

1744 Norman Road, Windsor

STORMWATER MANAGEMENT REPORT

**City of Windsor
Ontario**

10 July 2025



**Submitted by:
RC Spencer Associates Inc.**

File No.: 25-1726



RC SPENCER ASSOCIATES INC.
Consulting Engineers

PRE-DEVELOPMENT STORMWATER CONDITIONS

This report provides a stormwater management plan for the proposed apartment building located at 1744 Norman Road in the City of Windsor. The 0.162 ha development will consist of a 0.028 ha building, 0.072 ha paved area and 0.062 ha landscape area. The pre-developed site is a residential lot consisting of 0.014 ha building area, 0.012 ha paved area and 0.136 ha landscape area.

The recommended storm water management (SWM) plan was selected to minimize the hydrological impacts of the proposed site development on the existing drainage system and to protect the quality of receiving waters in the most effective way.

Qualitative protection measures will include:

- On-site course controls
- End-of-pipe controls (First Defense Water Quality Unit)
- Construction period best management practice

The storm sewers within the development are designed to convey the 5-year storm event with the entire site being restricted to a 5-year pre-developed flowrate.

This development will utilize the existing storm private drain connection and outlet into the existing 450mm diameter storm sewer located in Norman Road. The release rate of 8 L/s represents the 5-year pre-developed flowrate, which was calculated using the Rational Method. Pre-developed and post-developed time of concentration was based off of Graph 3.2.2.6 – Maximum Inlet Times of the Windsor/Essex Region Stormwater Management Standards Manual. The soil in this area is characterized as Brookston Clay Loam (Hydraulic Soil Group 'D') as identified by the Essex Region Conservation Authority Soils Map.

The required detention storage is met by providing sufficient volume in the form of pavement surfaces, sewer pipes, manholes and catchbasins.

DESIGN STORM

The design storm used for sizing the storm sewers and calculating the pre-developed flow is the 1:5-year rainfall event. The equation for the storm curve as per the Windsor/Essex Region Stormwater Management Standards Manual is as follows:

$$\text{Minor storm (5-Year):} \quad I \text{ (cm/hr)} \quad = \quad \frac{125.9}{(T+8.8)^{0.838}}$$

where

I is the rainfall intensity and

T is the time in minutes (measured relative to the start of the storm event)

The parameters in this equation are based on 66 years of historical rainfall data from the Windsor Airport Station.

POST-DEVELOPMENT STORMWATER CONDITIONS

A new storm drainage system servicing the development is designed to directly deliver storm water flow to the existing storm sewer located on Norman Road. The storm sewer system for this development is designed to accommodate the entire site.

The peak post-developed storm water flow for the 1:5-year event is calculated to be 22 L/s (0.022 m³/s). This development is required to be restricted to 8 L/s (0.008 m³/s) as required by the City of Windsor. The restricted release rate will be achieved by installing a 60 mm diameter Tempest Low to Moderate Flow (LMF) Inlet Control Device in the outlet pipe of Manhole 2.

The outlet restriction results in the need to provide additional on-site storage. Storage required for the 2-year, 5-year and 100-year events is determined to be 10 m³, 17 m³ and 37 m³ respectively. The total available storage provided on site was calculated to be 80 m³. The maximum depth of water that can be stored in the parking area is 290mm at catchbasin 2. Table 1 summarizes the stormwater management data below.

Table 1 – Stormwater Detention Summary Table

Storm Event	Post-Development Release Rate (m³/s)	Restricted Release Rate (m³/s)	Storage Required (m³)	Water Level (m)
2-Year	0.017	0.008	10	184.343
5-Year	0.022	0.008	17	184.414
100-Year	0.037	0.008	37	184.491

As shown in Table 1, the site was designed to contain the full range of storm events restricted to the 5-year pre-developed flowrate. Furthermore, the 100-Year ponding elevation (184.491) is 409 mm lower than the finished floor elevation (184.900). Storms beyond the 100-Year event that exceed the provided storage will spill onto Norman Road, away from the proposed building.

