D.B. Gray Engineering Inc.

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

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SITE SERVICING STUDY & STORMWATER MANAGEMENT REPORT

1386-1394 GREELY LANE
OTTAWA, ONTARIO

REPORT NO. 24015

JANUARY 13, 2025
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REVISED SEPTEMBER 29, 2025
REVISED NOVEMBER 20, 2025

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LIST OF APPENDICES

1.0 INTRODUCTION

This Site Servicing Study & Stormwater Management Report is a description of the servicing for a one-storey office / warehouse building and addresses the stormwater management requirements of a 4,679 m^2 property being redeveloped at 1386-1394 Greely Lane, in Ottawa. A car wash building and 'shipping container/dome' shed, both to be demolished, are currently located on the property. The property also has frontage on Parkway Road.

This report forms part of the site servicing and stormwater management design for the proposed development. Also refer to drawings C-1 to C-9 prepared by D. B. Gray Engineering Inc.

2.0 WATER SERVICING

2.1 WATER SUPPLY FOR FIREFIGHTING

The proposed one-storey building is about 1,263 m^2 in area, having an average height of 5.67 m. Using the Ontario Building Code (OBC) method to calculate the water supply for firefighting the required storage volume (Q) is 211,468 L and the required flowrate (FF) is 6,300 L/min (as per OBC A-3.2.5.7. Table 2). As per the City of Ottawa Technical Bulletin IWSTB-2024-05, if FF is 5,400 or 6,300 L/min the minimum required storage is Q; therefore, the minimum is 211,468 L. Refer to calculations in Appendix A.

Five 45,000 L (approximately 10,000 Imperial gallons) tanks are proposed for a total of 225,000 L, exceeding the required volume. This volume calculates to be about a 36-minute water supply at 6,300 L/min, which is greater than the 30-minute minimum required by OBC. One tank will be equipped with a chute and draw pipe, and the other tanks will have a chute and vent.

2.2 DOMESTIC WATER SUPPLY

An existing drilled well, located at the north end of the property will be decommissioned by a licensed well contractor in accordance with Ontario Regulation 903. Upon completion a well record for the decommissioned well will be delivered to the owner of the land.

A new drilled well, to be constructed near the southeast corner of the property, will provide the domestic water supply. The new well shall constructed by a licensed well contractor in accordance with Ontario Regulation 903.

A pumping test will be required at the new drilled well (under the direction of the hydrogeology consultant – Cambium Inc.), at a rate and duration to demonstrate that the well is capable of meeting the expected daily water demand. The expected daily water demand is estimated to be equal to the total daily design sanitary sewage flow (TDDSSF), which for the proposed development, is 1,800 L/day (refer to Sanitary Servicing below).

Analyses of water samples from the new drilled well is required (under the direction of the hydrogeology consultant – Cambium Inc.), to demonstrate that the well water is potable, and that any elevated concentrations of parameters can be treated with available water conditioning equipment.

3.0 SANITARY SERVICING

The existing on-site sewage (septic) system will be decommissioned to the satisfaction of the Director of the Ottawa Septic System Office (OSSO). A new septic system will serve the proposed building and will be constructed by a Registered Sewage System Installer.

The total daily design sanitary sewage flow (TDDSSF) for the proposed office / warehouse building is calculated to be 1,800 L/day. This flow is based on 16 employees and four shop / warehouse areas; and is calculated in accordance with the Part 8 of the Ontario Building Code (OBC) as follows:

Employees ('Office' or 'Factory Area – no showers'):
16 employees x 75 L/day per employee = 1,200 L/day
Shop / Warehouse Area:
4 bays x 150 L/day = 600 L/day

Total TDDSSF = 1,800 L/day

A Waterloo Biofilter advanced treatment system is proposed which includes: an Anaerobic Digestor with Internal Pump Chamber (Model ADIPC-6000), a Biofilter Tank (Model BFCN-4800), an WaterNOx-LS Tank (for nitrogen removal), and a Type A Area Bed.

As stated in the Hydrogeological Assessment Report, prepared by Cambium Inc. (Reference: 17281-002, dated July 25, 2025): *"A daily sewage design flow volume of 1,800 L/day was calculated for the proposed light industrial building. Given the site lithology and estimated T-times, a total septic bed footprint of approximately 21.6 m by 8.5 m, with a 6,000 L septic tank and a Waterloo Biofilter advanced treatment system, will be required. The bed will be at least partially raised due to Site conditions, with the specific height to be determined during the final building design. The predictive assessment indicates the proposed development will result in an estimated nitrate concentration of 5.3 mg/L at lot boundaries if wastewater is treated via the proposed Waterloo Biofilter advanced treatment system and only dilution water from infiltration within permeable areas is considered. Overall, the Site conditions appear feasible to install an on-site sewage system, and there is adequate space for the installation which appears to meet the required OBC setback distances. However, this should be considered and evaluated during the detailed sewage system design stage."*

To prevent having an adverse effect on the bacterial action in the septic system, floor drains inside the building are not proposed.

An application for a septic permit was submitted to the Ottawa Septic System Office (OSSO), and a permit was issued.

4.0 STORMWATER MANAGEMENT

4.1 QUALITY CONTROL

As stated in the City of Ottawa's 'Pre-Consultation: Meeting Feedback', dated January 26, 2024: *"The stormwater management quality criteria for this site are 80% TSS removal."* To meet the water quality target an oil grit separator (OGS) manhole is proposed. A CDS Model PMSU2015-4 was selected by the manufacturer based on the provided description of the drainage area and the manufacturer's software. The CDS PMSU2015-4 is calculated to remove approximately 85% of the TSS. Refer to Appendix B. The CDS PMSU2015-4 has an oil capacity of 232 L and a sediment capacity of 0.7 m^3.

As per Shield's Creek Subwatershed Study, June 2004, section 6.3.4.7 – Infiltration/Groundwater Protection: *"existing infiltration levels are to be maintained as part of a stormwater management plan for future development to protect the groundwater resources and maintain current hydrologic functions for flow regime protection, erosion control, and low flow maintenance (fisheries)"*.

The groundwater level at the subject property can be very high. As indicated on Table 5 in the Geotechnical Investigation Report (dated February 27, 2025, prepared by Cambium Inc.), groundwater was measured at three boreholes in March 2023 and April 2024. On April 19, 2024, groundwater measured to be 0.3 to 0.6m below grade (97.7 to 98.3 m ASL). The high groundwater precludes using underground infiltration measures. For example, small underground open bottomed storage chambers

(about 0.4m in height) surrounded by 150 mm clear stone, installed as shallow as possible (i.e. just under the pavement structure) was considered; however, the bottom of the clear stone would be at the April 2024 groundwater elevation (i.e. the clearance to groundwater would be 0, far less than the recommended 1.0 m clearance). Therefore, a surface infiltration trench, with a minimum 1.0 m clearance to groundwater, was selected as the best option to meet the water balance requirements.

An infiltration trench, having an area of 82 m^2 and a storage volume of 11.5 m^3, is proposed. This is slightly greater than the 11.4 m^3 volume required to capture the runoff from a 10 mm rainfall event (refer to calculations in Appendix B). In Ottawa, rainfall in 82% of the days with precipitation is 10 mm or less (Government of Canada, Environment and Natural Resources, Ottawa (Airport) (1991-2020)); therefore, in the area that drains to the infiltration trench, the runoff from the majority of rainfall events will infiltrate into the ground. The infiltration rate of the underlying soil (silty sand) was estimated to have an infiltration rate of 15 mm/hr. However, as per the City of Ottawa LID Technical Guidance Report a factor of safety should be considered: A safety correction factor of 2.5 has been applied to the infiltration rates. Therefore, a design infiltration rate of 6 mm/hr was used, and the infiltration trenches, having a depth of 140 mm, will have a drawdown time of about 23 hours (as per the MOE Stormwater Management Planning and Design Manual a maximum drawdown time of 24 to 48 hours is recommended).

In eastern Ontario, on hard surfaces, approximately 150 mm of the 943 mm annual precipitation is lost to evapotranspiration, and about 575 mm is lost on urban lawns (Eastern Ontario Water Resources Management Study (2001); Carp River Watershed / Subwatershed Study & MOE SWM Planning & Design Manual, 2003). As per Figure 5.5.1 and Table 6.3.2 in the Shields Creek Subwatershed Study the subject property is in an area of *"sand, reworked glaciofluvial"* with a target infiltration rate of 100 to 250 mm/yr. Based on the pre-development water balance and infiltration calculations, the volume of the annual infiltration within the property is 620 m^3, and the annual infiltration rate is within the target range at 133 mm/year. Based on the post development water balance and infiltration calculations, with the installation of an infiltration trench at the bottom of Stormwater Detention Area 'B" (82 m^2 in area and 11.4 m^3 storage volume), the annual infiltration is 655 m^3 (including 455 m^3 via the infiltration trench); compared to pre-development conditions, an infiltration surplus of 45 m^3. The post development the annual infiltration is calculated to be 142 mm/year; greater than the pre-development infiltration rate and within the 100 to 250 mm/yr target infiltration rate. (Without the infiltration trench, the annual infiltration would be 211 m^3, a 409 m^3 deficit compared to the pre-development volume, and the infiltration rate would only be only 45 mm/yr.)

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 recommended to minimize the potential for suspended sediments to clog the trench. All the hard surfaces draining to the infiltration trench will drain to it via a grassed swale about 37 m in length. This grassed swale, leading to the infiltration trench, will be used as a pre-treatment measure. The swales that have minimal longitudinal slopes will keep flow velocities low making them effective for pre-treatment and they will tend to increase the removal of TSS. The low flow conditions in these grassed areas will aid in filtering out coarse sediment from runoff and the grass will take up nutrients. As per the MOE Design Manual, to be effective, grassed swales should be designed with minimal longitudinal slopes (< 1%); with a bottom width of > 0.75 m; and with a maximum 0.15 m^3/s capacity; to achieve a maximum 0.5 m/s velocity during a 25-mm-4-hour storm. The proposed grassed swales will have minimal (0.5%) longitudinal slopes and a bottom width of about 1.0m.

4.2 QUANTITY CONTROL

As stated in the City of Ottawa's 'Pre-Consultation: Meeting Feedback', dated January 26, 2024: *"The quantity criteria for the development are that the 100-yr post development peak flow rate must match the 2-year pre-development peak flow rate."*

The pre-development condition is considered to be the existing conditions. The pre-development runoff coefficient ('C') is calculated to be 0.38, and, using the Bransby Williams Formula, the time of

concentration is calculated to be 2 minutes. Since the calculated time of concentration is less than 10 minutes, 10 minutes is used. Using the Rational Method, the pre-development 100-year peak flow is 102.51 L/s, and the 2-year peak flow is 37.66 L/s. Therefore, the maximum allowable release rate is 37.66 L/s for all storm events up to the 100-year event. Refer to calculations in Appendix B.

Stormwater will be stored within the development on the surface above catch basins and in two stormwater detention areas. The stormwater released from the site will discharge to the Parkway Road roadside ditch. 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.

Drainage Area I (Uncontrolled Flow Off Site – 1,151 m^2):
Areas around the perimeter of the property will drain uncontrolled off site. The flow rates are calculated at a time of concentration of 10 minutes.

	100-Year Event	2-Year Event
Maximum Flow Rate	15.62 L/s	5.45 L/s

Drainage Area II (3,529 m^2):
An inlet control device (ICD) located in the outlet of catch basin / manhole CB/MH-4 will control the release of stormwater from the property and will discharge stormwater to the Parkway Road roadside ditch. The ICD will restrict the flow and force the stormwater to rise in the sewer pipes, catch basins and manholes, and into two detention areas (Stormwater Detention Area 'A' & Stormwater Detention Area 'B', and onto the surfaces above the catch basins. The ICD shall be a plug style with a round orifice design manufactured by Pedro Plastics (or approved equal) and shall be sized by the manufacturer for a discharge rate of 22.04 L/s at 1.54 m head. It is calculated that an orifice area of 6,573 mm^2 ($\pm$91 mm diameter) and a discharge coefficient of 0.61 will restrict the outflow rate to 22.04 L/s at a head of 1.54 m. Based on this orifice the maximum outflow rate for the 2-year storm event is calculated to be 21.32 L/s at 1.44 m.

	100-Year Event	2-Year Event
Maximum ICD Release Rate	22.04 L/s	21.32 L/s
Maximum Ponding Elevation	99.84 m	99.74 m
Maximum Volume Stored	121.68 m^3	29.34 m^3

Entire Site

	100-Year Event	2-Year Event
Pre-Development Flow Rate	102.51 L/s	37.66 L/s
Maximum Allowable Release Rate	37.66 L/s	37.66 L/s
Maximum Release Rate	37.66 L/s	26.78 L/s
Maximum Volume Required & Stored	121.68 m^3	29.34 m^3

The maximum post-development release rate during the 100-year event is calculated to be 63% less than the pre-development flow rate and equal to the maximum allowable release rate. To achieve the maximum allowable release rate, a maximum storage volume of 121.68 m^3 is required and provided. The maximum post-development release rate during the 2-year event is calculated to be 29% less than the pre-development flow rate and the maximum allowable release rate. The proposed stormwater management quantity control measures are expected to have a positive impact on the downstream municipal infrastructure.

In the event that the 100-year storm is exceeded (or if there is blockage) stormwater will flow out the driveway entrance and over the retaining wall weir at Stormwater Detention 'B' (both having a spillover

elevation of 99.85, which is just above 100-year ponding elevation of 99.83). As stated in the City of Ottawa's 'Pre-Consultation: Meeting Feedback', dated January 26, 2024: *"A 0.3m freeboard should be provided between the 100-year high-water elevation and the finished floor elevation."* However, it is not practical to provide a 0.30 m freeboard with the proposed development, and it is not necessary; a 0.21 m freeboard is provided. At a 0.15 m overflow depth, the overflow capacity is calculated to be 2,180 L/s (about four times the overflow capacity of an 11 m wide municipal road, which is about 500 L/s to 550 L/s). In the extremely unlikely event that the proposed storm sewer system is completely blocked, and the ponding elevation is already at the maximum elevation of 99.85, and a 100-year storm event occurs; the maximum flowrate out the driveway entrance and out the overflow weir of Stormwater Detention 'B' is calculated to be 172.83 L/s (at 10-minutes time of concentration); but the overflow capacity is over 12-times greater. At this flowrate of 172.83 L/s (again, which is extremely unlikely to occur) the depth of the overflow is calculated to be only 0.03 m; therefore, the water elevation would be a maximum of 99.88, 180 mm below the ground finish floor elevation; and therefore, the risk of ponding stormwater entering the building is virtually zero. Refer to calculations in Appendix B.

4.3 STORM SERVICING

Stormwater will be conveyed off the site via a proposed storm sewer system to the Parkway Road roadside ditch. The unrestricted flowrate resulting from 2-year storm event will produce a peak flow of 58.58 L/s in the last pipe segment which will be 61% full. However, the restricted flow through the ICD will restrict the flow to a maximum flow of 21.32 L/s so that the last pipe segment will only be 22% full. Refer to calculations in Appendix B.

