MTE Consultants
123 St. George St., London, Ontario N6A 3A1

November 28, 2023
MTE File No.: 49653-100

Mr. Scott Allen, MA, RPP
MHBC Planning, Urban Design & Landscape Architecture
540 Bingemans Centre Drive, Suite 200
Kitchener, ON N2B 3X9

Dear Mr. Allen,

RE: 6097 COLONEL TALBOT ROAD SITE PLAN – PRELIMINARY STORMWATER MANAGEMENT BRIEF

This letter outlines the feasibility and stormwater management options for the site plan at 6097 Colonel Talbot Road, City of London, Ontario.

Introduction

MTE Consultants Inc. was retained by the client to provide stormwater management brief for the site draft plan application. The subject property is located on the west side of Colonel Talbot Road, north of the Colonel Talbot Road and Highway 401 Interchange, legally described as 6097 Colonel Talbot Road, generally described as Part of Lot 58, Concession WTR, London. Subject land is rectangular in shape and measures approximately 20.2 ha in area and has approximately 205m of frontage on to Colonel Talbot Road. Site location is presented in the attached **Figure 1**. The client is proposing to amend the current zones for the subject lands to support the development of the property for a heavy equipment/agricultural machinery dealership. The site generally drains from east to west, with surface flows entering the drainage channel that bisects the site from the southeastern property limit to the north limit and continues to travel northwest off the subject lands. The drainage channel is in the Kettle Creek Conservation Authority (KCCA) Regulated Area. There is no municipal ditch along the west side of Colonel Talbot Road fronting the property.

The proposed dealership site has an approximate area of 20878 m^2, with the building area of 929 m^2, and gravel parking area of 19628 m^2. There are 140 proposed parking spaces on the parking lot.

Stormwater Management Options

Existing municipal servicing consists of a municipal drainage ditch on the east side of Colonel Talbot Road.

Based on the preliminary dealership plan, the site imperviousness in post-development conditions will be increased compared to the pre-development conditions. Therefore, stormwater quality and quantity controls will have to be implemented. Stormwater calculations were performed based on the latest City of London Design Specifications. Considering the size of the site (approximately 2.08 ha), modified rational method was used. Per the City's Specifications, 2-year IDF curve was used in pre to post development controls. Runoff

coefficient of 0.20 used for the pre-development conditions, and runoff coefficient of 0.90 used for the entire dealership post-development area as it consists of gravel parking lot and impervious concrete sidewalk and the building itself.

Roof storage calculations assumed a flat roof, and controlled flows with a roof drain that can provide flows of 42 L/s/ha of roof area. The 100-year event requires storage of approximately 36.89 m^3 which can be provided on the roof assuming average depth of 130mm.

Based on the allowable pre-development flows and the roof storage flows, the 100-year event required storage for the site is approximately 111.61 m^3, on top of the roof storage requirement of 36.89 m^3. The required storage can be provided in the parking lot, assuming an average depth of 50mm across the entire parking lot. Different parking ponding configurations are possible based on the required storage and the parking area. Detailed rational method calculations are attached.

There are three options for the quantity and quality controls for the site. The preliminary rational method storage calculations and Figures showing the SWM options are presented in the Attachment.

Option 1: Control Manhole and an Oil/Grit Separator

Quantity controls can be provided with the roof drains with specific number of openings, and with a control manhole downstream from all of the parking catch basins featuring an orifice plate/tube that can control the flows to the 2-year predevelopment flow of 57.24 l/s.

Quality control can be provided with an oil/grit separator (OGS) that will provide the total suspended solids (TSS) reduction of 70%. The filtered flows can be conveyed to the drainage channel, however as the area is regulated by the Kettle Creek Conservation Authority, a permit would be required for a construction of an outfall in the regulated area. The southwest corner of the site is approximately 100 meters away from the drainage channel. Please refer to **Figure 2** for more detail.

Option 2: SWM Pond

Quantity controls can be provided with a dry SWM pond facility and quality control can be provided with an OGS unit upstream of the SWM facility. Considering the size of the dealership site, and the surrounding area a SWM pond could be constructed between the site and the drainage channel. The pond outfall would be conveyed to the KCCA regulated area and a permit would be required for an outlet in the regulated area. Please refer to **Figure 3** for more detail.

Option 3: Low Impact Development

Low Impact Development (LID) measures could be provided for the site. The City of London encourages the use of bioretention, bioswales, rain gardens, green roofs, permeable pavers and other LIDs in commercial sites.

