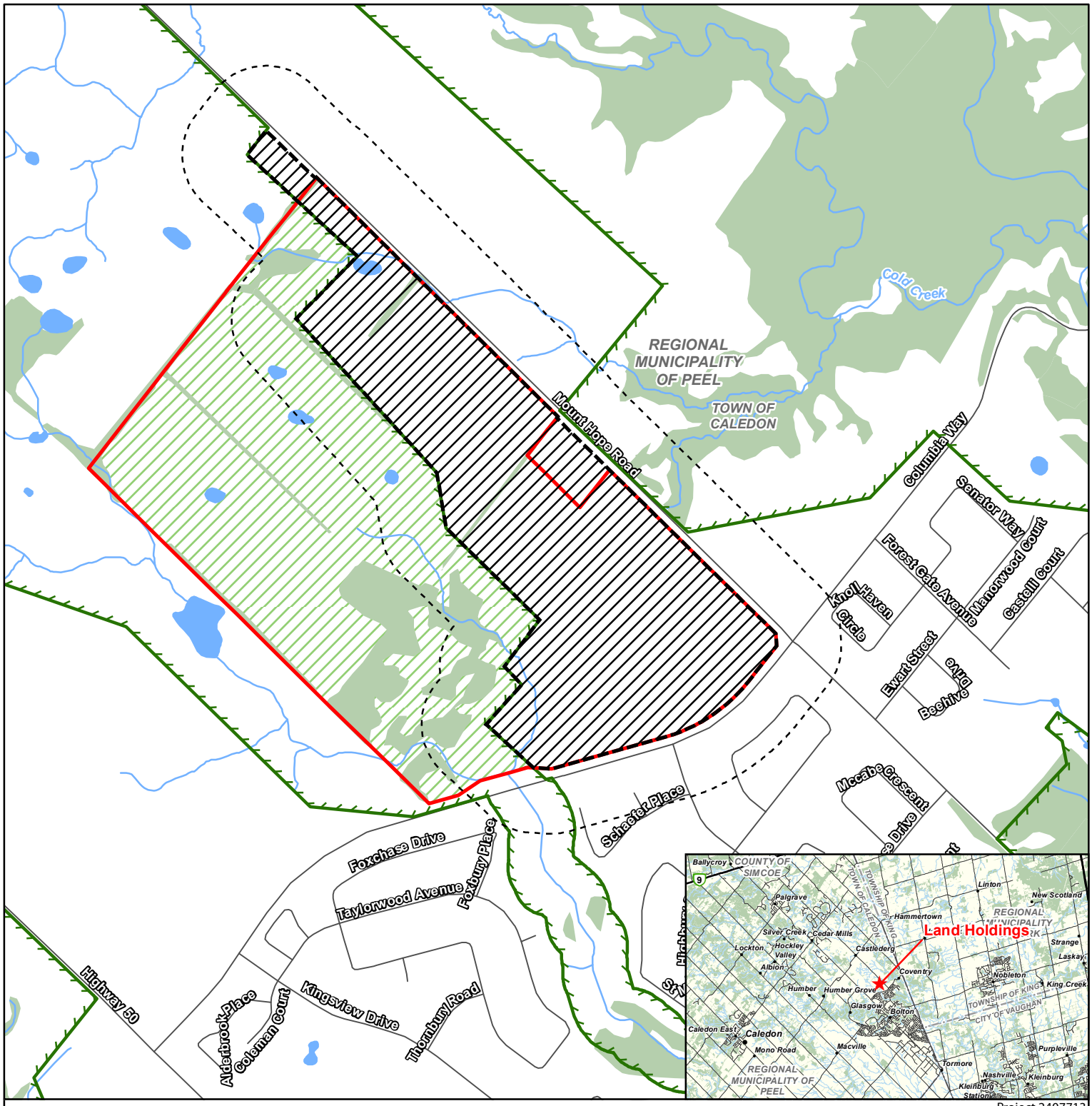
GEI Consultants Canada Ltd. (GEI) (2026c). Restoration Design Brief - Submission 1. Mount Hope West, Caledon, Ontario.