4.4 SUFFICIENT AND LEGAL OUTLET

As stated in the City of Ottawa's 'Pre-Consultation: Meeting Feedback', dated January 26, 2024: *"Stormwater must outlet to a legal and sufficient outlet."*

Runoff from the property currently drains to the Parkway Road and Greely Lane roadside ditch (which drains to the Parkway Road roadside ditch). Stormwater released from the proposed development will be discharged to the Parkway Road roadside ditch. As per the topographic survey of the property and adjacent areas, the Parkway Road roadside ditch adjacent to the subject property is approximately 1.7 m deep and drains west. The Parkway Road roadside ditch appears to provide a continuous flow to the Osgoode Gardens Cedar Acres Municipal Drain (immediately west of Fire Station 93) before the municipal drain is conveyed south via a culvert under Parkway Road. Therefore, the existing roadside ditch appears to provide a continuous flow from the subject property to an outlet, which appears to be a legal and sufficient outlet.

4.5 ASSESSMENT OF MONITORING

The proposed stormwater management facility has an infiltration component; however, it is not in a 'wellhead protection area' or an 'issue contributing area'; therefore, monitoring the discharge from the stormwater management facility is not considered necessary given the low risk of posing a significant drinking water threat.

4.6 OPERATION & MAINTENANCE

All maintenance & repair of the Stormwater Management system is the responsibility of the Owner.

Grassed Swale:
To be effective in the removal of suspended solids the grass in the swales should be maintained at 75 mm or higher. Annually, in the spring (and more frequently if necessary), any accumulated sediment needs to be removed from the swale. A maintenance log template has been provided in Appendix C.

Stormwater Detention Area & Infiltration Trench:
Annually, in the spring (and more frequently if necessary), any accumulated sediment needs to be removed from the surface of the infiltration trench. Also, about once every five years (more frequently if ponding for more than 24 hours is observed during non-freezing conditions), the top 50 mm of clear stone (i.e. above the geotextile fabric) should be removed and replaced; and any geotextile material that has been damaged also be replaced. A maintenance log template has been provided in Appendix C.

Catch Basins and Catch Basin/Manholes:
The sump in a catch basin tends to remove coarse sediment, debris and other material from runoff. To ensure the effectiveness of the downstream infrastructure; annually, in the spring (and more frequently, if necessary), remove any accumulated material from the sumps; manually by shovel, or by vacuum truck. Removed material should be disposed of at a facility licensed to accept such material. A maintenance log template has been provided in Appendix C.

Oil/Grit Separator Manhole:
The CDS Inspection and Maintenance Guide can be found in Appendix A. The OGS manhole should be inspected at regular intervals. During the first year of operation frequent inspections are recommended to accurately assess the accumulation of sediment, oil and debris. At a minimum, inspections should be conducted twice per year, in the spring and fall. Inspections should also be conducted immediately after oil, fuel, or other spills. Visual inspections are required to determine that there are no blockages or obstructions, and to determine that there are no damaged components. (However, since there are no moving parts, broken, damaged, or worn parts are not typically encountered.) The inspection should also record the existence of oil (using a dipstick) and depth of sediment (by measuring the depth to the top of the sediment). An OGS Inspection & Maintenance Log should be kept. A maintenance log template has been provided in Appendix C.

Maintenance is necessary to ensure the effectiveness of the OGS manhole. Annually, in the spring (and more frequently if necessary), remove any accumulated oil and sediment from the manhole. In addition, material should be removed, and the manhole cleaned, when the level of sediment has reached 75% of the sump capacity and/or when a measurable thickness of oil has accumulated and/or when an appreciable amount of debris has accumulated. Cleaning should be done during dry weather conditions when little flow is entering the system. A vacuum truck should be used to remove the accumulated materials, and the materials should be disposed at a facility licensed to accept such material.

Inlet Control Device:
An inlet control device (ICD) is located in the outlet pipe of catch basin/manhole CB/MH-4. Annually, in the spring after any accumulated sediment is removed from the catch basins and catch basin/manhole sumps (see above), the ICD should be inspected for damage and blockages. At any time of year, if water ponding above the catch basins or catch basin/manholes does not drain down within about one to three hours, this is an indication that the ICD is blocked and should be inspected.

4.7 EROSION & SEDIMENT CONTROL PLAN

An Erosion & Sediment Control Plan has been developed to be implemented during construction. Refer to drawing C-4 and notes 2.1 to 2.6 on drawing C-6:

- Sediment capture filter sock inserts are to be installed in all existing and proposed catch basins and catch basin manholes adjacent to and within the site. They shall be inspected at the end of each day and after each rainfall. Remove sediment as recommended by the manufacturer. Immediately repair or replace any damaged filter sock inserts.
- A silt fence barrier is to be installed along the perimeter of the site, inspect all silt fences at the end of each day and after each rainfall. Remove sediment deposits when the level of deposits reaches one third the height of the fence. Immediately repair or replace any damaged sections of fence.
- Any material deposited on the public road is to be removed by sweeping and shoveling or vacuuming and disposing sediment in a controlled area. Do not sweep or hose material into any stormwater conveyance system.

Do not remove any erosion and sediment control measure until construction is complete.

Log daily erosion and sediment control efforts. A maintenance log template has been provided in Appendix C.

4.8 ENVIRONMENTAL ACTIVITY AND SECTOR REGISTRY

The Ministry of Environment, Conservation and Parks (MECP) is expected to consider the property 'industrial lands'; therefore, an Environmental Activity and Sector Registry (EASR) is expected to be required for the proposed stormwater management facility.

5.0 CONCLUSIONS

1. Five 45,000 L (10,000 gallon) fire tanks are proposed for a total of 225,000 L, exceeding the minimum 211,468 L that is required as a water supply for firefighting.

2. A new drilled well, to be constructed near the southeast corner of the property, will provide the domestic water supply. A pumping test will be required at a rate and duration to demonstrate that the well is capable of meeting the expected daily water demand, which for the proposed building, is 1,800 L/day.

3. Analyses of water samples from the new drilled well are required to demonstrate that the well water is potable, and that any elevated concentrations of parameters can be treated with available water conditioning equipment.

4. A new on-site sewage (septic) system is proposed. The total daily design sewage flow (TDDSSF) of 1,800 L/day is calculated for the proposed building. An application for a septic permit was submitted to the Ottawa Septic System Office (OSSO), and a permit was issued.

5. To meet the water quality target of 80% TSS removal, an oil grit separator (OGS) manhole is proposed, which is calculated to remove approximately 85% of the TSS.

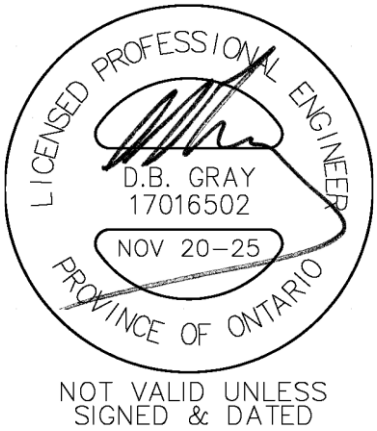
6. The maximum post-development release rate during the 100-year event is calculated to be 63% less than the pre-development flow rate and equal to the maximum allowable release rate; and during the 2-year event it is calculated to be 29% less than the pre-development flow rate and the maximum allowable release rate. To achieve the maximum allowable release rate, a maximum storage volume of 121.68 m^3 is required and provided.

7. The proposed stormwater management quantity control measures are expected to have a positive impact on the downstream municipal infrastructure.

8. Stormwater released from the proposed development will discharge to the Parkway Road roadside ditch, which appears to provide a continuous flow to an outlet at the Osgoode Gardens Cedar Acres Municipal Drain, which appears to be a legal and sufficient outlet.

9. An Erosion & Sediment Control Plan has been developed to be implemented during construction.

10. An Environmental Activity and Sector Registry (EASR) is expected to be required for the proposed stormwater management facility.


LICENSED PROFESSIONAL ENGINEER
D.B. GRAY
17016502
NOV 20–25
PROVINCE OF ONTARIO
NOT VALID UNLESS
SIGNED & DATED

APPENDIX A

WATER SERVICING

D.B. Gray Engineering Inc.

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March 20, 2025

1386-1394 Greely Lane

Ottawa, Ontario

FIRE FLOW AND WATER STORAGE CALCULATIONS
OBC Method to Calculate Fire Flow

As per "Required Minimum Water Supply Flow Rate" as calculated using the Ontario Building Code - Appendix A - Article A-3.2.5.7 "Water Supply For Fire Fighting".

K = Water supply coefficient as per OBC A-3.2.5.7. Table 1
= 17 Group F-2 Occupancy, Building is of noncombustible construction with fire separations with fire resistance ratings.

V = Building volume in cubic meters

Fooprint Area (sq.m)	Average Height (m)	Volume (cu.m)
1,263	6.57	8,293

S_{Total} = Total of spatial coefficients from exposure distances
= $1.0 + S_{Side\ 1} + S_{Side\ 2} + S_{Side\ 3} + S_{Side\ 4}$

	Spatial Coefficient	Exposure Distance (m)	
$S_{Side\ 1}$	0.5	3	(to N property line)
$S_{Side\ 2}$	0.0	32	(to centerline Greely Lane)
$S_{Side\ 3}$	0.0	26	(to centerline Parkway Road)
$S_{Side\ 4}$	0.0	17.6	(to W property line)
S_{Total}	1.5		

Q = KVS_{Tot} (required water supply in litres)
Q = 211,468 L
= 6,300 L/min as per OBC A-3.2.5.7. Table 2
(less than 9,000 L/min; therefore, FUS calculations are not required)
$Q_{REQUIRED}$ = 211,468 L (5,400 L/min or 6,300 L/min; therefore, Storage = Q)

$Q_{PROVIDED}$ = 225,000 L (5 x 45,000 L Tanks)
36 minute water supply at 6,300 L/min

D.B. Gray Engineering Inc.

Douglas Gray <d.gray@dbgrayengineering.com>

RE: 1386-1394 Greely Lane

1 message

Evans, Allan <Allan.Evans@ottawa.ca> Thu, Apr 3, 2025 at 9:43 AM
To: Douglas Gray <d.gray@dbgrayengineering.com>
Cc: "Whittaker, Damien" <Damien.Whittaker@ottawa.ca>, Chris Poirier <chris@cassidyewconstruction.com>, laurent Brosseau <l.brosseau@dbgrayengineering.com>

Yah, same for me on installation on fixed pipes – It would be awkwardly difficult to attach a metal plate onto a PVC pipe that moves around and would have to withstand some drop impacts, etc.

I had a quick chat with the rural chiefs who test/use these and they said we haven't seen any evidence of vortex in these draw pipes / tanks to date during our testing. It's possible there is some small cavitation leading to a decrease in draft capability, but we haven't noticed anything significant to date. It's actually something we all agreed would be interesting to do some further independent testing on as a longer term project.

For now, we will stay with the standard specification with no anti-vortex plate on the loose pipe.

Thanks!

Al

Allan Evans

Fire Protection Engineer / Ingénieur de Protection d'Incendies

Prevention Division / Prévention des Incendies

Ottawa Fire Services / Service des Incendies d'Ottawa

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OTTAWA FIRE SERVICES
SERVICE DES INCENDIES D'OTTAWA
Protecting Our Nation's Capital With Honour
Protéger notre capitale nationale avec honneur

From: Douglas Gray <d.gray@dbgrayengineering.com>
Sent: April 02, 2025 3:09 PM
To: Evans, Allan <Allan.Evans@ottawa.ca>
Cc: Whittaker, Damien <Damien.Whittaker@ottawa.ca>; Chris Poirier <chris@cassidyewconstruction.com>; laurent Brosseau <l.brosseau@dbgrayengineering.com>
Subject: Re: 1386-1394 Greely Lane

Hi Allan

The anti-vortex plates that I have seen are fixed to a tank at the end of a permanent suction pipe that is also fixed to the tank. They may exist but I have not seen an ant-vortex plate fixed to the end of a 'moveable' draw pipe. Although, if one is required, I suspect one could be found or fabricated.

Regards, Doug

Douglas B. Gray, P.Eng.

D. B. Gray Engineering Inc.

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On Mon, Mar 31, 2025 at 2:54 PM Evans, Allan <Allan.Evans@ottawa.ca> wrote:

> Everything looks great.
>
> That's an interesting point on the draw pipe – I remember a few years back inquiring about having to add anti-vortex to the bottom of the draw pipe when I went down the vortex rabbit hole. I will bump this one out to the crews who use these regularly and we can come back to this at some point in the future if that's okay with you? Worst case scenario it isn't a big change/cost if we do need to have one installed – you see any concerns?
>
> Al
>
> *Allan Evans*
>
> **Fire Protection Engineer / Ingénieur de Protection d'Incendies**
>
> **Prevention Division / Prévention des Incendies**
>
> **Ottawa Fire Services / Service des Incendies d'Ottawa**
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> SERVICE DES INCENDIES D'OTTAWA
> *Protecting Our Nation's Capital With Honour*
> *Protéger notre capitale nationale avec honneur*
>
>
>
> **From:** Douglas Gray <d.gray@dbgrayengineering.com>
> **Sent:** March 28, 2025 4:01 PM
> **To:** Evans, Allan <Allan.Evans@ottawa.ca>
> **Cc:** Whittaker, Damien <Damien.Whittaker@ottawa.ca>; Chris Poirier <chris@cassidyewconstruction.com>; laurent Brosseau <l.brosseau@dbgrayengineering.com>
> **Subject:** Re: 1386-1394 Greely Lane
>
>
>
> Hi Allan
>
> Revised drawings C-1 & C-8 are attached. Please refer to my comments in red below.

Regards, Doug

Douglas B. Gray, P.Eng.