Water stored on the roof and in the parking lot would be conveyed to LIDs along the south or west borders of the site, where the flows will be filtered and infiltrated, based on the type of implemented LID.

MTE has conducted a geotechnical investigation of the site and prepared the report, *6097 Colonel Talbot Road Development Geotechnical Investigation*, dated April 5, 2022. The native soils have a high content of clay and silt. In situ infiltration testing could be performed in the

exact areas of proposed LID measures to accurately measure the infiltration of the soils in those areas.

Conclusion

Based on the post-development runoff coefficient increase, quantity and quality controls are required for the site. Required storage calculations based on the modified rational method are presented. Three options for the quantity and quality control are presented. The required storage can be achieved with the roof and parking lot ponding. Post-development flows will be controlled and conveyed to the drainage channel, preserving the pre-development drainage conditions.

Should you have questions or comments, please do not hesitate to contact the undersigned.

Yours truly,

MTE Consultants Inc.

Bogdan Pavlovic, MESc., P.Eng.
Design Engineer
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bpavlovic@mte85.com

Attach: Figures, Rational Method SWM Calculation

M:\49653\100\Reports\MTE Reports\SWM\Docs\49653-100 SWM Brief.docx

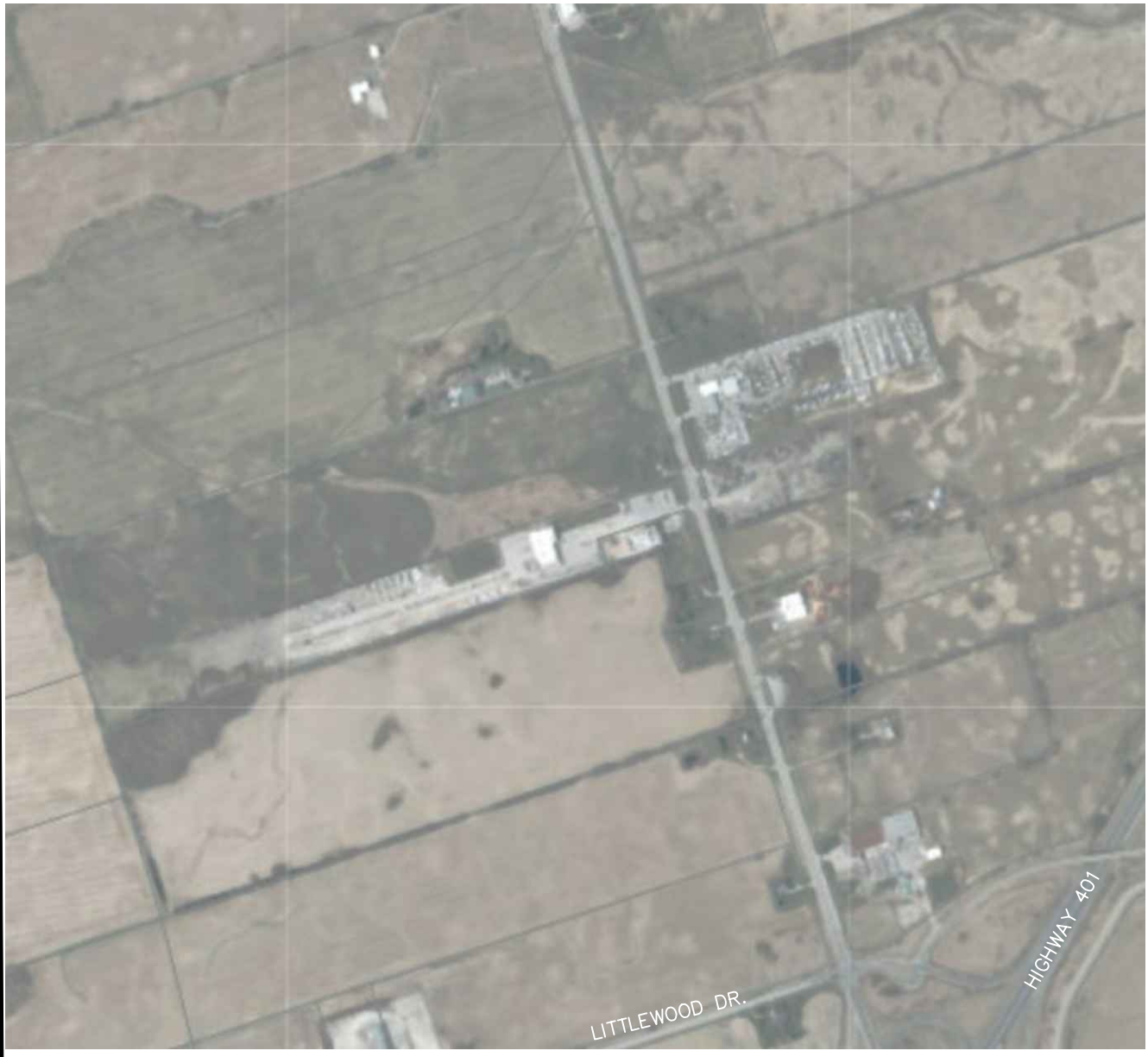

FIG.1

Date: NOV.28/23
Scale: N.T.S.