Pollutants and sediment washed from impervious surface areas that directly enter the storm system via catchbasins or manholes will be treated with the First Defense by Hydro International (Model FD-4HC) water quality unit. The WQU is located at Manhole 1, downstream of the restriction plate. It provides a restricted net TSS removal efficiency of 93.0%.

ATTACHMENTS

Please reference the attached calculations and specifications in support of this Report.

STORM DETENTION CALCULATIONS

$$I = \frac{125.9}{(T+8.8)^{0.838}}$$

T = Time in min.

I = Intensity (cm/hr)

$$Q = Aci/36$$

$$Q = m^3/sec$$

$$i = cm/hr$$

$$\text{Total Area (A)} = 0.162 \text{ Ha}$$

Pre-Developed Conditions (5-Year Storm Event):

Grassed =	0.136	Ha	==>	C =	0.20
Gravel =	0.000	Ha	==>	C =	0.70
Paved =	0.012	Ha	==>	C =	0.95
Rooftop =	0.014	Ha	==>	C =	0.95
AC _{TOTAL} =					0.052

$$T_c = 30 \text{ min.} ==>$$

$$i = 5.87 \text{ cm/hr}$$

$$Q_{EX} = A \times C_{AVG} \times i / 36 = 0.008 \text{ m}^3/sec$$

Proposed Conditions (5-Year Storm Event):

Grassed =	0.062	Ha	==>	C =	0.20
Gravel =	0.000	Ha	==>	C =	0.70
Paved =	0.072	Ha	==>	C =	0.95
Rooftop =	0.028	Ha	==>	C =	0.95
AC _{TOTAL} =					0.107

$$T_c = 20 \text{ min.} ==>$$

$$i = 7.53 \text{ cm/hr}$$

$$Q_{NEW} = A \times C_{AVG} \times i / 36 = 0.022 \text{ m}^3/sec$$

$Q_{NEW} > Q_{EX}$ Storm Detention Required

STORM WATER DETENTION CALCULATIONS**(1:2 YEAR STORM)****PRE-DEVELOPED CONDITIONS****AREA (Total)** 0.162 Ha**COEFFICIENT** 0.32**INTENSITY** 4.45 cm/hr

$$I = 85.4 \times (T+7.0)^{-0.818}$$

$$Q_{EX} = A \times C_{AVG} \times i / 36 = 0.006 \text{ m}^3/\text{sec}$$

PROPOSED CONDITIONS**AREA (Total)** 0.162 Ha**COEFFICIENT** 0.66**INTENSITY** 5.76 cm/hr

$$I = 85.4 \times (T+7.0)^{-0.818}$$

$$Q_{NEW} = A \times C_{AVG} \times i / 36 = 0.017 \text{ m}^3/\text{sec}$$

DESIGN CRITERIA**STORM FREQUENCY:****TOTAL AREA:****RELEASE Q:****TIME (Tc):****PEAK Q:****AC:**

1:2	YEARS
0.162	Ha
0.008	m ³ /sec
20	min.
0.017	m ³ /sec
0.107	

TIME (Tc) (min)	INTENSITY (cm/hr)	PEAK Q (m ³ /s)	VOLUME (m ³)	RELEASE VOLUME (m ³)	STORAGE (m ³)
5	11.19	0.008	3	3	0
10	8.41	0.013	8	5	2
15	6.81	0.015	14	8	6
20	5.76	0.017	21	10	10
25	5.01	0.015	22	13	10
30	4.45	0.013	24	15	9
35	4.01	0.012	25	18	7
40	3.66	0.011	26	20	6
45	3.37	0.010	27	23	4
50	3.13	0.009	28	25	3
55	2.92	0.009	29	28	1
60	2.74	0.008	29	30	0