D. B. Gray Engineering Inc.

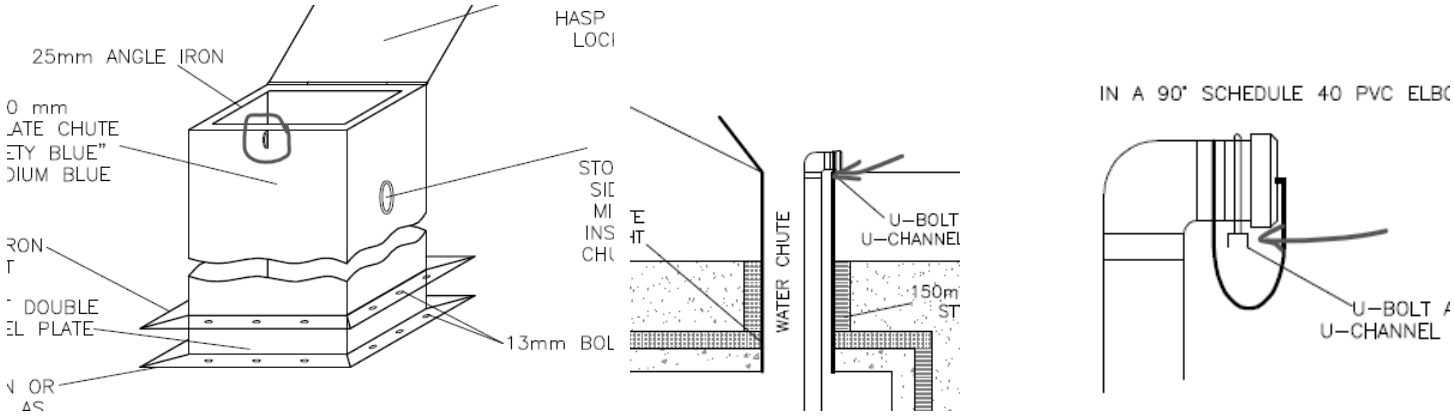
700 Long Point Circle

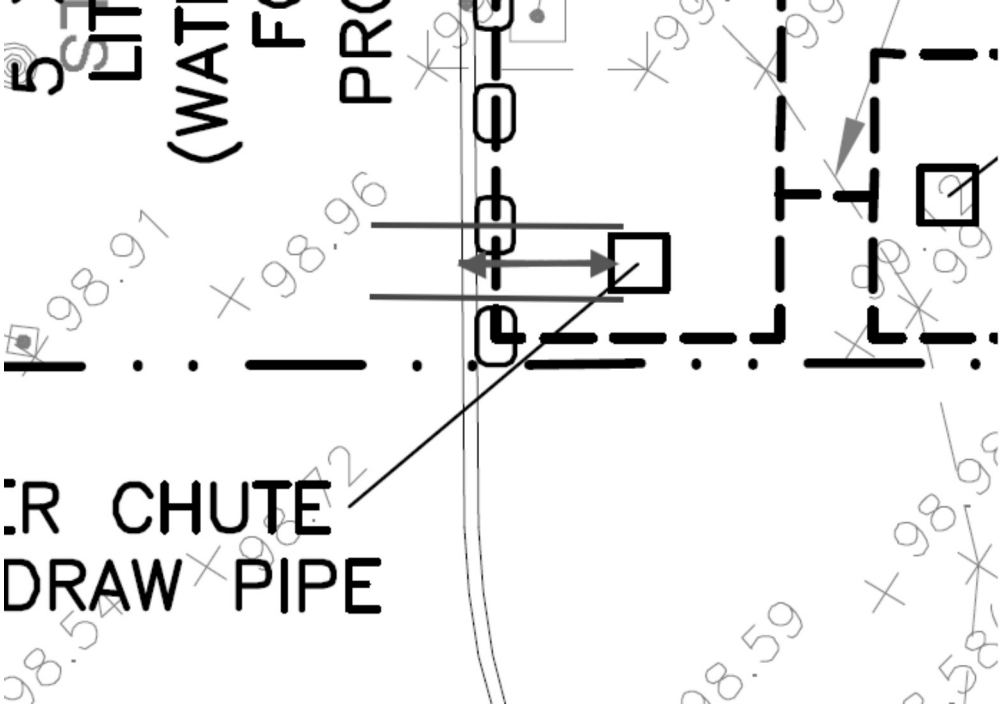
Ottawa, ON K1T 4E9

613-425-8044

On Tue, Mar 25, 2025 at 1:28 PM Evans, Allan <Allan.Evans@ottawa.ca> wrote:

> Apologies, I don't mean to keep adding observations with each change, but I also don't want there to be misunderstandings that will get missed and become bigger problems later on.
>
> I assume the chute on the other tanks are just for access (and/or vent)? Correct. To be clearer the access opening are now labelled: *"ACCESS OPENINGS WITH VENTS (NO DRAW PIPES)"* and the water chute is labelled as "WATER CHUTE WITH DRAW PIPE" They aren't required to be chutes, but I leave it up to you to decide – just be sure these non-fire use ones are NOT painted blue – blue is an indicator of "draft" for Ottawa Fire Services so only the one we are drafting from with a chute should be blue. Our details on drawing C-8 have been revised. The 'Water Fill Station' detail now has the follow note: *"ONLY ONE TANK SHALL HAVE A DRAW PIPE (AS INDICATED ON PLANS). TANKS WITHOUT A DRAW PIPE SHALL HAVE AN ACCESS OPENING WITH A 150 mm "CANDY CANE" VENT C/W WITH RODENT SCREEN. THE ACCESS OPENINGS SHALL NOT BE PAINTED BLUE."* Also worth noting that depending on the size of the interconnecting pipes between tanks, an anti-vortex plate may be required – I'll leave it to your engineering judgement on these. The interconnecting pipes are 250mm in diameter. At 4500 L/min the velocity is only 1.5 m/s so an anti-vortex plates should not be required. I would be more concerned with the 150mm draw pipe, which at 4500 L/min, the velocity is 4.2 m/s. The bottom of the draw pipe used to be cut on an angle but, especially now that the bottom is 'cut square', I would expect that vortexing could be an issue. Have you experienced vortexing with a 'cut square' draw pipe?
>
> I also wanted to draw the attention to something I've mentioned in meetings past (I think with you, but possibly not). Be sure that the padlock hole doesn't interfere with the u-channel on the draft pipe since it rests on the ledge of the box. Typically this is done by extending the hasp and lowering the eye for the lock. The following note is now on our 'Water Chute' detail: *"THE STAPLE SHALL NOT INTERFERE WITH THE U-CHANNEL ON THE DRAW PIPE."*
>
> I noticed there isn't a specification for the distance from the curb to the closest edge of the draft chute (bottom picture red arrow line). This dimension is important since we are using a fixed length of hard suction (3m) to connect. The connection port on the fire truck is often slightly inset of the outer edge of the truck (ie: further away) so the distance curb to close-edge of chute should be in the 1.5-1.8m distance (we can tolerate up to about 2m). We have added a dimension on drawing C-1 (±1.6m MAX. 1.8m). We have alos added the following note on the 'Water Fill Station' detail: *"THE FRONT FACE OF WATER CHUTE SHALL BE LOCATED A MAXIMUM 1.8m FROM FIRE ROUTE"*. On the 'Water Fill Station' detail we specify 'Boyd Bros Concrete or Approved equal' because they make a 45,000 L tank that is about 2.7m wide. Other tanks are 3.05m (10 ft) which may make it difficult to achieve the maximum 1.8 m (or up to 2.0 m) and keep the tank at least 0.5m from the edge of the asphalt.
>
> And finally on a related note I see that you are using armour stone to also help protect the draw chute. In general that's fine, but please be sure that the height of the armour stone will not interfere with the suction hose (it is very inflexible). It may be advisable to leave a gap between the stones directly in front of the draft box at least the width of the box wide (blue lines). The following note has been added to C-1: *"THERE SHALL BE NO ARMOUR STONES DIRECTLY IN FRONT OF WATER CHUTE"*.
>
> Let me know if you need any further clarifications.





Allan Evans

Fire Protection Engineer / Ingénieur de Protection d'Incendies

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Ottawa Fire Services / Service des Incendies d'Ottawa

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From: Douglas Gray <d.gray@dbgrayengineering.com>
Sent: March 25, 2025 8:23 AM
To: Evans, Allan <Allan.Evans@ottawa.ca>
Cc: Whittaker, Damien <Damien.Whittaker@ottawa.ca>; Chris Poirier <chris@cassidyewconstruction.com>; laurent Brosseau <l.brosseau@dbgrayengineering.com>
Subject: Re: 1386-1394 Greely Lane

Hi Allan

All of our revised drawings and report are attached. Drawings C-1, C-8, & C-9 are most relevant to you.

Page 2 of our report has been revised as follows:

> *"The proposed one-storey building is about 1,263 m2 in area, having an average height of 5.67 m. Using the Ontario Building Code (OBC) method to calculate the water supply for firefighting the required storage volume (Q) is 211,468 L and the required flowrate (FF) is 6,300 L/min (as per OBC A-3.2.5.7. Table 2). As per the City of Ottawa Technical Bulletin IWSTB-2024-05, if FF is 5,400 or 6,300 L/min the minimum required storage is Q; therefore, the minimum is 211,468 L. Refer to calculations in Appendix A."*

> *"Five 45,000 L (approximately 10,000 Imperial gallon) tanks are proposed for a total of 225,000 L, exceeding the required volume. This volume calculates to be about a 36-minute water supply at 6,300 L/min, which is greater than the 30-minute minimum required by OBC. One tank will be equipped with a chute and draw pipe, and the other tanks will have a chute and vent."*

The following has been added to the details on drawing C-8:

- the maximum dimension from top of chute to bottom of tank of 4877mm (16 feet).
- *"TOP OF CHUTE SHALL BE 610 mm (24") – 813 mm (32") ABOVE GRADE".*
- *"LID SHALL HINGE AWAY FROM THE FIRE ROUTE".*

In addition to a curb armour stone has been added to protect the tanks.

Only one draft point is indicated (see C-1).

Regards, Doug

Douglas B. Gray, P.Eng.

D. B. Gray Engineering Inc.

700 Long Point Circle

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613-425-8044

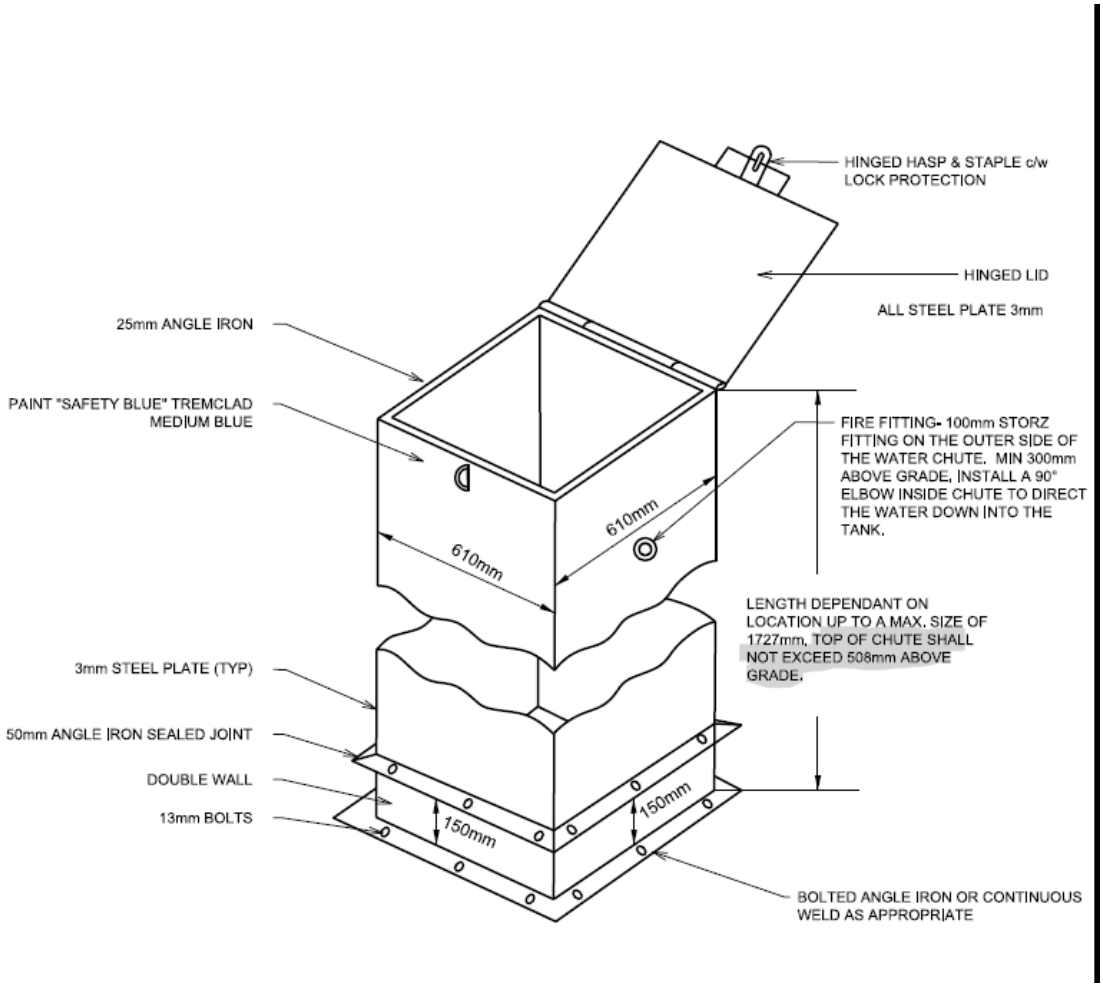
On Mon, Mar 10, 2025 at 3:34 PM Evans, Allan <Allan.Evans@ottawa.ca> wrote:

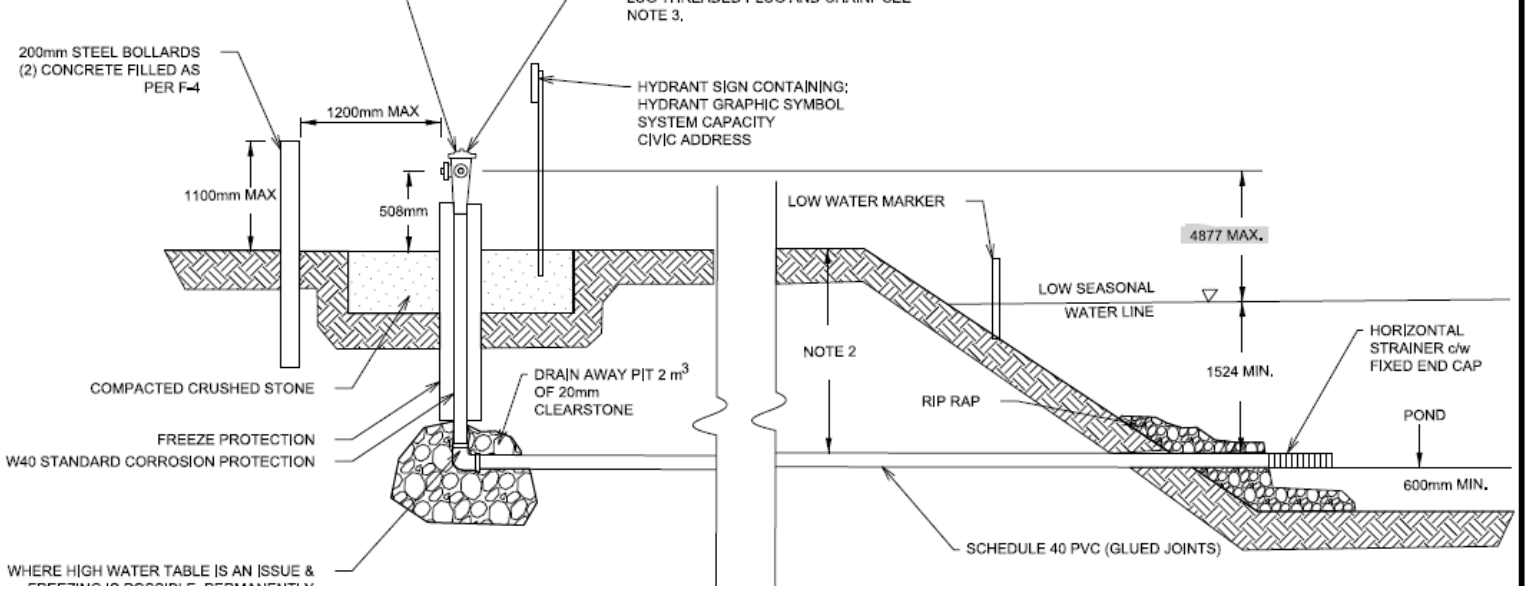
> Hi Doug – let's try and clarify these submissions moving forward because I see the interim information that was provided during our consultation process keeps getting used (additional draft points, distances to fire hall, etc). Please use the attached final technical bulletin for future calculations (I honestly think the final version we settled on is better for the client than the interim one was).
>
> 1. Q calculated is the water storage volume. The only possible deviations for this Q value are: max OBC 9000 L/min is reached (possible special evaluation), Sprinklers (NFPA 13), OBC flows in the lower end (2700, 3600, 4500 L/min) allowing a tanker shuttle reduction
> 2. Tanker Shuttle Reduction of 57 000 L -> applicable to be used as a direct reduction of Q (to the minimum volume permitted) on calculations where the fireflow is 2700 L/min, 3600 L/min or 4500 L/min
> 3. Tanker Shuttle for moderate fire flows (5400 L/min and 6300 L/min) is to be used to make up the difference between what a single draft point is capable of providing and not for a reduction in storage – no second draft point
>   a. we will rarely want a second draft point (but may be possible on very large sites with lots of space so it is left as a potential option in the 9000 L/min situations) as they are complex to operate at a rural site
>
> Qcalc = 211 468 L
>
> Qbuild = 225 000 L (ensure these tanks are 45000 L and not a 10000 US Gal (37 850 L))
>
> Since FF > 4500 L/min, no reduction in Q is permitted
>
> Qbuild > Qcalc -> therefore acceptable
>
> Damien reminded me that the W51 spec has some specs that are out of date (my best guess is they were specified back when there were limited tanks available).