SITE LOCATION

MTE
Engineers, Scientists, Surveyors

Project No.: 49653-100

DENOTES SURFACE PONDING

CB

CB

CB

DENOTES SURFACE PONDING

CONSERVATION AUTHORITY REGULATED AREA

DISPOSAL BED

HOLDING TANK FOR WASTEWATER

CBMH

CBMH

OUTLET HEADWALL-1

DOMESTIC WASTEWATER TREATMENT TANKS

ROOF DRAIN

CBMH

DENOTES SURFACE PONDING

DENOTES SURFACE PONDING

CBMH

CONC. PAD

CB

OGS

EXISTING WATER COURSE

COLONEL TALBOT ROAD

LEGEND

- PROP. ROOF DRAIN
- PROP. CATCH BASIN (TYP.)
- PROP. HEADWALL (TYP.)
- PROP. STORM SEWER
- DENOTES SURFACE PONDING
- PROP. OIL AND GRIT SEPARATOR
- PROP. CATCH BASIN MANHOLE
- PROPERTY LINE

FIG.2

Date: NOV.28/2023
Scale: 1:1000

SURFACE PONDING SOLUTION

MTE
Engineers, Scientists, Surveyors

Project No.: 49653-100

P:\P\49653\100\FIGURES\49653-100-FIGURES 11-27-2023.dwg

CB
CB
CBMH
CB
CONSERVATION AUTHORITY
REGULATED AREA
DISPOSAL BED WITH SIX
(6) RUNS OF 16.3m
HOLDING TANK
FOR WASTEWATER
CBMH
CBMH
OUTLET
HEADWALL-3
DOMESTIC
WASTEWATER
TREATMENT TANKS
ROOF
DRAIN
CBMH
EXISTING WATER
COURSE
INLET
HEADWALL-1
CB
CONC.
PAD
CONTROL MH
CB
OGS
HEADWALL-2
PROP. SWM FACILITY
COLONEL TALBOT ROAD
260
257
258
259
41
32
6
12
10
11
6
22

LEGEND

- PROP. ROOF DRAIN
- PROP. CATCH BASIN (TYP.)
- PROP. HEADWALL (TYP.)
- PROP. STORM SEWER
- PROP. OIL AND GRIT SEPARATOR (TYP)
- PROP. CONTROL MANHOLE (TYP.)
- PROP. CATCH BASIN MANHOLE (TYP.)
- PROP. POND
- PROPERTY LINE

FIG.3

Date: NOV.28/2023
Scale: 1:1000

SWM POND SOLUTION

MTE
Engineers, Scientists, Surveyors

Project No.: 49653-100

P:\P\49653\100\FIGURES\49653-100-FIGURES 11-27-2023.dwg

SWM Calculations

DATE:	November 28, 2023
JOB N0.:	MTE-49653-100

Client:	**2803767 Ontario Inc./MHBC Planning**
Project:	**6097 Colonel Talbot Road Site Plan**
Location:	**6097 Colonel Talbot Road, London**

ALLOWABLE FLOWS

EXISTING PRE-DEVELOPMENT AREA

	Area (m^2)	C	A*C
Total Area:	20878.00		
Building Area:	0.000	0.9	0.00
Concrete/Asphalt:	0.000	0.9	0.00
Gravel:	0.00	0.9	0.00
Landscaped/Open:	20878.00	0.2	4175.60
Totals:	20878.00		4175.60
C_{eq} = Sum(A*C)/Sum(A) =	0.20		

Existing Area 100-Year Flows

C =	0.20	
Time to concentration t_c =	23	min
Intensity, i (@ t_c) =	117.50	mm/hr
Post Development Flow, Q_r = 2.78*C*i*A =	136.40	l/s

Existing Area 2-Year Flows

C =	0.20	
Time to concentration t_c =	23	min
Intensity, i (@ t_c) =	49.31	mm/hr
Post Development Flow, Q_r = 2.78*C*i*A =	57.24	l/s