THEREFORE, MAXIMUM STORAGE REQUIRED IS 10 CUBIC METRES

STORM WATER DETENTION CALCULATIONS**(1:5 YEAR STORM)****PRE-DEVELOPED CONDITIONS****AREA (Total)** 0.162 Ha**COEFFICIENT** 0.32**INTENSITY** 5.87 cm/hr

$$I = 125.9 \times (T+8.8)^{-0.838}$$

$$Q_{EX} = A \times C_{AVG} \times i / 36 = 0.008 \text{ m}^3/\text{sec}$$

PROPOSED CONDITIONS**AREA (Total)** 0.162 Ha**COEFFICIENT** 0.66**INTENSITY** 7.53 cm/hr

$$I = 125.9 \times (T+8.8)^{-0.838}$$

$$Q_{NEW} = A \times C_{AVG} \times i / 36 = 0.022 \text{ m}^3/\text{sec}$$

DESIGN CRITERIA**STORM FREQUENCY:****TOTAL AREA:****RELEASE Q:****TIME (Tc):****PEAK Q:****AC:**

1:5	YEARS
0.162	Ha
0.008	m ³ /sec
20	min.
0.022	m ³ /sec
0.107	

TIME (Tc) (min)	INTENSITY (cm/hr)	PEAK Q (m ³ /s)	VOLUME (m ³)	RELEASE VOLUME (m ³)	STORAGE (m ³)
5	13.96	0.010	3	3	1
10	10.77	0.016	10	5	5
15	8.84	0.020	18	8	10
20	7.53	0.022	27	10	17
25	6.59	0.020	29	13	17
30	5.87	0.018	32	15	16
35	5.30	0.016	33	18	15
40	4.84	0.014	35	20	14
45	4.46	0.013	36	23	13
50	4.14	0.012	37	25	12
55	3.87	0.012	38	28	10
60	3.63	0.011	39	30	9

THEREFORE, MAXIMUM STORAGE REQUIRED IS 17 CUBIC METRES

STORM WATER DETENTION CALCULATIONS**(1:100 YEAR STORM)****PRE-DEVELOPED CONDITIONS****AREA (Total)** 0.162 Ha**COEFFICIENT** 0.32**INTENSITY** 9.71 cm/hr

$$I = 237.5 \times (T+11.0)^{-0.861}$$

$$Q_{EX} = A \times C_{AVG} \times i / 36 = 0.014 \text{ m}^3/\text{sec}$$

PROPOSED CONDITIONS**AREA (Total)** 0.162 Ha**COEFFICIENT** 0.66**INTENSITY** 12.35 cm/hr

$$I = 237.5 \times (T+11.0)^{-0.861}$$

$$Q_{NEW} = A \times C_{AVG} \times i / 36 = 0.037 \text{ m}^3/\text{sec}$$

DESIGN CRITERIA**STORM FREQUENCY:**

1:100 YEARS

TOTAL AREA:

0.162 Ha

RELEASE Q:0.008 m³/sec**TIME (Tc):**

20 min.

PEAK Q:0.037 m³/sec**AC:**

0.107

TIME (Tc) (min)	INTENSITY (cm/hr)	PEAK Q (m ³ /s)	VOLUME (m ³)	RELEASE VOLUME (m ³)	STORAGE (m ³)
5	21.82	0.016	5	3	2
10	17.27	0.026	15	5	10
15	14.37	0.032	29	8	21
20	12.35	0.037	44	10	34
25	10.86	0.032	49	13	36
30	9.71	0.029	52	15	37
35	8.79	0.026	55	18	37
40	8.04	0.024	58	20	37
45	7.42	0.022	60	23	37
50	6.89	0.021	62	25	36
55	6.44	0.019	63	28	36
60	6.05	0.018	65	30	35
65	5.71	0.017	66	33	33
70	5.40	0.016	68	36	32
75	5.13	0.015	69	38	31
80	4.89	0.015	70	41	29