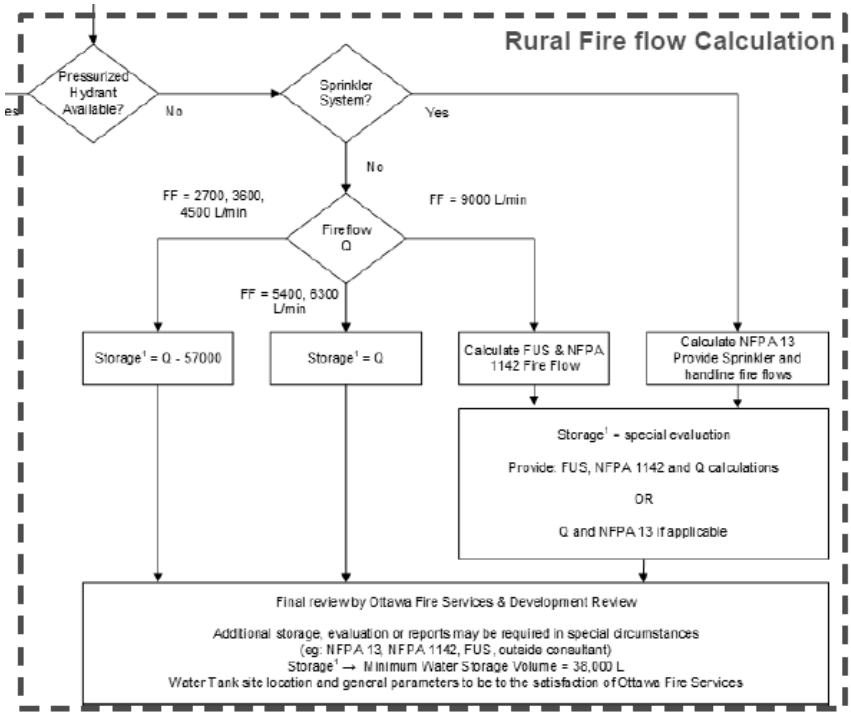
The specifications I wanted to highlight are:

- maximum draft height (lip of chute to bottom of tank) 4877mm (16 feet) (I used the value from the pond/river draft (bottom drawing)
- Top of chute above grade should be between 610 mm (24”) – 813 mm (32”) (**disregard** the 508mm maximum in drawing)
    - there is some minor flexibility on the upper number but I wanted to provide a target range. The goal is to make sure it is not easily covered in winter (not too low), safe (too low leads to risk of falling in) and comfortable to lift the pipe inside out (not too high)
- bollard or curb protection required
- lid should hinge away from fire truck where it will be parked
- no second draft point for this application
- make sure the lock portion on the base doesn’t interfere with the u-channel of the draft pipe
    - it should rest on the lip of the box
- ensure fire truck is able to get close enough to draft box
- ensure other fire trucks are able to get past the draft fire truck
- co-ordinate location of tanks with OFS

Happy to discuss or clarify anything you need.







Allan Evans

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From: Douglas Gray <d.gray@dbgrayengineering.com>
Sent: March 06, 2025 3:45 PM
To: Evans, Allan <Allan.Evans@ottawa.ca>; Whittaker, Damien <Damien.Whittaker@ottawa.ca>
Cc: Chris Poirier <chris@cassidyewconstruction.com>; laurent Brosseau <l.brosseau@dbgrayengineering.com>
Subject: 1386-1394 Greely Lane

Hi Allan & Damien

We have received the following comments for this application: "*The applicant should contact Fire Services to gain approval for the size and design of the Fire Tanks. Contact Damien Whittaker and Allan Evans (allan.evans@ottawa.ca).*" And "*The Department will need approval from Fire services for the Fire tank design provided in appendix A of this report.*"

Our report and all drawings are attached, but drawings C-1, C-8, & C-9 are most relevant to you.

The following is an excerpt from page 2 of our report:

"The proposed one-storey building is about 1,263 m2 in area, having an average height of 5.67 m. Using the Ontario Building Code (OBC) method to calculate the water supply for firefighting the required storage volume is 211,468 L and the required flowrate is 6,300 L/min (as per OBC A-3.2.5.7. Table 2). This calculates to be about a 34-minute water supply, which is greater than the 30-minute minimum required by OBC. Refer to calculations in Appendix A.

These calculations will be submitted to the Ottawa Fire Services (OFS) to determine if the storage credit of 57,000 L is available. It is available if the site meets the Fire Underwriters Survey (FUS) requirements for superior tanker shuttle (specifically the site must be within 5 km of a fire station and 2.5 km of an OFS approved water source).

Currently, five 45,000 L (10,000 gallon) tanks are proposed for a total of 225,000 L, exceeding the required volume. Two tanks will be equipped with a chute and draw pipe, and the other tanks will have a chute and vent. (If the OFS analysis determines that the storage credit of 57,000 L can be applied, four 45,000 L (10,000 gallon) tanks will be proposed."

If all is acceptable, please provide written confirmation. (Calculations are in Appendix A (on page 9) of the report.)

Thanks, Doug

Douglas B. Gray, P.Eng.

D. B. Gray Engineering Inc.

700 Long Point Circle

Ottawa, ON K1T 4E9

613-425-8044

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APPENDIX B

STORMWATER MANAGEMENT

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

Echelon Environmental

55 Albert Street, Suite #200 | Markham, ON, L3P 2T4

www.echelonenvironmental.ca info@echelonenvironmental.ca 905-948-0000

Project Name:	1386-1394 Greely Lane	**Engineer:**	**D.B. Grey Engineering Inc**
Location:	Greely, ON	**Contact:**	Laurent Brosseau
OGS ID:	1	**Report Date:**	17-Dec-24

Area:	0.356	ha	**Rainfall Station #**	215	
C Value:	0.90		**Particle Size Distribution**	FINE	
CDS Model:	PMSU2015-4		**CDS Treatment Capacity:**	20	l/s

Rainfall Intensity[1] (mm/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (l/s)	Treated Flowrate (l/s)	Operating Rate (%)	Removal Efficiency (%)	Incremental Removal (%)
0.5	9.2%	9.2%	0.4	0.4	2.2	98.2	9.0
1.0	10.6%	19.8%	0.9	0.9	4.5	97.6	10.4
1.5	9.9%	29.7%	1.3	1.3	6.7	96.9	9.6
2.0	8.4%	38.1%	1.8	1.8	9.0	96.3	8.1
2.5	7.7%	45.8%	2.2	2.2	11.2	95.6	7.4
3.0	5.9%	51.7%	2.7	2.7	13.5	95.0	5.6
3.5	4.4%	56.1%	3.1	3.1	15.7	94.3	4.1
4.0	4.7%	60.7%	3.6	3.6	18.0	93.7	4.4
4.5	3.3%	64.0%	4.0	4.0	20.2	93.1	3.1
5.0	3.0%	67.1%	4.5	4.5	22.5	92.4	2.8
6.0	5.4%	72.4%	5.3	5.3	27.0	91.1	4.9
7.0	4.4%	76.8%	6.2	6.2	31.5	89.8	3.9
8.0	3.5%	80.3%	7.1	7.1	35.9	88.6	3.1
9.0	2.8%	83.2%	8.0	8.0	40.4	87.3	2.5
10.0	2.2%	85.3%	8.9	8.9	44.9	86.0	1.9
15.0	7.0%	92.3%	13.4	13.4	67.4	79.5	5.6
20.0	4.5%	96.9%	17.8	17.8	89.9	73.1	3.3
25.0	1.4%	98.3%	22.3	19.8	100.0	62.5	0.9
30.0	0.7%	99.0%	26.7	19.8	100.0	52.1	0.3
35.0	0.5%	99.5%	31.2	19.8	100.0	44.6	0.2
40.0	0.5%	100.0%	35.6	19.8	100.0	39.1	0.2
45.0	0.0%	100.0%	40.1	19.8	100.0	34.7	0.0
50.0	0.0%	100.0%	44.5	19.8	100.0	31.2	0.0

Removal Efficiency Adjustment[2] = 6.5%

Predicted Net Annual TSS Removal Efficiency = 84.7%

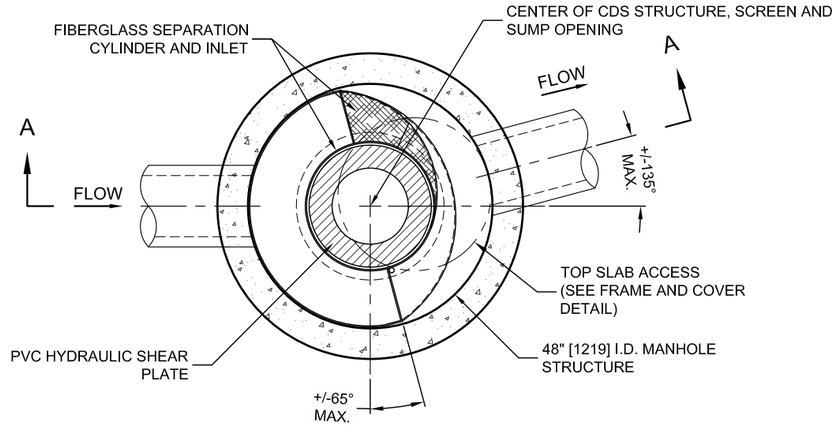
Predicted Annual Rainfall Treated = 98.7%

1 - Based on 42 years of hourly rainfall data from Canadian Station 6105976, Ottawa ON

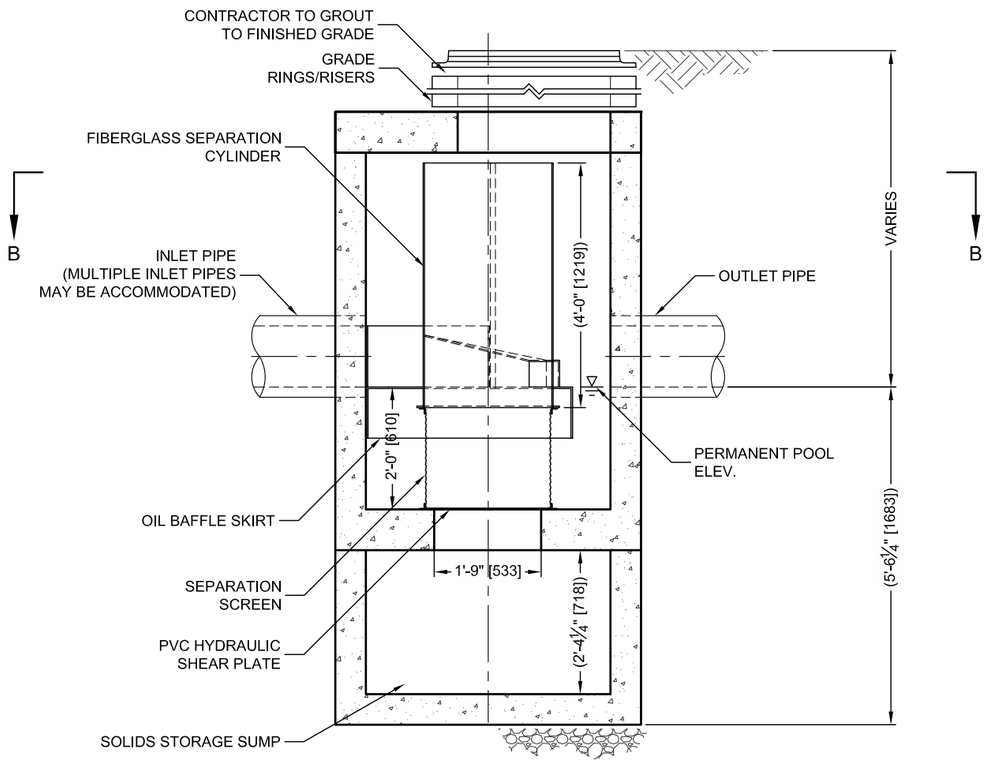
2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

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



PLAN VIEW B-B
N.T.S.



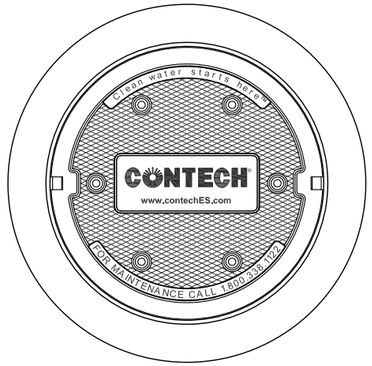
ELEVATION A-A
N.T.S.

THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: 5,788,848; 6,641,720; 8,511,500; 6,581,783; RELATED FOREIGN PATENTS, OR OTHER PATENTS PENDING.

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



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

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	
WATER QUALITY FLOW RATE (CFS OR L/s)	*
PEAK FLOW RATE (CFS OR L/s)	*
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

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.contechES.com
4. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. 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.
6. PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).
C. CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
E. 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.

CONTECH® ENGINEERED SOLUTIONS LLC
www.contechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CDS PMSU2015-4-C INLINE CDS STANDARD DETAIL

12-Nov-25

1386-1394 Greely Lane
Ottawa, Ontario

INFILTRATION CALCULATIONS

			C
Roof Area:	477	sq.m.	0.90
Asphalt/Concrete Area:	691	sq.m.	0.90
Stormwater Detention Area:	82	sq.m.	1.00
Gravel Area:	0	sq.m.	0.80
Landscaped:	50	sq.m.	0.20
Total Catchment Area	1,300	sq.m.	0.88

Required Volume Required to Capture: 10 mm rain event: 11.4 cu.m.