POST-DEVELOPMENT CONDITIONS

TOTAL POST-DEVELOPMENT CONTROLLED AREA (A1)

	Area (m^2)	C	A*C
Total Area:	20878.00		
Building Area:	929.00	0.9	836.1
Concrete/Asphalt:	320.80	0.9	288.72
Gravel:	19628.20	0.9	17665.38
Landscaped/Open:	0.00	0.2	0
Totals:	20878.00		18790.2
C_{eq} = Sum(A*C)/Sum(A) =	0.90		

CITY OF LONDON-CHICAGO RAINFALL DISTRIBUTION PARAMETERS*

Return Period (years)	A,B,C Parameters A	B	C
2	754.360	6.011	0.810
5	1183.740	7.641	0.838
10	1574.382	9.025	0.860
25	2019.372	9.824	0.875
50	2270.665	9.984	0.876
100	2619.363	10.500	0.884
250	3048.220	10.030	0.888

*Intensity i=A/(t+B)^C (mm/hr)

* Refer to the City of London Design Specification & Requirments Manual (DS&RM), Section 6.

ATTENUATE POST-DEVELOPMENT FLOWS TO ALLOWABLE RATE (OR LESS)

RETURN PERIOD OF STORM	PRE-DEVELOPMENT FLOWS (L/S)	ALLOWABLE POST-DEVELOPMENT FLOWS (L/S)
100-YEAR	136.40	**136.40**
2-YEAR	57.24	**57.24**

RAINFALL DATA

Rainfall Data - London Rainfall Intensity Duration

2 Yr Stm Event

Duration (min.)	Intensity "i" (mm/hr)
5	108.07
10	79.80
15	64.03
30	41.39
60	25.33
120	15.01
180	10.95

STORAGE CALCULATIONS

Inflow, Q_i 2.78*C*i*A (l/s)	Roof Drain Outlfow Q_o (l/s)	Volume In Q_i*t*60/1000 (m^3)	Release Q_o (l/s)	Surfice Outflow, Q_o (l/s)	Volume Out Q_o*t*60/1000 (m^3)	Difference/ Storage (m^3)
125.45	3.90	38.80	57.24	0.00	17.17	21.63
92.63	3.90	57.92	57.24	0.00	34.34	23.58
74.33	3.90	70.41	57.24	0.00	51.51	18.90
48.04	3.90	93.50	57.24	0.00	103.02	-9.52
29.41	3.90	119.91	57.24	0.00	206.05	-86.14
17.42	3.90	153.51	57.24	0.00	412.10	-258.59
12.71	3.90	179.37	57.24	0.00	618.14	-438.78

Max. Storage Volume (m^3) = 23.58

100 Yr Stm Event

Duration (min.)	Intensity "i" (mm/hr)
5	232.24
10	181.39
15	149.56
30	99.36
60	60.87
120	35.32
180	25.28

Inflow, Q_i 2.78*C*i*A (l/s)	Roof Drain Outflow Q_o (l/s)	Volume In Q_i*t*60/1000 (m^3)	Release Q_o (l/s)	Surfice Outflow, Q_o (l/s)	Volume Out Q_o*t*60/1000 (m^3)	Difference/ Storage (m^3)
269.59	3.90	82.05	57.24	0.00	17.17	64.88
210.56	3.90	128.68	57.24	0.00	34.34	94.33
173.61	3.90	159.76	57.24	0.00	51.51	108.25
115.34	3.90	214.63	57.24	0.00	103.02	111.61
70.66	3.90	268.41	57.24	0.00	206.05	62.37
41.00	3.90	323.28	57.24	0.00	412.10	-88.82
29.34	3.90	359.06	57.24	0.00	618.14	-259.08

Max. Storage Volume (m^3) = 111.61

Location		**Area (m^2)**	**Depth(m)**	**Volume (m^3)**
Parking Ponding				
	V=AxD/3	19628.20	0.05	327.14

Total Surface Storage Available (m^3) = 327.14

Total Storage Available (m^3) = 327.14
Required 100 Year Storage (m^3) = 111.61

Therefore, sufficient storage is provided to attenuate the post-development 2-year to 100-year storm events below the 2-year pre-development levels with parking ponding.