THEREFORE, MAXIMUM STORAGE REQUIRED IS 37 CUBIC METRES

STORAGE VOLUME CALCULATIONS

Storage provided in sewers

Catch Basins: (2 CBs 0.6m x 0.6m x 0.8m deep avg.)

$$2 \times 0.6^2 \times 0.8 = 0.6 \text{ m}^3$$

Manholes: (2 MHs 1.2m dia. x 1.0m deep avg.)

$$2 \times 3.14 \times 0.6^2 \times 1.0 = 2.3 \text{ m}^3$$

Pipes: (42.5m - 450mm dia.)

$$3.14 \times 0.225^2 \times 42.5 = 6.8 \text{ m}^3$$

(24.2m - 150mm dia.)

$$3.14 \times 0.075^2 \times 24.2 = 0.4 \text{ m}^3$$

$$\text{Subtotal in sewers} = \boxed{10.0} \text{ m}^3$$

Storage provided on pavement surface

Parking Lot: Tributary to CB1 7.7 m³ (140mm Depth)

Tributary to CB2 61.9 m³ (290mm Depth)

$$\text{Subtotal in pavement storage} = \boxed{69.6} \text{ m}^3$$

Storage required for 100-year event **37** m³

Total Storage Provided **80** m³ OK!

RESTRICTION OPENING CALCULATIONS

ORIFICE PLATE CALCULATIONS @ MH2

$$Q = C_d A (2gH)^{0.5}$$

$$Q = 0.008 \text{ m}^3/\text{s}$$

$$C_d = 0.6$$

$$g = 9.81$$

$$H = 184.491 - 183.290$$

$$1.201 \text{ m}$$

$$0.008 = 0.6 A (2 \times 9.81 \times 1.201)^{0.5}$$

$$A = 0.003 \text{ m}^2$$

$$D = 0.061 \text{ m}$$

Therefore, a 60mm diameter LMF Tempest Inlet Control Device shall be installed in MH2 to restrict the release rate to 8 L/s at the 100-Year water level.

Note: Inlet control device used for restriction rather than plate for maintenance purposes.

STORM SEWER DESIGN CHART - METRIC UNITS

PROJECT: 1744 NORMAN ROAD, WINDSOR - SERVICES DESIGN & SWM
PROJECT NO. 25-1726
DATE: 10 JULY 2025

DESIGN CRITERIA

STORM CURVE: 5 YEAR - C.O.W. C FACTORS: GRASS - 0.20
ENTRY TIME: 20 MINUTES GRAVEL - 0.60
MIN. VELOCITY: 0.76m/s PAVED/ROOF - 0.95
MAX. VELOCITY: 3.0m/s n FACTOR: 0.013

LOCATION		AREA		A X C				RAINFALL INTENSITY			Q	SEWER DESIGN									
FROM	TO	AREA ha	TOTAL AREA ha	RUNOFF COEFF. "C"	INCR. AXC	TOTAL LAT. AXC	TOTAL SEWER AXC	FLOW SECT.	TIME ACCUM.	INTEN- SITY cm/HR	REQ'D cms	PIPE DIA.	SLOPE %	CAP. cms	VEL. m/s	LENGTH m	FLOW TIME MINS.	STOR- AGE CM	INV. U.S.	INV. D.S.	FALL IN SEWER
MH3	MH2	0.16	0.16	0.66	0.107	0.000	0.107	0.88	20.00	7.53	0.022	0.450	0.20	0.127	0.80	42.5	0.88	6.8	183.355	183.270	0.085
MH2	MH1	0.00	0.16	0.66	0.000	0.107	0.107	0.11	20.11	7.51	0.022	0.150	1.00	0.015	0.86	5.9	0.11	0.1	183.260	183.200	0.060
MH1	STM CON.	0.00	0.16	0.66	0.000	0.107	0.107	0.13	20.25	7.48	0.022	0.150	1.00	0.015	0.86	6.8	0.13	0.1	183.190	183.120	0.070