82% of days with preciptation are 10mm or less

* Ottawa International Airport (1981-2010)

Infiltration Trench

Water Depth m	Water Volume cu.m.	Clear Stone Depth m	Area sq.m.	Clear Stone Volume cu.m.	Void Volume 40% cu.m.	Total Volume cu.m.
0.14	11.5	0.00	82	0.0	0.00	11.5

Silty sand

Estimated Infiltration Rate
15 mm/hr

Design Infiltration Rate
(includes 2.5 safety factor)
6 mm/hr

Time to Draw Down: 23 Hours

12-Nov-25

1386-1394 Greely Lane

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)	Volume (cu.m.)
Landscaped:	3472	944	547	397	0.15	0.2	0.1	0.45	179	620
Paved Area:	855	944	95	849				0.00	0	0
Roof Area:	353	944	95	849				0.00	0	0
Total:	4680									620
								Weighted Average:	133	

Post Development (NO INFILTRATION TRENCH)

	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 (cu.m.)
Landscaped:	1183	944	547	397	0.15	0.20	0.1	0.45	179	211
Hard Surfaces:	3497	944	95	849				0.00	0	0
Total:	4680									211
								Weighted Average:	45	
								Infiltration Deficit:		-409

Post Development (WITH INFILTRATION TRENCH)

	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:	1265	944	575	369	0.15	0.20	0.1	0.45	166	210	166
Hard Surfaces:	2247	944	150	793				0.00	0	0	0
Hard Surfaces: (draining to infiltration trench)	1168	944	150	794				0.00	0	455	389
Total:	4680									665	
								Weighted Average:	45		142
									Infiltration Surplus:	45	

	mm	Days with Precipitation ++	mm	Days with Precipitation	Hard Surfaces Surplus / Precipitation	Hard Surfaces (draining to infiltration trench) (sq.m.)	Hard Surfaces Available Annual Volume (cu.m.)			Hard Surfaces Annual Volume Captured (cu.m.)	Required Volume of Infiltration Trench (cu.m.)
>=	0.2	163.6	>= 0.2 and <=5	105.2	0.84	1168	21	xx		21	0.1
>=	5	58.4	>= 5 and <=10	28.4	0.84	1168	140			140	2.4
>=	10	30.0	10	30.0	0.84	1168	295			295	9.8
>=	25	5.5	>= 25	5.5	0.84	1168	135	exclude xxx	TOTAL	455	

xx assumes only 0.2mm rainfall for >= 0.2mm and <=5mm & 5 mm for >= 5mm and <=10 mm
xxx infiltration trench trench sized for maximum 10mm rainfall

++ Ottawa International Airport (1981-2010)
+++ Eastern Ontario Water Resources Management Study (2001) & Carp River Watershed / Subwatershed Study & MOE SWM Planning & Design Manual, 2003

		Factor	Subject Property
* Topography:	Flat Land, average slope < 0.6m/km (<.06%)	0.3	
	Rolling Land, average slope 2.8 to 3.8m/km (0.28% to 0.38%)	0.2	
	Hilly Land, average slope 28 to 47m/km (2.8 to 4.7%)	0.1	
** Soil:	Tight impervious clay	0.1	
	Medium combination of clay and loam	0.2	= 0.2 for silty sand
	Open sandy loam	0.4	
*** Cover:	Cultivated Lands	0.1	
	Woodland	0.2	

As per MOE SWM Planning & Design Manual, 2003

STORMWATER MANAGEMENT CALCULATIONS
(Quantity Control)

The orifice calculations are based on the following formula:

$$Q = C_d \times A_o \sqrt{2gh} \times 1000$$

where:

- Q = flowrate in litres per second
- C_d = coefficient of discharge
- A_o = orifice area in sq.m.
- g = 9.81 m/s^2
- h = head above orifice in meters

Storage volume calculations for the parking area above a catch basin are based on the following formula for volume of a cone:

$$V = (A \times d)/3$$

where:

- V = volume in m^3
- A = ponding area in m^2
- d = ponding depth in meters

Storage volume calculations for the stormwater detention areas are based on the following formula:

$$V = A \times d$$

where:

- V = volume in m^3
- A = area of detention area in m^2
- d = ponding depth in meters

SUMMARY TABLES

100-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)	-	-	15.62	-	-
AREA II	-	-	22.04	121.68	121.68
TOTAL	102.51	37.66	37.66	121.68	121.68

2-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)	-	-	5.45	-	-
AREA II	-	-	21.32	29.34	29.34
TOTAL	37.66	37.66	26.78	29.34	29.34

November 12, 2025

1386-1394 Greely Lane

Greely, Ontario

STORMWATER MANAGEMENT CALCULATIONS
Modified Rational Method

PRE-DEVELOPMENT CONDITIONS

100-YEAR EVENT

			C
Roof Area:	353	sq.m	1.00
Hard Area:	767	sq.m	1.00
Gravel Area:	88	sq.m	0.875
Soft Area:	3,472	sq.m	0.25
Total Catchment Area:	4,680	sq.m	0.44

Bransby Williams Formula

$$Tc = \frac{0.057 \bullet L}{Sw^{0.2} \bullet A^{0.1}} \text{ min}$$

Sheet Flow Distance (L):	38	m
Slope of Land (Sw):	1	%
Area (A):	0.4680	ha
Time of Concentration (Sheet Flow):	2	min
Time of Concentration:	10	min
Rainfall Intensity (i):	179	mm/hr
100-Year Pre-Development Flow Rate (2.78AiC):	102.51	L/s

2-YEAR EVENT

MAXIMUM ALLOWABLE RELEASE RATE

			C
Roof Area:	353	sq.m	0.90
Hard Area:	767	sq.m	0.90
Gravel Area:	88	sq.m	0.70
Soft Area:	3,472	sq.m	0.20
Total Catchment Area:	4,680	sq.m	0.38
Time of Concentration:	10	min	
Rainfall Intensity (i):	77	mm/hr	
2-Year Pre-Development Flow Rate (2.78AiC): (Maximum Allowable Release Rate)	37.66	L/s	

100-YEAR EVENT

DRAINAGE AREA I (Uncontrolled Flow Off Site)

(100-YEAR EVENT)

			C
Roof Area:		sq.m	1.00
Hard Area:	36	sq.m	1.00
Gravel Area:		sq.m	1.00
Soft Area:	1,115	sq.m	0.25
Total Catchment Area:	1,151	sq.m	0.27
Time of Concentration:	10	min	
Rainfall Intensity (i):	179	mm/hr	
Flow Rate (2.78AiC):	15.62	L/s	

DRAINAGE AREA II

(100-YEAR EVENT)

			C
Roof Area:	1,263	sq.m	1.00
Hard Area:	2,121	sq.m	1.00
Gravel Area:	0	sq.m	1.00
Infiltration Trench:	82	sq.m	1.00
Soft Area:	63	sq.m	0.25
Total Catchment Area:	3,529	sq.m	0.99

Water Elevation:	99.84	m
Head:	1.54	m
Centroid of ICD Orifice:	98.30	m
(ICD in Outlet Pipe of CB/MH-3)		
Invert of Outlet Pipe of CB/MH-3:	98.25	m
Orifice Diameter:	91	mm
Orifice Area:	6,573	sq.mm
Discharge Coefficient:	0.61	
Maximum Release Rate:	22.04	L/s

CB/MH	Top Area (sq.m)	Depth (m)	Volume	
CB/MH-2	117	0.17	6.43	cu.m
CB/MH-3	148	0.17	8.15	cu.m
CB-4	240	0.13	10.02	cu.m
CB/MH-5	257	0.17	14.17	cu.m
CB/MH-6	173	0.17	9.54	cu.m
Area Draining over Depressed Curb to Infiltration Trench (South)	195	0.15	9.43	cu.m
Area Draining over Depressed Curb to Infiltration Trench (North)	90	0.15	4.33	cu.m

Stormwater Detention Area 'A'

Area (sq.m)	Depth (m)	volume	
24.0	1.31	31.32	cu.m

Stormwater Detention Area 'B' & Infiltration Trench

Area (sq.m)	Depth (m)	volume	
82.0	0.35	28.30	cu.m

Maximum Volume Stored:	121.68	cu.m
Maximum Volume Required:	121.68	cu.m

DRAINAGE AREA II (Continued)

(100-YEAR EVENT)

Time (min)	i (mm/hr)	2.78AiC (L/s)	ICD Release Rate (L/s)	Stored Rate (L/s)	Required Storage Volume (cu.m)
10	179	172.83	22.04	150.80	90.48
15	143	138.31	22.04	116.27	104.65
20	120	116.10	22.04	94.07	112.88
25	104	100.52	22.04	78.48	117.72
30	92	88.92	22.04	66.89	120.39
35	83	79.93	22.04	57.89	121.58
40	75	72.74	22.04	50.70	121.68
45	69	66.84	22.04	44.80	120.96
50	64	61.90	22.04	39.87	119.60
55	60	57.71	22.04	35.68	117.73
60	56	54.10	22.04	32.07	115.44
65	53	50.96	22.04	28.92	112.80
70	50	48.19	22.04	26.16	109.86
75	47	45.74	22.04	23.70	106.67
80	45	43.55	22.04	21.51	103.26
85	43	41.58	22.04	19.54	99.65
90	41	39.79	22.04	17.76	95.88
95	39	38.17	22.04	16.13	91.96
100	38	36.69	22.04	14.65	87.91
105	36	35.33	22.04	13.29	83.73
110	35	34.07	22.04	12.04	79.45
115	34	32.91	22.04	10.88	75.06
120	33	31.84	22.04	9.80	70.59
125	32	30.84	22.04	8.80	66.03
130	31	29.91	22.04	7.87	61.39
135	30	29.03	22.04	7.00	56.69
140	29	28.22	22.04	6.18	51.92
145	28	27.45	22.04	5.41	47.09
150	28	26.73	22.04	4.69	42.20
180	24	23.14	22.04	1.10	11.88
210	21	20.47	20.47	0.00	0.00
240	19	18.40	18.40	0.00	0.00
270	17	16.74	16.74	0.00	0.00
300	16	15.38	15.38	0.00	0.00

2-YEAR EVENT

DRAINAGE AREA I (Uncontrolled Flow Off Site)

(2-YEAR EVENT)

			C
Roof Area:	0	sq.m	0.90
Hard Area:	36	sq.m	0.90
Gravel Area:	0	sq.m	0.80
Soft Area:	1,115	sq.m	0.20
Total Catchment Area:	1,151	sq.m	0.22
Time of Concentration:	10	min	
Rainfall Intensity (i):	77	mm/hr	
Flow Rate (2.78AiC):	5.45	L/s	

DRAINAGE AREA II

(2-YEAR EVENT)

			C
Roof Area:	1,263	sq.m	0.90
Hard Area:	2,121	sq.m	0.90
Gravel Area:	0	sq.m	0.80
Infiltration Trench:	82	sq.m	1.00
Soft Area:	63	sq.m	0.20
Total Catchment Area:	3,529	sq.m	0.89

Water Elevation:	99.74	m
Head:	1.44	m
Centroid of ICD Orifice:	98.30	m
(ICD in Outlet Pipe of CB/MH-3)		
Invert of Outlet Pipe of CB/MH-3:	98.25	m
Orifice Diameter:	91	mm
Orifice Area:	6,573	sq.mm
Discharge Coefficient:	0.61	
Maximum Release Rate:	21.32	L/s

CB/MH	Top Area (sq.m)	Depth (m)	Volume	
CB/MH-2	19	0.07	0.43	cu.m
CB/MH-3	24	0.07	0.55	cu.m
CB-4	11	0.03	0.10	cu.m
CB/MH-5	43	0.07	0.95	cu.m
CB/MH-6	29	0.07	0.64	cu.m
Area Draining over Depressed Curb to Infiltration Trench (South)	21	0.05	0.32	cu.m
Area Draining over Depressed Curb to Infiltration Trench (North)	9	0.05	0.15	cu.m

Stormwater Detention Area

Area (sq.m)	Depth (m)	Volume	
24.0	0.25	5.93	cu.m

Infiltration Trench Area

Area (sq.m)	Depth (m)	volume	
82.0	0.25	20.26	cu.m

Maximum Volume Stored:	29.34	cu.m
Maximum Volume Required:	29.34	cu.m

DRAINAGE AREA II (Continued)

(2-YEAR EVENT)

Time (min)	i (mm/hr)	2.78AiC (L/s)	ICD Release Rate (L/s)	Stored Rate (L/s)	Required Storage Volume (cu.m)
10	77	67.05	21.32	45.73	27.44
15	62	53.92	21.32	32.60	29.34
20	52	45.42	21.32	24.10	28.92
25	45	39.43	21.32	18.11	27.16
30	40	34.96	21.32	13.63	24.54
35	36	31.48	21.32	10.16	21.33
40	33	28.69	21.32	7.37	17.68
45	30	26.40	21.32	5.07	13.70
50	28	24.48	21.32	3.16	9.47
55	26	22.85	21.32	1.52	5.03
60	25	21.44	21.32	0.11	0.41
65	23	20.21	20.21	0.00	0.00
70	22	19.13	19.13	0.00	0.00
75	21	18.17	18.17	0.00	0.00
80	20	17.31	17.31	0.00	0.00
85	19	16.54	16.54	0.00	0.00
90	18	15.84	15.84	0.00	0.00
95	17	15.20	15.20	0.00	0.00
100	17	14.62	14.62	0.00	0.00
105	16	14.08	14.08	0.00	0.00
110	16	13.59	13.59	0.00	0.00
115	15	13.14	13.14	0.00	0.00
120	15	12.71	12.71	0.00	0.00
125	14	12.32	12.32	0.00	0.00
130	14	11.95	11.95	0.00	0.00
135	13	11.61	11.61	0.00	0.00
140	13	11.28	11.28	0.00	0.00
145	13	10.98	10.98	0.00	0.00
150	12	10.70	10.70	0.00	0.00
180	11	9.28	9.28	0.00	0.00
210	9	8.22	8.22	0.00	0.00
240	8	7.40	7.40	0.00	0.00
270	8	6.74	6.74	0.00	0.00
300	7	6.20	6.20	0.00	0.00

September 29, 2025

1386-1394 Greely Lane

Greely, Ontario

BROAD CRESTED WEIR CALCULATIONS

Capacity of spillover at 10m wide entrance at 0.15m depth

Length of Weir based on an assumed coefficient of discharge (Cd):

if Q=	991	l/s (maximum flow)	assumes Cd= 0.577
=	0.991	cu.m./s	
& H=	0.15	m (max. depth of water above top of weir)	(assumes P/H is large)
then L=	10.00	m (length of weir) L = (Q / ((1.705 x H^(3/2))	

Length of Weir based on a calculate coefficient of discharge (Cd):

if P=	0.35	m (depth of pond)
& Lp=	24	m (width of pond: perpendicular to direction of flow)
then Vp=	0.0826	m/s (velocity in pond: Vp = Q / (P+H) / Lp)
& E=	0.150348	m (energy: E = H + 2V^2/2g)
& Cd=	0.579	(Cd = 0.577 x (E/H)^(3/2))

if Q=	991.00	l/s (maximum permited flow)
=	0.99100	cu.m./s
& H=	0.15	m (depth of water above top of weir)
then L=	9.97	m (length of weir) L = (Q / ((Cd^(2/3) x (2x9.81)^(1/2) x H^(3/2))

Capacity of spillover at 12m weir at 0.15m depth

Length of Weir based on an assumed coefficient of discharge (Cd):

if Q=	1189	l/s (maximum flow)	assumes Cd= 0.577
=	1.189	cu.m./s	
& H=	0.15	m (max. depth of water above top of weir)	(assumes P/H is large)
then L=	12.00	m (length of weir) L = (Q / ((1.705 x H^(3/2))	

Length of Weir based on a calculate coefficient of discharge (Cd):

if P=	0.65	m (depth of pond)
& Lp=	12	m (width of pond: perpendicular to direction of flow)
then Vp=	0.1239	m/s (velocity in pond: Vp = Q / (P+H) / Lp)
& E=	0.150782	m (energy: E = H + 2V^2/2g)
& Cd=	0.582	(Cd = 0.577 x (E/H)^(3/2))

if Q=	1189.00	l/s (maximum permited flow)
=	1.18900	cu.m./s
& H=	0.15	m (depth of water above top of weir)
then L=	11.91	m (length of weir) L = (Q / ((Cd^(2/3) x (2x9.81)^(1/2) x H^(3/2))

