

SERVICING BRIEF & STORMWATER MANAGEMENT REPORT

135 Cardevco Road
Ottawa, Ontario

Report No. 21081

November 24, 2022



NOT VALID UNLESS
SIGNED & DATED



Stormwater Management - Grading & Drainage - Storm & Sanitary Sewers - Watermains

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SERVICING BRIEF & STORMWATER MANAGEMENT REPORT

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This Servicing Brief & Stormwater Management Report is a description of the services for an existing 188 sq.m. warehouse building and proposed 91 sq.m. addition; and it addresses the stormwater management requirements of 2,026 sq.m. of land located at 135 Cardevco Road Lane in Ottawa. There are 195 sq.m. of additions to the existing building that will be demolished.

This report forms part of the stormwater management design for the proposed development. Also refer to drawings C-1 to C-4 prepared by D. B. Gray Engineering Inc.

WATER SUPPLY FOR FIREFIGHTING:

As per OBC A-3.2.5.7. Table 2, the required water supply flow rate for firefighting for the proposed 1-storey 310 sq.m. building is 1,800 L/min. (i.e. a 1-storey building not exceeding 600 sq.m.) which calculated to be a 54,000 L volume for 30-minute water supply. As per City of Ottawa Technical Bulletin ISTB-2021-03 the requirements for fire protection on private property in rural areas is based on the Fire Underwriters Survey (FUS) method. Using the FUS method the required fire flow was calculated to be 4,000 L/min or 360,000 L volume for 1.5 hour water supply (as required by FUS). However, in the City of Ottawa, buildings less than 600 sq.m. typically do not require an onsite water supply; therefore, since the total area of the existing building and proposed building is only 279 sq.m. it is expected that it will be exempt from requiring an on-site water supply for firefighting.

ON-SITE WELL:

An existing drilled well will provide the domestic water supply. It is located in the rear yard approximately 1.2 m from an existing addition building to be demolished and 2.2 m the proposed addition. As per the Hydrogeological Assessment and Terrain Analysis, prepared by Paterson Group (report number PH46600-LET.01 dated October 13, 2022): *“The pumping test was carried out at a pumping rate of 27 L/min for a duration of 8 hours. ... The selected rate of 27 L/min provides approximately 8.5 times the maximum total daily design volume for the septic system during the 8 hour pumping test. The rate was determined to be representative of a flow rate which would be in excess of what the development would require. ... The water supply aquifer intercepted by the existing well is considered to be adequate to support the water quantity demands for the proposed renovation.”*

ON-SITE SEWAGE SYSTEM:

The existing private on-site septic system that services the existing development will be decommissioned; and a new on-site septic system is proposed. As stated in the Hydrogeological Assessment and Terrain Analysis, prepared by Paterson Group (report number PH46600-LET.01 dated October 13, 2022): “*Paterson has completed a replacement sewage system design for the proposed development due to Site Plan requirements related to the Nitrate Impact Assessment (NIA). A septic flow value was calculated for the proposed building renovation and resulted in a total daily design sewage flow (TDDSF) of 1,026 L/day. A Design Swage flow rate of 1,500 L/day was used for design purposes. ... The approved OSSO septic permit has been included in the Site Plan application submission package.*” For more specific details refer to Paterson Group drawings PH4600-1(rev.1) – Sewage System Layout Plan and PH4600-2(rev.1) – Sewage System Detail & Notes.

STORMWATER MANAGEMENT:

Water Quality:

It is expected that the Mississippi Valley Conservation Authority (MVCA) will require an enhanced level of protection with 80% total suspended solids (TSS) removal from the rainwater runoff. To meet the water quality target of 80% TSS removal an oil grit separator (OGS) is proposed to be located downstream of the inlet control device (ICD). A CDS Model PMSU2015-4 was selected by the manufacturer based on the manufacturer’s software which calculated that it would remove 90% of the TSS. The OGS has an oil capacity of 232 L and a sediment capacity of 0.7 cu.m.

It is also expected that the MVCA will require that the stormwater management design consider temperature mitigation because the property is within the Huntley Creek Subwatershed which is a cool water system. Promoting runoff to infiltrate into the ground is an effective method to achieve temperature mitigation. Two infiltration trenches, having a total storage volume of 6.1 cu.m., are proposed. This is about 15% greater than the volume required to capture the runoff from a 5 mm rainfall event (5.3 cu.m.). In Ottawa, rainfall in 64% of days with precipitation is less than 5 mm; therefore, the runoff from the majority of rainfall events will infiltrate into the ground. The infiltration trench is proposed to be located at the bottom of two proposed stormwater detention areas. Based on a Desktop Subsoil Infiltration Review prepared by Paterson Group (file number PH4600-MEMO.01, dated November 3, 2022) the underlying soil is either silty sand or glacial till having an infiltration rate of 45 to 160 mm/hr (silty sand) or 14 to 45 mm/hr (glacial till). However, as per the City of Ottawa LID Technical Guidance Report a factor of safety should be considered; therefore, as per the Paterson Group review, “*a conservative safety correction factor of 2.5 has been applied to the estimated infiltration rates of the silty sand and glacial till.*” Therefore, the design infiltration rates are 18 to 64 mm/hr (silty sand) or 6 to 18 mm/hr (glacial till). Using the most conservative infiltration rate of 6 mm/hr, the trench, having a depth of 145 mm, will have a drawdown time of 10 hours (a maximum drawdown time of 24 to 48 hours is recommended). (Infiltration rates

as low as 1.2 mm/hr (48-hour drawdown) to 2.4 mm/hr (24-hour drawdown) would be acceptable.) As is stated in the Paterson Group review: *“Based on the Geotechnical Investigation, the long-term groundwater table is expected at a depth of 2 to 3m below ground surface.”* The infiltration trench is designed to be 1 to 1.2 m above the groundwater level (a minimum of 1 m is recommended). Also, as per the geotechnical report bedrock is 5 to 10 m below the existing grade; and therefore, bedrock is not an issue.

As per the MOE Stormwater Management Planning and Design Manual, if an infiltration trench is being used to treat stormwater runoff from roads and parking lots, pre-treatment is necessary to minimize the potential for suspended sediments to clog the trench. Only rainfall runoff from roofs and grassed areas will drain, via two culverts, directly to the surface of the infiltration trench. Virtually all the asphalted surfaces will drain to infiltration trench, via perforated sub-drain (with a filter sock) connected to a catch basin. The sump of the catch basin and the filter sock will prevent sediment from the asphalted areas from entering the infiltration trench. Regardless, for the infiltration trench to function adequately it requires regular maintenance: annually, in the spring (and more frequently if necessary), any sediment accumulated on the surface of the infiltration trench, and in the sump of the catch basin, should be removed; and prior to removal of any sediment, the perforated sub-drain connected to the catch basin should be flushed free of sediment with water. Periodically (about once every five years, more frequently if ponding on the surface of the infiltration trench is observed after the spring thaw and before freezing conditions), the top 50 mm of clear stone (above the geotextile fabric) should be removed and replaced. Any geotextile material that has been damaged should also be replaced.

Spills potentially entering the groundwater can be a concern with infiltration trenches. As is required by the Environmental Compliance Approval (ECA – see page 7), within six months from the issuance of an ECA, the owner is required to implement a spill contingency plan that includes a set of procedures describing how to mitigate the impacts of a spill. Among other items, the spill contingency plan would include:

- a site plan showing buildings, streets, drainage patterns, the infiltration trench and any other feature that could potentially be significantly impacted by a spill;
- physical obstructions and location of response and clean-up equipment;
- steps to be taken to report, contain, clean up and dispose of contaminants following a spill;
- a listing of telephone numbers for local clean-up company(ies) who may be called upon to assist in responding to spills; local emergency responders including health institution(s); and Ministry Spills Action Centre 1-800-268-6060;
- Safety Data Sheets (SDS) for each hazardous material which may be transported or stored within the area;
- the means (internal corporate procedures) by which the spill contingency plan is activated;
- a description of the spill response training provided to employees and the date(s) on which the training was provided and by whom;
- an inventory of response and clean-up equipment available to implement the spill.

The spill contingency plan has to be kept in a conspicuous, readily accessible location on-site; and the plan needs to be amended as required by changes in the operation of the facility.