Sanitary Sewer Design Chart - Metric Units

Project : 1744 NORMAN ROAD, WINDSOR - SERVICES DESIGN & SWM

Project No. : 25-1726

Date: 10 JULY 2025

1.) Sewage Flow	2.) Ultimate FLOW FACTOR	4.) Minimum pipe size	250mm
Per Capita 0.0042 L/s	WINDSOR	5.) Minimum velocity	0.75 m/s
Industrial 62 Ppl/ha	3.) Infiltration L/s PER hectare	6.) Maximum velocity	3.0 m/s
Commercial 74 Ppl/ha	0.1560	7.) Manning's 'n'	0.013
Residential 50 Ppl/ha		8.) Population density	Varies

Location				No. of Units	Ppl per Unit	No. of	Tot. no.	Ult. Flow	Sanitary Flow		Infiltration Flow			Total Flow	Sewer Design					Profile			
Area I.D.	Street	From	To	Area(ha)	Ppl per ha	People	of People	Factor	Sewer Flow (cms)	Factored (cms)	Area (ha)	Total (ha)	Flow (cms)	(cms)	Dia. (m)	Slope (%)	Cap. (cms)	Vel. (m/s)	Length (m)	Loss in DS MH	Fall in Sewer	Invert Elevation	
																						U.S.	D.S.
Residential	1744 Norman Road	BLDG	CO	9	2.5	23	23	6.00	0.0001	0.0006	0.16	0.16	0.0000	0.0006	0.125	2.00	0.0132	1.08	5.0	0.040	0.100	182.890	182.790

Percent of Pipe Capacity

4.5%

1744 NORMAN ROAD, WINDSOR
SERVICES DESIGN & SWM
Storage Volume Calculations

File No.: 25-1726
10 JULY 2025

Elevation (m)	Pond	Storm Sewer Storage	Manhole & CB Storage	Pavement Surface Storage	TOTAL
183.10	0.0	0.0	0.0	0.0	0.0
183.20	0.0	1.0	0.2	0.0	1.2
183.30	0.0	2.1	0.4	0.0	2.4
183.40	0.0	3.1	0.6	0.0	3.6
183.50	0.0	4.1	0.7	0.0	4.9
183.60	0.0	5.1	0.9	0.0	6.1
183.70	0.0	6.2	1.1	0.0	7.3
183.80	0.0	7.2	1.3	0.0	8.5
183.90	0.0	7.2	1.5	0.0	8.7
184.00	0.0	7.2	1.7	0.0	8.9
184.10	0.0	7.2	1.9	0.0	9.1
184.20	0.0	7.2	2.1	0.0	9.3
184.30	0.0	7.2	2.2	0.0	9.4
184.35	0.0	7.2	2.3	0.5	10.1
184.40	0.0	7.2	2.4	4.5	14.1
184.45	0.0	7.2	2.5	14.6	24.3
184.50	0.0	7.2	2.6	30.0	39.8
184.55	0.0	7.2	2.7	49.8	59.7
184.59	0.0	7.2	2.8	69.6	79.6

2-YR STORAGE

Elevation= 184.343m
 Req. Storage= 10m³

5-YR STORAGE

Elevation= 184.414m
 Req. Storage= 17m³

100-YR STORAGE

Elevation= 184.491m
 Req. Storage= 37m³

Hydro First Defense® - HC



Rev. 12.5

Project Name: 1744 Norman Road	Report Date:	Paste
Street:	City:	
Province:	Country:	
Designer:	email:	

Treatment Parameters:

Structure ID: MH1
TSS Goal: 70 % Removal
TSS Particle Size: Fine
Area: 0.162 ha
Percent Impervious: 76%
Rational C value: 0.66
Rainfall Station: Windsor, ONT
Peak Storm Flow: 43 L/s