TOTAL SPILLOVER CAPACITY (at 0.15m depth): 2180 L/s

September 29, 2025

1386-1394 Greely Lane

Greely, Ontario

BROAD CRESTED WEIR CALCULATIONS

Maximum depth of spillover flow - assuming 100-year event and a 10 minute Time of Concentration

Q= 172.83 L/s (maximum 100-year flow at 10 minutes TofC)

Depth of overflow at 10m wide entrance:

Length of Weir based on an assumed coefficient of discharge (Cd):

Q=	78.55	l/s (maximum flow)	assumes Cd= 0.577
=	0.079	cu.m./s	
& H=	0.028	m (max. depth of water above top of weir)	(assumes P/H is large)
then L=	10.00	m (length of weir) L = (Q / ((1.705 x H^(3/2))	

Length of Weir based on a calculate coefficient of discharge (Cd):

if P=	0.23	m (depth of pond)
& Lp=	24	m (width of pond: perpendicular to direction of flow)
then Vp=	0.0128	m/s (velocity in pond: Vp = Q / (P+H) / Lp)
& E=	0.027693	m (energy: E = H + 2V^2/2g)
& Cd=	0.578	(Cd = 0.577 x (E/H)^(3/2))

if Q=	78.55	l/s (maximum permited flow)
=	0.07855	cu.m./s
& H=	0.028	m (depth of water above top of weir)
then L=	10.00	m (length of weir) L = (Q / ((Cd^(2/3) x (2x9.81)^(1/2) x H^(3/2))

Depth of overflow at 12m Wier:

Length of Weir based on an assumed coefficient of discharge (Cd):

Q=	94.29	l/s (maximum flow)	assumes Cd= 0.577
=	0.094	cu.m./s	
& H=	0.028	m (max. depth of water above top of weir)	(assumes P/H is large)
then L=	12.00	m (length of weir) L = (Q / ((1.705 x H^(3/2))	

Length of Weir based on a calculate coefficient of discharge (Cd):

if P=	0.53	m (depth of pond)
& Lp=	12	m (width of pond: perpendicular to direction of flow)
then Vp=	0.0141	m/s (velocity in pond: Vp = Q / (P+H) / Lp)
& E=	0.027695	m (energy: E = H + 2V^2/2g)
& Cd=	0.578	(Cd = 0.577 x (E/H)^(3/2))

if Q=	94.29	l/s (maximum permited flow)
=	0.09429	cu.m./s
& H=	0.028	m (depth of water above top of weir)
then L=	12.00	m (length of weir) L = (Q / ((Cd^(2/3) x (2x9.81)^(1/2) x H^(3/2))

MAXIMUM SPILLOVER FLOW DEPTH: 0.028 m

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

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STORM SEWER CALCULATIONS

Rational Method

TWO YEAR EVENT

1386-1394 Greely Lane
Greely, Ontario

November 12, 2025

Manning's Roughness Coefficient: 0.013

Location		Individual					Cumulative				Sewer Data								
		Roof	Hard	Gravel	Soft				Rainfall	Flow		Nominal	Actual			Q_{Full}		
		C = 0.90	C = 0.90	C = 0.70	C = 0.20			Time	Intensity	Rate	Length	Diameter	Diameter	Slope	Velocity	Capacity	Time	
From	To	(ha)	(ha)	(ha)	(ha)	2.78AC	2.78AC	(min)	(mm/hr)	(L/s)	(m)	(mm)	(mm)	(%)	(m/s)	(L/s)	(min)	Q / Q_{Full}
Detention																		
Area 'A'	CB/MH-2	0.0158	0.0034			0.0480	0.0480	10.00	77	3.69	53.1	300	299	0.4	0.86	60.62	1.03	0.06
CB-1	CB/MH-2	0.0476	0.0493		0.0038	0.2446	0.2446	10.00	77	18.78	4.6	250	251	0.43	0.80	39.41	0.10	0.48
CB/MH-2	CB/MH-3		0.0188		0.0020	0.0481	0.3407	11.03	73	24.90	19.1	300	299	0.34	0.80	55.89	0.40	0.45
CB-4	CB/MH-5	0.0158	0.0414			0.1431	0.1431	10.00	77	10.99	23.8	300	299	0.34	0.80	55.89	0.50	0.20
CB/MH-5	CB/MH-6	0.0316	0.0413			0.1824	0.3255	10.50	75	24.39	20.3	300	299	0.34	0.80	55.89	0.43	0.44
CB/MH-6	CB/MH-3		0.0261			0.0653	0.3908	10.92	73	28.70	20.3	300	299	0.34	0.80	55.89	0.43	0.51
CB/MH-3	MH-7	0.0158	0.0197			0.0888	0.8204	11.43	72	58.85	5.4	375	366	0.34	0.91	95.82	0.10	0.61
						Flow through inlet control device:				21.32	5.4	375	366	0.34	0.91	95.82	0.10	0.22
MH-7	DITCH					0.0000	0.8204	11.52	71	58.58	2.3	375	366	0.34	0.91	95.82	0.04	0.61
						Flow through inlet control device:				21.32	2.3	375	366	0.34	0.91	95.82	0.04	0.22

APPENDIX C

STORMWATER MANAGEMENT
AND
EROSION & SEDIMENT CONTROL
OPERATION & MAINTENANCE

Grassed Swale & Stormwater Detention Area & Infiltration Trench Maintenance Log

Location: 1386-1394 Greely Lane, Ottawa

Date	**Grassed Swale** Maintained at 75 mm or higher. Annually, in the spring (and more frequently if necessary), remove any accumulated sediment.	**Stormwater Detention Area & Infiltration Trench:** Annually, in the spring (and more frequently if necessary), remove any accumulated sediment from the surface of the infiltration trench. About once every five years (more frequently if ponding for more than 24 hours is observed during non-freezing conditions), remove and replace the top 50 mm of clear stone (i.e. above the geotextile fabric) and replace any damaged geotextile material.	Inspector's Name	Comments/Notes

Catchbasin, Catchbasin/Manhole & Manhole
Sump Cleaning Maintenance Log

Location: 1386-1394 Greely Lane, Ottawa

Date	CB-1	CB/MH-2	CB/MH-3	CB-4	CB/MH-5	Inspector Name	Comments/Notes

CONTECH®
ENGINEERED SOLUTIONS

CDS® Inspection and Maintenance Guide

CDS TECHNOLOGIES

Maintenance

The CDS system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants will depend more heavily on site activities than the size of the unit. For example, unstable soils or heavy winter sanding will cause the grit chamber to fill more quickly but regular sweeping of paved surfaces will slow accumulation.

Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant transport and deposition may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (e.g. spring and fall) however more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment washdown areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

The visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet and separation screen. The inspection should also quantify the accumulation of hydrocarbons, trash, and sediment in the system. Measuring pollutant accumulation can be done with a calibrated dipstick, tape measure or other measuring instrument. If absorbent material is used for enhanced removal of hydrocarbons, the level of discoloration of the sorbent material should also be identified during inspection. It is useful and often required as part of an operating permit to keep a record of each inspection. A simple form for doing so is provided.

Access to the CDS unit is typically achieved through two manhole access covers. One opening allows for inspection and cleanout of the separation chamber (cylinder and screen) and isolated sump. The other allows for inspection and cleanout of sediment captured and retained outside the screen. For deep units, a single manhole access point would allows both sump cleanout and access outside the screen.

The CDS system should be cleaned when the level of sediment has reached 75% of capacity in the isolated sump or when an appreciable level of hydrocarbons and trash has accumulated. If absorbent material is used, it should be replaced when significant discoloration has occurred. Performance will not be impacted until 100% of the sump capacity is exceeded however it is recommended that the system be cleaned prior to that for easier removal of sediment. The level of sediment is easily determined by measuring from finished grade down to the top of the sediment pile. To avoid underestimating the level of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile carefully. Particles at the top of the pile typically offer less resistance to the end of the rod than consolidated particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the as-built drawing for the unit to determine weather the height of the sediment pile off the bottom of the sump floor exceeds 75% of the total height of isolated sump.

Cleaning

Cleaning of a CDS systems should be done during dry weather conditions when no flow is entering the system. The use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system. Simply remove the manhole covers and insert the vacuum hose into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The area outside the screen should also be cleaned out if pollutant build-up exists in this area.

In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill should be cleaned out immediately. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use absorbent pads since they are usually less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Trash and debris can be netted out to separate it from the other pollutants. The screen should be power washed to ensure it is free of trash and debris.

Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and also to ensure that proper safety precautions have been followed. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the CDS system should be done in accordance with local regulations. In many jurisdictions, disposal of the sediments may be handled in the same manner as the disposal of sediments removed from catch basins or deep sump manholes.

CDS Model	Diameter		Distance from Water Surface to Top of Sediment Pile		Sediment Storage Capacity	
	ft	m	ft	m	y^3	m^3
CDS1515	3	0.9	3.0	0.9	0.5	0.4
CDS2015	4	1.2	3.0	0.9	0.9	0.7
CDS2015	5	1.3	3.0	0.9	1.3	1.0
CDS2020	5	1.3	3.5	1.1	1.3	1.0
CDS2025	5	1.3	4.0	1.2	1.3	1.0
CDS3020	6	1.8	4.0	1.2	2.1	1.6
CDS3025	6	1.8	4.0	1.2	2.1	1.6
CDS3030	6	1.8	4.6	1.4	2.1	1.6
CDS3035	6	1.8	5.0	1.5	2.1	1.6
CDS4030	8	2.4	4.6	1.4	5.6	4.3
CDS4040	8	2.4	5.7	1.7	5.6	4.3
CDS4045	8	2.4	6.2	1.9	5.6	4.3
CDS5640	10	3.0	6.3	1.9	8.7	6.7
CDS5653	10	3.0	7.7	2.3	8.7	6.7
CDS5668	10	3.0	9.3	2.8	8.7	6.7
CDS5678	10	3.0	10.3	3.1	8.7	6.7

Table 1: CDS Maintenance Indicators and Sediment Storage Capacities

Support

- Drawings and specifications are available at www.contechstormwater.com.
- Site-specific design support is available from our engineers.

Contech Engineered Solutions LLC provides site solutions for the civil engineering industry. Contech's portfolio includes bridges, drainage, sanitary sewer, stormwater, earth stabilization and wastewater treament products. For information, visit www.ContechES.com or call 800.338.1122

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CDS Inspection & Maintenance Log

CDS Model: _____ Location: _____

Date	Water depth to sediment[1]	Floatable Layer Thickness[2]	Describe Maintenance Performed	Maintenance Personnel	Comments

1. The water depth to sediment is determined by taking two measurements with a stadia rod: one measurement from the manhole opening to the top of the sediment pile and the other from the manhole opening to the water surface. If the difference between these measurements is less than the values listed in table 1 the system should be cleaned out. **Note: to avoid underestimating the volume of sediment in the chamber, the measuring device must be carefully lowered to the top of the sediment pile.**

2. For optimum performance, the system should be cleaned out when the floating hydrocarbon layer accumulates to an appreciable thickness. In the event of an oil spill, the system should be cleaned immediately.

CDS Maintenance Log

CDS Model: PMSU 2015-4-C **Location:** 1384-1394 Greely Lane, Ottawa, Arnprior

Date	Water Depth to Sediment[1] (clean if less than 0.9m)	Floatable Layer Thickness[2]	Describe Maintenance Performed	Inspector Name	Comments/Notes

1. The water depth to sediment is determined by taking two measurements with a stadia rod: one measurement from the manhole opening to the top of the sediment pile and the other from the manhole opening to the water surface. If the difference between these measurements is less than the values listed in table 1 the system should be cleaned out. **Note: to avoid underestimating the volume of sediment in the chamber,the measuring device must be carefully lowered to the top of the sediment pile.**

2. For optimum performance, the system should be cleaned out when the floating hydrocarbon layer accumulates to an appreciable thickness. In the event of an oil spill, the system should be cleaned immediately.

Inlet Control Device (ICD) Maintenance Log

Location: 1384-1394 Greely Lane, Ottawa

Date	ICD in MH-7 Inspected for damage and blockages	Inspector Name	Comments/Notes

Erosion & Sediment Control Maintenance Log

Location: 1386-1394 Greely Lane, Ottawa

Date	**Sediment Capture Filter Sock(s)** Inspect for sediment and damage at the end of each day. Remove sediment as per manufacturer's recommendations. Repair or replace damaged socks.	**Silt Fence Barriers** Inspect all silt fence barriers at the end of each day and after each rainfall. Remove sediment deposits when the level of deposits reaches one third the height of the fence. Immediately repair or replace any damaged sections of fence.	**Remove Material From Public Road** Inspect for material deposited on road and remove at the end of each day by sweeping, shoveling or vacuuming. Dispose of sediment in a controlled area.	Inspector's Name	Comments/Notes

APPENDIX D

PRE-CONSULTATION MEETING NOTES & CITY OF OTTAWA SERVICING STUDY CHECKLIST

January 26, 2024 File No.: PC2024-0002

Suzanne Gibson
Bryden Gibson Architects Incorporated
Via email: gibson@brydengibson.ca

Subject: Pre-Consultation: Meeting Feedback
Proposed Site Plan Control – 1386 & 1394 Greely Lane

Please find below information regarding next steps as well as consolidated comments from the above-noted pre-consultation meeting held on January 23, 2024.

Pre-Consultation Preliminary Assessment

1 ☐	**2** ☐	**3** ☐	**4** ☒	**5** ☐

One (1) indicates that considerable major revisions are required while five (5) suggests that the proposal appears to meet the City's key land use policies and guidelines. This assessment is purely advisory and does not consider technical aspects of the proposal or in any way guarantee application approval.

Next Steps

A. A review of the proposal and materials submitted for the above-noted pre-consultation has been undertaken. Please proceed to complete a Phase 2 Pre-consultation Application Form and submit it together with the necessary studies and/or plans to planningcirculations@ottawa.ca.

B. In your subsequent pre-consultation submission, please ensure that all comments or issues detailed herein are addressed. A detailed cover letter stating how each issue has been addressed must be included with the submission materials. Please coordinate the numbering of your responses within the cover letter with the comment number(s) herein.

C. Please note, if your development proposal changes significantly in scope, design, or density before the Phase 3 pre-consultation, you may be required to complete or repeat the Phase 2 pre-consultation process.

Supporting Information and Material Requirements

The attached **Study and Plan Identification List** outlines the information and material that has been identified, during this phase of pre-consultation, as either required (R) or advised (A) as part of a future complete application submission.

- The required plans and studies must meet the City's Terms of Reference (ToR) and/or Guidelines, as available on Ottawa.ca. These ToR and Guidelines outline

the specific requirements that must be met for each plan or study to be deemed adequate.

Consultation with Technical Agencies

You are encouraged to consult with technical agencies early in the development process and throughout the development of your project concept. A list of technical agencies and their contact information is enclosed.

Planning

Comments:

1. The proposed development is for a warehouse and office space that will be completed in two phases.

2. As the proposed development will be between 600 and 1,860 sq. m. of gross floor area, a Rural Standard Site Plan Control application would be applicable.