The Carp River Watershed / Subwatershed Study requires minimum annual infiltration targets but does not directly address the infiltration target in the area of the subject property; but as per the City of Ottawa Site Plan Pre-Application Consultation notes a minimum of 104 mm/year is required. Based on water balance and infiltration calculations the pre-development condition of the property has an annual infiltration of 128 mm/year. In eastern Ontario, on hard surfaces, approximately 150 mm of the 943 mm annual precipitation (or 16%) is lost to evapotranspiration (Eastern Ontario Water Resources Management Study (2001) & Carp River Watershed / Subwatershed Study). Therefore, 84% of the precipitation on hard surfaces is available for infiltration. As per Environment Canada's records at the Ottawa International Airport (1981-2010), there are on average 58.4 days per year where the precipitation is greater than 5 mm. Conservatively assuming only 5 mm of precipitation on each of the 58.4 days (and assuming 84%), 284 cu.m. is available for infiltration from the runoff from the 1,156 sq.m. of hard surfaces draining to the area above the infiltration trench. Therefore, on average about 4.9 cu.m. is available for infiltration for per each of the 58.4 days. The infiltration trench, having a capacity of 6.1 cu.m., has the capacity to capture and infiltrate into the ground 100% of this volume or about 284 cu.m. annually. Inserting the 284 cu.m. into the water balance calculations, the post development annual infiltration for the property is 195 mm/year; 52% greater than the pre-development infiltration and 88% greater than the minimum 104 mm/year target.

An erosion and sediment control plan has been developed to be implemented during construction, (see drawing C-2 and notes 2.1 to 2.6 on drawing C-2). In summary: to filter out construction sediment a silt fence barrier will be installed around the perimeter of the site where runoff will drain off the site; sediment capture filter sock inserts will be installed at the catch basin; and any material deposited on a public road will be removed.

Water Quantity:

The stormwater management criteria for quantity control are to control the post development peak flows for the 5-year and 100-year storm events to peak flows during the 2-year storm event using a pre-development runoff coefficient, whichever is less; and a calculated time of concentration (but not less than 10 minutes). It is calculated that the pre-development conditions reflect a 5-year runoff coefficient of 0.30 and a time of concentration of 3 minutes. Therefore, based on runoff coefficient of 0.30, a 10 minute time of concentration; and using the Rational Method; the maximum allowable release rate is 12.98 L/s for all storm events. The Modified Rational Method is used to calculate the required storage volume. The runoff coefficients for the 100 year event are increased by 25% to maximum 1.00.

Stormwater will be stored within the development on the roof of the proposed addition and in a stormwater detention area. The stormwater released from the detention area will discharge to the roadside ditch.

Drainage Area I (Uncontrolled Flow Off Site – 65 sq.m.):

The runoff from small area at the perimeter at the northeast and northwest corners of the site will be allowed to flow uncontrolled off the site.

	100-year	5-year
Maximum flow rate:	0.99 L/s	0.82 L/s

Drainage Area III (Addition Roof – 186 sq.m.)

The two roof drains on proposed addition roof are to be flow control type roof drains which will restrict the flow of stormwater and cause water to pond on the roof. Each roof drain is to be installed with one parabolic slotted weir and releasing 0.01242 L/s/mm (5 USgpm/in). The roof drains are to be Watts with an Accutrol Weir RD-100-A1 or approved equal. The opening at the top of the flow control weir is to be a minimum 50 mm in diameter. A minimum of 2 scuppers each a minimum 300 mm wide are to be installed 150 mm above the roof drains. Refer to architectural for exact locations and details. The roof is to be designed to carry the load of water having a 50 mm depth at the scuppers or 200 mm depth at the roof drains (refer to structural).

	100-year	5-year
Maximum release rate:	3.49 L/s	2.55 L/s
Maximum ponding depth:	141 mm	103 mm
Maximum stored volume:	3.51 cu.m.	1.38 cu.m.

Drainage Area III (1,1775 sq.m.):

An inlet control device (ICD) located at the outlet of the stormwater detention area will control the release of stormwater from the property. The ICD will restrict the flow and force the stormwater to back up into the detention area. The ICD will discharge to the roadside ditch near the northeast corner of the property. The ICD shall be a plug style with a round orifice design manufactured by Pedro Plastics (or approved equal) and each shall be sized by the manufacturer for a discharge rate of 11.99 L/s at 0.14 m head. It is calculated that an orifice area of 11,985 sq.mm. (± 124 mm diameter) and a discharge coefficient of 0.61 will restrict the outflow rate to 11.99 L/s at a head of 0.14 m. Based on this orifice the maximum outflow rate for the 5-year storm event is calculated to be 6.13 L/s at 0.04 m.

	100-year	5-year
Maximum release rate:	11.99 L/s	6.13 L/s
Maximum ponding elevation:	118.10 m	118.00 m
Maximum ponding depth:	0.20 m	0.10 m
Maximum stored volume:	29.21 cu.m.	16.27 cu.m.

The Entire Site:

	100-year	5-year
Pre-development flow rate:	37.71 L/s	17.61 L/s
Maximum allowable release rate:	12.98 L/s	12.98 L/s
Maximum release rate:	12.98 L/s	6.95 L/s
Maximum stored volume:	29.21 cu.m.	16.27 cu.m.

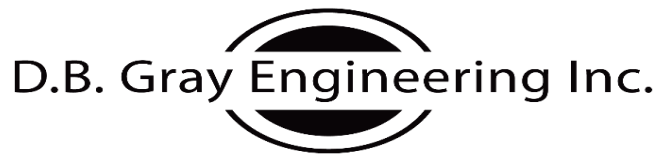
Therefore, the maximum post-development release rate for the 100-year storm event is calculated to be equal to the maximum allowable; and 66% lower than the pre-development conditions. For the 5-year event the maximum post-development release rate is calculated to be 46% lower than the maximum allowable; and 61% lower than the pre-development conditions.

MINISTRY OF ENVIRONMENT, CONSERVATION AND PARKS (MECP)
ENVIRONMENTAL COMPLIANCE APPROVAL (ECA):

It is expected that the MECP will consider the property “industrial lands” and a MECP ECA will be required for the proposed stormwater management facility.

CONCLUSIONS:

1. Since the total area of existing building and proposed addition is less than 600 sq.m. in area it is expected that it will be exempt from requiring an on-site water supply for firefighting.
2. An existing drilled well will provide an adequate domestic water supply for the existing building and proposed addition.
3. The existing private on-site septic system that services the existing development will be decommissioned; and a new on-site septic system is proposed.
4. An oil grit separator (OGS) is sized to remove 80% TSS from the rainwater runoff.
5. The storage volume of the proposed infiltration trench has been sized capture the runoff from a 5 mm rainfall event; therefore, the runoff from most rainfall events will infiltrate into the ground, an effective method for achieve temperature mitigation.
6. The maximum post-development release rate for the 100-year storm event is calculated to be equal to the maximum allowable; and 66% lower than pre-development conditions. For the 5-year event the maximum post-development release rate is calculated to be 41% lower than the maximum allowable; and 61% lower than the pre-development conditions.



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24-Nov-22

Existing Warehouse Building and Proposed Addition
 135 Cardevco Rd
 Ottawa, Ontario

Fire Flow Requirements

Fire flow requirement as calculated as per Fire Underwriters Survey "Water Supply For Fire Protection".

$F = 220 C A^{0.5}$ = the required fire flow in litres per minute

C = coefficient related to the type of construction
 = 0.8 Non-combustible

A = total floor area (all storeys excluding basements at least 50% below grade)

Existing Building	190 sq.m.
Proposed Addition	90 sq.m.
TOTAL FIRE AREA:	280 sq.m.