RESULTS SUMMARY

Model	TSS	Volume
FD-3HC	89.0%	>90%
FD-4HC	93.0%	>90%
FD-5HC	95.0%	>90%
FD-6HC	97.0%	>90%
FD-8HC	98.0%	>90%
FD-10HC	99.0%	>90%

Net Annual Removal Model: FD-4HC

Intensity ⁽¹⁾	Fraction of Rainfall ⁽¹⁾	FD-4HC Removal Efficiency ⁽²⁾	Weighted Net Annual Efficiency
(mm/hr)	(%)	(%)	(%)
3.00	13.2%	100.0%	13.2%
4.00	9.6%	100.0%	9.6%
5.00	7.5%	100.0%	7.5%
6.00	6.0%	98.5%	5.9%
7.00	4.8%	97.1%	4.7%
8.00	4.1%	95.9%	3.9%
9.00	3.6%	94.9%	3.4%
10.00	3.2%	94.0%	3.0%
11.00	2.8%	93.1%	2.6%
12.00	2.5%	92.4%	2.3%
15.00	6.6%	90.5%	6.0%
20.00	8.3%	88.1%	7.3%
25.00	5.8%	86.3%	5.0%
30.00	4.6%	84.8%	3.9%
35.00	3.8%	83.6%	3.2%
40.00	2.9%	82.6%	2.4%
45.00	2.4%	81.7%	2.0%
50.00	1.8%	80.9%	1.5%
65.00	6.6%	79.0%	5.2%

Model Specification:

Model: FD-4HC
Diameter: 1200 mm
Peak Flow Capacity: 510.00 L/s
Sediment Storage: 0.54 m³
Oil Storage: 723.00 L

Installation Configuration:

Placement: Offline
Outlet Pipe Size: 150 mm OK
Inlet Pipe 1 Size: 150 mm OK
Inlet Pipe 2 Size: mm OK
Inlet Pipe 3 Size: mm OK

Rim Level: 184.750 m
Outlet Pipe Invert: 183.190 m OK
Invert Pipe 1: 183.200 m OK
Invert Pipe 2: m Inlet below outlet
Invert Pipe 3: m Inlet below outlet

Total Net Annual Removal Efficiency: 93.0%

Total Annual Runoff Volume Treated: >90%

1. Based on Windsor/Essex Region Stormwater Manual 2018, Table 3.4.1.5
2. Based on third party verified data and approximating the removal of a PSD similar to the STC Fine distribution
3. Rainfall adjusted to 5 min peak intensity based on hourly average.

Designer Notes:

Hydro
International



1	Vortex Chamber Diameter	1200 mm
2	Inlet Pipe Diameter	150 mm
3	Oil Storage Capacity	723.00 L
4	Min. Provided Sediment Storage Capacity	0.54 m ³
5	Outlet Pipe Diameter	150 mm
6	Height(Final Grade to Outlet Invert)	1560 mm
7	Sump Depth(Outlet Invert to Sump)	1510 mm
	Total Depth	3070 mm

Notes:

Stormwater Management Submission Requirements Rational Method

For sites under 2 hectares, the following information must be included in the stormwater management submission from the Engineering Consultant on behalf of the Developer and shall be completed in accordance with the [Windsor/Essex Region Stormwater Standards Manual](#), including any addendums issued thereafter. Additionally, the submission shall adhere to the City of Windsor’s [Standard Specifications & Engineering Best Practices](#). [Stormwater management review fees](#) will be collected with the SWM plan submission for review by the City.

Please Note: This checklist **does not apply** to the following circumstances and the Stormwater Management Submission Requirements - [Modeling Method](#) must be referenced for further information.