Ministry of Environment, Conservation and Parks (2003). “Stormwater Management Planning and Design Manual, 2003”. Available online: https://www.ontario.ca/document/stormwater-management-planning-and-design-manual-0

Schaeffers & Associates Ltd., GEI Consultants Canada Ltd., GEO Morphix Ltd., Pratus Group Inc., SGL Planning & Design Inc., Soil Engineers Ltd. 2026. Local Subwatershed Study Report. Mount Hope West Residential Subdivision United Holdings Inc., Town of Caledon.

Thornthwaite, C.W. and J.R. Mather (1957). “Instructions and Tables for Computing Potential Evapotranspiration and the Water Balance”. Drexel Institute of Technology Laboratory of Climatology. Publications in Climatology, Volume X, Number 3.

Appendix A Figures



NOTES:
1. Coordinate System: NAD 1983 UTM Zone 17N.
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © King's Printer for Ontario, 2026.

Legend

- Land Holdings
- Secondary Plan Area
- Secondary Plan Area + 120 m
- Greenbelt Plan Boundary
- Greenbelt Plan Area within Land Holdings
- Watercourse (LIO)
- Waterbody (LIO)
- Wooded Area (LIO)
- Road

Project 2407713

Local Subwatershed Study: Phase 1
Mount Hope West Lands
United Holdings Inc.