F = 2,945 L/min
 = 3,000 L/min (rounded off to the nearest 1,000 L/min)

15% Charge for free-burning Occupancy

= 3,450 L/min

0% Reduction: No Sprinkler System
 = - L/min

Increase for Separation Exposed Buildings

			Adjacent Building		Length-Height Factor
		Construction	Length m	Storeys	
17% North-West	3.1 to 10m	non-combustible	16	1	16
0% South-East					
5% South-West	30.1 to 45m	non-combustible			
0% North-East					
22% Total Increase for Exposure (maximum 75%)					
= 759 L/min Increase					

= 4,209 L/min
 F = 4,000 L/min (rounded off to the nearest 1,000 L/min)

Duration of fire flow:

= 1.5 hours as per FUS Required Duration of Fire Flow

Required water supply in litres

= 360,000 L



**CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION
BASED ON THE RATIONAL RAINFALL METHOD
BASED ON A FINE PARTICLE SIZE DISTRIBUTION**



Project Name: 135 Cardevo Road	Engineer: D.B. Gray Engineering
Location: Ottawa, ON	Contact: L. Brosseau
OGS #: OGS	Report Date: 14-Nov-22
Area 0.2026 ha	Rainfall Station # 215
Weighted C 0.51	Particle Size Distribution FINE
CDS Model 2015-4	CDS Treatment Capacity 20 l/s

<u>Rainfall Intensity¹</u> (mm/hr)	<u>Percent Rainfall Volume¹</u>	<u>Cumulative Rainfall Volume</u>	<u>Total Flowrate</u> (l/s)	<u>Treated Flowrate (l/s)</u>	<u>Operating Rate (%)</u>	<u>Removal Efficiency (%)</u>	<u>Incremental Removal (%)</u>
0.5	9.2%	9.2%	0.1	0.1	0.7	98.6	9.0
1.0	10.6%	19.8%	0.3	0.3	1.4	98.4	10.5
1.5	9.9%	29.7%	0.4	0.4	2.2	98.2	9.7
2.0	8.4%	38.1%	0.6	0.6	2.9	98.0	8.2
2.5	7.7%	45.8%	0.7	0.7	3.6	97.8	7.5
3.0	5.9%	51.7%	0.9	0.9	4.3	97.6	5.8
3.5	4.4%	56.1%	1.0	1.0	5.1	97.4	4.2
4.0	4.7%	60.7%	1.1	1.1	5.8	97.2	4.5
4.5	3.3%	64.0%	1.3	1.3	6.5	97.0	3.2
5.0	3.0%	67.1%	1.4	1.4	7.2	96.8	2.9
6.0	5.4%	72.4%	1.7	1.7	8.7	96.4	5.2
7.0	4.4%	76.8%	2.0	2.0	10.1	95.9	4.2
8.0	3.5%	80.3%	2.3	2.3	11.6	95.5	3.4
9.0	2.8%	83.2%	2.6	2.6	13.0	95.1	2.7
10.0	2.2%	85.3%	2.9	2.9	14.5	94.7	2.1
15.0	7.0%	92.3%	4.3	4.3	21.7	92.6	6.5
20.0	4.5%	96.9%	5.7	5.7	29.0	90.6	4.1
25.0	1.4%	98.3%	7.2	7.2	36.2	88.5	1.3
30.0	0.7%	99.0%	8.6	8.6	43.5	86.4	0.6
35.0	0.5%	99.5%	10.1	10.1	50.7	84.3	0.4
40.0	0.5%	100.0%	11.5	11.5	58.0	82.2	0.4
45.0	0.0%	100.0%	12.9	12.9	65.2	80.2	0.0
50.0	0.0%	100.0%	14.4	14.4	72.4	78.1	0.0

96.5

Removal Efficiency Adjustment² = 6.5%
Predicted Net Annual Load Removal Efficiency = 90.0%
Predicted % Annual Rainfall Treated = 100.0%

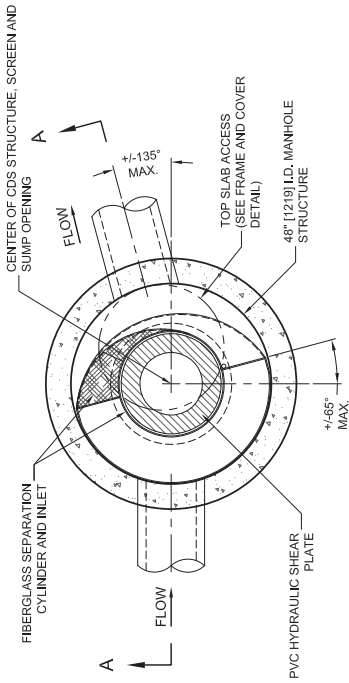
- 1 - Based on 42 years of hourly rainfall data from Canadian Station 6105976, Ottawa ON
- 2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.
- 3 - CDS Efficiency based on testing conducted at the University of Central Florida
- 4 - CDS design flowrate and scaling based on standard manufacturer model & product specifications

CDS PMSU2015-4-C DESIGN NOTES

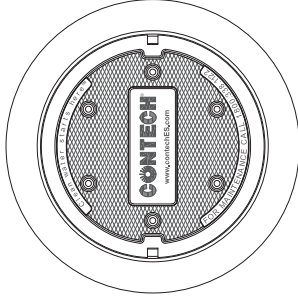
THE STANDARD CDS PMSU2015-4-C CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

CONFIGURATION DESCRIPTION

- GRATED INLET ONLY (NO INLET PIPE)
- GRATED INLET WITH INLET PIPE OR PIPES
- CURB INLET ONLY (NO INLET PIPE)
- CURB INLET WITH INLET PIPE OR PIPES
- CUSTOMIZABLE SUMP DEPTH AVAILABLE
- ANTI-FLOTATION DESIGN AVAILABLE UPON REQUEST

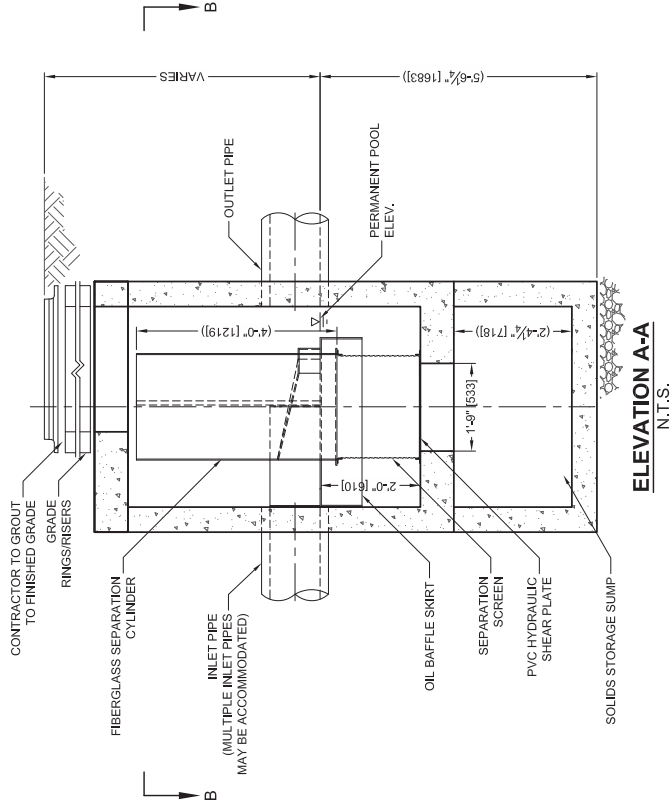


PLAN VIEW B-B
N.T.S.



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS	
STRUCTURE ID	*
WATER QUALITY FLOW RATE (CFS OR US)	*
PEAK FLOW RATE (CFS OR US)	*
RETURN PERIOD OF PEAK FLOW (YRS)	*
SCREEN APERTURE (2400 OR 4700)	*
PIPE DATA: I.E. MATERIAL	DIAMETER
INLET PIPE 1	*
INLET PIPE 2	*
OUTLET PIPE	*
RIM ELEVATION	*
ANTI-FLOTATION BALLAST	WIDTH
	HEIGHT
NOTES/SPECIAL REQUIREMENTS:	
* PER ENGINEER OF RECORD	



ELEVATION A-A
N.T.S.

- GENERAL NOTES**
- CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
 - CONTECH TO PROVIDE ALL DIMENSIONS UNLESS NOTED OTHERWISE.
 - FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEER.
 - SOLUTIONS LLC REPRESENTATIVE: www.conteches.com
 - CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
 - STRUCTURE SHALL MEET AASHTO HS20 AND CASTINGS SHALL MEET HS20 (AASHTO M 306) LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
 - PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.
- INSTALLATION NOTES**
- ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
 - CONTRACTOR TO PROVIDE ALL LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE. LIFTING JACKS OR CRANES PROVIDED.
 - CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLY STRUCTURE.
 - CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
 - CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

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CDS PMSU2015-4-C
INLINE CDS
STANDARD DETAIL



135 Cardevco Road Ottawa, Ontario

INFILTRATION CALCULATIONS (for Temperature Mitigation)

DRAINAGE AREA II + III

			C
Roof Area:	281	sq.m.	0.90
Asphalt/Concrete Area:	604	sq.m.	0.90
Gravel Area:	0	sq.m.	0.70
Landscaped:	<u>1076</u>	<u>sq.m.</u>	<u>0.25</u>
 Total Catchment Area	 1961	 sq.m.	 0.54

Required Volume Required to Capture: 5 mm rain event: 5.3 cu.m.