1. Site area is greater than 2 ha
2. Time of concentration exceeds two times the appropriate maximum inlet time per graph 3.2.2.6 within the Windsor/Essex Region Stormwater Standards Manual
3. Modeling Method has been used

Total Site Area:			m²	Total Number of Drainage Areas		
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DRAINAGE AREA					
Sites with multiple drainage areas must include Appendix A					
EXISTING			PROPOSED		
Area	Area (m ²)	Runoff Coefficient (C - Value)	Area	Area (m ²)	Runoff Coefficient (C - Value)
Grassed		0.2	Grassed		0.2
Gravel		0.7	Gravel		0.7
Paved		0.95	Paved		0.95
Rooftop		0.95	Rooftop		0.95
Total			Total		
Soil Type:			Time of Concentration (T):		
Orifice Type:			Orifice Diameter (if applicable):		
*Pre-development runoff (Q _{pre})		L/Sec	Post-development runoff (Q _{post})		L/Sec
5-year required storage		m ³	100-year required storage		m ³

Check all boxes to confirm information has been provided within the submission:

STORMWATER MANAGEMENT REPORT		
1. Storage design chart, indicating:		
☐ Time	☐ Intensity	
☐ Maximum Required Storage	☐ Maximum Provided Storage	
☐ Maximum Controlled Peak Outflow (Q _{peak})		
2. Intensity values indicating:		
☐ IDF values	☐ Formula & breakdown of calculations	
3. Storage volume calculations:		
☐ Peak storage	Individual calculations for each storage structure (pipes, catchbasins, etc.)	
4. Site is located within the ERCA regulated area	☐ Yes (contact ERCA)	☐ No
5. *Combined sewer, roadside ditch or municipal drain outlet	Yes (restrict to 2 year predevelopment flow)	☐ No
Please Note: Sanitary flows must be taken into consideration when determining the allowable release rate for any development that outlets to a municipal combined sewer		

STORMWATER MANAGEMENT REPORT - CONTINUED

- ☐ 5 year storage calculations
 - ☐ The first 32mm are stored exclusively underground
 - ☐ Surface ponding does not exceed maximum depth of 300mm
- ☐ 100 year storage calculations
 - ☐ Surface ponding does not exceed maximum depth of 300mm

Flow restriction calculations complete with:

- | | |
|--|---|
| ☐ Calculation formula | ☐ Orifice Specifications |
|--|---|

Please Note: Minimum orifice plate size - 76mm x 76mm (3" x 3") or 100mm dia. (4" dia.)

DRAWINGS

SITE SERVICING

- ☐ Drainage/catchment areas (size, elevations, etc.)
- ☐ All proposed and existing connections to municipal sewers and watermain.
 - o All redundant connections to be abandoned as per [Best Practice BP1.3.3](#)
 - o Wye connections to combined sewers as per [Best Practice BP1.1.1](#)
 - o Windsor Utilities Commission (WUC) approval is required for any water works
- ☐ Sanitary sampling manhole (non residential only)
 - o In accordance with [Best Practice BP1.1.2](#)
- ☐ Existing and new pipe information, including the diameter, slope, material & intended use (storm, sanitary, water, etc.)
- ☐ Any quantity and/or quality control measures identified with the model number
- ☐ Location, elevation and description of all catchbasins, manholes, underground storage units and any other structures, labelled existing or new
- ☐ Dimensions of all driveways at the property line and curb line
 - o Straight flares, with no raised curbs in the ROW as per [AS-204](#)
 - o If the subject site fronts a rural cross section, [AS-203](#) may be acceptable
 - o Ditch fills and culverts in accordance with [AS-209A](#) and [Best Practice BP3.3.3](#)
- ☐ Poles, pedestals and other vertical obstructions within the right-of-way (if applicable)
- ☐ Any removals within the right-of-way, including encroachments, sidewalks/leadwalks and redundant driveway approaches
- ☐ Property lines, including any required land conveyances

LOT GRADING

- ☐ Existing and proposed elevations, drainage areas, surface ponding, with maximum depths (5 & 100 year ponding elevations)
- ☐ All catchbasins, manholes, underground storage units and any other structures, labelled existing or new

ADDITIONAL INFORMATION