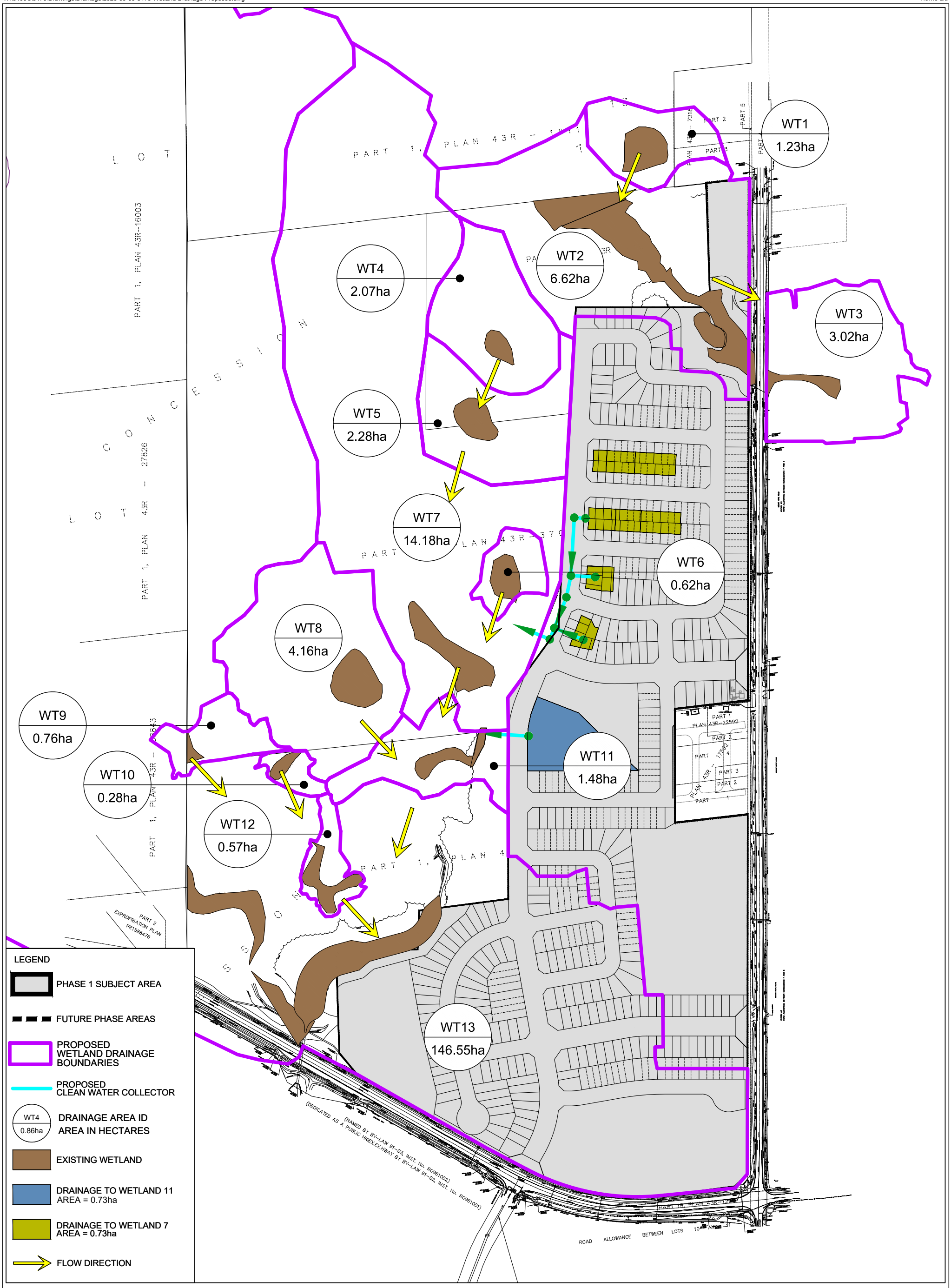
Figure 1
Location of Land Holdings

0 200 m
1:10,000

N

GEI Consultants

Appendix B Drainage Plan



RESIDENTIAL SUBDIVISION
UNITED HOLDINGS INC. C/O SOLMAR DEVELOPMENT CORP.

SCHAEFFERS
CONSULTING ENGINEERS
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LEGEND

(AS SHOWN ABOVE)

FIGURE 5.6
POST-DEVELOPMENT
DRAINAGE TO WETLANDS

2024-5476	SEPTEMBER 2026	SCALE: N.T.S.

Appendix C Feature-Based Water Balance

Project Information	
Project Number:	2407713
Project Name:	Mount Hope West Lands Bolton
Project Location:	Ontario
Type of Water Balance:	FBWB Post-Development Water Balance with Mitigation
Wetland ID:	Compensation Wetland
Wetland Type:	MAM, MAS
Wetland Area (m^2):	8910.52
Preparer Initials:	BG
Reviewer Intials:	0
Date:	Oct-26
Latitude:	43 ° 54 ' 0.2 "
Longitude:	79 ° 44 ' 55.6 ''
Closest Climate Station:	TORONTO PEARSON (AIRPORT) 6158731/6158733 1991-2020