64% of days with precipitation are less than 5mm *

* Ottawa International Airport (1981-2010)

Infiltration Trench				Void
	Depth	Area	Total Volume	40% Volume
	m	sq.m.	cu.m.	cu.m.
Area A	0.145	67	9.7	3.9
Area B	0.145	38	5.5	<u>2.2</u>
			Total=	<u>6.1</u>

Percolation Rate: 6.0 mm/hr (as per Geotechnical
recommendations)

Time to Draw Down: 10 Hours

135 Cardevco Road Ottawa, Ontario Water Balance and Infiltration Calculations

Water Balance is based on the equation: Mean Annual Precipitation - Change in Groundwater Storage - Evapotranspiration = Runoff + Infiltration

Where: Long term changes to groundwater storage are assumed to be negligible
and
Short term or seasonal changes to groundwater are assumed to balance out over the year.

Therefore: Mean Annual Precipitation - Evapotranspiration = Runoff + Infiltration

Infiltration is based on the equations: Surplus (available for infiltration) = Mean Annual Precipitation - Evapotranspiration
and
Infiltration = Surplus x Infiltration Coefficient
and
Infiltration Coefficient = Topography Factor + Soil Factor + Vegetation Factor
(as per the MOE SWM Planning & Design Manual, 2003 - see below)

Pre Development

	Area (sq.m.)	Precipitation + (mm/yr)	Evapo-transpiration ++ (mm/yr)	Surplus (mm/yr)	Topography Factor *	Soil Factor **	Vegetation Factor ***	Infiltration Coefficient	Infiltration (mm/yr)
"Meadows"	2026	943	577	366	0.10	0.15	0.1	0.35	128
Total:	2026							Weighted Average:	128

Post Development

	Area (sq.m.)	Precipitation + (mm/yr)	Evapo-transpiration ++ (mm/yr)	Surplus (mm/yr)	Topography Factor *	Soil Factor **	Vegetation Factor ***	Infiltration Coefficient	Infiltration (mm/yr)	Volume Including Infiltration Trench (cu.m.)	Infiltration (mm/yr)
Landscaped	870	943	577	366	0.10	0.15	0.10	0.35	128	111	128
Hard Surfaces	1156	943	150	793				0.00	0	284	246
Total:	2026									395	
								Weighted Average:	55		195

	mm	Days with Precipitation +	Hard Surfaces Surplus / Precipitation	Hard Surfaces Area (sq.m.)	Hard Surfaces Available Annual Volume (cu.m.)	Hard Surfaces Annual Percentage Captured	Hard Surfaces Annual Volume Captured (cu.m.)	Required Volume of Infiltration Trench (cu.m.)
>=	0.2	163.6	0.84	1156	32	100%	32	0.2
>=	5	58.4	0.84	1156	284	100%	284	4.9
>=	10	30.0	0.84	1156	292	100%	292	9.7
>=	25	5.5	0.84	1156	134	100%	134	24.3

+ Ottawa International Airport (1981-2010)

++ Eastern Ontario Water Resources Management Study (2001) & Carp River Watershed / Subwatershed Study

* Topography: Flat Land, average slope < 0.6m/km (<0.06%)
Rolling Land, average slope 2.8 to 3.8m/km (0.28% to 0.38%)
Hilly Land, average slope 28 to 47m/km (2.8 to 4.7%)

** Soil: Tight impervious clay
Medium combination of clay and loam
Open sandy loam

*** Cover: Cultivated Lands
Woodland

Factor	Subject Property
0.3	
0.2	
0.1	
0.1	= 0.15 for sily sand / glacial till
0.2	
0.4	
0.1	
0.2	

As per MOE SWM Planning & Design Manual, 2003

Summary Tables

ONE HUNDRED-YEAR EVENT					
Drainage Area	Pre-development Flow Rate (L/s)	Maximum Allowable Release Rate (L/s)	Maximum Release Rate (L/s)	Maximum Volume Required (cu.m)	Maximum Volume Stored (cu.m)
AREA I (Uncontrolled Flow Off Site)	-	-	0.99	-	-
AREA II (Addition Roof - Drains to Drainage Area III)	-	-	3.49	3.51	3.51
AREA III	-	-	11.99	29.21	29.21
TOTAL	37.71	12.98	12.98	29.21	29.21

FIVE YEAR-EVENT					
Drainage Area	Pre-development Flow Rate (L/s)	Maximum Allowable Release Rate (L/s)	Maximum Release Rate (L/s)	Maximum Volume Required (cu.m)	Maximum Volume Stored (cu.m)
AREA I (Uncontrolled Flow Off Site)	-	-	0.82	-	-
AREA II (Addition Roof - Drains to Drainage Area III)	-	-	2.55	1.38	1.38
AREA II	-	-	6.13	16.27	16.27
TOTAL	17.61	12.98	6.95	16.27	16.27

135 Cardevco Road

Ottawa, Ontario

STORMWATER MANAGEMENT CALCULATIONS

Rational Method

PRE-DEVELOPMENT CONDITIONS

100-Year Flow Rate

			C
Roof Area:	0	sq.m	1.00
Asphalt/Concrete Area:	0	sq.m	1.00
Gravel Area:	0	sq.m	1.00
Existing Conditions:	2026	sq.m	0.375
Landscaped Area:	0	sq.m	0.25
Total Catchment Area:	2026	sq.m	0.375

1.25 x Woodland or Pasture - Flat - Clay and Silt Loam as per Table 5.7 Ottawa Sewer Design Guidelines

Bransby William Formula

$$T_c = \frac{0.057 \cdot L}{S_w^{0.2} \cdot A^{0.1}} \text{ min}$$

Sheet Flow Distance (L):	65	m
Slope of Land (Sw):	5.0	%
Area (A):	0.2026	ha
Time of Concentration (Sheet Flow):	3	min
Time of Concentration:	10	min
Rainfall Intensity (i):	179	mm/hr
100-Year Pre-Development Flow Rate (2.78AiC):	37.71	L/s

5-Year Flow Rate

			C
Roof Area:	0	sq.m	0.90
Asphalt/Concrete Area:	0	sq.m	0.90
Gravel Area:	0	sq.m	0.80
Existing Conditions:	2026	sq.m	0.30
Landscaped Area:	0	sq.m	0.20
Total Catchment Area:	2026	sq.m	0.30
Time of Concentration:	10	min	
Rainfall Intensity (i):	104	mm/hr	
5-Year Pre-Development Flow Rate (2.78AiC):	17.61	L/s	

Woodland or Pasture - Flat - Clay and Silt Loam as per Table 5.7 Ottawa Sewer Design Guidelines

2-Year Flow Rate & Maximum Allowable Release Rate

			C
Roof Area:	0	sq.m	0.90
Asphalt/Concrete Area:	0	sq.m	0.90
Gravel Area:	0	sq.m	0.80
Existing Conditions:	2026	sq.m	0.30
Total Catchment Area:	2026	sq.m	0.30
Time of Concentration:	10	min	
Rainfall Intensity (i):	77	mm/hr	
5 Year Pre-Development Flow Rate (2.78AiC):	12.98	L/s	
(Maximum Allowable Release Rate)			

Woodland or Pasture - Flat - Clay and Silt Loam as per Table 5.7 Ottawa Sewer Design Guidelines

ONE HUNDRED YEAR EVENT

DRAINAGE AREA I (Uncontrolled Flow Off Site)

(ONE HUNDRED-YEAR EVENT)