3. Official Plan:

    a. The subject property is designated Village Industrial on the Village of Greely Secondary Plan within Volume 2B of the Official Plan.

    b. Industrial lands provide employment opportunities within the village. Operations on these lands may take advantage of proximity to arterial roads, such as Bank Street, for movement of goods through the city.

    c. The following policies apply to lands within the Village Industrial designation:

        - Access to Parkway Road is limited: lots shall be accessed via local roads within an industrial subdivision.

        - Signage should be in keeping with the character of a rural village.

        - Any effluent or emissions discharged, or waste disposed, must be approved by the province.

        - Developments must be adequately screened on all sides to mitigate impacts to adjacent uses, particularly residential development, and the public realm.

    d. The subject property is within the 1 in 350 Year Flood Event Extent overlay and is therefore within a climate change flood vulnerable area under section 10.1.3 of the official plan.

Where lands located in a climate change flood vulnerable area are subject to site plan control or plan of subdivision applications, flood risk will be evaluated, and mitigation measures will be applied as part of the planning and design of the site. These measures will be determined through the servicing studies required as part of the development approvals process.

e. The subject property is within the Airport Vicinity Development Zone within Schedule C14 and the policies within section 10.2.2 of the Official Plan may be applicable.

4. Zoning By-Law:

a. The subject property is zoned Rural General Industrial, Subzone 3 (RG3).

b. **Warehouse** means a building used for the storage and distribution of goods and equipment including self-storage units and mini-warehouses and may include one accessory dwelling unit for a facility manager.

c. **Office** means a place used by an agency, business or organization for:

(a) the transaction of administrative, clerical, data processing or management business.

(b) the practice of a profession other than a medical facility; or Part 1 – Administration, Interpretation and Definitions 1 – 31 City of Ottawa Zoning By-law 2008-250 Consolidation

(c) the provision of government or social services and other similar services.

d. **Accessory** means aiding or contributing in a secondary way to a principal use to carry out its function, and having regard to this definition:

(a) an accessory use is a land use that is accessory to a principal use;

(b) an accessory building is a building that houses an accessory use;

(c) an accessory structure is a structure, that is not a land use, but is accessory to a principal use and this definition is broadened to include tower antennas and satellite dishes.

e. **Car wash** includes a conveyor-type car wash, a drive-through automatic car wash and a manual car wash.

f. As a principle use, a warehouse is permitted within the RG3 zone and an office use would be permitted only if it is an accessory use to the operation of the warehouse. The office must exist to aid and contribute to carrying

out the function of the warehouse. A standalone office use is not permitted.

g. A car wash is also a permitted use, as long as it is located on the same lot with a principle use within Section 219(1) Part 13 of the Zoning By-law.

h. Zoning Provisions for the RG3 Subzone:

- Minimum lot width – 30 m
- Minimum lot area – 2000 m²
- Minimum front and rear yard setbacks – 15 m
- Minimum interior side yard setback – 3 m
- Minimum corner side yard setback – 12 m
- Maximum principal building height – 15 m
- Maximum lot coverage – 50%

i. Outdoor storage is not permitted within any required front yard or corner side yard and outside storage must be screened from abutting residential uses or zones and public streets by an opaque screen at least 1.8 m in height from finished grade.

j. The Site Plan must include areas where outdoor refuse and recycling collection will occur and areas for snow storage.

k. Parking requirements:

i. The parking requirements for a warehouse in Area D on schedule 1A are 0.8 per 100 m² for the first 5000 m² of gross floor area and 0.4 per 100 m² above 5000 m² of gross floor area.

ii. The parking requirements for office space in Area D on schedule 1A are 2.4 per 100 m² of gross floor area.

iii. The bicycle parking requirements within Part 4 of the zoning by-law for a warehouse are 1 per 2000 m² of gross floor area.

iv. If the proposed development will have a gross floor area between 1000 – 1999 m² then 1 vehicle loading space will be required.

5. Submission Requirements

a. Please submit a Site Plan consistent with the City's Terms of Reference requirements.

6. Comments:

    a. There is an Order under the Building Code related to structures built without permits. An approved Site Plan will be required as a part of the resolution of the Order.

    b. Please clarify if Site Plan Approval will be sought for both Phases of development at the same time, or will Site Plan Approval be completed separately.

    c. Please confirm that both lots have merged on title. This must occur before a building can be constructed across the property line.

    d. Please include areas on the site plan for septic system, well and stormwater management.

    e. The setback from the corner sight triangle, 12 metres, should also be shown on the site plan.

    f. The area of Phase 1 on the site plan is identified as 2 storeys, please clarify on the plans that only an increased ceiling height is proposed.

Feel free to contact Erica Ogden-Fedak (erica.ogden-fedak@ottawa.ca), Planner, for follow-up questions.

Urban Design

Comments:

7. Please remove one of the curb cuts along Greely Lane and replace it with planting.

8. Please provide a landscape buffer along Parkway Road.

9. Please provide street trees along Greely Lane.

10. Staff look forward to reviewing detailed elevations and a landscape plan as part of your submission.

Feel free to contact Nader Kadri, Urban Designer, for follow-up questions.

Engineering

11. General

    a. For a complete description of the Terms of Reference and application submission requirements, please reference the City's web site : Planning application submission information and materials | City of Ottawa .

b. All drawings and reports submitted for engineering review must be stamped and dated by a Professional Civil Engineer, Civil Engineering Technologist registered in the Province of Ontario, or Ontario Land Surveyor.

c. Engineering plans should include information up to and including the centreline of the roadway.

12. Environmental Site Assessment (Phase 1 & 2 ESA)

a. A Phase One ESA is required for the Site Plan Control of the site.

b. Environmental Site Assessments (ESA's) are required to ensure that development only takes place on sites where the environmental conditions are suitable for the proposed use in accordance with provincial legislation and regulations.

c. The Phase 1 ESA report will determine whether a Phase 2 ESA is required.

13. Geotechnical Study

a. A Geotechnical report is required to support the design and construction of this project.

b. The Geotechnical report should provide sufficient soils and engineering information to confirm that the site(s) are suitable or can be made suitable for development. The geotechnical report shall adequately discuss the fill requirements, grade raise restrictions, and other limitations and earthworks required for development within a floodplain or adjacent to a watercourse, and wetland.

c. The report should clearly state whether sensitive marine clays or organic soils are present on this site, or not.

d. A Geotechnical report might typically include: Atterberg limits, consolidation testing, shear strength testing, grade raise restrictions, or a sieve analysis as required.

e. The report should clearly state whether soil liquefaction is a risk on this site, or not.

f. If the proposal intends to include infiltration or soak-away areas as part of the stormwater management design, be advised that:

i. The soil must be tested and proved to have an infiltration rate in excess of 15mm/hr.

ii. The seasonal groundwater level must be at least 1.0 metres below the bottom of the trench structure. Depth to groundwater should be measured over a considerable amount of time that includes the Spring freshet.

iii. Ref: Low Impact Development Technical Guidance Report (Feb 2021).

14. Grading and Drainage Plan

a. A Grading Plan is required to support the design and construction of this project.

b. A Grading and Drainage Plan establishes the grading relationships between connecting (or abutting) properties. It serves as the basis for controlling surface runoff. A grading plan directs water from the building. The focus is on the landscaping around the building and soil elevation. The goal is to provide proper yard grading for drainage away from buildings.

c. Grading Plans provided to the City of Ottawa should include:

i. All elevations must be referenced to a geodetic reference point.

ii. All measurements must be in metric units, imperial measure may be provided as a secondary measurement.

iii. Please indicate the Site Benchmark and the external reference that provides the horizontal and vertical datum of the reference used to set this benchmark.

iv. Provide top of curb (TC) and bottom of curb (BC) elevations.

v. Please maintain a minimum 150 mm difference between the proposed finished floor elevation and the finished grade at the structure. Maintain positive surface drainage away from the foundation wall.

vi. A 0.3m freeboard should be provided between the 100-year water elevation and the finished floor elevation.

vii. Please include the Pavement Design provided in the Geotechnical Report. Typically, this should include a low-density and a heavy-duty pavement design.

15. Hydrogeological Report (Rural)

a. A Hydrogeological and Terrain Analysis (HGTA) will be required to establish that there is an adequate quantity and quality of groundwater to

support the site plan control application and that the proposed activities (including the septic system) will not negatively impact the underlying aquifers and the natural environment. The report must meet the requirements of the City's Hydrogeological and Terrain Analysis Guidelines (March 2021); requirements related to site plan control applications are listed in Section 5.0 – Site Plans.

b. The supply well(s) must be established to confirm that the water quality and quantity are suitable for the proposed use prior to approval. A pumping test is required to confirm that the well(s) onsite can supply the required amount of water and the quality of water meets Ontario Drinking Water Standards, Objectives and Guidelines.

    i. If an existing well is proposed to be used, then a well inspection is required to confirm it meets the Wells Regulations (O.Reg.903); specifically, please confirm that the well casing and grouting are sound, grading around the wellhead, and that the casing height above ground details that meets the regulations. Note that the supply well(s) must be shown in all plans.

    ii. The pump test rate must be justified, and the maximum day rate should be used. It is recommended to conduct the pump test based on the pumping rate required for the final development plan at the property, to sufficiently supply the car wash and office building(s), considering both phases; that way a second pump test will not be needed to support the water quantity assessment for the second phase.

    iii. As per the City Guidelines, water quality sampling will be required during the pumping test, minimum parameters to sample include the subdivision suite, trace metals, and VOCs, in addition it is recommended that sampling include hydrocarbons and BTEX due to nearby automotive activity land uses. Additional sampling parameters should also be assessed based on land uses, such as chemicals used in the car wash.

c. If the total septic flow is less than 10,000 L/d, then a septic impact assessment is required following the City HGTA Guidelines. If the total septic flow is more than 10,000 L/d, then the septic system will be subject to Ministry of the Environment, Conservation and Parks approval and an ECA would be required.

    i. The assessment should use the predictive assessment for industrial/commercial developments (not residential developments); the result will be the maximum allowable septic flow.

ii. Note that compact gravel will be considered impermeable in the septic impact calculations unless accompanied by field testing to confirm infiltration rates.

iii. There may be limited permeable area for infiltration for dilution of septic effluent; septic treatment (tertiary treatment with nitrate reduction) may be considered for site plan control applications to support the nitrate dilution calculations. If a tertiary septic system with nitrate reduction will be recommended, then the system should be certified by CAN/BNQ or NSF/ANSI. The septic permit is required for site plan approval. Note that the septic permit will be reviewed to confirm that is meets the system (treatment level) used in the septic impact calculations.

d. Confirmation is required if an ECA will be required for the proposed activities.

i. Protection of the aquifer from the site activities should be clearly discussed.

ii. The site is located within the Shield's Creek Sub Watershed Study Area, the Study includes recommendations to maintain recharge. As such, a water budget must be included in the hydrogeological report to show how clean recharge will be maintained onsite.

e. The City Hydrogeologist (Obai Mohammed, obai.mohammed@ottawa.ca) will be available for any technical consultation required to support and facilitate the application process from hydrogeological points of view.

16. Site Servicing Study

a. A Site Servicing Study is required to support the design and construction of this project.

b. Applications for new development are required to demonstrate, to the City's satisfaction, that adequate services are available and can be allocated to support the proposal.

c. An Erosion and Sediment Control Plan is required in support of the design and construction of this project.

d. Septic System Review and Approval

i. The City will require septic approval before we can issue Site Plan Approval.

ii. If the sanitary sewage daily design flow is less than 10,000 L/day, the septic permit from the Ottawa Septic System Office (OSSO) must be issued prior to future Site Plan Approval being granted.

iii. If the sanitary sewage daily design flow is greater than 10,000 L/day, 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.

iv. Be advised that a Groundwater Impact Assessment will be required if the site-wide daily design flow is greater than 10,000 L/day.

v. Please ensure that the OSSO office is aware if an oil/grit separator or car wash runoff is contributing flows to the septic system.

vi. As per the OSSO office, the septic system must be at least 3.0 metres from the property lines.

vii. If the consultant plans to reuse the existing well or septic systems, then they must provided a report assessing the adequacy and integrity of these systems.

viii. Technical consultation with the City's hydrogeologist is encouraged, please contact the City hydrogeologist, Obai Mohammed (obai.mohammed@ottawa.ca) and copy the assigned Infrastructure Project Manager to schedule a technical consultation.

e. Stormwater Management Report

i. A Stormwater Management report is required in support of the design and construction of this project.

ii. Stormwater design must adhere to the City's 'Ottawa Design Guidelines -Sewer', Second Edition, document no. SDG002, October 2012, City of Ottawa, including technical bulletins: ISDTB-2014-01, PIEDTB-2016-01, ISTB 2018-01, ISTB-2018-04, ISTB-2019-02.

iii. The quantity criteria for the development are that the 100-yr post development peak flow rate must match the 2-year pre-development peak flow rate.

iv. The stormwater management quality criteria for this site are 80% TSS removal.

v. A calculated time of concentration (Cannot be less than 10 minutes) is required.

vi. Runoff volumes must be calculated using the 'C' values found in Ottawa Design Guidelines (Sewer), Section 5.4.5.2.1 page 5.26. There are no standard or maximum 'C' values in the Rural area.

vii. Stormwater must outlet to a legal and sufficient outlet.

viii. A 0.3m freeboard should be provided between the 100-year high-water elevation and the finished floor elevation.

ix. Stormwater or Drainage plans must include the ponding depth, volume, and ponding extent for 2-year and 100-year storm events.

x. Please provide pre- & post- development drainage plans clearly identifying the sub-drainage zones, their areas, and 'C' values.

xi. In regard to proposed LID development, please reference to the City's 'Low Impact Development Technical Guidance Report', in particular 'Section 2.0 Hydrological Constraints', Section 3.3 Geotechnical Investigations, and 'Section 3.5 Current Approaches and Guidance'.

xii. Due to the requirements of the Airport Vicinity Development Zone, areas of open water are not permitted.

f. Fire Services

i. As per City of Ottawa Technical Bulletin ISTB-2021-03, the requirement for the level of fire protection on private property in rural areas is based on the Fire Underwriters Survey (FUS) method. Please contact Allan Evans for more information. allan.evans@ottawa.ca .

ii. Fire truck routes should be shown on civil plans. Fire Routes now require designation with By-law through the Site Plan application process by contacting fireroutes@ottawa.ca .

iii. Underground storage tanks for Fire Fighting purposes are required if the building(s) are above 600 sq.m. in size.