MONTHLY AND YEARLY WATER BALANCE COMPONENTS

		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
Potential Evapotranspiration Calculation	Average Temperature: T (°C)	-5.0	-4.4	0.6	7.0	13.7	19.2	22.1	21.1	16.9	10.0	4.1	-1.6	8.6
	Heat Index: $i=(T/5)^{1.514}$	0.00	0.00	0.04	1.66	4.60	7.67	9.49	8.85	6.32	2.86	0.74	0.00	42.2
	Unadjusted Daily Potential Evapotranspiration: U (mm)	0.0	0.0	1.7	28.8	62.8	93.0	109.6	103.8	80.2	43.6	15.5	0.0	539.0
	Adjusting Factor for U (Latitude 44 degrees N)	0.81	0.81	1.02	1.13	1.27	1.28	1.30	1.20	1.04	0.94	0.80	0.76	-
	Adjusted Potential Evapotranspiration: PET (mm)	0.0	0.0	1.7	32.5	79.8	119.1	142.4	124.6	83.4	41.0	12.4	0.0	636.9
	Precipitation: P (mm)	61.6	50.2	50.5	76.7	77.6	80.7	74	68.5	69.4	67.2	71.8	58.6	806.8
	Potential Surplus: P - PET (mm)	61.6	50.2	48.8	44.2	-2.2	-38.4	-68.4	-56.1	-14.0	26.2	59.4	58.6	169.9
	Accumulated Potential Water Loss (mm)					-2.2	-40.6	-109.1	-165.1	-179.2				-
Pervious Components: 100 mm Water Holding Capacity	Soil Moisture Storage (Max. 100 mm)	100.0	100.0	100.0	100.0	98.0	66.0	33.0	18.0	16.0	42.2	100.0	100.0	-
	Soil Moisture Storage Including Snow (mm)	220.2	270.4	100.0	100.0	98.0	66.0	33.0	18.0	16.0	42.2	100.0	158.6	-
	Change in Soil Moisture Storage (mm)	0.0	0.0	0.0	0.0	-2.0	-32.0	-33.0	-15.0	-2.0	26.2	57.8	0.0	-
	Actual Evapotranspiration (mm)	0.0	0.0	1.7	32.5	79.6	112.7	107.0	83.5	71.4	41.0	12.4	0.0	541.8
	Moisture Surplus, Undistributed (mm)	61.6	50.2	48.8	44.2	0.0	0.0	0.0	0.0	0.0	0.0	1.7	58.6	265.0
	Water Surplus Available for Infiltration or Runoff (mm)	61.6	50.2	48.8	44.2	0.0	0.0	0.0	0.0	0.0	0.0	1.7	58.6	265.0
	Snowmelt Runoff (mm)	0.1	0.1	17.0	76.7	38.3	19.2	9.6	4.8	2.4	1.2	0.6	0.3	170.3
	Surplus Accounting for Snowmelt (mm)	0.1	0.1	65.9	120.8	38.3	19.2	9.6	4.8	2.4	1.2	2.3	0.3	265.0
Pervious Components: 250 mm Water Holding Capacity	Soil Moisture Storage (Max. 250 mm)	250.0	250.0	250.0	250.0	248.0	212.0	161.0	128.0	121.0	147.2	206.7	250.0	-
	Soil Moisture Storage Including Snow (mm)	326.9	377.1	250.0	250.0	248.0	212.0	161.0	128.0	121.0	147.2	206.7	265.3	-
	Change in Soil Moisture Storage (mm)	0.0	0.0	0.0	0.0	-2.0	-36.0	-51.0	-33.0	-7.0	26.2	59.4	43.3	-
	Actual Evapotranspiration (mm)	0.0	0.0	1.7	32.5	79.6	116.7	125.0	101.5	76.4	41.0	12.4	0.0	586.8
	Moisture Surplus, Undistributed (mm)	61.6	50.2	48.8	44.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.3	220.0
	Water Surplus Available for Infiltration or Runoff (mm)	61.6	50.2	48.8	44.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.3	220.0
	Snowmelt Runoff (mm)	0.1	0.1	12.7	57.2	28.6	14.3	7.1	3.6	1.8	0.9	0.4	0.2	127.0
	Surplus Accounting for Snowmelt (mm)	0.1	0.1	61.5	101.3	28.6	14.3	7.1	3.6	1.8	0.9	0.4	0.2	220.0
Impervious Components	Precipitation: P (mm)	61.6	50.2	50.5	76.7	77.6	80.7	74.0	68.5	69.4	67.2	71.8	58.6	806.8
	Actual Evapotranspiration (mm)	0.0	0.0	0.6	11.1	27.1	40.5	48.4	42.4	28.4	13.9	4.2	0.0	216.6
	Surplus from Snow (mm)	0.4	0.1	22.0	33.8	93.3	46.6	23.3	11.7	5.8	2.9	1.5	0.7	242.1
	Potential Surface Water Runoff: P - PE (mm)	61.6	50.2	49.9	65.6	50.5	40.2	25.6	26.1	41.0	53.3	67.6	58.6	590.2
	Surplus Accounting for Snowmelt (mm)	0.4	0.1	72.0	99.4	143.7	86.9	48.9	37.8	46.9	56.2	69.1	0.7	661.9

Notes

1. Both potential infiltration and surface water runoff are independent of temperature
2. Assumption is in January maximum soil moisture storage value is present
3. Water Holding Capacity & Infiltration Factors taken from Table 3.1 of MOE SWMPDM, 2003
4. Average Temp. and Precip. taken from Environment Canada station:
   TORONTO PEARSON (AIRPORT)
5. Adjusting Factor for U based on Lorente, 1961