			C	
Roof Area:	0	sq.m	1.00	
Asphalt/Concrete Area:	5	sq.m	1.00	1.25 x Woodland or Pasture - Flat - Clay and Silt Loam as per Table 5.7 Ottawa Sewer Design Guidelines
Gravel Area:	0	sq.m	1.00	
Existing Conditions:	0	sq.m	0.375	
Landscaped Area:	60	sq.m	0.25	
Total Catchment Area:	65	sq.m	0.31	
Area (A):	65	sq.m		
Time of Concentration:	10	min		
Rainfall Intensity (i):	179	mm/hr		
Runoff Coefficient (C):	0.31			
Release Rate (2.78AiC):	0.99	L/s		

DRAINAGE AREA II (Addition Roof - includes 1/2 of existing roof)

(ONE-HUNDRED-YEAR EVENT)

	C	
Total Catchment Area:	1.00	186 sq.m
No. of Roof Drains:	2	
Slots per Wier:	1	0.0124 L/s/mm/slot (5 USGPM/in/slot)
Depth at Roof Drain:	141 mm	Pond Area: 75 sq.m
Maximum Release Rate:	3.49 L/s	Achieved Volume: 3.51 cu.m
		Maximum Volume Required: 3.51 cu.m

Time (min)	i (mm/hr)	2.78AiC (L/s)	Release Rate (L/s)	Stored Rate (L/s)	Stored Volume (cu.m)
5	243	12.55	3.49	9.06	2.72
10	179	9.23	3.49	5.74	3.45
15	143	7.39	3.49	3.90	3.51
20	120	6.20	3.49	2.71	3.26
25	104	5.37	3.49	1.88	2.82
30	92	4.75	3.49	1.26	2.27
35	83	4.27	3.49	0.78	1.64
40	75	3.89	3.49	0.40	0.95
45	69	3.57	3.49	0.08	0.22
50	64	3.31	3.31	0.00	0.00
55	60	3.08	3.08	0.00	0.00
60	56	2.89	2.89	0.00	0.00
90	41	2.13	2.13	0.00	0.00
120	33	1.70	1.70	0.00	0.00
150	28	1.43	1.43	0.00	0.00
180	24	1.24	1.24	0.00	0.00

DRAINAGE AREA III

(ONE HUNDRED-YEAR EVENT)

					C						
Roof Area:	95	sq.m		1.00							
Asphalt/Concrete Area:	604	sq.m		1.00							
Gravel Area:	0	sq.m		1.00							
Landscaped Area:	<u>1076</u>	sq.m		<u>0.25</u>							
Total Catchment Area:	1775	sq.m		0.55							
Water Elevation:	118.10	m									
Invert of Inlet of Culvert	117.90	m									
Centroid of ICD Orifice: (ICD in Inlet of Culvert)	117.96	m									
Head:	0.14	m									
Orifice Diameter:	124	mm									
Orifice Area:	11985	sq.mm									
Coefficient of Discharge:	0.61										
Maximum Release Rate:	11.99	L/s									
					Infiltration Trench						
					Depth	Area	Total	Void			
					m	sq.m.	Volume	Volume			
					0.145	105	cu.m.	40% cu.m.			
							15.2	6.1			
					Detention Area						
					Length	Width	Average				
					(sq.m)	(sq.m)	Depth	Volume			
							(m)				
			Area A	8.7	7.7	0.20	13.24	cu.m			
			Area B	8.5	4.5	0.20	7.60	cu.m			
					CB/MH	Top Area	Depth				
						(sq.m)	(m)	Volume			
					CB-1	46	0.15	2.29	cu.m		
								Achieved Volume:	29.21	cu.m	
									Maximum Volume Required:	29.21	cu.m

Time (min)	i (mm/hr)	2.78AiC (L/s)	Roof				
			Release Rate (L/s)	Total Inflow (L/s)	Release Rate (L/s)	Stored Rate (L/s)	Stored Volume (cu.m)
5	243	65.31	3.49	68.80	11.99	56.82	17.04
10	179	48.05	3.49	51.54	11.99	39.55	23.73
15	143	38.45	3.49	41.94	11.99	29.96	26.96
20	120	32.28	3.49	35.77	11.99	23.78	28.54
25	104	27.95	3.49	31.44	11.99	19.45	29.17
30	92	24.72	3.49	28.21	11.99	16.23	29.21
35	83	22.22	3.49	25.71	11.99	13.73	28.83
40	75	20.22	3.49	23.71	11.99	11.73	28.14
45	69	18.58	3.49	22.07	11.99	10.09	27.23
50	64	17.21	3.31	20.52	11.99	8.53	25.60
55	60	16.04	3.08	19.13	11.99	7.14	23.57
60	56	15.04	2.89	17.93	11.99	5.95	21.41
90	41	11.06	2.13	13.19	11.99	1.20	6.50
120	33	8.85	1.70	10.55	10.55	0.00	0.00
150	28	7.43	1.43	8.86	8.86	0.00	0.00
180	24	6.43	1.24	7.67	7.67	0.00	0.00

FIVE-YEAR EVENT

DRAINAGE AREA I (Uncontrolled Flow Off Site)

(FIVE-YEAR EVENT)

			C	
Roof Area:	0	sq.m	0.90	
Asphalt/Concrete Area:	5	sq.m	0.90	Woodland or Pasture - Flat - Clay and Silt Loam as per Table 5.7 Ottawa Sewer Design Guidelines
Gravel Area:	0	sq.m	0.80	
Existing Conditions:	0	sq.m	0.375	
Landscaped Area:	60	sq.m	0.20	
 Total Catchment Area:	 65	 sq.m	 0.25	
 Area (A):	 65	 sq.m		
Time of Concentration:	10	min		
Rainfall Intensity (i):	179	mm/hr		
Runoff Coefficient (C):	0.25			
 Release Rate (2.78AiC):	 0.82	 L/s		

DRAINAGE AREA II (Addition Roof - includes 1/2 of existing roof)

(FIVE-YEAR EVENT)

		C			
Total Catchment Area:	186 sq.m	0.90			
No. of Roof Drains:	2				
Slots per Wier:	1	0.0124 L/s/mm/slot (5 USGPM/in/slot)			
Depth at Roof Drain:	103 mm		Pond Area:	40 sq.m	
Maximum Release Rate:	2.55 L/s		Achieved Volume:	1.38 cu.m	
			Maximum Volume Required:	1.38 cu.m	

Time (min)	i (mm/hr)	2.78AiC (L/s)	Release Rate (L/s)	Stored Rate (L/s)	Stored Volume (cu.m)
5	141	6.57	2.55	4.02	1.20
10	104	4.85	2.55	2.29	1.38
15	84	3.89	2.55	1.33	1.20
20	70	3.27	2.55	0.71	0.86
25	61	2.83	2.55	0.28	0.42
30	54	2.51	2.51	0.00	0.00
35	49	2.26	2.26	0.00	0.00
40	44	2.06	2.06	0.00	0.00
45	41	1.89	1.89	0.00	0.00
50	38	1.75	1.75	0.00	0.00
55	35	1.63	1.63	0.00	0.00
60	33	1.53	1.53	0.00	0.00
90	24	1.13	1.13	0.00	0.00
120	19	0.91	0.91	0.00	0.00
150	16	0.76	0.76	0.00	0.00
180	14	0.66	0.66	0.00	0.00

DRAINAGE AREA III

(FIVE-YEAR EVENT)

			C
Roof Area:	95	sq.m	0.90
Asphalt/Concrete Area:	604	sq.m	0.90
Gravel Area:	0	sq.m	0.80
Landscaped Area:	<u>1076</u>	sq.m	<u>0.20</u>
Total Catchment Area:	1775	sq.m	0.48

Water Elevation: 118.00 m

Invert of Inlet of Culvert 117.90 m

Centroid of ICD Orifice: 117.96 m
(ICD in Inlet of Culvert)

Head: 0.04 m

Orifice Diameter: 124 mm

Orifice Area: 11985 sq.mm

Coefficient of Discharge: 0.61

Maximum Release Rate: 6.13 L/s

Infiltration Trench

Depth m	Area sq.m.	Total Volume cu.m.	Void Volume 40% cu.m.
0.145	104	15.1	6.0

Detention Area

Length (sq.m)	Width (sq.m)	Average Depth (m)	Volume
Area A 8.7	7.7	0.10	6.50 cu.m
Area B 7.5	5.0	0.10	3.66 cu.m