17. Ministry of the Environment, Conservation and Parks Review

a. An MECP Environmental Compliance Approval may be required for the proposed development. Please contact the Ministry of the Environment, Conservation and Parks, Ottawa District Office to arrange a pre-submission consultation.

b. It is the applicant's responsibility to determine which of the several types of ECA approvals may be required for this application. If a Direct

Submission is by the nature of the application required by the MECP, the applicant can request a Transfer of Review in its place by contacting Charles Warnock, Charles.warnock@ottawa.ca.

c. Industrial sites will likely require an additional ECA approval from the MECP.

d. For any water taking of volumes greater than 50,000 L/day, either an Environmental Activity and Sector Registration (EASR) or a Permit To Take Water (PTTW) is required from the MECP, dependent on dewatering requirements

e. An additional ECA will be requried if the the stormwater runoff crosses a neighbouring lot. Please advise the City when these two lots are successfully merged.

f. MECP/ECA Contact info:

Charlie Primeau at (613) 521-3450, ext. 251 or Charlie.Primeau@ontario.ca
Emily Diamond at (613) 521-3450, ext. 238 or Emily.Diamond@ontario.ca
Charles Warnock at 613-580-2424 x27809 or Charles.warnock@ottawa.ca

18. Site Lighting Certificate

a. The City will require an Exterior Lighting Certificate certified by a qualified engineer before issuing Site Plan Approval.

b. Any exterior lighting proposed for the site is required by the City of Ottawa to be certified by a qualified engineer conforming the design complies with the following criteria:

i. It must be designed using only fixtures that meet the criteria for Full-Cut-Off (Sharp cut-off) Classification, as recognized by the illuminating Engineering Society of North America (IESNA or IES).

ii. It must result in minimal light spillage onto adjacent properties. As a guide, 0.5 foot-candle is normally the maximum allowable spillage.

iii. The location of the fixtures, fixture types (make, model, and part number) and the mounting heights must be provided.

Feel free to contact Brian Morgan, Infrastructure Project Manager, for follow-up questions.

Noise

Comments:

19. It is best practice to address noise for the following types of spaces: general offices, reception areas and individual or semi-private office. It is therefore recommended to review the roadway noise for the site due to the proximity to Parkway Rd and to ensure mitigation is provided (as required) so that workers and visitors are not adversely affected.

Feel free to contact Josiane Gervais, TPM, for follow-up questions.

Transportation

Comments:

20. A TIA is not required.

21. Ensure that the development proposal complies with the Right-of-Way protection requirements of the Official Plan's Schedule C16.

    a. See Schedule C16 of the Official Plan.

    b. Any requests for exceptions to ROW protection requirements must be discussed with Transportation Planning and concurrence provided by Transportation Planning management.

22. As the proposed site is industrial and for general public use, AODA legislation applies.

    a. Ensure all crosswalks located internally on the site provide a TWSI at the depressed curb, per requirements of the Integrated Accessibility Standards Regulation under the AODA.

    b. Clearly define accessible parking stalls and ensure they meet AODA standards (include an access aisle next to the parking stall and a pedestrian curb ramp at the end of the access aisle, as required).

    c. Please consider using the City's Accessibility Design Standards, which provide a summary of AODA requirements. https://ottawa.ca/en/city-hall/creating-equal-inclusive-and-diverse-city/accessibility-services/accessibility-design-standards-features#accessibility-design-standards

23. On site plan:

    a. Ensure site access meets the City's Private Approach Bylaw.

b. Show all details of the roads abutting the site; include such items as pavement markings, accesses and/or sidewalks.

c. Turning movement diagrams required for all accesses showing the largest vehicle to access/egress the site.

d. Turning movement diagrams required for internal movements (loading areas, garbage).

e. Show all curb radii measurements; ensure that all curb radii are reduced as much as possible and fall within TAC guidelines (Figure 8.5.1).

f. Show dimensions for site elements (i.e. lane/aisle widths, access width and throat length, parking stalls, sidewalks, pedestrian pathways, etc.)

Feel free to contact Josiane Gervais, Transportation Project Manager, for follow-up questions.

Planning Forestry

Comments:

24. There are no trees identified within the City of Ottawa right of way. A tree removal permit is therefore not needed for this site.

25. Retention of healthy trees is strongly recommended wherever feasible.

26. Planting native trees that will contribute to canopy cover on the site is strongly recommended. The Airport Bird Hazard Plant list must be adhered to.

27. A Landscape Plan (LP) is only required if new trees are proposed and could be combined with the Site Plan. Tree Planting Requirements within the Right of Way:

    a. Minimum Setbacks for Planting in the Right of Way

        i. Maintain 7.5m between large growing trees, and 4m between small growing trees. Park or open space planting should consider 10m spacing, except where otherwise approved in naturalization / afforestation areas.

        ii. Adhere to Hydro One's planting guidelines (species and setbacks) when planting around overhead primary conductors.

    b. Tree Specifications

        i. Minimum stock size: 50mm tree caliper for deciduous, 200cm height for coniferous.

ii. Maximize the use of large deciduous species wherever possible to maximize future canopy coverage.

iii. Tree planting on city property shall be in accordance with the City of Ottawa's Tree Planting Specification; and include watering and warranty as described in the specification (can be provided by Forestry Services).

iv. Plant native trees whenever possible.

v. No root barriers, dead-man anchor systems, or planters are permitted.

vi. No tree stakes unless necessary (and only 1 on the prevailing winds side of the tree).

c. Soil Volume

i. Please document on the LP that adequate soil volumes can be met:

Tree Type/Size	Single Tree Soil Volume (m3)	Multiple Tree Soil Volume (m3/tree)
Ornamental	15	9
Columnar	15	9
Small	20	12
Medium	25	15
Large	30	18
Conifer	25	15

ii. ** Please note that these soil volumes are not applicable in cases with Sensitive Marine Clay **

Feel free to contact Hayley Murray, Planning Forester, for follow-up questions.

Environment

Comments:

28. There are no natural heritage features, surface water features, or species-at-risk habitat present on site that would require further review through an Environmental Impact Statement (EIS). No EIS is required.

29. This site is located in the airport bird hazard zone, which affects the trees that can be planted. A list of trees to avoid planting will be attached to this response.

30. Additional tree plantings of native, non-invasive species (that are not on the provided list) is recommended to help meet the city's urban forest canopy goals as well as to reduce the impacts of climate change and the urban heat island effect.

Feel free to contact Mark Elliott, Environmental Planner, for follow-up questions.

Parkland

Comments:

31. The amount of parkland dedication required is to be calculated as per the City of Ottawa Parkland Dedication By-law No. 2022-280.

32. The proposed development or redevelopment increases the gross floor area of a non-residential use. Therefore, the parkland conveyance requirement is calculated as 2% of the gross land area of the site being developed/redeveloped for commercial purposes, including roads, parking lot and other associated land.

33. Please provide the City with a surveyor's area certificate/memo which specifies the exact gross land area of the site being developed/redeveloped. For industrial or commercial redevelopment, this includes the portion of the property that is impacted by the proposed redevelopment, but not including any hazard lands or natural heritage features identified in the Official Plan, an approved Secondary Plan, or through an environmental impact study accepted by the City.

34. Please note that the park comments are preliminary and will be finalized (and subject to change) upon receipt of the development application and any requested supporting documentation. Additionally, if the proposed land use changes, then the parkland dedication requirement will be re-evaluated accordingly.

35. Parks & Facilities Planning (PFP) will be requesting **cash-in-lieu of conveyance of parkland** for parkland dedication in accordance with the Parkland Dedication By-law NO. 2022-280.

36. Please review the following City of Ottawa reference documents which outline the requirements for parkland conveyance and/or cash-in-lieu of parkland.
    - Official Plan (2021)
    - Parks and Recreation Facilities Master Plan (2021)
    - Park Development Manual, 2nd edition
    - Parkland Dedication By-Law (2022-280) and Planning Act amendments
    - City of Ottawa Standard Parks Conditions

Feel free to contact Warren Bedford, Parks Planner, for follow-up questions.

Conservation Authority

Comments:

37. South Nation Conservation's (SNC) review considers the impacts of the proposed development to natural hazards, including flooding and erosion, upstream and downstream of the site. It supports the City as it implements its Official Plan natural hazard policies. The review also clarifies the permit requirements under the O.Reg. 170/06, enacted under the Conservation Authorities Act.

38. Natural Hazards

    a. The Osgoode Gardens Cedar Acres Municipal Drain flows under Parkway Road approximately 190m to the west. Development of the site must not negatively impact this floodplain or cause local flooding.

    b. The perimeter of the property on the west, south and east sides is inundated by the 1:350-year floodplain. This is the Climate Change Scenario Flood Limit in the City of Ottawa's Official Plan (OP). The extents of the 350 year floodplain can be viewed on GeoOttawa under the *Surface Water/Flood Extents* folder

        i. OP Policy 10.1.3.3 indicates that during: site plan control or plan of subdivision applications, flood risk will be evaluated, and mitigation measures will be applied as part of the planning and design of the site. These measures will be determined through the servicing studies required as part of the development approvals process.

    c. The elevations of the 1:350 year floodplain can be derived from the model cross-sections as follows:
        - 5572 = 99.74
        - 5540 = 99.06
        - 5400 = 98.96
        - 5171 = 98.92

        All the elevations are in Elevation CGVD1928.

d. Changes in stormwater runoff must not negatively impact flooding and erosion. SNC will complete a technical review of the quantity component of the stormwater design, the proposed grading and drainage, and the sediment and erosion control.

39. Regulations

a. For the property, please note that any alteration to a watercourse, including an outlet for stormwater management will require a permit under O. Reg. 170/06 and restrictions may apply.

b. SNC regulates development within and 15m adjacent to the 1:100-year event, as shown on the figure above. SNC does <u>not</u> regulate lands associated with the 1:350-year event.

Feel free to contact James Holland, South Nation Conservation, for follow-up questions.

<u>Other</u>

40. The High Performance Development Standard (HPDS) is a collection of voluntary and required standards that raise the performance of new building projects to achieve sustainable and resilient design. The HPDS was passed by Council on April 13, 2022.

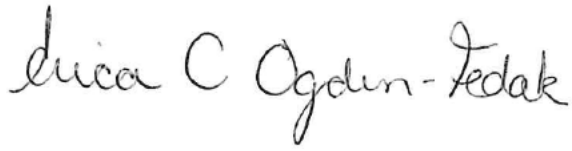
a. At this time, the HPDS is not in effect and Council has referred the 2023 HPDS Update Report back to staff with direction to bring forward an updated report to Committee with recommendations for revised phasing timelines, resource requirements and associated amendments to the Site Plan Control By-law by no later than Q1 2024.

b. Please refer to the HPDS information attached and ottawa.ca/HPDS for more information.

The following link outlines the different phases of the pre-consulation process, along with the information for each step: Site Plan Control and Zoning By-law Amendments Pre-consultation Process for Development Applications (ottawa.ca)

Should there be any questions, please do not hesitate to contact myself or the contact identified for the above areas / disciplines.

Yours Truly,



Erica C. Ogden-Fedak, MCIP, RPP
Planner II

c.c. Brian Morgan, Infrastructure Project Manager
Damien Whittaker, Senior Project Manager
Josiane Gervais, Transportation Project Manager
Nader Kadri, Urban Designer
Warren Bedford, Parks Planner
Mark Elliott, Environmental Planner
Hayley Murray, Planning Forester
Obai Mohammed, Hydrogeologist
James Holland, South Nation Conservation

Encl. Study and Plan Identification List
List of Technical Agencies to Consult
Supplemental Development Information
Airport Bird Hazard Plant Species

GENERAL

Executive Summary: **N/A**

Date and revision number of report: **Included**

Location map and plan showing municipal address, boundary and layout of proposed development: **Included**

Plan showing site and location of all existing services: **Included**

Development statistics, land use, density, adherence to zoning and Official Plan and reference to applicable watershed and subwatershed plans: **N/A**

Summary of Pre-Application Consultation meetings with City of Ottawa and other approval agencies: **Included**

Confirmation of conformance with higher level studies: **N/A**

Statement of objectives and servicing criteria: **Included**

Identification of existing and proposed infrastructure available in the immediate area: **Included**

Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development: **N/A**

Concept level master grading plan to confirm existing and proposed grades in the proposed development: **Included**

Identification of potential impacts of proposed piped services on private services on adjacent lands: **N/A**

Proposed phasing of proposed development: **N/A**

Reference to geotechnical studies: **Included**

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

- Metric scale: **Included**
- North arrow: **Included**
- Key plan: **Included**
- Property limits: **Included**
- Existing and proposed structures and parking areas: **Included**
- Easements, road widenings and right-of-ways: **Included**
- Street names: **Included**

WATER SERVICING

Confirmation of conformance with Master Servicing Study: **N/A**

Availability of public infrastructure to service proposed development: **N/A**

Identification of system constraints: **N/A**

Identification of boundary conditions: **N/A**

Confirmation of adequate domestic supply: **Included**

Confirmation of adequate fire flow: **Included**

Check of high pressures: **N/A**

Definition of phasing constraints: **N/A**

Address reliability requirements: **N/A**

Check on necessity of a pressure zone boundary modification: **N/A**

Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for proposed development: **N/A**

Description of proposed water distribution network: **N/A**

Description of required off-site infrastructure to service proposed development: **N/A**

Confirmation that water demands are calculated based on the City of Ottawa Water Design Guidelines: **N/A**

Provision of a model schematic showing the boundary conditions locations, streets, parcels and building locations**: N/A**

SANITARY SERVICING

Summary of proposed design criteria: **Included**

Confirmation of conformance with Master Servicing Study: **N/A**

Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the City of Ottawa Sewer Design Guidelines: **N/A**

Description of existing sanitary sewer available for discharge of wastewater from proposed development: **N/A**

Verification of available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service proposed development: **N/A**

Calculations related to dry-weather and wet-weather flow rates: **N/A**

Description of proposed sewer network: **N/A**

Discussion of previously identified environmental constraints and impact on servicing: **N/A**

Impacts of proposed development on existing pumping stations or requirements for new pumping station: **N/A**

Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity: **N/A**

Identification and implementation of emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding: **N/A**

Special considerations (e.g. contamination, corrosive environment): **N/A**

STORMWATER MANAGEMENT & STORM SERVICING

Description of drainage outlets and downstream constraints: **Included**

Analysis of available capacity in existing public infrastructure: **N/A**

Plan showing subject lands, its surroundings, receiving watercourse, existing drainage pattern and proposed drainage pattern: **Included**

Water quantity control objective: **Included**

Water quality control objective: **Included**

Description of the stormwater management concept: **Included**

Setback from private sewage disposal systems: **Included**

Watercourse and hazard lands setbacks: **N/A**

Record of pre-consultation with the Ministry of the Environment, Conservation and Parks and the Conservation Authority having jurisdiction on the affected watershed: **N/A**

Confirmation of conformance with Master Servicing Study: **N/A**

Storage requirements and conveyance capacity for minor events (5-year return period) and major events (100-year return period): **Included**

Identification of watercourses within the proposed development and how watercourses will be protected or if necessary altered by the proposed development: **N/A**

Calculation of pre-development and post-development peak flow rates: **Included**

Any proposed diversion of drainage catchment areas from one outlet to another: **N/A**

Proposed minor and major systems: **Included**

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: **N/A**

Identification of potential impacts to receiving watercourses: **N/A**

Identification of municipal drains: **N/A**

Description of how the conveyance and storage capacity will be achieved for the proposed development: **Included**

100-year flood levels and major flow routing: **Included**

Inclusion of hydraulic analysis including hydraulic grade line elevations: **N/A**

Description of erosion and sediment control during construction: **Included**

Obtain relevant floodplain information from Conservation Authority: **N/A**

Identification of fill constraints related to floodplain and geotechnical investigation: **N/A**

APPROVAL AND PERMIT REQUIREMENTS

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 the 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: **N/A**

Application for Certificate of Approval (CofA) under the Ontario Water Resources Act: **N/A**

Changes to Municipal Drains: **N/A**

Other permits (e.g. National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation): **N/A**

CONCLUSIONS

Clearly stated conclusions and recommendations: **Included**

Comments received from review agencies: **N/A**

Signed and stamped by a professional Engineer registered in Ontario: **Included**