YEARLY WATER BALANCE

		Total Land Area (m^2)	Impervious Factor	Pervious Area (m^2)	Impervious Area (m^2)	Infiltration Factor	Runoff Factor	Infiltration (m^3/year)	Runoff (m^3/year)
Proposed Land Use (Post-Development) with Mitigation	Retained MAS2-1 Wetland in Compensation Area (WT7)	3510.5	0%	3510.5200	0.00	0.55	0.45	425	347
	Proposed MAS/MAM Wetland (WT7)	5400.0	0%	5400.00	0.00	0.55	0.45	653	535
	WT4: MAS2-1	916.4	0%	916.35	0.00	0.55	0.45	111	91
	WT4: Meadow (Restored from Agriculture)	19783.7	0%	19783.65	0.00	0.55	0.45	2,394	1,958
	WT5: Pond	1871.6	100%	0.00	1871.63	0.55	0.45	0	1,239
	WT5: Meadow (Restored from Agriculture)	20928.4	0%	20928.37	0.00	0.55	0.45	2,532	2,072
	WT7: Meadow (Restored from Agriculture)	132889.5	0%	132889.48	0.00	0.55	0.45	16,078	13,154
	WT6: Shallow Aquatic	400.0	100%	0.00	400.00	0.55	0.45	265	265
	WT6: MAS2-1/MAM2-2	1171.4	0%	1171.41	0.00	0.55	0.45	142	116
	WT6: Meadow (Restored from Agriculture)	5028.6	0%	5028.59	0.00	0.55	0.45	608	498
	Clean Water Collector Drainage to Wetland 7	7300.0	-	-	-	0.50	0.50	0	3,641
	TOTAL	**199,200**	**1%**	**189,628**	**2,272**	**0.55**	**0.45**	**23,207**	**23,916**

Notes

1. Both potential infiltration and surface water runoff are independent of temperature
2. Water Holding Capacity & Infiltration Factors taken from Table 3.1 of MOE SWMPDM, 2003
3. Average Temp. and Precip. taken from Environment Canada station:
   TORONTO PEARSON (AIRPORT)

MONTHLY INFILTRATION (m^3)

		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
Proposed Land Use (Post-Development) - with Mitigation	Retained MAS2-1 Wetland in Compensation Area (WT7)	0.22	0.11	118.77	195.66	55.20	27.60	13.80	6.90	3.45	1.72	0.86	0.43	424.7
	Proposed MAS/MAM Wetland (WT7)	0.33	0.17	182.70	300.97	84.91	42.45	21.23	10.61	5.31	2.65	1.33	0.66	653.3
	WT4: MAS2-1	0.06	0.03	31.00	51.07	14.41	7.20	3.60	1.80	0.90	0.45	0.23	0.11	110.9
	WT4: Meadow (Restored from Agriculture)	1.22	0.61	669.36	1102.65	311.06	155.53	77.77	38.88	19.44	9.72	4.86	2.43	2393.5
	WT5: Pond	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
	WT5: Meadow (Restored from Agriculture)	1.29	0.64	708.09	1166.45	329.06	164.53	82.27	41.13	20.57	10.28	5.14	2.57	2532.0
	WT7: Meadow (Restored from Agriculture)	8.16	4.08	4496.18	7406.65	2089.46	1044.73	522.36	261.18	130.59	65.30	32.65	16.32	16077.7
	WT6: Shallow Aquatic	0.15	0.03	28.78	39.76	57.50	34.74	19.56	15.12	18.75	22.47	27.62	0.29	264.8
	WT6: MAS2-1/MAM2-2	0.07	0.04	39.63	65.29	18.42	9.21	4.60	2.30	1.15	0.58	0.29	0.14	141.7
	WT6: Meadow (Restored from Agriculture)	0.31	0.15	170.14	280.27	79.07	39.53	19.77	9.88	4.94	2.47	1.24	0.62	608.4
	Clean Water Collector Drainage to Wetland 7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
	TOTAL	**11.8**	**5.9**	**6444.7**	**10608.8**	**3039.1**	**1525.5**	**765.0**	**387.8**	**205.1**	**115.6**	**74.2**	**23.6**	**23207.0**