CB/MH	Top Area (sq.m)	Depth (m)	Volume
CB-1	5	0.05	0.08 cu.m

Achieved Volume: 16.27 cu.m

Maximum Volume Required: 16.27 cu.m

Time (min)	i (mm/hr)	2.78AiC (L/s)	Roof		Release Rate (L/s)	Stored Rate (L/s)	Stored Volume (cu.m)
			Release Rate (L/s)	Total Inflow (L/s)			
5	141	33.14	2.55	35.69	6.13	29.56	8.87
10	104	24.46	2.55	27.01	6.13	20.88	12.53
15	84	19.61	2.55	22.17	6.13	16.04	14.43
20	70	16.49	2.55	19.04	6.13	12.91	15.50
25	61	14.29	2.55	16.85	6.13	10.72	16.08
30	54	12.66	2.51	15.17	6.13	9.04	16.27
35	49	11.39	2.26	13.65	6.13	7.52	15.78
40	44	10.37	2.06	12.43	6.13	6.30	15.11
45	41	9.54	1.89	11.43	6.13	5.30	14.30
50	38	8.84	1.75	10.59	6.13	4.46	13.38
55	35	8.24	1.63	9.88	6.13	3.75	12.37
60	33	7.73	1.53	9.27	6.13	3.14	11.29
90	24	5.70	1.13	6.83	6.13	0.70	3.79
120	19	4.57	0.91	5.48	5.48	0.00	0.00
150	16	3.84	0.76	4.60	4.60	0.00	0.00
180	14	3.33	0.66	3.99	3.99	0.00	0.00

Site Plan Pre-Application Consultation

135 Cardevco Road

Meeting Date: July 7, 2022
PC2022-0041

Applicant: Arbaum Architects Inc.

Ward 5- West Carleton - March **Proposal Summary:** Construct 44m² dwelling on property, requires removal of hold

Attendees: Sean Harrigan, File Lead, City of Ottawa
Derek Kulyk, Infrastructure Project Manager, City of Ottawa
Mark Elliot, Environmental Planner, City of Ottawa
Erica Ogden, Mississippi Valley Conservation Authority
Jasdeep Brar, Planning Student, City of Ottawa

Consultation Team

Mariana Palos
Andrea Buchsbaum
Douglas Gray
Erik Ardley
Hendrik Van de Glind
Maha Saleh

Regrets

Mike Giampa, Transportation Project Manager, City of Ottawa

Meeting Minutes

Proposal Details

- Regularization of an existing building used for repairing buses and the addition of a small office building.
- Small office building will replace existing portables.
- Connecting to existing septic system and well.

Planning Comments

Provided by Sean Harrigan

- The subject site is designated Rural Industrial and Logistics by Schedule B9 of the new Official Plan. As per Official Plan section 9.3, the proposed development is permitted. However, development within this designation shall consider the provisions within policy 9.3.1(2), particularly subpoint (b) that requires appropriate screening from public roads and adjacent properties should be implemented using natural vegetation. To this regard, I strongly recommend considering possible minor modifications to the parking/gravel area directly along front lot line to help create space for vegetation planting.
- The site is further designated Light Industrial by Schedule 8.A – Designation Plan, Volume 2C: Area-Specific Policies, Official Plan.
- The subject site is zoned Rural General Industrial Zone, subzone 4 (RG4). The current heavy equipment and vehicle service for bus repairs is permitted. An office is permitted as a condition use provided it is on the same lot as a primary permitted use.
- This property is part of the Cardevco Industrial Park subdivision; the proposed development and Site Plan Approval will need to comply with the conditions listed in this subdivision agreement. Please provide staff with a copy of this agreement to confirm there are no restrictions that prevent construction.
- A **Planning Justification Report** will be required. This report must discuss how the proposed uses meet the Official Plan and Zoning By-law.
- A **Site Plan** is required and must show the property boundaries, dimensions of existing and proposed structures, zoning table, and other requirements listed in the Site Plan section within the [Guide to preparing studies and plans | City of Ottawa](#).
- As per Zoning By-law Section 101, the parking requirements are:
 - 0.75 spots per 100m² of heavy equipment/vehicle service space.
 - 2.4 spots per 100m² of office space.Please ensure the **Site Plan** lists the required and provided parking spaces per land use and that the parking/storage area for buses awaiting service or pickup after service is clearly shown.
- Official Plan policy 4.7.2(9) provides guidance that new development that relies upon private sewage system should maintain a minimum area of 800m² of undeveloped

land for the sewage system. Please ensure the **Site Plan** illustrates the total undeveloped land maintained for the sewage system. The Hydrogeological Report should provide justification if the proposed development does not achieve the 800m².

- A **Landscape Plan** is required and should clearly illustrate the location and details of any vegetation planting. This plan may be combined with the **Tree Conservation Report** provided the details are clearly visible.

Engineering Comments

Provided by Derek Kulyk

1) Survey

- A topographic survey needs to identify all representative elevation points, currently existing features (outline of existing septic bed/s, water wells, structures, etc.), including all property lines, bodies of water, vegetation, easements etc. It needs to provide a note that references the horizontal and vertical datums that were used and tied into to complete the project. Site benchmark/s also need/s to be provided. The survey should also show the existing municipal road ROW.

2) Water Service

- It is an existing site and it is understood that there are no municipal water pipes near the application. A hydrogeological and terrain study report is required to be submitted to the City, to show that there is a sufficient quantity and quality of aquifer water for the existing and the proposed development. The site is within Mississippi Valley Source Water Protection and Significant Groundwater Recharge area with a highly vulnerable aquifer. All these critical elements should be considered in the investigation.
- The investigation will require the “subdivision suite” of parameters to be tested (known to local consultants and laboratories) and also trace metals and Volatile Organic Compounds.
- The address is predicted to have groundwater of acceptable yield but variable quality.
- The existing and the proposed well/wells need to be shown on the proposed site servicing plan and they need to be established in agreement with the findings of the hydrogeological and terrain analysis report and to assure that they can provide water supply in excess of the design demand (for the existing and the proposed usage) and to comply with the latest water quality requirements.
- The location of the existing well/s will need to be shown on the plans. Existing Well Inspection report will be required.

- It is the responsibility of the owner to ensure that adequate water supply for fire-fighting is provided. The applicant must contact Allan Evans (Allan.Evans@ottawa.ca) with Ottawa Fire Services to determine any water supply requirements (potentially water storage tanks) for fire fighting, if building footprint is larger than 600 m².

3) Sanitary Service

- There are no municipal sanitary sewers adjacent the proposed development. A hydrogeological and terrain analysis study is required to show that a sufficient septic treatment system, or systems, will work for the development, especially considering that a highly vulnerable aquifer was identified on the site and the treatment system might need to be designed the way that infiltration is controlled to prevent possibility of groundwater contamination; Impact Risk Assessment will be required. Enhanced septic design might be required.
- Thin soils exist in the area and an analysis of the existing septic bed is required to identify its current parameters and how they relate to the proposed development. New septic bed might be required.
- If the design sanitary flow is less than 10,000 l/day, as anticipated, OSSO approval is required and this is needed prior to site plan approval being given.
- If the design flow is greater than 10,000 L/d, the septic system(s) is regulated by the Ministry of the Environment, Conservation and Parks (MECP) and requires a direct submission Environmental
- Compliance Approval (ECA) application. Note that the site-wide daily design flow refers to the total design flow produced on one lot or parcel of land.
- Minimum Septic Field Setback from property lines is 3 metres & 5 metres from buildings. Note: if the septic fields are raised beds, then these separations distances increase (they increase by 2x the grade raise) – please see Ottawa Septic System Office guidelines for details.

4) Servicing Report

- A servicing report will need to be submitted and it needs to comprehensively address the water quality and quantity, including the required projected water demand and the expected well capacity considerations and sanitary servicing needs of the existing and the proposed site conditions. All references need to be made to the proposed Site Plan features, including the existing structures that are to remain.
- It is not clear if there is an existing water well on site. If it is and it is planned to service the existing and the proposed development, these considerations must be included on the site plan and in the report.
- It also needs to include any plans for decommissioning of the existing septic bed, if such actions are considered. The existing well test will be required, and adequate well capacity needs to be confirmed (references to hydrogeological studies must be

made to confirm the groundwater conditions), if it is to remain. If a new well is planned, then it needs to be addressed in the report. Any potential well decommissioning plans need also be included in the report, as well.