SWM Calculations

DATE:	November 28, 2023
JOB N0.:	MTE-49653-100
Client:	**2803767 Ontario Inc./MHBC Planning**
Project:	**6097 Colonel Talbot Road Site Plan**
Location:	**6097 Colonel Talbot Road, London**

P0ST-DEVELOPMENT- NEW BUILDING CONTROLLED AREA (A2)

	Area (m^2)	C	A*C
Total Area:	929.00		
Building Area:	929.00	0.9	836.1
Concrete/Asphalt:	0.00	0.9	0
Gravel:	0.00	0.9	0
Landscaped/Open:	0.00	0.2	0
Totals:	929.00		836.1
C_{eq} = Sum(A*C)/Sum(A) =	0.90		

Existing Area 100-Year Flows

C =	0.90	
Time to concentration t_c =	10.5	min
Intensity, i (@ t_c) =	177.56	mm/hr
Post Development Flow, Q_r = 2.78*C*i*A =	41.27	l/s

Existing Area 2-Year Flows

C =	0.90	
Time to concentration t_c =	10.5	min
Intensity, i (@ t_c) =	77.84	mm/hr
Post Development Flow, Q_r = 2.78*C*i*A =	18.09	l/s

CITY OF LONDON-3 CHICAGO RAINFALL DISTRIBUTION PARAMETERS*

Return Period (years)	A,B,C Parameters A	B	C
2	754.360	6.011	0.810
5	1183.740	7.641	0.838
10	1574.382	9.025	0.860
25	2019.372	9.824	0.875
50	2270.665	9.984	0.876
100	2619.363	10.500	0.884
250	3048.220	10.030	0.888

*Intensity i=A/(t+B)^C (mm/hr)

* Refer to the City of London Design Specification & Requirments Manual (DS&RM), Section 6.

ATTENUATE POST-DEVELOPMENT FLOWS TO MAXIMAZE ROOF STORAGE

RETURN PERIOD OF STORM	POST-DEVELOPMENT CONTROLLED ROOF DRAIN FLOW (L/s/ha)**	POST-DEVELOPMENT CONTROLLED FLOWS (L/S)
100-YEAR	42.00	**3.90**

**Determined by mechanical engineer

RAINFALL DATA

Rainfall Data - London Rainfall Intensity Duration

2 Yr Stm Event

Duration (min.)	Intensity "i" (mm/hr)
5	108.07
10	79.80
15	64.03
30	41.39
60	25.33
120	15.01
180	10.95

100 Yr Stm Event

Duration (min.)	Intensity "i" (mm/hr)
5	232.24
10	181.39
15	149.56
30	99.36
60	60.87
120	35.32
180	25.28

STORAGE CALCULATIONS

Inflow, Q_i 2.78*C*i*A (l/s)	Volume In Q_i*t*60/1000 (m^3)	Roof Drain Outflow Q_o (l/s)	Surfice Outflow, Q_o (l/s)	Volume Out Q_o*t*60/1000 (m^3)	Difference/ Storage (m^3)
25.12	7.54	3.90	0.00	1.17	6.37
18.55	11.13	3.90	0.00	2.34	8.79
14.88	13.39	3.90	0.00	3.51	9.88
9.62	17.32	3.90	0.00	7.02	10.29
5.89	21.20	3.90	0.00	14.05	7.15
3.49	25.11	3.90	0.00	28.09	-2.98
2.54	27.48	3.90	0.00	42.14	-14.66

Max. Storage Volume (m^3) = 10.29

Inflow, Q_i 2.78*C*i*A (l/s)	Volume In Q_i*t*60/1000 (m^3)	Roof Drain Outflow Q_o (l/s)	Surfice Outflow, Q_o (l/s)	Volume Out Q_o*t*60/1000 (m^3)	Difference/ Storage (m^3)
53.98	16.19	3.90	0.00	1.17	15.02
42.16	25.30	3.90	0.00	2.34	22.96
34.76	31.29	3.90	0.00	3.51	27.78
23.09	41.57	3.90	0.00	7.02	34.55
14.15	50.93	3.90	0.00	14.05	36.89
8.21	59.11	3.90	0.00	28.09	31.01
5.88	63.46	3.90	0.00	42.14	21.32

Max. Storage Volume (m^3) = 36.89

Available Roof Storage

Location		**Area (m^2)**	**Depth(m)**	**Volume (m^3)**
Roof				
	V=AxD/3	929.00	0.13	40.26

Total Roof Storage Available (m^3) = 40.26

Total Storage Available (m^3) = 40.26
Required 100 Year Storage (m^3) = 36.89

Therefore, sufficient roof storage is provided to attenuate the post-development 2-year to 100-year storm events below the 2-year pre-development levels with average roof storage depth of 13 cm