Notes
1. Both potential infiltration and surface water runoff are independent of temperature
2. Water Holding Capacity & Infiltration Factors taken from Table 3.1 of MOE SWMPDM, 2003
3. Average Temp. and Precip. taken from Environment Canada station:
TORONTO PEARSON (AIRPORT)

MONTHLY RUNOFF (m^3)

		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
Proposed Land Use (Post-Development) - with Mitigation	Retained MAS2-1 Wetland in Compensation Area (WT7)	0.2	0.1	97.2	160.1	45.2	22.6	11.3	5.6	2.8	1.4	0.7	0.4	347.5
	Proposed MAS/MAM Wetland (WT7)	0.27	0.14	149.48	246.25	69.47	34.73	17.37	8.68	4.34	2.17	1.09	0.54	534.5
	WT4: MAS2-1	0.05	0.02	25.37	41.79	11.79	5.89	2.95	1.47	0.74	0.37	0.18	0.09	90.7
	WT4: Meadow (Restored from Agriculture)	0.99	0.50	547.66	902.17	254.51	127.25	63.63	31.81	15.91	7.95	3.98	1.99	1958.3
	WT5: Pond	0.68	0.14	134.68	186.02	269.04	162.55	91.51	70.75	87.72	105.16	129.24	1.36	1238.8
	WT5: Meadow (Restored from Agriculture)	1.05	0.53	579.35	954.37	269.23	134.62	67.31	33.65	16.83	8.41	4.21	2.10	2071.7
	WT7: Meadow (Restored from Agriculture)	6.68	3.34	3678.69	6059.99	1709.56	854.78	427.39	213.69	106.85	53.42	26.71	13.36	13154.5
	WT6: Shallow Aquatic	0.15	0.03	28.78	39.76	57.50	34.74	19.56	15.12	18.75	22.47	27.62	0.29	264.8
	WT6: MAS2-1/MAM2-2	0.06	0.03	32.43	53.42	15.07	7.53	3.77	1.88	0.94	0.47	0.24	0.12	116.0
	WT6: Meadow (Restored from Agriculture)	0.25	0.13	139.20	229.31	64.69	32.35	16.17	8.09	4.04	2.02	1.01	0.51	497.8
	Clean Water Collector Drainage to Wetland 7	0.00	0.00	0.00	1560.00	294.00	263.00	284.00	269.00	261.00	260.00	450.00	0.00	3641.0
	TOTAL	**10.4**	**4.9**	**5412.8**	**10433.2**	**3060.0**	**1680.0**	**1004.9**	**659.8**	**519.9**	**463.9**	**645.0**	**20.7**	**23915.5**

Notes
1. Both potential infiltration and surface water runoff are independent of temperature
2. Water Holding Capacity & Infiltration Factors taken from Table 3.1 of MOE SWMPDM, 2003
3. Average Temp. and Precip. taken from Environment Canada station:
TORONTO PEARSON (AIRPORT)

MONTHLY POTENTIAL AVERAGE WATER LEVEL (m)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
Proposed MAM, MAS	0.00	0.00	0.61	1.17	0.34	0.19	0.11	0.07	0.06	0.05	0.07	0.00	0.22
Meadow Marsh (MAM2) Typical Hydroperiod - Maximum		0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30		0.30
Meadow Marsh (MAM2) Typical Hydroperiod - Minimum		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.05		0.02
Shallow Marsh (MAS2) Typical Hydroperiod - Maximum		0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55		0.55
Shallow Marsh (MAS2) Typical Hydroperiod - Minimum		0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30		0.30

Notes
1. Monthly potential average water level is calculated by dividing the monthly runoff by the wetland area. This is a maximum estimate and does not take into account micro-topography or distribution of runoff events throughout the month
2. Typical hydroperiods are based on GEI professional experience