- Fire-fighting considerations must also be included (specific firefighting flows, supported by calculations) and the applicant must contact Allan Evans (Allan.Evans@ottawa.ca) with Ottawa Fire Services to determine any water supply requirements (potentially water storage tanks) for fire fighting purpose. The communication record needs to be included in the report.
- The report needs to include enhanced investigation and mitigation of the thin soils condition and presence of highly vulnerable aquifer.
- Proposed septic bed sizing needs to be provided, to assure that it will be able to accommodate the generated flows. It should also contain comprehensive rationale that will allow to conclude that the existing hydrogeological and geotechnical conditions were considered, in order to protect the groundwater, as per latest guidelines and legal requirements.
- Water pumping testing might be required to assure the industrial or normal operating conditions water demands can be met.

5) Groundwater

- Groundwater level is to be investigated in the Hydrogeological Report and Terrain analysis and the level is to be derived from spring-time investigation. Report needs to be submitted to the City for review.
- The proposed well on-site needs to follow the determinations of the Hydrogeological report and needs to assure that adequate water supply is provided which exceeds the determined design requirements.
- The proposed development falls within the jurisdiction of Mississippi Valley Conservation Authority and is within Mississippi-Rideau source water protection area and Carp River watershed/sub-watershed. It is also identified to be within highly vulnerable aquifer and significant groundwater recharge area.
- These fact needs to be considered in the hydrogeological and terrain analysis and they also pertain to SWM considerations and the Septic bed considerations for the proposed development.

6) Storm Sewers

- There are no municipal storm sewers adjacent the proposed development. A retained consultant will need to review the existing downstream ditch network for capacity and prepare a SWM plan and report that will assure that the post development surface run-off will not adversely affect the downstream drainage system, including culverts, point of proposed site storm sewer system outlet location and the adjacent properties during construction and in the post-construction condition.

- Currently the site (including its asphalted surface) drains directly overland to the swale on the adjacent property to the north-west. This condition must be corrected. Also, if current drainage allows for adjacent properties draining towards the site under consideration, this condition needs to be maintained.
- Consultant will need to show Legal and sufficient storm outlet from site for both release rate and volume. If the plan is to try to discharge Stormwater to the roadside ditch you will need to check with the City R.O.W. department, to see that there is capacity and that they agree to accept the additional runoff from the site.
- Snow Storage area should be shown on the site plan and should be separated from the septic field locations, so there is no snow melt impacting the septic field. In addition, the snow storage areas should drain into the SWM system for discharge from the site.
- Additional controls might need to be implemented, to prevent contaminants (salts and other) infiltration into the ground, due to sensitive hydrogeological conditions such as highly vulnerable aquifer on site.
- A direct submission ECA application to the MECP for an ECA will likely be required for any proposed stormwater management systems since this is an industrial-zoned site.

7) Storm Water Management (SWM)

- LID is required, as per the memo from the former MOECC (now MECP). Efforts are required to provide low flow runoff in the summer. Any existing stormwater runoff from adjacent site(s) that crosses the property must be accommodated by the proposed stormwater management design. No adverse effect can be created to the surrounding properties.
- SWM report will be required. The SWM Report needs to reference soil hydrogeological and geotechnical conditions and its infiltration capacity clearly and what, if any, surface run-off water treatment measures are being applied to protect the vulnerable aquifer. Mississippi Valley Conservation Authority needs to be contacted in this matter and its requirements will also need to be included in this report.
- The entire site needs to be controlled via on-site control measures, considering post-construction 100-year storm run-off flows that might have to be directed to the SWM pond.
- 100 year post development flow must be controlled to the 2-year pre-development return period storm level (pre-development condition needs to be considered as greenfield area). If this is not attainable, SWM pond might be required.
- All stormwater management determinations shall have supporting rationale.
- The stormwater management shall itemize concurrence with the content of the CRWSS.

- a. Storage shall be the greater of Table 8.3.10 of the CRWSS and that required for 80% TSS removal
 - b. Efforts are required to provide low flow runoff in summer
 - c. 104 mm/yr infiltration (p.196)
 - d. Runoff shall be provided to achieve temperature mitigation thermal regime (p. 159)
- The location is within the area covered by the Carp River Watershed/Subwatershed Study, project no. 00056, December 2004, prepared by Robinson Consultants Inc., Aquafor Beech Ltd., Lloyd Phillips and Associates, and Daniel Brunton Consulting Services. The report suggests (following sufficient/satisfactory treatment) methods promoting infiltration. The Stormwater Management Report must address the applicable requirements of the Carp River Watershed/Subwatershed Study.
 - Detailed surface run-off calculations need to be included in the new report and all types of existing and proposed surfaces should be individually considered in the analysis. Gravel run-off coefficient should be 0.8.
 - The pre-development condition will be determined using the smaller of a run-off coefficient of:
 - 0.5
 - actual existing approved site runoff coefficient
 - previously agreed in the existing Subdivision Agreement (if one can be found)

8) Geotechnical Investigation

- Please note that thin soils, sensitive marine clays and potential karst topography are anticipated in the area of the proposal and enhanced geotechnical investigation and exhaustive analysis will be necessary. Investigation of clays should be undertaken with vane shear testing, Atterberg limits testing (from a number of depths in each column), shrinkage, grain size, grade raise restriction, consolidation, compaction sensitivity, remolded strength and liquefaction analysis- amongst others. Earthquake analysis is now required to be provided in the report.
- It should also include infiltration/percolation testing for SWM & septic field design due to a highly vulnerable aquifer present on site within Mississippi-Rideau source water protection and groundwater recharge area. Infiltration here might be of concern.
- The groundwater level is to be investigated and the level is to be derived from spring-time investigation.

9) Roads:

- Please refer to the City of Ottawa Private Approach By-Law 2003-447 for the entrance design.
- Cardevco Road – in Rural Road Network, as a local road and a ROW protection of 20 m is required

- Topographic survey needs to confirm the ROW width of 20 m (if it is determined to be less, ROW widening will be required to match the requirement)

10) Energy conservation

- Energy conservation is required to be demonstrated throughout design as per section 2.2.3 of the Official Plan (reduction of urban heat, renewable energy, mitigation of climate change impacts and others).

11) Subdivision agreement

- The subject property is part of the Cardevco Industrial Park which was approved under Subdivision Agreement 4M-356, registered in 1982. The Site Plan application must comply with the terms and conditions of the Subdivision Agreement.

12) Permits and Approvals

- Please contact the Mississippi Valley Conservation Authority (MVCA), amongst other federal and provincial departments/agencies, to identify all the necessary permits and approvals required to facilitate the development: responsibility rests with the developer and their consultant for determining which approvals are needed and for obtaining all external agency approvals. The address shall be in good standing with all approval agencies, for example MVCA, prior to approval. Copies of confirmation of correspondence will be required by the City of Ottawa from all approval agencies that a form of assent is given. Please note that a stormwater program for multiple lots is understood to be the expanded type of Environmental Compliance Approval (ECA) application with the MECP; please speak with your engineering consultant to understand the impact this has on the application.
- Please note that OSSO approval is required prior to site plan approval being given.
- An MECP ECA application is not submitted until after City of Ottawa engineering is satisfied that components directly or indirectly aligned with the ECA process concur with standards, directives, and guidelines of the MECP.
- No construction shall commence until after a commence work notification is given by Development Review
- Ministry of the Environment, Conservation and Parks contact information: Jena Lavoy – water inspector; (613)521-3450 x 236; Jena.Leavoy@ontario.ca
- Mississippi Valley Conservation Authority information: Erica Ogden; eogden@mvc.on.ca

13) Engineering Submission Requirements:

Plans

- Site Servicing Plan*
- Grading and Drainage Area Plan
- Erosion and Sediment Control Plan*
- Lighting Plan (not required at submission, but for registration)

*All identified required plans are to be submitted on standard A1 size sheets as per City of Ottawa Servicing and Grading Plan Requirements and shall note the survey monument used to establish datum on the plans with sufficient information to enable a layperson to locate the monument.

Reports

- Site Servicing Study/Report (include firefighting considerations) (Water & Sanitary)
- Storm Water Management Report and Plan
- Hydrogeological and terrain analysis report
- Geotechnical Investigation Report (The geotechnical consultant will need to provide full copies of any published and peer reviewed papers relied on to determine results and conclusions)
 - Earthquake analysis is now required to be provided in the report.
- Erosion and Sediment Control Measures (Plan is also required)

Guide to preparing City of Ottawa Studies and Plans: [Guide to preparing studies and plans | City of Ottawa](#)

To request City of Ottawa plan(s) or report information please contact the ISD Information Centre: Information Centre(613) 580-2424 ext. 44455

Environmental Comments

Provided by Mark Elliot

- A **Tree Conservation Report (TCR)** will be required for the site as per By-law 2001-451. As part of this report, the critical root zone of the existing trees must be identified and protected during construction pursuant to Tree Conservation Report Guidelines.
- The primary focus of the report should be the protection of existing trees (none of which are slated to be removed in the current plan) and also to find opportunities for additional plantings to help meet the forestry canopy targets identified in the general forest canopy goals in section 2.2.3.7, 4.8.2, 11.1.3, and 9.3.1 of the new Official Plan.
- Section 9.3.1 gives two broad goals that should be considered when choosing the planting sites:

- b) Appropriate screening from public roads and adjacent properties using natural vegetation, preferably existing vegetation where possible; and
- c) Outdoor amenity areas for employees and landscaping that supports the City's tree canopy targets.
- Screening from the road may be difficult in this case, but it may be possible if minor modifications are made to the parking/gravel area. Failing this, the rear of the lot offers space to achieve a large number of tree plantings that also would offer an amenity space for employees. Caution should be taken to ensure that the proposed plantings do not interfere with the septic system on site.

Mississippi Valley Conservation Authority Comments

Provided by Erica Ogden

- The subject property is not regulated by MVCA under Ontario Regulation 153/06
- The stormwater quality requirement is an enhanced level of protection, 80% total suspended solids removal.
- The property is within the Carp River Watershed Subwatershed Study area and a part of the Huntley Creek Subwatershed which is a cool water system. Temperature mitigation will be an important consideration in the stormwater design.

To request City of Ottawa plan(s) or report information please contact the City of Ottawa Information Centre:

informationcentre@ottawa.ca OR (613) 580-2424 ext. 44455

As per section 53 of the Professional Engineers Act, O.Reg. 941/40, R.S.O. 1990, all documents prepared by engineers must be signed and dated on the seal.

Application Submission Information

Application Type: **Site Plan Control – Rural Small**

For information on Site Plan Control Applications, including fees, please visit: <https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/fees-and-funding-programs/development-application-fees>

The application processing timeline generally depends on the quality of the submission. For more information on standard processing timelines, please visit: <https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/development-application-forms#site-plan-control>

Prior to submitting a formal application, it is recommended that you pre-consult with the Ward Councillor.

Application Submission Requirements

For information on the preparation of Studies and Plans and the City's requirements, please visit: <https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans>

Please provide electronic copy (PDF) of all plans and studies required.

All identified required plans are to be submitted on standards A1 size sheets and use an appropriate metric scale as per [City of Ottawa Servicing and Grading Plan Requirements](#), and shall note the survey monument used to establish datum (beyond the local benchmark) on the plans with sufficient information to enable a layperson to locate the document.

Note that many of the plans and studies collected with this application must be signed, sealed and dated by a qualified engineer, architect, surveyor, planner or designated specialist.

City of Ottawa Servicing Study Checklist

General Content

Executive Summary (for large reports only): not applicable

Date and revision number of the report: see page 1 of Servicing Brief and Stormwater Management Report

Location map and plan showing municipal address, boundary, and layout of proposed development: see drawings C-1 to C-4

Plan showing the site and location of all existing services: see drawings C-1 to C-4

Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere: not applicable

Summary of Pre-consultation Meetings with City and other approval agencies: not available

Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defensible design criteria: not applicable

Statement of objectives and servicing criteria: see page 2 of Servicing Brief and Stormwater Management Report

Identification of existing and proposed infrastructure available in the immediate area: see drawings C-1 to C-4

Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available). see drawings C-1 to C-4

Concept level master grading plan to confirm existing and proposed grades in the development and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths: not applicable

Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts: not applicable

Proposed phasing of the development, if applicable: not applicable

Reference to geotechnical studies and recommendations concerning servicing: see note 1.5 on drawing C-2

All preliminary and formal site plan submissions should have the following information:

- **Metric scale:** included
- **North arrow:** included
 - **(including construction North):** not included
- **Key Plan:** included

- **Name and contact information of applicant and property owner:** not available
- **Property limits:** included
 - **including bearings and dimensions:** not included
- **Existing and proposed structures and parking areas:** included
- **Easements, road widening and rights-of-way:** included
- **Adjacent street names:** included

Development Servicing Report: Water

Confirm consistency with Master Servicing Study, if available: not applicable

Availability of public infrastructure to service proposed development: not applicable

Identification of system constraints: not applicable

Confirmation of adequate domestic supply and pressure: not applicable

Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow locations throughout the development: not applicable

Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves: not applicable

Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design: not applicable

Address reliability requirements such as appropriate location of shut-off valves: not applicable

Check on the necessity of a pressure zone boundary modification:. not applicable

Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range: not applicable

Description of the proposed water distribution network, including locations of proposed connections to the existing systems, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions: not applicable

Description of off-site required feeder mains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation: not applicable

Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines: not applicable

Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference: not applicable

Development Servicing Report: Wastewater

Summary of proposed design criteria: see page 2 of Servicing Brief

(Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure): not applicable

Confirm consistency with Master Servicing Study and /or justification for deviations: not applicable

Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and conditions of sewers: not applicable

Descriptions of existing sanitary sewer available for discharge of wastewater from proposed development: see page 2 of Servicing Brief

Verify available capacity in downstream sanitary sewer and / or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable): not applicable

Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix C) format. not applicable

Description of proposed sewer network including sewers, pumping stations, and forcemains: see not applicable

Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality): not applicable

Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development: not applicable

Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity: not applicable

Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding: not applicable

Special considerations such as contamination, corrosive environment etc: not applicable

Development Servicing Report: Stormwater Checklist

Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property): see page 4 of Servicing Brief and Stormwater Management Report

Analysis of available capacity in existing public infrastructure. not applicable

A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern: see drawing C-1 to C-4

Water quality control objective (e/g/ controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking

into account long-term cumulative effects: see Stormwater Management Report Servicing Brief and Stormwater Management Report

Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements: Servicing Brief and Stormwater Management Report

Descriptions of the references and supporting information.
Set-back from private sewage disposal systems. not applicable

Watercourse and hazard lands setbacks: not applicable

Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed: the pre-application consultation record has not been issued

Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists: not applicable

Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period). see drawings C-1 to C-4 and Servicing Brief and Stormwater Management Report

Identification of watercourses within the proposed development and how watercourses will be protected, or , if necessary, altered by the proposed development with applicable approvals. see drawings C-1 to C-4 and Servicing Brief and Stormwater Management Report

Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions: see Servicing Brief and Stormwater Management Report

Any proposed diversion of drainage catchment areas from one outlet to another. : not applicable

Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities. : not applicable

If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event: not applicable

Identification of potential impacts to receiving watercourses: Servicing Brief and Stormwater Management Report

Identification of municipal drains and related approval requirements. : not applicable

Descriptions of how the conveyance and storage capacity will be achieved for the development: see page 3 of Servicing Brief and Stormwater Management Report

100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading:

Inclusion of hydraulic analysis including hydraulic grade line elevations. : not applicable

Description of approach to erosion and sediment control during construction for the protection of receiving watercourses of drainage corridors: see notes 2.1 to 2.6 on drawing C-2

Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplains elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current: not applicable

Identification of fill constraints related to floodplain and geotechnical investigation. : not applicable

Approval and Permit Requirements: Checklist

The Servicing Study shall provide a list of applicable permits and regulatory approvals necessary for the proposed development as well as the relevant issues affecting each approval. The approval and permitting shall include but not be limited to the following:

Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not approval authority for the Lakes and Rivers Improvement Act. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act: see page 19 of Servicing Brief and Stormwater Management Report

Application for Certificate of Approval (CofA) under the Ontario Water Resources Act:

Changes to Municipal Drains. : not applicable

Other permits (National Capital commission, Parks Canada, public Works and Government Services Canada, Ministry of transportation etc.) : not applicable

Conclusion Checklist

Clearly stated conclusions and recommendations: see page 7 of Servicing Brief

Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.

All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario: included